Frequently Asked Questions About Fonts

The `comp.fonts` FAQ
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1 General Information

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This FAQ is a work in progress. If you have any suggestions, I would be delighted to hear them. After many months of inactivity, I hope to begin a major update on the FAQ. Please send in your comments. And thanks for being patient.

This FAQ is maintained in TeXinfo format. A Perl script constructs the postable FAQ from the TeXinfo sources. The FAQ is also available from *The comp.fonts Home Page* on the World Wide Web:

`http://www.ora.com/homepages/comp.fonts/`

This is also the site for *The Internet Font Archives*.

TeX DVI, PostScript, Emacs Info, plain text, and HTML versions of this FAQ are available from the web at `http://www.ora.com/homepages/comp.fonts/FAQ.html`. FTP access to these archives has been temporarily suspended.

The posted version of the FAQ is organized in a quasi-digest format so that it is easy to find the questions you are interested in. All questions that appear in the table of contents can be found by searching for the word "`Subject:`" followed by the question number.

The "TeXinfo" distribution from the Free Software Foundation contains a program called "Info" that can be used to read the Info version of the FAQ in a hypertext manner. The "TeXinfo" distribution can be obtained from `prep.ai.mit.edu` in the `/pub/gnu` directory. At the time of this writing, `texinfo-2.16.tar.gz` is the most recent version. Info files can also be read in hypertext form by GNU Emacs.

Future versions of the FAQ will make more use of the hypertext capabilities provided by the Info format. At present, the FAQ is organized as a simple tree. A plain ASCII, postable version of the FAQ will always be maintained.

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2 Font Houses

This section will be expanded on in the future. It contains notes about various commercial font houses.

2.1 Adobe Systems, Inc.

Adobe Systems Incorporated develops, markets, and supports computer software products and technologies that enable users to create, display, print, and communicate electronic documents. Adobe licenses its technology to major computer and publishing suppliers, and markets a line of type and application software products.

2.2 Compugraphic

See "Miles, Agfa Division"

2.3 designOnline(tm)

Home of *Alphabets, Inc.*, designOnline is the online resource for design. The majority of the interactivity is happening on [their] FirstClass server, currently available by dialup and across the Internet.

2.4 Miles, Agfa Division

Compugraphic which was for a while the Compugraphic division of Agfa, is now calling itself "Miles, Agfa Division" (yes, the Miles drug company), since CG's off-shore parent Agfa has been absorbed by Miles. So typographically speaking, Compugraphic, CG, Agfa, A-G ag, and Miles all refer to the same company and font library. Their proprietary fonts are still CG Xyz, but the name is Miles Agfa.

2.5 Quadrat Communications

Quadrat Communications is a digital type foundry based in Toronto, Ontario, Canada. [David Vereschagin] began creating and designing type a few years ago, intrigued by the new possibilities

presented by Altsys's Fontographer software. [His] first project was the plain style of Clear Prairie Dawn, a sans serif text face, which took three years to complete. As well as designing [his] own faces, [he's] also available for the creation of custom faces.

3 What's the difference between all these font formats?

This question is not trivial to answer. It's analogous to asking what the difference is between various graphics image file formats. The short, somewhat pragmatic answer, is simply that they are different ways of representing the same "information" and some of them will work with your software/printer and others won't.

At one level, there are two major sorts of fonts: bitmapped and outline (scalable). Bitmapped fonts are falling out of fashion as various outline technologies grow in popularity and support.

Bitmapped fonts represent each character as a rectangular grid of pixels. The bitmap for each character indicates precisely what pixels should be on and off. Printing a bitmapped character is simply a matter of blasting the right bits out to the printer. There are a number of disadvantages to this approach. The bitmap represents a particular instance of the character at a particular size and resolution. It is very difficult to change the size, shape, or resolution of a bitmapped character without significant loss of quality in the image. On the other hand, it's easy to do things like shading and filling with bitmapped characters.

Outline fonts represent each character mathematically as a series of lines, curves, and 'hints'. When a character from an outline font is to be printed, it must be 'rasterized' into a bitmap "on the fly". PostScript printers, for example, do this in the print engine. If the "engine" in the output device cannot do the rasterizing, some front end has to do it first. Many of the disadvantages that are inherent in the bitmapped format are not present in outline fonts at all. Because an outline font is represented mathematically, it can be drawn at any reasonable size. At small sizes, the font renderer is guided by the 'hints' in the font; at very small sizes, particularly on low-resolution output devices such as screens, automatically scaled fonts become unreadable, and hand-tuned bitmaps are a better choice (if they are available). Additionally, because it is rasterized "on demand," the font can be adjusted for different resolutions and 'aspect ratios'.

Werenfried Spit adds the following remark:

Well designed fonts are not scalable. I.e. a well designed 5pt font is not simply its 10pt counterpart 50% scaled down. (One can verify this by blowing up some small print in a copier and compare it with large print; or see the example for computer modern in D.E. Knuth's TeXbook.) Although this fact has no direct implications for any of the two methods of font representation it has an indirect one: users and word processor designers tend to blow up their 10pt fonts to 20pt or scale them down to 5pt given this possibility. Subtle details, but well...

LaserJet .SFP and .SFL files, TeX PK, PXL, and GF files, Macintosh Screen Fonts, and GEM .GFX files are all examples of bitmapped font formats.

PostScript Type 1, Type 3, and Type 5 fonts, Nimbus Q fonts, TrueType fonts, Sun F3, MetaFont .mf files, and LaserJet .SFS files are all examples of outline font formats.

Neither of these lists is even close to being exhaustive.

To complicate the issue further, identical formats on different platforms are not necessarily the same. For example Type 1 fonts on the Macintosh are not directly usable under MS-DOS or Unix, and vice-versa.

It has been pointed out that the following description shows signs of its age (for example, the eexec encryption has been thoroughly hacked). I don't dispute the observation and I encourage anyone with the knowledge and time to submit a more up to date description.

It has further been suggested that this commentary is biased toward Kingsley/ATF. The omission of details about Bitstream (and possibly Bauer) may be considered serious since their software lies inside many 3rd-party PostScript interpreters.

The moderators of this FAQ would gladly accept other descriptions/ explanations/viewpoints on the issues discussed in this (and every other) section.

[Ed Note: Liam R. E. Quin supplied many changes to the following section in an attempt to bring it up to date. Hopefully it is a better reflection of the state of the world today (12/07/92) than it was in earlier FAQs]

Henry Schneiker <reachable electronically?> wrote the following description of the differences between several scalable font technologies:

(((semi-quote)))

There has been a lot of confusion about font technologies in recent times, especially when it comes to Type 1 versus Type 3 fonts, "hints," PostScript compatibility, encryption, character regularizing, kerning, and the like.

- Encryption (eexec)

  All fonts produced with Adobe's font technology are protected through data encryption. The decryption is provided by the 'eexec' (encrypted execute) PostScript operator and, until recently, was only present in Adobe's licensed PostScript.

  Adobe has published the details of the Type 1 font format in the 'Black Book', Adobe Type 1 Font Format (version 1.1), Adobe Systems Inc., 1990. The encryption was mainly used because of font copyright problems; unencrypted fonts can also be used, but these tend to use

an efficient binary encoding, also in documented the Type 1 book, and so are still not readable PostScript.

- Type 1, Type 3, and Type 5 font formats

  There are generally three font formats used in Adobe PostScript printers: Type 1, Type 3, and Type 5. Type 1 fonts are Adobe's downloadable format. Type 3 fonts are third-party downloadable format. Type 5 fonts are the ROM-based fonts that are part of your printer.

  There is no functional difference between a Type 1, Type 3, or Type 5 font. A Type 3 font can do anything a Type 1 or Type 5 font can do. The only real difference between them is where the 'BuildChar' routine comes from. For Type 1 and Type 5 fonts it's built into the printer. For Type 3 fonts it's built into the font. In other words, anything a Type 1 font can do a Type 3 font can also do.

  [Ed note: the reverse is not true. Type3 fonts can do things that Type1 fonts cannot. But they aren't hinted...]

  When PostScript is asked to generate a character, PostScript looks in the font's dictionary for FontType. If FontType is 1 or 5 PostScript executes an internal routine that knows how to interpret the font data stored in CharStrings. If FontType is 3 PostScript executes the routine BuildChar from the font's dictionary to interpret the font data (often stored in CharStrings).

  However, each BuildChar routine is written to read data formatted in a method convenient to the vendor. Adobe, Altsys, Bitstream, and Kingsley/ATF all format their font data differently and, hence, have different BuildChar routines.

  [Ed note: relative hard disk efficiency of Kingsley vs. Adobe fonts deleted on 12/07/92]

  Type 5 fonts are special in that they often include hand-tuned bitmaps for the commonly used sizes, such as 10- and 12-point. Other sizes are generated from the outlines in normal fashion.

  Don't confuse Type 1, Type 3, and Type 5 fonts with Bitstream's Type A, Type B, Type C, and Type F. They are not the same and serve only to confuse the issue.

- Resolution 'hints'

  When a character is described in outline format the outline has unlimited resolution. If you make it ten times as big, it is just as accurate as if it were ten times as small.

  However, to be of use, we must transfer the character outline to a sheet of paper through a device called a raster image processor (RIP). The RIP builds the image of the character out of lots of little squares called picture elements (pixels).

  The problem is, a pixel has physical size and can be printed only as either black or white. Look at a sheet of graph paper. Rows and columns of little squares (think: pixels). Draw a large 'O' in the middle of the graph paper. Darken in all the squares touched by the O. Do the darkened squares form a letter that looks like the O you drew? This is the problem with low resolution (300 dpi). Which pixels do you turn on and which do you leave off to most accurately reproduce the character?

  All methods of hinting strive to fit (map) the outline of a character onto the pixel grid and produce the most pleasing/recognizable character no matter how coarse the grid is.

[Ed note: deleted some paragraphs that are no longer true. Times change...]

- Optical Scaling

  Optical Scaling modifies the relative shape of a character to compensate for the visual effects of changing a character's size. As a character gets smaller, the relative thickness of strokes, the size of serifs, the width of the character, the inter-character spacing, and inter-line spacing should increase. Conversely, as a character gets larger, the relative thickness, widths, and spacing should decrease.

  Contrast this with linear scaling, in which all parts of a character get larger or smaller at the same rate, making large characters look wide and heavy (strokes are too thick, serifs are too big) while small characters look thin and weak.

- Kerning

  As applied to PostScript fonts, kerning refers to kern pairs. A kern pair specifies two characters (e.g., A and V) and the distance to move the second character relative to the first. The typical use of a kern pair is to remove excessive space between a pair of characters. However, it may also be used to add space.

- PostScript clones

  There are currently several printer manufacturers on the market with PostScript clones. To be viable, a PostScript clone must comply with the 'red book' (PS Language Reference Manual).

  In order to avoid paying royalties to Adobe, and because Adobe's Type 1 font format was originally proprietary, many PostScript interpreters use some other font format. Sun uses F3, and some other vendors use Bitstream's Speedo format, for example. The only real problem this causes is that the widths of characters (the 'font metrics') may vary from Adobe's, so that programs that assume the Adobe character widths will produce poor quality output. Bitstream fonts used to be particularly bad in the early days, but they and most or all of the other vendors have solved those problems.

- Apple TrueType [Ed note: formerly "Royal ('sfnt')"] format and System 7

  Apple's new System 7.0 supports a new format of outline font that will allow high-quality characters of any size to be displayed on the screen. TrueType stores font outlines as B-spline curves along with programmed resolution hints. B-spline curves are faster to compute and easier to manipulate than the Bezier curves used in PostScript.

  Adobe is not going to support Apple's new format by converting the Adobe/Linotype library to B-spline format. There are two reasons for this: First, there is no support for font encryption (yes, the hooks are there, but nothing is implemented). Second, Adobe does not want to dilute PostScript and its font library. However, the Macintosh is too big a market to simply turn away from. Therefore, Adobe will provide its Font Manager to display its own fonts on the Mac screen. Apple ships Adobe's ATM for this purpose.

(((unquote)))

4 What about "Multiple Master" fonts?

Multiple Master Fonts are an extension to the Adobe font format. providing the ability to interpolate smoothly between several "design axes" from a single font. Design axes can include weight, size, and even some whacko notions like serif to sans serif. Adobes' first Multiple Master Font was Myriad – a two-axis font with WEIGHT (light to black) on one axis, and WIDTH (condensed to expanded) along the other axis. In the case of Myriad, there are four "polar" designs at the "corners" of the design space. The four designs are light condensed, black condensed, light expanded, and black expanded.

Given polar designs, you can set up a "weight vector" which interpolates to any point within the design space to produce a unique font for a specific purpose. So you can get a "more or less condensed, somewhat black face".

Multiple Master Fonts can be used on any PostScript printer. Multiple Master Fonts need a new PostScript operator known as makeblendedfont. The current crop of Multiple Master Fonts supply an emulation of this operator so the printer doesn't need this operator.

A short tutorial on Multiple Master Fonts and makeblendedfont appears in PostScript by Example, by Henry McGilton and Mary Campione, published by Addison-Wesley.

Danny Thomas contributes that there are a few PostScript interpreter (version)s which have bugs that appear with the emulation of the makeblendedfont operator used to support Multiple Master fonts. There weren't many exhibiting this problem, though it may have happened even with one Adobe interpreter.

5 Is there a methodology to describe and classify typefaces?

There is a standard, Panose, but it is mostly ignored by typographers (not because it's bad, just because they don't need it). The Panose system is documented, among other places, in the Microsoft Windows 3.1 Programmer's Reference from Microsoft Press.

The ISO also has a scheme, but it is not Panose.

At least one book by a respected authority, Alexander Lawson, Printing Types: An Introduction, describes another, less rigorous system [ed: of his own], which is exposited in "An Introduction" and used without exposition in his later "Anatomy of a Typeface".

There is another book, Rookledges International Typefinder, which has a very complete system that uses tell-tales of individual glyphs as well as overall style to index most known faces right in the book.

J. Ben Leiberman has another book on type face description.

Terry O'Donnell adds the following comments:

The current ISO system was initiated (I believe) by Archie Provan of RIT—a successor to Mr. Lawson. Whereas in typographic practice or teaching—only a high level classification is necessary - times have changed and the current ISO system aims to accomplish something beyond the high level. A major goal is to aid software to help users make selections. For example, a naive user might ask for all fonts on a font server which have a Roman old style appearance. Another goal would be to help users with multi-lingual text: a user creating a document in English using e.g. Baskerville wants to know what Arabic or Japanese language font on his system/file server would harmonize well with the Baskerville. It is not all in place yet—but the more detailed ISO classes—and the current addition of non-latin typefaces—are an attempt to address this issue.

A second goal is to help with the font substitution problem. Neither ISO or Panose address the metrics issues in font substitution—but both might aid software in picking the nearest style of available available fonts.

6 What is the “f” shaped “s” called?

Both the “f” with half a crosbar (roman) and the integral sign (italic) are called long-S.

7 What about "Colonial" Typefaces?

7.1 Why does colonial printing have that "Colonial" feel?

Colonial type was either very roughly treated by moist salt air on the crossing and in colonial port cities, or was copied locally by tacky techniques (such as driving used foundry type into soft lead to make very soft deformable matrices), and the paper was very rough, which abrades both the serifs and the hairlines. So except for the best work done with new, european types, the serifs were much smaller, even broken off, than the original founder/punchcutter intended. Thins could be abraded by rough paper to nothingness, esp after humid salt air had leached the hardener out of the alloy.

Peter Honig contributes the following alternative explanation of the roughness of colonial types:

The roughness of early fonts was caused by several factors: Type was quite expensive and was used for many years (even if somewhat damaged). Also, printing presses would only be set up to print one side of one folio at a time, so you would not need to set more than a couple of pages at once. This meant that the printer did not need as many copies of each character, however, each character got used very frequently. The early casting techniques did not produce as perfect or consistant examples as we have today. That is, the face of a character might not be quite planar with the page, or its sides might not be quite parallel. Lastly, the inks of the past were not as advanced those of today.

7.2 What fonts are good for mock-colonial uses?

For example, what fonts have the following features: old-style figures (non-lining numbers), the long s character, slightly irregular shapes (á la type produced by colonial printers), and a decent complement of ligatures. And what about free or cheap faces like this?

I don't know if any exist with all of 1-5. As I believe you get what you pay for, especially in fonts, I haven't looked at free and cheap-copy fonts.

Microsoft's expansion set for their Win3.1 optional fonts has Garamond Expert & Expert Extensions, which has a good complement of ligatures and I think I remember it having the long ess too. I forget about OSFigs; it should tho'. Monotype's metal faces "16th Century Roman" and "Poliphilus" may be available in digital; if so, they imitate early presswork with early and are very close to what one wants.

"A commercial supplier [not yet sampled] is Image Club Graphics in Calgary (1-800-661-9410). It is called Caslon Antique. It is supplied as both roman and italic, together, for $25. They advertise in MacWorld/MacUser/MacBlah. I am unable to tell from abcDEF123 if the numerals are old-style, but I think not. Ligatures? long-S? Not yet known. Guillemots, though, are there. ... Letraset, circa 1977, showing a Caslon Antique with modern numerals, no ligatures, and only UKPounds and German ss extensions." [Ike Stoddard]

NB: Caslon Antique is not a Caslon per se: "The last Caslon to mention is that ubiquitous but unrelated Caslon Antique, which possesses no similarity whatsoever to the original. This old reprobate was introduced by Barnhart Brothers of Chicago under the name Fifteenth Century. Its negative reception lasted until about 1918, when, with a simple name change to Caslon Antique, it became the most commonly selected type for reproductions of colonial American printing. It is now seen in everything from liquor advertisments to furniture commercials" [Lawson, 1990,Anatomy]

Miles Agfa (Compugraphic) has always had a Caslon Antique; I don't know if it is available for TrueType or Type 1, but Agfa has been doing TrueType bundles at reasonable prices. [wdr]

Peter Honig contributes the following suggestions:

Name Year Irreg. Long S OSfig Comment —- —- —— —— —— ——-

- Poliphilus A cleaned-up reproduction of type from 1499. It's only slightly irregular and does not contain the long S, but does have old style figures. From Italy, founded by Francesco Griffo.
- Old Claude An exact reproduction of Garamond from 1532. It is irregular and does not contain the long S, but it does have old style figures. From France, founded by Claude Garamond.
- Blado An exact reproduction of type from 1539. It is irregular and does not contain the long S, but it does have old style figures. From Italy, founded by Antinio Blado (designed by Ludovico delgi Arrighi).
- Van Dijck An exact reproduction of type from the 1660s. It is irregular and does not contain the long S, but it does have old style figures. From Holland, founded by Van Dijck.
- Adobe Caslon A cleaned-up reproduction of type from the 1720s. It isn't irregular but it does contain the long S, old style figures, and several ligatures. From England, founded by William Caslon.

Blado, Poliphilus, and Van Dijck are available from Monotype. Adobe Caslon is available from Adobe. Old Claude is available from Letter Perfect. In my opinion, Old Claude is font that is worthy of close attention. Although it lacks the long S, it is VERY accurately reproduced. Although Adobe Caslon is not irregular, it has a great set of authentic ornaments from the Renaissance and Baroque. It is also the only set that I am aware of, that has the long S and its ligatures.

[Bill Troop notes: I do not believe that Monotype ever had a font called 16th Century Roman. You are thinking of a private face created by Paul Hayden-Duensing for his private press based on old Italian punches. It is very rough indeed, but I can assure you no Colonial printer had a typeface as stylish.

Poliphilus does indeed exist in digital form, and is fairly faithful, but again is far too stylish to give the proper feel of US Colonial printing. Nor is Antique Caslon, so called, anything to do with the Caslon types used by American printers–except those who used this bogus type at the end of the 19th century.

Monotype Bell is a faithful copy of a font that was actually used in the US, but it is far more modern than the Caslon types. Nobody has yet done a really authentic Caslon, and it is a curious fact, but none of the Caslon revivals, in any of metal, photo, or digital formats, has ever been based on the best Caslon sizes. I have been toying with such a revival.

Monotype Van Dijk can hardly be called a faithful copy of a metal font; the outlines are far more regular, for instance, than what Monotype did for Bell. In addition, the less interesting forms of the lower case f and f-ligatures were chosen for the digital version, and the alternate f was not supplied. That makes it a very uninteresting font to use in digital form. In addition, the italic has been unbelievably badly spaced in the digital version. (Harry Carter complained about the spacing in the 13pt Roman in the metal version.)

For anyone wishing to recreate the feel of early-to-mid 18th century printing, a battered, sensitive revival of Caslon would be desirable. The Giampa version is interesting, but is based on a poor model.]

7.3 What fonts could a colonial printer have had?

According to D.B.Updike in the classic reference "Printing Types: Their History, Forms & Use", he indicates that most colonial work was with types of the Caslon Old Style fonts and cheap copies of same in the 18th C. Before that, it would have been the older Dutch & English faces, almost always lagging English tastes. If you can find the Oxford Fell types, they are classic Dutch-as-used-by-englishmen. Anything with a Dutch moniker and the Oldstyle adjective is probably ok; Van Dijck if you find it, say (died 1673).

Ben Franklin recommended Caslon faces. But these were not available in England before 1720, first full broadside in 1734. Lawson declares that the first printing of the Declaration of Independance was in Caslon.

Wilson’s Scotch Modern was the “modern” font that surfaced in quantity in america. If the Scotch Roman your vendor has is sort-of like-Bodoni but nicer than his Bodoni, that’s it. It wasn’t available until late 1700s, though.

8 What is “Point Size”?

This article was constructed from a posting by William D. Ricker from Sep 1992.

In general terms, point size is a relative measure of the size of a font. It used to have a more concrete meaning in the “old days” of typeography.

In the world of Photo-typesetters and digital fonts, the distance from the top of the tallest ascender to the bottom of the longest descender is only an approximate lower bound on the point size of a font; in the Old days, it was almost always a firm lower bound, and there was warning on the exception.

Point-size is the measure of *default* or *minimum* inter-baseline distance; inter line distance in absense of leading, a/k/a “set solid”. If you don’t know if the text was set solid or leaded, you can’t tell the point-size with a measuring glass unless you know if the type design includes built-in space betweed adjacent, set-solid lines.

Exceptions to the points size equals ascender to descender size rule:

- In metal, there was usually a little room between the highest and lowest corners of the face and the body size, so that the Matrix was completely molding the face and not relying on the mold-body to form a vertical side to the printing face—since a bevel or beard is desirable for impression and strength.
- If the designer of a face thinks it should always be set leaded, s/he may choose to include the minimal leading in the design, in which case it is included in the base point size, and no capital, lowercase-ascender, or lowercase-descender will get very near the edges.
- In some faces the capitals are taller than the ascenders, and others vice versa. (Vertical sticks on capitals are called stems, not ascenders.) A minimum point size estimate would normally be the height of the font’s "envelope", to borrow from Avionics/Aeronautics.
- The point size of a “Titling Face” may not include descenders; in which case the Q’s tail hangs off the body as a vertical kern. Such a face in metal usually has “Titling” in the name, although sometimes the fact that only capitals are available is all the hint given.

  ([William D. Ricker’s] metal font of *Ray Shaded*, cast on a Monotype Display caster, has “vertical kerns” if you will: the hanging shaded tail of the Q and some punctuation below the 24pt body, because it has no lower-case. It might be better described as being 36/24, thirty-six point type cast on a twenty-four point body, since the cap A is about the height and density of a Ultrabold 36pt A in many other fonts. It would be called 36/24 Caps if a lowercase had been cast on a 36 point body, but since only UC was ever cut, as UC-only titling, it was standardly issued and refered to as a 24 point titling—much to the confusion of non-cognoscenti.)

- The Continental Point, a/k/a the Didot point, (and its Pica Em equivalent, the Cicero) is just a hair longer. 15 Ciceros=16 Picas, 15 Didots=16 Points. So type which is imported or cast from imported matrices has been, and still is, cast on the next size larger body in anglo-american points. So an 11D/12 or 12D/14 type will look larger than a similar 12pt font but smaller than a simlar 14pt font, by about a point of fixed built-in leading that the designer didn't intend. What happened when these faces were converted to photo and digital composition, I don't know. (I could find out.) Probably some were scaled to American sizes proportionally from the european masters, some copied from the American castings with built-in leading to ease conversion, and some were probably done both ways at different conversion houses.

Net result: unless you know it's *Adobe Times Roman* or whatever and just want to know what point size & leading options were, you can't measure the size with a definition and an optical micrometer. The defnition is embodied/manifested in the typesetting "hardware", even if it is software, not the product.

8.1 Knuth's Assertion

What about Knuth's assertion that point size is "a more-or-less arbitrary number that reflects the size of type [a font] is intended to blend with"?

That statement is true only in the context of MetaFonts. MetaFonts (and this definition) are perfectly adequate for Knuth's purposes but not fully descriptive of all of typography. And definitely not conformant to established usage.

This is not meant to condemn heterodoxy, but just to warn that while the ASCII markup notations in Knuth's "Second Great Work" [TeX and MetaFont] are even more widely disseminated than his wonderful coinage of mathematical notations in "The First Great Work" [*The Art of Computer Programming*, volumes I, II, and III], MetaFont has not been accepted as an encoding for all useful fonts for the future, and the defintions of font characteristics in MetaFont context must be taken with a large grain of salt when used with fonts outside the MetaFont font-generation paradigm.

Knuth's quotation, when applied to a (non-MetaFont) font designer, overstates the arbitrariness of the design choice; the designer was stating in the old days that you'd need a saw, a file, or a caster with his matrices if you wanted to use negative leading to set his type closer than he wanted to see it set; and today, in Photo/digital composition, the designer is either indicating the opinion of the original metal-head or his own design advice as to what the minimum distance between adjacent baselines should be.

Also, point size is very poor predictor of blending, except in a mechanical sense in terms of not-overflowing the same rectangles. Some faces to blend *in the same line* with 12 point type will need to be 10/12 or 14/12, due to differences in the way they fill the space. (The overall leading should fit the body type.) Harmony and contrast of overall color, shape, style, etc. are much more important considerations for blending than body-size. (For two types to work together, there must be sufficient harmonies between them to work together and sufficent contrasts to be easily distinguished. See Carl Dair's books.)

If one wants to understand usage of typographical terms in the general milieu, the *Chicago Manual of Style*'s appendix on *Typesetting for Authors* is a good capsule presentation of history and terminology; if one wants the nitty-gritty on how digital type does, or at least should, differ and be treated differently from just copies of metal, see Richard Rubinstein, *Digital Typography*, MIT Press. On type in general, consult D.B. Updike in a library (out of print), or A(lexander) S. Lawson (who covers electronic type in his latest revision!).

9 Where can I get ... fonts.

Before I go any farther, let me extol the virtues of the Archie servers. If you need to find something on the net, and you have any idea what it might be called, Archie is the place to go. In North America, telnet to "archie.rutgers.edu" and login as "archie". There are many other servers around the world, any Archie server can give you a list of other servers. There are better documents than this to describe Archie and you should be able to find them from the above starting point. If you have trouble, feel free to ask norm (via Email please, no need to clutter comp.fonts with a query about Archie ;-).

In addition to the telnet option, several archie clients exist including a very nice X11 implementation (Xarchie).

- Adobe Type 1 Fonts in MS-DOS/Unix Format:
  `ftp.cica.indiana.edu:/pub/pc/win3/fonts`
  `ftp.cica.indiana.edu:/pub/pc/win3/fonts/atm`
  `archive.umich.edu:/msdos/mswindows/fonts`
- Adobe Type 1 Fonts in Mac Format:
  `mac.archive.umich.edu:/mac/system.extensions/font/type1`
  `sumex-aim.stanford.edu:/info-mac/font`
- Adobe Type 3 Fonts in Mac Format:
  `mac.archive.umich.edu:/mac/system.extensions/font/type3`
- TrueType fonts in MS-DOS Format:
  `ftp.cica.indiana.edu:/pub/pc/win3/fonts/truetype`
- TrueType fonts in Mac Format:
  `mac.archive.umich.edu:/mac/system.extensions/font/truetype`
- TEX PK/PXL/GF fonts:
  The TEX community has its own support groups that can provide better answers to this question. The canonical list of MetaFont fonts is posted occasionally to comp.text.tex. The comp.text.tex newsgroup (or the Info-TeX mailing list, if you do not have access to news) are good places to start. Email norm if you need more specific information.
- LaserJet bitmap fonts:
  `wuarchive.wustl.edu:/mirrors/msdos/laser`
  Also on other simtel20 mirrors...

If you know of other archive sites (the above list is no where near complete) or other formats that are available on the net, please let us know.

The sites above represent places where shareware and public domain fonts are available. Many, many typefaces are not available in shareware form. And many shareware faces are less than adequate for a variety of reasons, particularly at small sizes. It seems to be the consensus of the comp.fonts community that "you get what you pay for." If you need a professional quality font, you should probably buy it from a professional.

The list of font vendors in Appendix A (annotated with information about non-Roman alphabets) was contributed by Masumi Abe. Masumi was Adobe's Manager of Typographic Marketing for Asia. He has since left Adobe.

Many font CDs are now available which offer many fonts for a low cost/font.

10 Where can I get fonts for non-Roman alphabets?

As mentioned above, the list of font vendors is annotated with information about non-Roman alphabets. Commercially, Masumi suggests that Linguists' Software is the current [ed: as of 7/92] leading supplier of non-Roman fonts.

Ian Tresman contributes:

The Multilingual PC Directory is a source guide to multilingual and foreign language software, including fonts, for PCs. Over a hundred different languages are included, from Arabic to Hieroglyphics to Zulu. A 1200 word description is available from the publishers, Knowledge Computing, email: `72240.3447@compuserve.com`.

11 What about fonts with the International Phonetic Alphabet (IPA) symbols?

I summarized Scott Brumage's recent post for the FAQ:

11.1 Shareware or free (PostScript Type 1 and/or TrueType):

- TechPhon

  Seems to lack some characters and has no zero-offset characters (for accents).

- PalPhon

  A phonetic font which you can get by anonymous ftp from `mac.archive.umich.edu`. It is called PalPhon. There are actually two fonts: the basic PalPhon and one with additional accents and symbols called PalPi. The package includes some documents on using the fonts as well.

- SIL-IPA

  SIL-IPA is a set of scalable IPA fonts containing the full International Phonetic Alphabet with 1990 Kiel revisions. Three typefaces are included:

  - SIL Doulos (similar to Times)
  - SIL Sophia (similar to Helvetica)
  - SIL Manuscript (monowidth)

  Each font contains all the standard IPA discrete characters and non-spacing diacritics as well as some suprasegmental and puncuation marks. Each font comes in both PostScript Type 1 and TrueType formats. The fonts are also available for Microsoft Windows.

  These fonts were designed by the Printing Arts Department of the Summer Institute of Linguistics, Dallas, Texas.

11.2 Shareware or free (TEX):

METAFONT sources of the phonetic symbols developed by Tokyo-Shoseki-Printing and Sanseido are available. The font contains all of IPA (Internatioanl Phonetic Alphabet) symbols.

You can get phonetic symbols METAFONT (named TSIPA) from

`ftp.foretune.co.jp:/pub/tools/TeX/Fonts`

The IP address for `ftp.foretune.co.jp` is 133.123.1.2.

11.3 Commercial:

Linguist's Software Adobe (ITC Stone Phonetic [#255], Times Phonetic [#278])

12 How can I convert my ... font to ... format?

Conversion from one bitmapped format to another is not generally too difficult. Conversion from one scalable format to another is very difficult. Several commercial software packages claim to perform these tasks, but none has been favorably reviewed by the comp.fonts community.

12.1 Converting Between TrueType and Adobe Type 1 Formats

This section was constructed from postings by Primoz Peterlin and Bert Medley in Sep 1993.

There are several commercial tools that will convert between these formats. There are no shareware or free tools that will do the job. See also "Why do converted fonts look so bad?".

12.1.1 FontMonger by Ares Software

Performs conversion between Adobe Type 1, Adobe Type 3 and TrueType formats in both PC-DOS and Mac flavours, as well as simple glyph editing. Currently at version 1.0.7, patches available via CompuServe. Available for Mac and MS Windows. Commercial product, price \$60-80.

12.1.2 Alltype by Atech Software

Performs font conversion. A stable product, being on a market for a while. Available for PC-DOS/MS Windows only. Commercial product. Atech is supposedly leaving the business.

12.1.3 Fontographer by Altsys Co.

Comprehensive package, allowing creation of fonts as well as conversion between formats. Available for Mac and MS Windows. Commercial product, price cca. \$270 (PC version).

12.1.4 Metamorphosis by Altsys Co.

Available for Mac. Commercial product. More info needed.

12.2 Converting Between Other Scalable Formats

Many of the programs in the preceding section claim to be able to convert between other formats as well. And there are probably other commercial programs as well. However, as several people have noted, conversion from one scalable format to another is a bad idea. If the original font was well hinted, the converted font will not be. Of course, if the original was poorly hinted, maybe it won't matter much.

In an effort to settle a long-running and oft-asked question, I'll be blunt: as of today [6/93], THERE ARE NO NON-COMMERCIAL PROGRAMS WHICH WILL CONVERT FROM ONE SCALABLE FORMAT TO ANOTHER. Not from TrueType to PostScript Type 1, Type 3, Type 5, or any other scalable PostScript format. Not from PostScript Type 1 to TrueType. Not to or from Intellifont. Not to or from Sun F3 format.

For specific conversions, check the platform specific parts of the FAQ. Most of the conversions discussed require platform specific tools.

Here is a summary of the conversions discussed (and the section in which they appear):

Mac Type 1 PostScript
: To PC Type 1 PostScript (MS-DOS). To TrueType (commercial).

PC Type 1 PostScript
: To Mac Type 1 PostScript (Mac, commercial). To TrueType (commercial). To TeX `PK` (MS-DOS).

TrueType
: To Type 1 PostScript (Mac and MS-DOS, commercial). To HP LaserJet bitmaps (MS-DOS, hack!).

TeX `PK`
: To HP LaserJet bitmap softfonts (MS-DOS).

HP LaserJet bitmap softfonts
: To TeX `PK` (MS-DOS).

In addition, Adobe ships a copy of Adobe Font Foundry with all of its fonts which can convert Type 1 fonts into HP LaserJet softfonts.

12.3 Why Do Converted Fonts Look So Bad?

This section was constructed from postings by Mark Hastings and David Glenn in Aug 1993.

With all commercially available conversion tools, converting fonts between scalable formats almost always results in a font inferior to the original. (The rare case where a converted font is not inferior to the original occurs *only* when the original is a cheap knock-off, and the automatic hinting of the conversion program is better than automatic hinting used in the original!)

David Glenn contributes the following analysis:

There are a few probable [reasons why converted fonts, especially screen fonts, look inferior to the original]. First off, any font that's converted uses a converting algorithm which will make an exact copy at best. Because no currently available converter even comes close to copying faithfully the manual tweaks and hinting in a font file, you often end up with poor screen fonts and poor output. The only reason that printed output from the converted font looks markedly better than the screen font is that the printed output is at a higher resolution. The converter achieves better results on the higher resolutions because hinting is less important at higher resolutions. Screen fonts are incredibly complex to make well. You have very few pixels to represent a very aesthetic and distinct design. That's why at small sizes almost all typefaces look alike—how do you represent a graceful concave side on the letter "L" for Optima with only 12 pixels in height and one in width? You can't. And that's why most fonts look similar at 10pt, unless they're hand hinted by typograhers.

One thing that may come into play when fonts are converted between platforms, for example between PC/Windows format and Mac format, is that fonts are hinted down to a certain number of pixels per em. On a Mac screen (72 dpi) there is a one-to-one correspondence between the ppem and the point size of a font. Under windows, the usual VGA screen is 96dpi and fonts that look good at 8 or 9 pt under windows might look like crap on a Mac 'cuz the fonts weren't hinted below 10 or 11ppem. Also, the conversion programs may have made the appearance worse at some sizes than others.

Whenever you convert fonts from one platform to the other keep in mind that:

- Your license with the type foundry may or may not allow this.
- The font may or may not have the correct character sets in it.
- The TT font file may or may not have all the tables necessary.
- Your converter may make it so ugly that you don't want to use it...

12.4 Smoothing Bitmaps

This section was constructed from postings by Jason Lee Weiler and Piercarlo Antonio Grandi

Enlarging bitmapped images is easy, but enlarging them without creating very jagged edges is much more demanding. There are several possibilities.

- If you are interested in programming your own solution, the comp.graphics FAQ will provide pointers to a number of resources that can get you started.
- If the bitmaps are in a standard format, the 'xv' tool (an X11 picture viewing tool) includes magnify and smooth functions that may perform adequately.
- Commercial tools like Adobe Illustrator, Corel Draw, and many others include tracing functions that can translate some bitmaps into acceptable outlines (which can be enlarged without jaggedness).
- The GNU Font Utilities include a tracing tool that may be helpful.

13 Are fonts copyrightable?

This topic is hotly debated at regular intervals on comp.fonts. Terry Carroll. provides the following analysis of current [ed: as of 6/92] legislation and regulation regarding fonts and copyrights in the United States. Terry is "Editor in Chief" of Volume 10 of the *Santa Clara Computer and High Technology Law Journal*. Members of the comp.fonts community are encouraged to submit other materials that add clarity to the issue.

It has been pointed out that this section deals primarily font copyright issues relevant to the United States and that this situation is not universal. For example, in many parts of Europe typeface designs are protectable.

"First, the short answer in the USA: Typefaces are not copyrightable; bitmapped fonts are not copyrightable, but scalable fonts are copyrightable. Authorities for these conclusions follow.

Before we get started, let's get some terminology down:

A typeface is a set of letters, numbers, or other symbolic characters, whose forms are related by repeating design elements consistently applied in a notational system and are intended to be embodied in articles whose intrinsic utilitarian function is for use in composing text or other cognizable combinations of characters.

A font is the computer file or program that is used to represent or create the typeface.

Now, on to the legal authorities:

Volume 37 of the Code of Federal Regulations specifies this about the copyrightability of typefaces:

"The following are examples of works not subject to copyright and applications for registration of such works cannot be entertained: . . . typeface as typeface" 37 CFR 202.1(e).

The regulation is in accordance with the House of Representatives report that accompanied the new copyright law, when it was passed in 1976:

"The Committee has considered, but chosen to defer, the possibility of protecting the design of typefaces. A 'typeface' can be defined as a set of letters, numbers, or other symbolic characters, whose forms are related by repeating design elements consistently applied in a notational system and are intended to be embodied in articles whose intrinsic utilitarian function is for use in composing text or other cognizable combinations of characters. The Committee does not regard the design of typeface, as thus defined, to be a copyrightable 'pictorial, graphic, or sculptural work' within

the meaning of this bill and the application of the dividing line in section 101." H. R. Rep. No. 94-1476, 94th Congress, 2d Session at 55 (1976), reprinted in 1978 U.S. Cong. and Admin. News 5659, 5668.

It's also in accordance with the one court case I know of that has considered the matter: Eltra Corp. V. Ringer, 579 F.2d 294, 208 USPQ 1 (1978, C.A. 4, Va.).

The U.S. Copyright Office holds that a bitmapped font is nothing more than a computerized representation of a typeface, and as such is not copyrightable:

"The [September 29, 1988] Policy Decision [published at 53 FR 38110] based on the [October 10,] 1986 Notice of Inquiry [published at 51 FR 36410] reiterated a number of previous registration decisions made by the [Copyright] Office. First, under existing law, typeface as such is not registerable. The Policy Decision then went on to state the Office's position that 'data that merely represents an electronic depiction of a particular typeface or individual letterform' [that is, a bitmapped font] is also not registerable." 57 FR 6201.

However, scalable fonts are, in the opinion of the Copyright Office, computer programs, and as such are copyrightable:

"... the Copyright Office is persuaded that creating scalable typefonts using already-digitized typeface represents a significant change in the industry since our previous [September 29, 1988] Policy Decision. We are also persuaded that computer programs designed for generating typeface in conjunction with low resolution and other printing devices may involve original computer instructions entitled protection under the Copyright Act. For example, the creation of scalable font output programs to produce harmonious fonts consisting of hundreds of characters typically involves many decisions in drafting the instructions that drive the printer. The expression of these decisions is neither limited by the unprotectable shape of the letters nor functionally mandated. This expression, assuming it meets the usual standard of authorship, is thus registerable as a computer program." 57 FR 6202."

14 Typeface Protection

[This article first appeared in TUGboat 7:3 (October 1986), pp. 146-151. Reproduced with permission.]

14.1 Preamble

The main question of typeface protection is: "Is there anything there worth protecting?" To that the answer must certainly be: "Yes." Typeface designs are a form of artistic and intellectual property." To understand this better, it is helpful to look at who designs type, and what the task requires.

14.1.1 Who makes type designs?

Like other artistic forms, type is created by skilled artisans. They may be called type designers, lettering artists, punch-cutters, calligraphers, or related terms, depending on the milieu in which the designer works and the technology used for making the designs or for producing the type.

("Type designer" and "lettering artist" are self-explanatory terms. "Punch-cutter" refers to the traditional craft of cutting the master image of a typographic letter at the actual size on a blank of steel that is then used to make the matrix from which metal type is cast. Punch-cutting is an obsolete though not quite extinct craft. Seeking a link to the tradition, modern makers of digital type sometimes use the anachronistic term "digital punch-cutter". "Calligrapher" means literally "one who makes beautiful marks". The particular marks are usually hand-written letters, though calligraphers may design type, and type designers may do calligraphy.)

It usually takes about seven years of study and practice to become a competent type designer. This seems to be true whether one has a Ph.D. in computer science, a high-school diploma, or no academic degree. The skill is acquired through study of the visual forms and practice in making them. As with geometry, there is no royal road.

The designing of a typeface can require several months to several years. A family of typefaces of four different styles, say roman, italic, bold roman, and bold italic, is a major investment of time and effort. Most type designers work as individuals. A few work in partnership (Times Roman(R), Helvetica(R), and Lucida(R) were all, in different ways, the result of design collaboration). In Japan, the large character sets required for a typeface containing Kanji, Katakana, and Hiragana induce designers to work in teams of several people.

Although comparisons with other media can only be approximate, a typeface family is an accomplishment on the order of a novel, a feature film screenplay, a computer language design and implementation, a major musical composition, a monumental sculpture, or other artistic or technical endeavors that consume a year or more of intensive creative effort. These other creative activities can be protected by copyright or other forms of intellectual property protection. It is reasonable to protect typefaces in the same way.

14.1.2 The problem of plagiarism

A lack of protection for typeface designs leads to plagiarism, piracy, and related deplorable activities. They are deplorable because they harm a broad range of people beyond the original designers of the type. First, most type plagiarisms are badly done. The plagiarists do not understand the nature of the designs they are imitating, are unwilling to spend the necessary time and effort to do good work, and consequently botch the job. They then try to fob off their junk on unsuspecting users (authors, editors, and readers). Without copyright, the original designer cannot require the reproducer of a type to do a good job of reproduction. Hence, type quality is degraded by unauthorized copying.

Secondly, without protection, designs may be freely imitated; the plagiarist robs the original designer of financial compensation for the work. This discourages creative designers from entering and working in the field. As the needs of typography change (on-line documents and laser printing are examples of technical and conceptual changes) new kinds of typefaces are required. Creative design in response to such needs cannot flourish without some kind of encouragement for the creators. In a capitalist society, the common method is property rights and profit. In a socialist (or, in the past, royalist) society, the state itself might employ type artists. France, as a monarchy and as a republic, has had occasional state sponsorship of typeface design over the past 400 years. The Soviet Union has sponsored the design of new typefaces, not only in the Cyrillic alphabet, but also in the other exotic scripts used by various national groups in the Soviet Union.

Those who would justify plagiarism often claim that the type artists do not usually receive a fair share of royalties anyway, since they have usually sold their designs to some large, exploitive corporation. It is true that type designers, like many artists, are often exploited by their "publishers", but plagiarism exacerbates the problem. Plagiarism deprives the designer of decent revenues because it diverts profits to those who merely copied the designs. Plagiarism gives the manufacturer yet another excuse to reduce the basic royalty or other fee paid for typeface designs; the theme song is that the market determines the value of the design and cheap rip-offs debase the value of a face. For those interested in the economic effects of piracy, it is clear that plagiarism of type designs ultimately hurts individual artists far more than it hurts impersonal corporations.

14.1.3 Kinds of protection for type

There are five main forms of protection for typefaces:

- Trademark
- Copyright
- Patent
- Trade Secret
- Ethics

14.1.3.1 Trademark

A trademark protects the *name* of a typeface. In the U.S., most trademarks are registered with the U.S. Patent and Trademark Office. The R in a circle (R) after a trademark or tradename indicates U.S. registration. The similarly placed TM indicates that a trademark is claimed, even if not yet officially registered. However, a trademark may be achieved through use and practice, even without registration. Owners of trademarks maintain ownership by use of the trademark and by litigation to prevent infringement or unauthorized use of the trademark by others.

As a few examples of registered typeface trademarks, there are Times Roman (U.S. registration 417,439, October 30, 1945 to Eltra Corporation, now part of Allied); Helvetica (U.S. registration 825,989, March 21, 1967, also to Eltra-Allied), and Lucida (U.S. reg. 1,314,574 to Bigelow & Holmes). Most countries offer trademark registration and protection, and it is common for a typeface name to be registered in many countries. In some cases the registrant may be different than the originator. For example, The Times New Roman (Times Roman) was originally produced by the English Monotype Corporation. In England and Europe, most typographers consider the design to belong to Monotype, but the trademark was registered by Linotype (Eltra-Allied) in the U.S., as noted above.

Trademark protection does not protect the design, only the name. Therefore, a plagiarism of a design is usually christened with a pseudonym which in some way resembles or suggests the original trademark, without actually infringing on it. Resemblance without infringement can be a fine distinction.

Some pseudonyms for Times Roman are: “English Times”, “London”, Press Roman, “Tms Rmn”. Some for Helvetica are “Helios”, “Geneva”, “Megaron”, “Triumvirate”. So far, there seem to be none for Lucida. There are generic typeface classifications used by typographers and type historians to discuss styles, trends, and categories of design. Occasionally these apparently innocuous classification systems are employed by plagiarists to devise generic pseudonyms, such as “Swiss

721" for Helvetica, and "Dutch 801" for Times Roman. It is not certain whether this usage of a generic classification is more for clarification or for obfuscation. In general, the proper tradename is a better indicator of identity, quality, and provenance in typefaces than a generic name. Some people believe that the same is true for other commodities such as wine, where taste is important.

A trademark usually consists of both a proprietary and a generic part. For example, in the name "Lucida Bold Italic", "Lucida" is the proprietary trademark part and "Bold Italic" is the generic part. The generic word "type" is usually understood to be a part of the name, e.g. "Lucida Bold Italic type". Sometimes a firm will append its name or a trademarked abbreviation of it to the typeface name, to achieve a greater degree of proprietary content, e.g. "B&H Lucida Bold Italic".

A related matter is the use of the name of a type's designer. A firm that ethically licenses a typeface will often cite the name of the designer— e.g. Stanley Morison (with Victor Lardent) for Times Roman, Max Miedinger (with Edouard Hoffmann) for Helvetica, Charles Bigelow and Kris Holmes for Lucida. Although a person's name is not usually a registered trademark, there are common law restrictions on its use. The marketing of plagiarized type designs generally omits the names of the designers.

Although Trademark is an incomplete kind of protection, it is used effectively (within its limitations) to prevent the theft of type names. Certain traditional typeface names, usually the surnames of illustrious designers like Garamond, Caslon, Baskerville, Bodoni, and others have become generic names in the public domain. Trademark protection of such names requires the addition of some proprietary word(s), as with these hypothetical creations, "Acme New Garamond", or "Typoluxe Meta-Baskerville".

14.1.3.2 Copyright

Copyright of typefaces can be divided into two parts: copyright of the design itself; and copyright of the font in which the design is implemented. In the U.S., typeface designs are currently not covered by copyright. This is a result of reluctance by the copyright office to deal with a complex field; by lobbying against copyright by certain manufacturers whose profits were based on typeface plagiarism; by a reluctance of Congress to deal with the complex issues in the recent revision of the copyright law.

The reluctance of Americans to press for typeface copyright may have been influenced by a feeling that typeface plagiarism was good for U.S. high-tech businesses who were inventing new technologies for printing, and plagiarizing types of foreign origin (Europe and England). If the situation becomes reversed, and foreign competition (from Japan, Taiwan, and Korea) threatens to overcome American technological superiority in the laser printer industry, then American firms may do an about-face and seek the protection of typeface copyright to help protect the domestic printer

industry. Such a trend may already be seen in the licensing of typeface trademarks by Adobe, Hewlett-Packard, IBM, Imagen, and Xerox in the U.S. laser printer industry.

In Germany, where typeface design has always been a significant part of the cultural heritage, and where typefounding has remained an important business, there are more than one kind of copyright-like protections for typefaces. Certain long-standing industrial design protection laws have been used to protect typeface designs in litigation over royalties and plagiarisms. Further, there is a recent law, the so-called "Schriftzeichengesetz" enacted in 1981, that specifically protects typeface designs. New designs are registered, as is done with copyright in most countries. This law only protects new, original designs. It is available to non-German designers and firms. Therefore, some type firms and designers routinely copyright new designs in West Germany. This gives a degree of protection for products marketed in Germany. Since multinational corporations may find it cheaper to license a design for world-wide use rather than deal with a special case in one country, the German law does encourage licensing on a broader scale than would initially seem to be the case.

France, like Germany, has ratified an international treaty for protection of typefaces. This 1973 Vienna treaty will become international law when four nations ratify it. So far, only France and West Germany have done so, and thus a design must be protected separately in each country. Even when the treaty becomes law, it will take effect only in those countries that have ratified it. The treaty was principally the work of the late Charles Peignot, a French typefounder, and John Dreyfus, an English typographer and typographic scholar. Presently, typefaces may be registered for protection in France under a 19th century industrial design protection law.

In the U.S., there continues to be some movement for typeface design protection. A proposed bill that would protect the designs of useful articles, like type, has been in committee for a few years. It seems to be going nowhere.

Digital (as opposed to analog) fonts may be protected by copyright of digital data and of computer programs. It has been established that computer software is copyrightable. Therefore, software that embodies a typeface, e.g. a digital font, is presumably also protected. There is some objection to this kind of copyright, on the grounds that the ultimate output of the program or the result of the data (i.e. a typeface design) is not copyrightable. However, the current belief expressed by the National Commission on New Technological Use of Copyrighted Works is that software is copyrightable even if its function is to produce ultimately a non-copyrightable work. Hence, typefaces produced by Metafont or PostScript(R), two computer languages which represent fonts as programs, are presumably copyrightable. Typefaces represented as bit-map data, run-length codes, spline outlines, and other digital data formats, may also be copyrightable. Some firms do copyright digital fonts as digital data. % The copyright office is currently reviewing %this practice to determine if it is acceptable.

Note that the designs themselves are still not protected in the U.S. A plagiarist could print out large sized letters (say, one per page) on an Apple LaserWriter, using a copyrighted PostScript digital font, and then redigitize those letters by using a scanner or a font digitizing program and thus produce a new digital font without having copied the *program* or *digital data*, and thus without infringing the copyright on the font. The quality of the imitation font would usually be awful, but it wouldn't violate copyright. Of course, the plagiarist would usually need to rename the font to evade trademark infringement. [As I write these words, I have the guilty feeling that I have just provided a recipe for type rip-off, but others have obviously thought of just such a scheme—John Dvorak has even proposed something like it in one of his columns.]

14.1.3.3 Design Patent

The designs of typefaces may be patented in the U.S. under existing design patent law. Many designs are patented, but type designers generally don't like the patent process because it is slow, expensive, and uncertain. Nevertheless, some types do get patented, and it is a form of potential protection. Note that this is *Design* Patent—the typeface doesn't have to be a gizmo that does something, it merely has to be unlike any previous typeface. The drawback here is that most attorneys and judges are not aware that there are more than two or three typefaces: say, handwriting, printing, and maybe blackletter. Therefore, litigating against infringement is an educational as well as a legal process. It is easy to see that typeface theft is more subtle than knocking over a liquor store; it may not be illegal and the returns may be greater.

Protections like design patent are available in many other countries, but there is not an international standard (to my knowledge) so the situation must be examined on a country by country basis.

14.1.3.4 Invention Patent

Methods of rendering typefaces can be patented as mechanical or electronic inventions. For example, the old hot-metal Linotype machinery was protected by various patents, as was the IBM Selectric typewriter and type ball. IBM neglected to trademark the typeface names like Courier and Prestige, so once the patents had lapsed, the names gradually fell into the public domain without IBM doing anything about it (at the time, and for a dozen years or so, IBM was distracted by a major U.S. anti-trust suit). Most students of the type protection field believe that those names are probably unprotectable by now, though IBM could still presumably make a try for it if sufficiently motivated.

There is currently a noteworthy development regarding a patent for outline representation of digital type as arcs and vectors, with special hardware for decoding into rasters. This patent (U.S. 4,029,947, June 14, 1977; reissue 30,679, July 14, 1981) is usually called the Evans & Caswell patent, after its inventors. It was originally assigned to Rockwell, and in 1982, Rockwell sued

Allied Linotype for infringement. Allied settled out of court, having paid an amount rumored to be in the millions. Rockwell sold the patent, along with other typographic technology, to Information International, Inc. (III), which then sued Compugraphic for infringement. According to the Seybold Report, a respected typographic industry journal, Compugraphic recently settled out of court for 5 million dollars. Although many experts believe the patent to be invalid because of several prior inventions similar in concept, it nevertheless seems to be a money-maker in corporate litigation. The Seybold Report has speculated on which firms III would litigate against next. Among the candidates suggested by the Seybolds was Apple for its LaserWriter, which uses outline fonts. Since the entire laser printer industry and the typesetting industry is moving toward outline font representation, Apple is certainly not alone. The Seybolds further speculate on whether the difference between character-by-character CRT typesetting and raster-scan laser typesetting and printing would be legally significant in such a case. Ultimately, some firm will hold out for a court judgement, and the matter will be decided. %Although the Evans & Caswell patent doesn't have much to do with %typeface copyright per se, it does make many font vendors nervous.

14.1.3.5 Trade Secret

Given that typeface designs have relatively little copyright protection in the U.S., they are often handled as trade secrets. The secret must apply to the digital data or programs only, because the images themselves are ultimately revealed to the public as printed forms. It is much more difficult to reconstruct the formula of Coca-Cola from its taste than it is to reconstruct the design of Helvetica from its look on the page. The exact bitmap or spline outline of a digital font is usually not reconstructable from the printed image, although CRT screen fonts at usual resolutions (60–120 dots per inch) may be reconstructed by patient counting and mapping of bits off a screen display. Typeface licenses often contain stipulations that the digital data will be encrypted and confidential. Just as a firm will protect the secret of a soft drink recipe, so a type firm will protect the exact nature of its digital data.

14.1.3.6 Ethics

Some typographers are motivated by higher principles than greed, profit, expediency, and personal interest. Idealists afflicted with concepts of ethical behavior and a vision of typography as a noble art may find it distasteful to use plagiarized types. Some graphic designers insist on using typefaces with bona-fide trademarks, both to ensure that the type will be of high quality, and to encourage creativity and ethics in the profession. A consequence of plagiarism that is sometimes overlooked is a general erosion of ethics in an industry. If it is okay to steal typeface designs, then it may be okay to purloin other kinds of data, to falsify one's resume, to misrepresent a product, and so forth. Most professional design organizations attempt to promote ethical standards of professional behavior, and personal standards may extend to avoidance of plagiarism.

The Association Typographique Internationale (ATypI) is an international organization of type designers, type manufacturers, and letterform educators. Its purpose is to promote ethical behavior in the industry, advancement of typographic education, communication among designers, and other lofty aims. Members of ATypI agree to abide by a moral code that restricts plagiarism and other forms of depraved behavior (pertaining to typography). These are noble goals, but some members (especially corporate members) of ATypI, confronted with the pressures and opportunities of commercial reality, nevertheless plagiarize typefaces of fellow members, the moral code notwithstanding. Since ATypI is a voluntary organization, there is very little that can be done about most such plagiarism. Some years back, a world-famous type designer resigned %the noted type designer Hermann Zapf from the ATypI Board of Directors in protest over the organization's flaccid attitude toward plagiarists among its ranks. He has since agreed to sit on the board again, but criticism of the organization's inability to prevent type rip-offs by its own members, not to mention by non-members, continues to be heard. Moderates in ATypI believe that a few morals are better than none. It is not clear whether their philosophical stance derives from Plato, Hobbes, or Rousseau.

Given the general attitude of users toward copyrighted video and software, it is doubtful that ethical considerations will hinder most end-users' attitude to plagiarized type fonts. A desire to have the fashionable "label" or trademark may be a greater motivation toward the use of bona-fide fonts than an ethical consideration.

14.1.4 Further reading

"The State of the Art in Typeface Design Protection", Edward Gottschall, *Visible Language*, Vol. XIX, No. 1, 1985 (a special issue on "The Computer and the Hand in Type Design"—proceedings of a conference held at Stanford University in August, 1983).

Der Schutz Typographischer Schriftzeichen, by Guenter Kelbel. Carl Heymans Verlag KG, Cologne, 1984. (A learned account, in juridical German prose, of the significance of the Vienna Treaty of 1973 and the West German Schriftzeichengesetz of 1981.)

14.1.5 Disclaimer

These notes were originally prepared at the request of Brian Reid, for informal distribution. They are based on the author's review of available literature on the subject of typeface protection, and on personal experience in registering types for trademark, copyright, and patent. However, they are %While they result from careful research, no claim is made for accuracy; not legal advice. If one is contemplating protecting or plagiarizing a typeface, and seeks legal opinion, it is advisable to consult an attorney. The term "plagiarize" (and words derived from it) is used here in its dictionary

sense of "to take and use as one's own the ideas of another" and does not mean that the practice of typeface plagiarism is illegal, as that is determined by the laws of a particular country.

The author is a professor of digital typography as well as a professional designer of original digital typefaces for electronic printers and computer workstations. He therefore has an obvious bias toward the inculcation of ethical standards and the legal protection of artistic property. Other commentators might have a different perspective.

15 File Formats

Many different kinds of files are available on the net. These files contain many different kinds of data for many different architectures. Frequently, the extension (trailing end) of a filename gives a good clue as to the format of its contents and the architecture that it was created on.

In order to save space, most files on the net are compressed in one way or another. Many compression/decompression programs exist on multiple architectures.

Multiple files and directories are often combined into a single 'archive' file. Many archive formats perform compression automatically.

15.1 File Format Extensions

- `.tar`

  Unix 'tape archive' format. Tar files can contain multiple files and directories. Unlike most archiving programs, tar files are held together in a wrapper but are not automatically compressed by tar.
- `.Z`

  Unix 'compress' format. Compression doesn't form a wrapper around multiple files, it simply compresses a single file. As a result, you will frequently see files with the extension .tar.Z. This implies that the files are compressed tar archives.
- `.z .gz`

  GNU zip format. GNU zip doesn't form a wrapper around multiple files, it simply compresses a single file. As a result, you will frequently see files with the extension .tar.z or .tar.gz. This implies that the files are compressed tar archives. Do not confuse GNU Zip and PKZip or GNU Zip and Unix compress, those are three different programs!
- `.hqx`

  Macintosh 'BinHex' format. In order to reliably transfer Mac files from one architecture to another, they are BinHex encoded. This is actually an ascii file containing mostly hexadecimal digits. It is neither a compression program nor an archive format.
- `.sit`

  Macintosh 'Stuffit' archive.
- `.cpt`

  Macintosh 'Compactor' archive.

  Like the .tar.Z format that is common among Unix archives, Macintosh archives frequently have the extensions .sit.hqx or .cpt.hqx indicating a BinHex'ed archive.

- `.arc`

  PC 'arc' archive. This is an older standard (in PC terms, at least) and has gone out of fashion.

- `.zip`

  PC 'zip' archive. This is the most common PC archive format today.

- `.arj`

  PC 'arj' archive.

- `.zoo`

  PC 'zoo' archive

- `.lzh`

  PC 'lha/lharc' archive.

- `.uue`

  'UUencoding' format. In order to reliably transfer binary data across architectures (or through email), they are frequently uuencoded. This is actually an ascii file. It is neither a compression program nor an archive format.

15.2 Font Formats

Just as the are many, many archive formats, there are many different font formats. The characteristics of some of these formats are discussed below. Once again, the file extension may help you to determine the font type. (On the Mac, the resource TYPE field is (probably) a better indicator).

- PostScript Type 1 Fonts:

  Postscript Type 1 fonts (Also called ATM (Adobe Type Manager) fonts, Type 1, and outline fonts) contains information, in outline form, that allows a postscript printer, or ATM to generate fonts of any size. Most also contain hinting information which allows fonts to be rendered more readable at lower resolutions and small type sizes.

- PostScript Type 3 Fonts:

  Postscript type 3 fonts are an old outline font format that is not compatible with ATM. Most developers have stopped using this format except in a few special cases, where special type 3 characteristics (pattern fills inside outlines, for example) have been used.

- TrueType Fonts:

  Truetype fonts are a new font format developed by Microsoft with Apple. The rendering engine for this font is built into system 7 and an init, the Truetype init, is available for system 6 (freeware from Apple). It is also built into MS Windows v3.1. Like PostScript Type 1 and Type 3 fonts, it is also an outline font format that allows both the screen, and printers, to scale fonts to display them in any size.

- Bitmap Fonts:

  Bitmap fonts contain bitmaps of fonts in them. This a picture of the font at a specific size that has been optimized to look good at that size. It cannot be scaled bigger without making it look horrendously ugly. On the Macintosh, bitmap fonts also contain the kerning information for a font and must be installed with both type 1 and type 3 fonts. Their presence also speeds the display of commonly used font sizes.

15.3 Font Format Extensions

- `.afm`

  Adobe Type 1 metric information in 'ascii' format (human parsable)

- `.bco`

  Bitstream compressed outline

- `.bdf`

  Adobe's Bitmap Distribution Format. This format can be converted to the platform specific binary files required by the local X Windows server. This is a bitmap font format distributed in ASCII.

- `.bez`

  Bezier outline information

- `.cfn`

  Calamus Font Notation. Vector font format, without hinting, but with greater accuracy when compared to Type 1 fonts. Used by a.o. Calamus (Atari, Windows NT), a DTP program with Soft RIP.

- `.chr`

  Borland stroked font file

- `.ff, .f3b, .fb`

  Sun formats. More info when I know more...

- `.fli`

  Font libraries produced by emTeX fontlib program. Used by emTeX drivers and newer versions of dvips.

- `.fnt`

  Bitmapped GEM font in either Motorola or Intel format.

- `.fon`

  An MS-Windows bitmapped font.

- `.fot`

  An MS-Windows kludge for TrueType fonts. The `fot` file points to the actual TrueType font (in a `ttf` file).

- `.gf`

  Generic font (the output of TeX's MetaFont program (possibly others?))

- `.mf`

  TeX MetaFont font file (text file of MetaFont commands)

- `.pfa`

  Adobe Type 1 Postscript font in ASCII format (PC/Unix) I believe that this format is suitable for directly downloading to your PostScript printer (someone correct me if I'm wrong ;-)

- `.pfb`

  Adobe Type 1 PostScript font in "binary'' format (PC/Unix) Note: this format is not suitable for downloading directly to your PostScript printer. There are utilities for conversion between PFB and PFA (see the utilities section of the FAQ).

- `.pfm`

  Printer font metric information in Windows format

- `.pk`

  TeX packed bitmap font file (also seen as .###pk where ### is a number)

- `.pl`

  TeX 'property list' file (a human readable version of .tfm)

- `.ps`

  Frequently, any PostScript file. With respect to fonts, probably a Type3 font. This designation is much less 'standard' than the others. Other non-standard extensions are .pso, .fon, and .psf (they are a mixture of type 1 and type 3 fonts).

- `.pxl`

  TeX pixel bitmap font file (obsolete, replaced by .pk)

- `.sfl`

  LaserJet bitmapped softfont, landscape orientation

- `.sfp`

  LaserJet bitmapped softfont, portrait orientation

- `.sfs`

  LaserJet scalable softfont

- `.spd`

  Vector font in Speedo format.

- `.tdf`

  Vector font type definitions for Speedo fonts.

- `.tfm`

  TeX font metric file. Also an HP Tagged Font Metric file.

- `.ttf`

  An MS-Windows TrueType font.

- `.vf`

  TeX virtual font which allows building of composite fonts (a character can be composed of any sequence of movements, characters (possibly from multiple fonts) rules and TeX specials)

- `.vpl`

  TeX 'property list' (human readable) format of a `.vf`

16 Ligatures

A ligature occurs where two or more letterforms are written or printed as a unit. Generally, ligatures replace characters that occur next to each other when they share common components. Ligatures are a subset of a more general class of figures called "contextual forms." Contextual forms describe the case where the particular shape of a letter depends on its context (surrounding letters, whether or not it's at the end of a line, etc.).

One of the most common ligatures is "fi". Since the dot above a lowercase 'I' interferes with the loop on the lowercase 'F', when 'f' and 'i' are printed next to each other, they are combined into a single figure with the dot absorbed into the 'f'.

An example of a more general contextual form is the greek lowercase sigma. When typesetting greek, the selection of which 'sigma' to use is determined by whether or not the letter occurs at the end of the word (i.e., the final position in the word).

- Amanda Walker provides the following discussion of ligatures:

  Ligatures were originally used by medieval scribes to conserve space and increase writing speed. A 14th century manuscript, for example, will include hundreds of ligatures (this is also where "accents" came from). Early typefaces used ligatures in order to emulate the appearance of hand-lettered manuscripts. As typesetting became more automated, most of these ligatures fell out of common use. It is only recently that computer based typesetting has encouraged people to start using them again (although 'fine art' printers have used them all along). Generally, ligatures work best in typefaces which are derived from calligraphic letterforms. Also useful are contextual forms, such as swash capitals, terminal characters, and so on.

  A good example of a computer typeface with a rich set of ligatures is Adobe Caslon (including Adobe Caslon Expert). It includes:

  Upper case, lower case, small caps, lining numerals, oldstyle numerals, vulgar fractions, superior and inferior numerals, swash italic caps, ornaments, long s, and the following ligatures:

  ff fi fl ffi ffl Rp ct st Sh Si Sl SS St

  [Ed: Another common example is the Computer Modern Roman typeface that is provided with TeX. this family of fonts include the ff, fi, fl, ffi, and ffl ligatures which TeX automatically uses when it finds these letters juxtaposed in the text.]

  While there are a large number number of possible ligatures, generally only the most common ones are actually provided. In part, this is because the presence of too many alternate forms starts reducing legibility. A case in point is Luxeuil Miniscule, a highly-ligatured medieval document hand which is completely illegible to the untrained eye (and none too legible to the trained eye, either :)).

- Don Hosek offers the following insight into ligatures:

  Ligatures were used in lead type, originally in imitation of calligraphic actions (particularly in Greek which retained an excessive number of ligatures in printed material as late as the 19th century), but as typefaces developed, ligatures were retained to improve the appearance of certain letter combinations. In some cases, it was used to allow certain letter combinations to be more closely spaced (e.g., "To" or "Vo") and were referred to as "logotypes". In other cases, the designs of two letters were merged to keep the overall spacing of words uniform. Ligatures are provided in most contemporary fonts for exactly this reason.

- Liam Quin makes the following observations:

  The term ligature should only be used to describe joined letters in printing, not letters that overlap in manuscripts.

  Many (not all) accents came from the practice of using a tilde or other mark to represent an omitted letter, so that for example the Latin word 'Dominus' would be written dns, with a tilde or bar over the n. This is an abbreviation, not a ligature.

  Most ligatures vanished during the 15th and 16th Centuries. It was simply too much work to use them, and it increased the price of book production too much.

[Ed: there is no "complete" set of ligatures.]

17 Built-in Fonts

- PostScript printers (and Adobe Type Manager) with 13 fonts have:

  Courier, Courier-Bold, Courier-BoldOblique, Courier-Oblique, Helvetica, Helvetica-Bold, Helvetica-BoldOblique, Helvetica-Oblique, Symbol, Times-Bold, Times-BoldItalic, Times-Italic, Times-Roman

- Postscript printers with 17 fonts have:

  Courier, Courier-Bold, Courier-BoldOblique, Courier-Oblique, Helvetica, Helvetica-Bold, Helvetica-BoldOblique, Helvetica-Narrow, Helvetica-Narrow-Bold, Helvetica-Narrow-BoldOblique, Helvetica-Narrow-Oblique, Helvetica-Oblique, Symbol, Times-Bold, Times-BoldItalic, Times-Italic, Times-Roman

- Postscript printers with 35 fonts have:

  All of the above, plus the following:

  ZapfChancery-MediumItalic, ZapfDingbats, AvantGarde-Book, AvantGarde-BookOblique, AvantGarde-Demi, AvantGarde-DemiOblique, Bookman-Demi, Bookman-DemiItalic, Bookman-Light, Bookman-LightItalic, NewCenturySchlbk-Bold, NewCenturySchlbk-BoldItalic, NewCenturySchlbk-Italic, NewCenturySchlbk-Roman, Palatino-Bold, Palatino-BoldItalic, Palatino-Italic, Palatino-Roman

- HP LaserJet printers (II, IIP)

  Courier 10, Courier 12, LinePrinter 16.66, ...

- HP LaserJet printers (III, IIIP)

  All of the above, plus the following:

  Scalable Times Roman and Scalable Univers using Compugraphic's Intellifont hinted font format.

- HP LaserJet IV printers

  All of the above, plus the following scalable (Intellifont) faces:

  Courier, Courier Bold, Courier Italic, Courier Bold Italic, CG Times, CG Times Bold, CG Times Italic, CG Times Bold Italic CG Omega, CG Omega Bold, CG Omega Italic, CG Omega Bold Italic Coronet, Clarendon Condensed Univers Medium, Univers Bold, Univers Medium Italic, Univers Bold Italic Univers Medium Condensed, Univers Bold Condensed, Univers Medium Condensed Italic, Univers Bold Condensed Italic Antique Olive, Antique Olive Bold, Antique Olive Italic Garamond Antiqua, Garamond Halbfett, Garamond Kursiv, Garamond Kursiv Halbfett Marigold, Albertus Medium, Albertus Extra Bold Arial, Arial Bold, Arial Italic, Arial Bold Italic Times New, Times New Bold, Times New Italic, Times New Bold Italic Symbol, Wingdings, Letter Gothic, Letter Gothic Bold, Letter Gothic Italic

- SPARCPrinters

  The basic 35 fonts plus four scaled faces of each of Bembo, Gill Sans, Rockwell, Lucida, Lucida Bright, Sans and Typewriter, giving a total of 57 fonts, all in the F3 format.

18 Glossary

[I ripped this right out of the manual I wrote for Sfware. If you have comments, improvements, suggestions, please tell me...]

anti-aliasing

[ed: this is an 'off-the-cuff' definition, feel free to clarify it for me ;-)]

On low-resolution bitmap devices (where ragged, ugly characters are the norm) which support more than two colors, it is possible to provide the appearance of higher resolution with anti-aliasing. Anti-aliasing uses shaded pixels around the edges of the bitmap to give the appearance of partial-pixels which improves the apparent resolution.

baseline

The baseline is an imaginary line upon which each character rests. Characters that appear next to each other are (usually) lined up so that their baselines are on the same level. Some characters extend below the baseline ("g" and "j", for example) but most rest on it.

bitmap

A bitmap is an array of dots. If you imagine a sheet of graph paper with some squares colored in, a bitmap is a compact way of representing to the computer which squares are colored and which are not.

In a bitmapped font, every character is represented as a pattern of dots in a bitmap. The dots are so small (300 or more dots-per-inch, usually) that they are indistinguishable on the printed page.

character

(1) The smallest component of written language that has semantic value. Character refers to the abstract idea, rather than a specific shape (see also glyph), though in code tables some form of visual representation is essential for the reader's understanding. (2) The basic unit of encoding for the Unicode character encoding, 16 bits of information. (3) Synonym for "code element". (4) The English name for the ideographic written elements of Chinese origin.

download

Downloading is the process of transferring information from one device to another. This transferral is called downloading when the transfer flows from a device of (relatively) more power to one of (relatively) less power. Sending new fonts to your printer so that it "learns" how to print characters in that font is called downloading.

font

A particular collection of characters of a typeface with unique parameters in the 'Variation vector', a particular instance of values for orientation, size, posture, weight, etc., values. The word font or fount is derived from the word foundry, where, originally, type was cast. It has come to mean the vehicle which holds the typeface character collection. A font can be metal, photographic film, or electronic media (cartridge, tape, disk).

glyph

(1) The actual shape (bit pattern, outline) of a character image. For example, an italic 'a' and a roman 'a' are two different glyphs representing the same underlying character. In this strict sense, any two images which differ in shape constitute different glyphs. In this usage, "glyph" is a synonym for "character image", or simply "image". (2) A kind of idealized surface form derived from some combination of underlying characters in some specific context, rather than an actual character image. In this broad usage, two images would constitute the same glyph whenever they have essentially the same topology (as in oblique 'a' and roman 'a'), but different glyphs when one is written with a hooked top and the other without (the way one prints an 'a' by hand). In this usage, "glyph" is a synonym for "glyph type," where glyph is defined as in sense 1.

hints

When a character is described in outline format the outline has unlimited resolution. If you make it ten times as big, it is just as accurate as if it were ten times as small.

However, to be of use, we must transfer the character outline to a sheet of paper through a device called a raster image processor (RIP). The RIP builds the image of the character out of lots of little squares called picture elements (pixels).

The problem is, a pixel has physical size and can be printed only as either black or white. Look at a sheet of graph paper. Rows and columns of little squares (think: pixels). Draw a large 'O' in the middle of the graph paper. Darken in all the squares touched by the O. Do the darkened squares form a letter that looks like the O you drew? This is the problem with low resolution (300 dpi). Which pixels do you turn on and which do you leave off to most accurately reproduce the character?

All methods of hinting strive to fit (map) the outline of a character onto the pixel grid and produce the most pleasing/recognizable character no matter how coarse the grid is.

kerning

(noun): That portion of a letter which extends beyond its width, that is, the letter shapes that overhang - the projection of a character beyond its sidebearings.

(verb): To adjust the intercharacter spacing in character groups (words) to improve their appearance. Some letter combinations ("AV" and "To", for example) appear farther apart than others because of the shapes of the individual letters.

Many sophisticated word processors move these letter combinations closer together automatically.

outline font/format

See 'scalable font'

point

The (more or less) original point system (Didot) did have exactly 72 points to the inch. The catch is that it was the French imperial inch, somewhat longer than the English inch, and it went away in the French revolution. What most people now think of as points were established by the United States Typefounders Association in 1886. This measure was a matter of convenience for the members of the Association, who didn't want to retool any more than they had to, so it had no relationship to the inch. By that date, people realized that the inch was an archaic measure anyway; the point was set to be 1/12 of a pica, and an 83-pica distance was made equal to 35 centimeters. (Talk about arbitrary!)

Thus the measure of 72.27/in. is just an approximation. Of course, when PostScript was being written, it was necessary to fit into an inch-measured world. For the sake of simplicity PostScript defined a point as exactly 1/72". With the prevalance of DTP, the simplified point has replaced the older American point in many uses. Personally, I don't see that it matters one way or the other; all that counts is that there's a commonly-understood unit of measurement that allows you to get the size you think you want. That is, after all, the point ;)

scalable font

A scalable font, unlike a bitmapped font, is defined mathematically and can be rendered at any requested size (within reason).

softfont

A softfont is a bitmapped or scalable description of a typeface or font. They can be downloaded to your printer and used just like any other printer font. Unlike built-in and cartridge fonts, softfonts use memory inside your printer. Downloading a lot of softfonts may reduce the printers ability to construct complex pages.

symbol set

The symbol set of a font describes the relative positions of individual characters within the font. Since there can only be 256 characters in most fonts, and there are well over 256 different characters used in professional document preparation, there needs to be some way to map characters into positions within the font. The symbol set serves this purpose. It identifies the "map" used to position characters within the font.

typeface

The features by which a character's design is recognized, hence the word face. Within the Latin language group of graphic shapes are the following forms: Uncial, Blackletter, Serif, Sans Serif, Scripts, and Decorative. Each form characterizes one or more designs. Example: Serif form contains four designs called Old Style, Transitional, Modern, and

Slab Serif designs. The typeface called Bodoni is a Modern design, while Times Roman is a Transitional design.

19 Bibliography

Editors note: the following books have been suggested by readers of comp.fonts. They are listed in no particular order. I have lost the citations for some of the submissions. If you wrote a review that appears below and you aren't credited, please let norm know.

I have decided that this is the best section for pointers to other font resources (specs and other documents, for example). These appear after the traditional bibliographic entries. As usual I will happily accept entries for this section. As of 9/92, the only files listed are the TrueType font information files available from Microsoft.

Bill Ricker contributed the following general notes:

The Watson-Guptill, Godine, and Dover publishers all have many typography titles. Godine and Dover tend to be excellent; W-G tends toward 'how-to' books which are good for basics and juried Annuals of job work.

Hermann Zapf and his Design Philosophy, Society of Typographic Arts, Chicago, 1987.

On Stone — The Art and Use of Typography on the Personal Computer, Sumner Stone, Bedford Arts, 1991.

Of the Just Shaping of Letters, Albrecht Durer, isbn 0-486-21306-4.

First published in 1525 as part of his theoretical treatise on applied geometry, "The Art of Measurment".

Champ Flevry, Geofroy Troy.

First published in 1529 Troy attempts, in this book, to design an ideal Roman alphabet upon geometrical and aesthetic principles.

The Alphabet & Elements of Lettering, Frederic W. Goudy, isbn 0-486-20792-7. Revised 1942 edition.

This very interesting book looks at the history of letter shapes as well font design.

The Mac is Not a Typewriter, Robin Williams, Peachpit Press.

A good, clear explanation of what typography is, and how to get it from your computer. Mac-specific, but full of excellent general advice. I think there's also a PC version. Available at most computer bookstores

Rhyme and Reason: A Typographic Novel, Erik Spiekermann, H. Berthold AG, ISBN 3-9800722-5-8.

Printing Types (2 vols), Daniel Berkely Updike, Dover Press.

Affordable edition of the most readable history of type, lots of illustrations.

Notes: Both the Dover and Harvard U. P. editions were 2 volumes. The Dover editions were paperback and the Harvard hardback. It appears that the Dover edition is out of print. Collectible HUP editions are not cheap although later HUP editions may be had. Most libraries have later HUP and Dover editions. If someone knows of a source, please pass it along.

The Art of Hand Lettering, Helm Wotzkow, Dover Press, reprint from 1952.

Looking Good In Print, Roger C. Parker, Ventana Press, ISBN: 0-940087-32-4.

Well, as a beginner's book, [it] isn't bad. I can't say that I agree with the author's tastes all the time, but he at least gives some good examples. Also there are some nice _Publish_-style makeovers. Don Hosek <dhosek@ymir.claremont.edu>

Book Design: A Practical Introduction, Douglas Martin, Van Nostrand Reinhold, New York: 1989. 206pp.

Along with Jan White's book (see below), this provides a fairly complete guide to book design. Martin's book is somewhat more conservative in outlook and also reflects his UK background. Don Hosek <dhosek@ymir.claremont.edu>

Digital Typography: An Introduction to Type and Composition for Computer System Design, Richard Rubinstein, Addison-Wesley, Reading, Massachusetts: 1988. 340pp.

An interesting, technological approach to typography which is worth reading although not necessarily always worth believing. A not insubstantial portion of the text is dedicated to representing type on a CRT display and Rubinstein devotes some time to expressing characteristics of typography numerically. Don Hosek <dhosek@ymir.claremont.edu>

Graphic Design for the Electronic Age, Jan V. White, Watson-Guptill Publications, New York: 1988. 212pp.

A good handbook for document design. In a well-organized approach, White covers the principles for laying out most of the typographics features of a technical document. White is a bit overeager to embrace sans-serif types and in places his layout ideas seem a bit garish, but it's still a quite worthwhile book. Don Hosek <dhosek@ymir.claremont.edu>

Xerox Publishing Standards: A Manual of Style and Design, Watson-Guptill Publications, New York: 1988. 400pp.

Overall, a disappointing book. It is divided into four sections of widely varying intent: "Publishing Process," "Document Organization," "Writing and Style" and "Visual Design." None of them is really adequate for the task and all are highly centered on the Xerox method for publishing. As a guide to Xerox' process, it succeeds, but as a manual for general use, it falls far short. In print. Don Hosek <dhosek@ymir.claremont.edu>

Methods of Book Design (3rd edition), Hugh Williamson, Yale University Press, New Haven: 1983. 408pp.

It is a bit out-of-date as regards technology, but on issues relating purely to design it is comprehensive and definitive. Well, I suppose it could be argued that printing technology influences design – e.g. some types look fine in metal but lousy in digital imagesetting – and therefore a book that is out-of-date in technology can't really be "definitive" in matters of design either. In any event, _Methods_ is more than adequate for a beginner's needs. My paper-bound copy (ISBN 0-300-03035-5) was \$13.95; cheap at twice the price! Cameron Smith <cameron@symcom.math.uiuc.edu>

The Thames & Hudson Manual of typography, Rauri McLean, Thames & Hudson

An excellent book if you start getting more interested in type. Look for Rauri McLean's other books after this one... Liam R.E. Quin <lee@sq.com>

Typography and Why it matters, Fernand Baudin.

There is no better introduction than [it]. It's not a primer on subjects such as "what does Avant Garde look like," or "This is a good font for books." It is a good primer on the things you need to know before the rest should be considered. He's a lovely writer, to boot.

[My copy is at work, so I may have munged the title–look up Baudin in "Books in Print" and improvise :-)]

Ari Davidow <ari@netcom.com>

Better Type, Betty Binns

It's definitely not a lightweight beginner's introduction, but I've found [it] to be indispensable. It's a large-format hardcover, but you can find it remaindered for cheap if you look around. The book goes into great detail about how factors like line spacing, line length, point size, and design of typeface (evenness of stroke weight, x-height, etc.) affect readability. When you've gotten the basics out of the way and want to learn more about the fine nuances of type color, this book is an absolute must. David Mandl <dmandl@bilbo.shearson.com>

Printing Types: An Introduction..., S. Lawson, (revised) 1990

I'd also recommend Alexander S. Lawson's books especially /Printing Types: An Intro.../ (revised), 1990, which includes electronic types now. Bill Ricker <wdr@world.std.com>

Tally of Types, Stanley Morrison, Cambridge University Press.

A keepsake for CUP on the Monotype fonts he'd acquired for them when he was Type Advisor to both Brit.Monotype & CUP (Cambridge University Press, Cambs.UK), which discusses his hindsight on some of the great revival fonts and some of the better new fonts. Bill Ricker <wdr@world.std.com>

Chicago Manual of Style, University of Chicago Press, 1982; ISBN 0-226-10390-0.

The chapter on Design and Typography is most directly relevant, but there are a lot of hints scattered all through the Chicago Manual on making your words more readable and your pages more attractive. Stan Brown <brown@ncoast.org>

X Window System Administrator's Guide (O'Reilly X Window System Guides, volume 8), O'Reilly

It gives advice about setting up fonts, etc. Liam Quin <lee@sq.com>

How Bodoni intended his types to look Bodoni, Giambattista. Fregi e Majuscole Incise e Fuse de ... Bodoni, Harvard University Library (repr).

Inexpensive collectible, reproduced as a keepsake by the Houghton Library at Harvard. [wdr]

The Elements of Typographic Style, Robert Bringhurst, Hartley & Marks 0-88179-033-8 pbk \$15, Z246.B74 1992 0-88179-110-5 cloth, \$25.

A typography for desktop publishers who want to absorb some style. Informed by the historical european tradition and the desktop advertising, tempered by oriental yin-yang and examples. A page-turner with repeat-read depth.

The only book I've seen that discusses page proportions that admits there are more than three ways that describes how to find one that feels good for your page. [wdr]

Hermann Zapf on the cover-blurb: "All desktop typographers should study this book. ... I wish to see this book become the Typographers' Bible."

Printing It, Clifford Burke, Ballantine, 0-345-02694-2.

Manual for the hobby letterpress printer. [wdr]

Twentieth Century Type Designers, Sebastian Carter, Taplinger, 1987.

Discusses the talented adaptators of old faces to machine caster and film/laser, as well as the designers of new works. Indexed? [wdr]

Design with Type, Carl Dair, University of Toronto Press, 0-8020-1426-7.

In print again (or still?); the ISBN above may be stale.

A great introduction to the issues of practicality and taste that confront the users of type. A prized possession. I only regret that the book does not include among the excerpts from his Westvaco pamphlets the Seven Don'ts of Typography. [wdr]

Typography 6: The Annual of the Type Directors Club, Susan Davis, ed., Watson-Guptill, 0-8230-5540-x.

Specimens of Type Faces in the U.S. G.P.O., John J. Deviny, director., US G.P.O.

Practice of Typography: Plain Printing Types, Theodore Low De Vinne, Century Co./DeVinne Press.

One of the earlier critical studies, in four volumes of which this is my personal favorite, and still a classic reference. If one wants to understand 18th and 19th century typography in context, this writer lived the transition from eclectic to standard sizes, and comments with taste. [wdr]

An Essay on Typography, Eric Gill, Godine, 0-87923-762-7.

The Alphabet and Elements of Lettering, Frederic W. Goudy, Dorset Press (Marboro Books), 0-88029-330-6

Lovely. A wonderful way to learn Goudy's taste.

Stanley Morison Displayed, Herbert Jones, Frederick Muller Ltd / W, 0-584-10352-2.

Lovely. A wonderful way to learn Morrison's taste.

Printing Types: An Introduction..., Alexander S. Lawson et. al., Beacon 1971,?Godine? 1990; (2nd Ed includes electronic types now)

"Good introduction to comparisons of typefaces, with a detailed history and a key family or face of each general category. Denounces rigid indexes of type faces." [wdr]

Anatomy of a Typeface, Alexander Lawson, Godine, 0-87923-333-8, Z250.L34 1990

Deep description of the authors' favorite exemplar and its influences and relatives in each type category. It follows, without explicating, the category system developed in the prior book. [wdr]

Types of Typefacs and how to recognize them, J. Ben Lieberman, Sterling, 1968

"This isn't very good really, but it does give lots of examples of the main categories." [Liam] [Old bibliographies praised this one, but I haven't seen it so I can't comment.– wdr]

Tally of Types (& other titles), Stanley Morrison, Cambridge U. Press.

A keepsake for CUP on the Monotype fonts he'd acquired for them when he was Type Advisor to both Brit. Monotype & CUP (Cambridge University Press, Cambs.UK), which discusses his hindsight on some of the great revival fonts and some of the better new fonts. [wdr]

Rookledge's International Type Finder 2nd, Perfect, Christopher and Gordon Rookledge, Ed Moyer Bell Ltd / Rizzoli, 1-55921-052-4, Z250.P42 [1st Ed was NY: Beil 1983]

"Lg. trade pb. Indexed by stylistic & characteristic features. Shows A-Z, a-z, 0-9 in primary figures, whether lining or ranging. Particularly distinctive sorts are marked for ease of comparison. Separate tables collect the distinctive characters for assistance in identifying a sample." [wdr]

English Printers' Ornaments, Henry R. Plomer, Burt Franklin

Paragraphs on Printing, Bruce Rogers, [Rudge] Dover, 0-486-23817-2

Digital Typography: An Introduction to Type and Composition for Computer System Design, Richard Rubinstein, Addison-Wesley, Reading, Massachusetts: 1988. 340pp.

For people who are disappointed with how the type looks on the laser, this book explains the subleties of that medium and of the screen that others miss. This is a study of the Human Factors of computer typographic systems. [wdr]

The Case for Legibility, John Ryder, The Bodley Head, 0-370-30158-7, Z250.A4

The Solotype Catalog of 4,147 Display typefaces, Dan X. Solo, Dover, 0-486-27169-2, Z250.5.D57S654 19

"Working catalog of a specialty Graphics Arts shop. They use proprietary optical special effects techniques to get Desktop Publishing effects, and more, without the laser-printer grain. Great listing of 19th Century Decorated Types – probably the largest collection in the world. Prices to order headlines from them are NOT cheap however. Their services are for professional or serious hobby use only. Solo's previous Dover books show some number of complete alphabets of a general peculiar style; this one shows small fragments of his entire usable collection, important as an index. (According to private correspondence, they have more faces that have not yet been restored to usable condition.) Not well indexed, but indexed." [wdr]

Stop Stealing Sheep & find out how type works, Erik Spiekermann & E.M. Ginger., Adobe Press, 1993

Introductory, motivational. If you wonder why there are so many type faces in the world, this is the book for you! [Liam] [The title refers to the old joke: "A man who would letterspace lowercase would also steal sheep." [wdr]]

The Art & Craft of Handmade Paper, Vance Studley, Dover, 0-486-26421-1, TS1109.S83 1990

Letters of Credit, Walter Tracey, Godine Press

"I can't recommend this too highly. It's not as introductory as the Sheep Book, but conveys a feeling of love and respect for the letter forms, and covers a lot of ground very, very well." [Liam]

Printing Types: Their History, Forms & Use, Daniel Berkely Updike, Harvard University Press, reprint by Dover.

The standard reference. Tour-de-force history of type and type-styles. A trifle conservative in its biases, but typography is conservative for good reason: readability. Check the addenda for his final words on newer faces. [wdr]

1. I believe the Dover edition to be 3 vols Pbk; both the collectable and later Harvard U.P. editions were two vols hbk.

2. I am informed by my bookseller & Books In Print that the Dover edition is out of print. *sigh* If a source be known, let me know. Collectible HUP eds are not cheap, although later HUP eds may be had. Most libararies have later HUP or Dover eds. [wdr]

Modern Encyclopedia of Typefaces, 1960-90, Lawrence W. Wallis, Van Nostrand Reinhold, 0-442-30809-4, Z250.W238 1990

"Gives examples of most typefaces, almost all digital, designed & distributed in the last 30 years. Cross indexed by foundry and designer, and sources and looks-likes. Some historical bits. Shows full a-z,A-Z,0-9, a few points (punctuation); and 0-9 again if both lining and oldstyle supplied. Only complaint is that it omits small caps even from what few fonts have 'em and the accented characters, of which most have some but too few. List \$25." [wdr]

About Alphabets: Some Marginal Notes on Type Design, Hermann Zapf, MIT Press, 0-262-74003-6

Hermann Zapf & His Design Philosophy, Hermann Zapf, Society of Typographic Arts, Chicago

"Anything about, by, or vaguely connected with Hermann Zapf is probably worth reading several times :-)" [Liam]

Manuale Typographicum, Hermann Zapf, MIT Press, 0-262-74004-4

There are two books of this title (portrait and landscape); this is the only mass-market edition of either. Both are Zapf's selections of interesting typographical quotations in his inimitable display typography. [wdr]

Microsoft Windows 3.1 Programmer's Reference, Microsoft Press.

Documents the Panose system of typeface classification. Probably contains a general discussion of TrueType under MS Windows 3.1.

Introduction to Typography, 3rd ed, Faber, London, 1962.

A very good introduction for any beginner. Also discusses things like illustrations and cover design, although not in great detail.

Simon was a purist, as the editor of the 3rd edition remarks. He did not mention phototypesetting in his original edition, but some observations on its uses and abuses have since been added. Anders Thulin <ath@linkoping.trab.se>

Eve Damaziere contributes:

Twentieth Century Type, Lewis Blackwell, Calmann & King, London (GB), 1992. Chez Flammarion (1993 - 256 p.) pour l'edition francaise (french edition).

It's a very intelligent account of the history of type in our century, and its links to art, technics and politics (history). Lots of pictures, too. At the end of it, a "description and classification of types", from the 15th century up to now : the author follows the classification of Maximilien Vox (1952), a french graphist.

[ed: additional bibliographic information appears in the file "Additional-bibliography" on *http://www.ora.com/hon*
I have not yet had time to integrate this bibliographic information into the FAQ]

20 Font Encoding Standards

20.1 What is a character set?

A character set is a collection of symbols in a specific order. Some common character sets are ASCII and ISO Latin 1.

20.2 What is an encoding vector?

The term "encoding vector" is most frequently heard in the context of PostScript fonts. An encoding vector embodies a particular character set, it is simply the list of all the characters in the character set in the order in which they occur.

Most font technologies limit a particular encoding to 256 characters; an Adobe Type 1 font, for example, may contain an arbitrary number of characters, but no single encoding vector can contain more than 256.

Some common encodings are:

- Adobe Standard Encoding - the default encoding of many PS Type1 fonts
- Apple Standard Encoding - the default encoding on a Mac
- US ASCII - seven bit ASCII
- ISO Latin-1 - an eight bit multi-national character set encoding
- Cork Encoding - the TeX community's eight bit standard
- FC - an eight bit encoding for African languages
- TeX text - the TeX community's seven bit defacto standard (CMR)

20.3 Where can I get them?

You can get tables showing the layout of many standard character sets from the Kermit distribution (via anonymous ftp from `watsun.cc.columbia.edu` in `/kermit/charsets`.

21 PostScript

21.1 What About PostScript UNIQUEIDs?

This section was constructed from a posting by Johannes Schmidt-Fischer in Jun 1993.

All PostScript Type 1 fonts should contain a UniqueId. This is a number which should be, as the name suggests, unique (at least among the fonts that you download to the printer at any given time).

There are many PostScript fonts on the 'Net which have identical UniqeIds. If two of these fonts are downloaded to the same printer at the same time, attempts to use either font may cause the wrong characters to be printed.

In a nutshell, the reason that the wrong characters may be printed is that the printer may be storing the rendered glyphs in its font cache, addressed by UniqueID. So, if two fonts, /Foo and /Bar, both have UniqueID=5 and /Foo's 10pt "A" is currently in the cache, a request for /Bar's 10pt "A" will cause the wrong character to be printed. Rather than rendering /Bar's "A" from its (correct and unambiguous) outline, the printer will note that the cache contains a 10pt "A" for font 5 and will copy it from the cache (resulting in /Foo's "A" printing for /Bar).

Adobe's "Red Book" contains a detailed discussion of this topic.

21.2 Can a Type 1 Font Be Shaded?

David Lemon contributes:

There are three ways to get grey into a font. The first is to make a series of Type 1 fonts, each of which will be used for a single shade of grey (or other color). The user then sets copies of the characters on top of each other, selecting each and setting it to the shade desired. It's a bit inconvenient (and won't work in a word processor) but it gets full resolution, good hinting and gives the user lots of control. This is the approach Adobe has used in its "chromatic" fonts (as in Adobe Wood Type 3 and Copal) and is viable for both Type 1 and TrueType formats.

As an alternative, the designer can approximate shades of grey in the characters by using many little dots (a sort of halftone effect) or lines (as in cross-hatching). This leads to pretty complex characters, which may choke some rasterizers, and won't hint well. As with the first method, this is viable (more or less) for both Type 1 and TrueType.

The third method is more direct but limited. In this approach, the designer/producer creates the shades of grey in a font-editing program. The limitation is that such a font must be written in Type 3, which is a generalized PostScript format (Type 1 and TrueType recognize only solid shapes). Such a font won't be supported by ATM, so your screen display will suffer and you'll be restricted to PostScript printers. On the plus side, your greys will be rendered at the full resolution of the printer you use.

22 TrueType

George Moore announces the following information regarding TrueType fonts:

"I am pleased to announce that there is now one central location for all official Microsoft TrueType information available on the Internet. The 9 files listed below are available for anonymous ftp access on ftp.microsoft.com in the /developr/drg/TrueType-Info directory. The most important of those files is the TrueType Font Files Specifications, a 400 page book which describes in excruciating detail how to build a TrueType font. Other information is also available in the same directory and other files will be added from time to time.

For those people who do not have ftp access to the Internet can find the same information available for downloading on Compuserve in the Microsoft developer relations forum (GO MSDR) in the TrueType library.

Please be aware that the TrueType specifications is a copyrighted work of Microsoft and Apple and can not be resold for profit.

TrueType developer information files on ftp.microsoft.com:

1. `ttspec1.zip`, `ttspec2.zip`, and `ttspec3.zip`

   The TrueType Specification:

   These three compressed files contain the "TrueType Font Files Specifications", a 400 page book complete with illustrations which details how to construct a TrueType font from scratch (or build a tool to do so), the TrueType programming language, and the complete format of each sub-table contained in the .TTF file. These documents are stored in Word for Windows 2.0 format and require Windows 3.1 for printing. See the "readme.doc" (in ttspec1.zip) for printing instructions. Requires 2.5MB of disk space after uncompression.

   This manual is a superset of the similar specifications from Apple and has added information specific to Windows that is not present in the Apple version.

2. `ttfdump.zip`

   An MS-DOS executable which will dump the contents of a TrueType font out in a human-readable fashion. It allows you to dump the entire font, or just specific sub-tables. This tool, combined with the specifications above, allows very effective debugging or exploration of any TrueType font. For example, to dump the contents of the 'cmap' (character code to glyph index mapping) table, enter:

   ttfdump fontname.ttf -tcmap -nx

   Entering "ttfdump" with no options will give you a help message.

3. `ttfname.zip`

   Example C source code on how to parse the contents of a TrueType font. Although this particular example will open up the file and locate the font name contained within the 'name' table, it could be readily adapted to parse any other structure in the file. This compressed zip file also contains many useful include files which have pre-defined structures set up for the internal tables of a TrueType font file. This code may be useful for developers who wish to parse the TrueType data stream returned by the GetFontData() API in Windows 3.1.

4. `tt-win.zip`

   A 31 page Word for Windows 2.0 document which is targeted for the Windows developer who is interested in learning about some of the capabilities TrueType adds to Windows 3.1. Contains many illustrations.

5. `embeddin.zip`

   A text file which describes all of the information necessary for a Windows developer to add TrueType font embedding capabilities to their application. Font embedding allows the application to bundle the TrueType fonts that were used in that document and transport it to another platform where the document can be viewed or printed correctly.

6. `tt-talk.zip`

   The TrueType Technical Talks 1 and 2. These text files describe some of the things that are happening with TrueType behind the scenes in Windows 3.1. The first document walks the reader through all of the steps that occur from when the user first presses the key on the keyboard until that character appears on the screen (scaling, hinting, drop out control, caching and blitting). The second talk describes one of the unique features of TrueType called non-linear scaling which allows the font vendor to overcome some of the physical limitations of low resolution output devices.

7. `lucida.zip`

   This text file contains useful typographic information on the 22 Lucida fonts which are contained in the Microsoft TrueType Font Pack for Windows. It gives pointers on line-layout, mixing and matching fonts in the family and a little history on each typeface. This information was written by the font's designers, Chuck Bigelow & Kris Holmes."

23 Unicode

[ed: This is a summary of the Unicode info I've gleaned from the net recently, the whole Unicode issue needs to be addressed better by the FAQ...someday... someday...I'll get to reorganize the whole thing]

23.1 What Is Unicode?

Charles A. Bigelow notes:

The authors of the Unicode standard emphasize the fact that Unicode is a *character encoding*, not a *glyph encoding*. This might seem like a metaphysical distinction, in which characters have some "semantic" content (that is, they signify something to literates) and and glyphs are particular instantiations or renderings of characters—Plato talked about this kind of stuff—but in practice it means that most ligatures are not represented in Unicode, nor swash variants, nor figure variants (except for superior and inferior, which are semantically distinct from baseline figures), and so on.

For further information, consult *The Unicode Standard: Worldwide Character Encoding* Version 1.0, Vol. 1 (alphabets & symbols) and Vol 2. (Chinese, Japanese, Korean characters), by The Unicode Consortium, Addison Wesley Publishing Co, 1991, ISBN 0-201-56788-1, 0-201-60845-6.

23.2 What is the Unicode Consortium?

The Unicode Consortium is an international body responsible for maintaining the Unicode standard. Their email address is `<unicode-inc@unicode.org>`

To obtain more information on Unicode or to order their printed material and/or diskettes contact:

Steven A. Greenfield
Unicode Office Manager
1965 Charleston Road
Mountain View, CA 94043
Tel. 415-966-4189
Fax. 415-966-1637

23.3 Unicode Editing

James Matthew Farrow contributes:

I use 'sam' for all by text editing. It is X editor based on an editor for the blit called jim. Papers describing sam as well as a distribution of sam itself are available for ftp from research.att.com. The sam there is a Unix port of the Plan 9 version. Plan 9 is a full unicode operating system, even around before NT! The libraries sam is built upon therefore support 16 bit wide characters. The graphics library, supplied with it at present does not. However they may be planning to distribute a new version which does soon. The library just plugs in replacing the library that comes with sam. No modification is necessary. Character are stored using the utf-2 encoding.

All of the files I had before I started working with sam were 7 bit ascii so no conversion was needed. Now I have ditched xterm in favour of 9term: a terminal emulator in the style of 81/2 (the Plan 9 interface). This lets me type Unicode characters on the command line, as part of filenames, in mail, wherever and most Unix utilities cope without modification. This is about to be released. I'm looking for beta testers. ;-)

23.3.1 Is a special keyboard required?

No. ASCII Characters are typed as normal. Common characters above 0x7f are typed using two letter abbreviations. The table is similar to the troff special character codes, e.g, Alt-12 gives you a 1/2, Alt-'e gives you e acute, Alt-bu a bullet and so on. This table is hardwired into the library at present but is trivial to change. Other codes are accessed by typing their hex value, for instance the smiley is Alt-X263a (0x263a being a smiley character in the Unicode character set).

23.3.2 Is roman-to-Unicode conversion available?

All normal 7 bit ascii characters are encoded as themselves so no translation is needed. There are conversion routines in the library (runetochar and chartorune) which will do the conversion and it should be pretty simple to convert files already in another format. You would have to write something to do the transliteration yourself. A small patch to the system would let you enter different language 'modes' for text entry.

23.4 Are there PostScript or TrueType fonts available?

Apparently there is a version of the Lucida fonts by Bigelow and Holmes which support Unicode. This is the information I have on them.

[ed: quoting another source]

[Windows NT] will ship with a Unicode TrueType font containing approximately 1,500 characters. The font is called "Lucida Sans Unicode" and was specifically designed by Bigelow and Holmes for Microsoft to contain the following Unicode sets:

```
ASCII
Latin 1
European Latin
Extended Latin
Standard Phonetic
Modifier Letters
Generic Diacritical
Greek
Cyrillic
Extended Cyrillic
Hebrew
Currency Symbols
Letterlike Symbols
Arrows
Mathematical Operators
Super & Subscript
Form & Chart Components
Blocks
Geometric Shapes
Miscellaneous Technical
Miscellaneous Dingbats
```

The bitmap fonts which comes with the utf version of the libXg graphics library (the library upon which sam is built) support a sparse subset of the full character set. That is, only a few of them have glyphs at present. A font editor such as xfedor would let you add more. The list of those currently available is pretty much as the above list.

I use 9term and sam as a matter of course now and have for several months. I enjoy the convenience of putting special characters and accented characters in my mail as well as being able to do some phonetic work all in the one terminal/editor suite.

24 Can I Print Checks with the MICR Font?

This comes up all the time: standard ordinary laser toner is magnetic and will be read by the banks. The gotcha is that standard laser toner rubs off in the *very* high-speed sorting equipment that are used, and this makes read rates drop low and the banks will hate you.

I researched check printers for a customer, and was surprised to find this. The Troy(tm) printers he bought are basically stock Ricoh engines that have slightly tighter paper handling (for registration), plus they add a proprietary Teflon-type powder coating on the output path to coat the checks.

I saw some examples of checks printed with and without this special coating after running through something like 40 passes through check processing equipment, and the one without the coating was a mess. These require special handling that the banks do *not* like. Apparently, they go after companies that issue these kinds of checks with special processing fees.

25 Rules of Thumb

It is difficult to set out guidelines for font usage, because almost any rule can be brilliantly broken under the right circumstances.

- General guidelines:
  - Never lose track of the kind of work you're doing. An effect that would ruin a newsletter might be just the thing for a record cover. Know when you can safely sacrifice legibility for artistic effect.
  - Keep in mind the final reproduction process you'll be using. Some effects (like reversed type, white on black) can be hard to read off an ordinary 300-dpi laser, but will work if finals are done on a high-resolution printer, such as a Linotronic. Will the pages be photocopied? Offset? Onto rough paper, shiny paper? All these factors can and should influence your choice of fonts and how you use them.
  - Running some comparative tests is a good idea. Better to blow off a few sheets of laser paper now than to see a problem after thousands of copies are made.
  - No one can teach you font aesthetics; it must be learned by example. Look at beautiful magazines, posters, books with wide eyes, so that you can see how it's done. Examine ugly printed matter critically and consider why it's hard to read.
- Good rules of thumb:
  - If you need a condensed font, find one that was designed that way, rather than scaling an existing font down to a percentage. Any scaling distorts a font's design; excessive scaling interferes with legibility - this goes for widening as well as narrowing. Extended faces do exist, although they aren't as common as condensed ones.
  - Many people feel that bold or italic type, or type in ALL CAPS, is more legible: "This is the most important part of the newsletter, let's put it in bold." In fact, legibility studies show that such type is actually harder to read in bulk. Keep the text in a normal style and weight, and find another way to emphasize it - box it, illustrate it, run it in color, position it focally.
  - Too much reverse type - white on black - is hard on the eyes. It can be a nice effect if used sparingly. Don't reverse a serif font, though - its details will tend to fill in. Stick to reversing bold sans-serifs, and remember to space them out a bit more than usual.
  - It is always safest to use a plain serif font for large amounts of text. Because Times is widely used, it doesn't mean it should be avoided. Fonts like Palatino, Times, Century Old Style are deservedly popular because people can read a lot of text set in such faces without strain.

    Don't expect anyone to read extensive text set in a condensed font.

- As point size gets bigger, track tighter, and (if the software allows) reduce the spacebands as well. A spaceband in a headline size (anything over 14 point) should be about as wide as a letter "i".
- If you only have a few large headlines, hand-kerning the type, pair by pair, can make the end result much more pleasing. Besides, working with fonts this closely makes them familiar.
- Column width and justification are major elements in design. The narrower the column, the smaller the type can be; wide rows of small type are very hard to read. Often it's a better idea to set narrow columns flush left rather than justified, otherwise large gaps can fall where hyphenation isn't possible.
- Use curly quotes.
- Don't put two spaces at the end of a line (.) instead of (.) when using a proportionally spaced font.

26 Acknowledgements

The moderators would like to express their gratitude to the whole community for providing insightful answers to innumerable questions. In particular, the following people (listed alphabetically) have contributed directly to this FAQ (apologies, in advance, if anyone has been forgotten):

Masumi Abe <abe@keleida.com>
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27 A Brief Introduction to Typography

Space, time, and bandwidth are too limiting to provide a complete introduction to typography in this space. I'd be very willing to make one available for anonymous ftp, if you want to write one, but I'm not going to write it–I have neither the time nor the expertise. However, the following description of Times, Helvetica, and Courier will suffice for a start. For more information, several books on typography are listed in the bibliography.

27.1 Comments by Laurence Penney:

Laurence Penney offers the following description of Times, Helvetica, and Courier:

Times is a typeface designed in the 1930s for the Times newspaper in London and is now used widely in books, magazines and DTP. Its design is based on the typographical principles evolved since Roman times (upper case) and the 16th century (lower case). It is called a TRANSITIONAL typeface, after the typefaces of the 17th century which it resembles. Like all typefaces designed for typesetting large quantities of text, it is proportionally spaced: the i takes about a third the width of an M. Personally I don't like Times too much and prefer the more elegant Garamond and Baskerville, but these will probably cost you money... Note: The Transitionals came after the Old Styles (like Garamond) and before the Moderns (like Bodoni).

Helvetica is an example of a SANS-SERIF typeface. These first appeared in the late 19th century in Germany and flourished in the 1920s and 30s, when they were regarded as the future of typography. It's more a geometric design than the humanist design of Gill Sans, but less geometric than Avant Garde and Futura. To my mind it lacks elegance, and Adrian Frutiger's Univers shows how this kind of typeface should be done. (Just compare the B, R, Q, a, g of Univers and Helvetica to see what I mean – and don't you just love Univers's superbly interpreted ampersand ?!) Helvetica is one of the few fonts that is improved by its BOLD version.

Another interesting approach to sans-serif is Optima, by Hermann Zapf, which keeps the stroke-weight variations which sans-serifs usually reject. Use sans-serif fonts for the same applications as Times, above, but where you're less concerned with elegance, and more with a functional appearance - they're generally reckoned to be slightly less legible than good serifed fonts. They're also very suitable for display work.

Courier is a typeface derived from typewriter styles. It should ONLY be used when you want to simulate this effect (e.g. when writing letters Courier usually appears "friendlier" than Times). Like all typewriter fonts, it is MONOSPACED (characters all have the same width) and is thus suitable for typesetting computer programs. However there are nicer looking monospace fonts than

Courier (which has oversize serifs), that still remain distinct from the text fonts like Times and Helvetica. A good one is OCR-B, designed by Frutiger. Note that monospaced fonts are less economical on space than proportional fonts.

[ed: Following the original posting of this message, Laurence Penny and Jason Kim discussed the issue privately. The following summary of their discussion may serve to clarify some of the more subtle points. My thanks to Laurence and Jason for allowing me to include this in the FAQ.]

———————————

LP-1> The Transitionals came after the Old Styles (like Garamond) and before the Moderns (like Bodoni).

JK> Not necessarily true! Ideologically, yes, but not chronologically. I believe, for example, that Bodoni predates New Century Schoolbook or some such typeface.

LP-2> What I meant by "X came after Y" was "the first examples of X appeared after the first examples of Y" – it's called precis. Some people still make steam trains, but you can still say "Steam engines came before diesels." This is chronological, not ideological in my book.

———————————

LP-1> Another interesting approach to sans-serif is Optima, by Hermann Zapf, which keeps the stroke-weight variations which sans-serifs usually reject. Use sans-serif fonts for the same applications as Times, above, but where you're less concerned with elegance, and more with a functional appearance - they're generally reckoned to be slightly less legible than good seriffed fonts. They're also very suitable for display work.

JK> Slightly? I have several textbooks typeset by utter fools and they are a pain in the ass (and eyes) to read! Please don't encourage anyone to use Optima (or any sans serif fonts for that matter) "for the same applications as Times," which, need I remind you, was designed for *newspaper* work!!

LP-2> OK, maybe I was a little over-generous to Univers, Helvetica, etc., but I think variation is extremely important in typography. Have you ever read the British magazine "CAR" ? That uses Helvetica light (I think) in a very legible and attractive way, IMO. I agree, though, Optima is crappy for text, but it's a very valuable experiment and looks beautiful when printed in high quality for titling, etc. And yes, *books* in Helvetica are generally awful.

———————————

JK> Serifs have been scientifically shown to be a *lot* easier on the reader, as they guide the eyes along the lines.

LP-2> In all tests I've seen the serifs have always won the day, but only with certain seriffed fonts, and fonts like Univers aren't far behind. The "tracking" advantage for serif fonts is reduced when you're talking about narrow newspaper/magazine columns.

———————————

JK> You wrote a pretty short and partial history of type. Why ignore the roots of type (blackletter) as well as the climax (moderns–give an explanation) and subsequent 'post-modern' revivals?

LP-2> I was just talking about the place the 3 most common DTP types hold in the history of typography, and a few associated pitfalls. It wasn't meant as a "history of typography" at all. Please feel free to provide such a history yourself.

JK> I think any short list of specific faces is incomplete without mention of Palatino, the most popular Old Style revival in existence.

LP-2> Do you? To my mind Palatino is grossly over used. You must agree it looks bad for dense text. It isn't a proper "oldstyle revival" at all, more of a "calligraphic interpretation" of it. Zapf designed it as a display face, and wasn't too concerned about lining up the serifs (check out the "t"). And it just *has* to be printed on 1200dpi devices (at least) to look good in small sizes. OK then, maybe a short list is incomplete without a caution NOT to use Palatino...

JK> Also, if this is meant to be a "quick history/user guide for those fairly new to using fonts on desktop publishing systems," then I would recommend more directions about the proper uses of certain faces (e.g., Goudy for shaped text, Peignot for display *only*) and styles (e.g., italics for editorial comments, all-caps for basically nothing).

LP-2> Okay, okay. I was only sharing a few ideas, not trying to write a book. Surely you agree that the 3 typefaces I chose are by far the most commonly used and abused these days? I don't think a discussion of Goudy or Peignot fits in very well here, unless we're hoping to make a very wide-ranging FAQL. Regarding styles: first, italics are used principally for *emphasis* (rather than bold in running text); second, all good books have a few small caps here and there, don't they? - all mine do...

JK> Sorry if I come across as critical. I think the idea of making a FAQL is a good one, as is your effort. We just have to make sure it doesn't give any newbies the wrong impressions and further perpetuate the typographical morass we're facing today.

LP-2> Sorry if I come across as defensive, but I stand by what I said and object to the suggestion that I am "perpetuating the typographical morass". (I don't know if you really intended this - apologies if you didn't.)

27.2 Comments by Don Hosek:

Don Hosek offers the following additional notes:

The "Times" in most printers is actually a newer version of the font than Monotype's "Times New Roman" which it is originally based on. Walter Tracy's _Letters of Credit_ gives an excellent history of the face which was based on Plantin and in the original cutting has metrics matching the original face almost exactly. Another interesting note about the face is that it is almost a completely different design in the bold: this is due to the fact that old-styles are difficult to design as a bold. Incidentally, the classification of Times as a transitional is not firm. It likely is placed there by some type taxonomists (most notably Alexander Lawson) because of the bold and a few minor features. Others, myself included, think of it as a old style. The typeface listed in the Adobe catalog as Times Europa was a new face commissioned in 1974 to replace the old Times (whose 50th birthday was this past October 3rd).

Hermann Zapf is not particularly pleased with any of the phototypesetting versions of Optima. As a lead face, Optima is very beautiful. His typeface "World", used in the World Book Encyclopedia is one recutting for photocomp which improves the font somewhat. He is on record as saying that if he had been asked, he would have designed a new font for the technology.

28 A Brief History of Type

Thomas W. Phinney contributes the following discussion of the history of type[1]:

28.1 Foreword

It is difficult to cover all the developments and movements of typography in a short space. My separation of evolving technologies from the development of typefaces is an artificial one—designs and the technology used to create them are not truly separable—but perhaps it is conceptually useful.

Where names of typefaces are used, I attempt to use the original name: there are often clones with very similar names.

I shall update, clarify and correct this essay periodically, and will be happy to credit contributors. I can be e-mailed on CompuServe at 75671,2441 (Internet: `75671.2441@compuserve.com`).

28.2 Type Technology—The Four Revolutions

28.2.1 Gutenberg (ca. 1450-1480) & The Impact of Printing

Before the printing press, books were produced by scribes (at first, primarily based in monasteries, although by the 12th century there were many lay copiers serving the university market). The process of writing out an entire book by hand was as labor-intensive as it sounds (try it some time): so much so that a dozen volumes constituted a library, and a hundred books was an awe-inspiring collection.

This remained true until the invention of movable type, the perfection of which is attributed to Johannes Gutenberg (although the Chinese had it several centuries earlier, and a Dutch fellow named Coster may have had some crude form a decade earlier). Gutenberg, although a man of vision, did not personally profit from his invention. He worked for over a decade with borrowed capital, and his business was repossessed by his investors before the first mass-produced book was successfully printed—the Gutenberg Bible of 1454, printed in Mainz by Fust and Schoeffer.

[1] Version 1.02 14 Apr 1995

Gutenberg's basic process remained unchanged for centuries. A punch made of steel, with a mirror image of the letter is struck into a piece of softer metal. Molten metal is poured into this, and you get type. The type is put into a matrix to form the page of text, inked, then pressed into paper.

Within several decades typesetting technology spread across Europe. The speed with which it did so is impressive: within the first fifty years, there were over a thousand printers who set up shops in over two hundred European cities. Typical print runs for early books were in the neighborhood of two hundred to a thousand books.

Some of these first printers were artisans, while others were just people who saw an opportunity for a quick lira/franc/pound. The modern view of a classical era in which craftsmanship predominated appears unjustified to scholars: there has always been fine craft, crass commercialism, and work that combines both.

To those who have grown up with television, radio, magazines, books, movies, faxes and networked computer communications it is difficult to describe just how much of a revolution printing was. It was the first mass medium, and allowed for the free spread of ideas in a completely unprecedented fashion. The Protestant Reformation might not have occurred, or might have been crushed, without the ability to quickly create thousands of copies of Luther's Theses for distribution.

Many groups sought to control this new technology. Scribes fought against the introduction of printing, because it could cost them their livelihoods, and religious (and sometimes secular) authorities sought to control what was printed. Sometimes this was successful: for centuries in some European countries, books could only be printed by government authorized printers, and nothing could be printed without the approval of the Church. Printers would be held responsible rather than authors for the spread of unwanted ideas, and some were even executed. But this was a largely futile struggle, and most such restraints eventually crumbled in the western world.

28.2.2 Industrial Revolution: Steam, Line-casting & Automated Punch-cutting (start 1870-95; end 1950-65)

Amazingly, the printing press and the science of typecutting had only minor refinements from the late 1500s to the late 1800s. Towards the end of this period, the industrial revolution brought major innovations in printing technology. Rotary steam presses (steam 1814, rotary 1868) replaced hand- operated ones, doing the same job in 16 per cent of the time; photo-engraving took over from handmade printing plates.

Typesetting itself was transformed by the introduction of line-casting machines, first Ottmar Mergenthaler's Linotype (1889), and then the Monotype machine. Essentially, line-casting allowed type be chosen, used, then recirculate back into the machine automatically. This not only introduced

a huge labor savings in typesetting, (again, on the order of the 85% reduction in printing time), but also rendered obsolete the huge masses of metal type created by the previously existing type foundries.

While typesetting and printing speeds increased phenomenally, so did the speed of punchcutting. In 1885, Linn Boyd Benton (then of Benton, Waldo & Company, Milwaukee) invented a pantographic device that automated the previously painstaking process of creating punches. His machine could scale a drawing to the required size, as well as compressing or expanding the characters, and varying the weight slightly to compensate for the larger or smaller size— this last being a crude form of the "optical scaling" done by skilled typographers making versions of the same font for different sizes. In optical scaling, the thickest strokes retain the same relative thickness at any size, but the thinnest strokes are not simply scaled up or down with the rest of the type, but made thicker at small sizes and thinner at large display sizes, so as to provide the best compromise between art and readability.

The economic impact of all these advances on the type industry cannot be overstated. For example, in the United States, the majority of type foundries escaped a bankruptcy bloodbath in 1892 by merging into a single company, called American Type Founders (ATF). Ultimately twenty-three companies merged into ATF, making it far and away the dominant American type foundry.

Also around this time, the "point" measurement system finally reached ascendancy. In the earlier days of printing, different sizes of type had simply been called by different names. Thus, "Brevier" was simply the British name for 8-point type of any style. Unfortunately, these names were not standardized internationally; 8-point type was called "Petit Texte" by the French and "Testino" by the Italians. Such a naming system also allowed wonderful confusion, such as "English" referring both to blackletter type, and a 14-point size; "English English" was thus a 14-point blackletter!

Pierre Simon Fournier had first proposed a comprehensive point system in 1737, with later refinements, but what was ultimately adopted was the later version developed by Francois Ambroise Didot. This put approximately 72 points to the inch (and now exactly 72 points to the inch on most computer- based typesetting systems).

28.2.3 Photocomposition (Intertype et. al., start 1950-60, end 1975-85)

The first photocomposition devices (the French "Photon" and Intertype's Fotosetter) made their debuts as early as 1944, but didn't really catch on until the early 1950s. Typeface masters for photocomposition are on film; the characters are projected onto photo-sensitive paper. Lenses are used to adjust the size of the image, scaling the type to the desired size. In some senses this technology was an "improvement," allowing new freedoms, such as overlapping characters. However, it also pretty much eliminated optical scaling (see 2.2, above), because in the rush to

convert fonts to the new format, usually only one design was used, which was directly scaled to the desired size.

28.2.4 Digital (start 1973-83)

The earliest computer-based typesetters were a hybrid between the above- mentioned photocomposition machines and later pure digital output. They each had their own command language for communicating with output devices. Although these machines had advantages, they also had problems. None of these early command languages handled graphics well, and they all had their own formats for fonts. However, some of these devices are still in service as of 1995, for use in production environments which require more speed and less flexibility (phone books, newspapers, flight schedules, etc.).

In the late 1980s PostScript gradually emerged as the de facto standard for digital typesetting. This was due to a variety of reasons, including its inclusion in the Apple Laserwriter printer and its powerful graphics handling. When combined with the Macintosh (the first widely used computer with a what-you-see-is-what-you-get display) and PageMaker (the first desktop publishing program), the seeds were all sown for the current dominance of computer-based typesetting.

Most high-end typesetting still involves printing to film, and then making printing plates from the film. However, the increasing use of high- resolution printers (600-1200 dots per inch) makes the use of actual printing presses unnecessary for some jobs. And the next step for press printing is the elimination of film altogether, as is done by a few special systems today, in which the computer can directly create printing plates.

Today, although PostScript predominates, there are a variety of competing page description languages (PostScript, HP PCL, etc.), font formats (Postscript Type One and Multiple Master, Truetype and Truetype GX) computer hardware platforms (Mac, Windows, etc.) and desktop publishing and graphics programs. Digital typesetting is commonplace, and photocomposition is at least dying, if not all but dead. Digital typefaces on computer, whether Postscript or some other format, are generally outline typefaces, which may be scaled to any desired size (although optical scaling is still an issue).

There has been considerable economic fallout from all this in typography. Although some digital type design tools are beyond the price range of the "average" user, many are in the same price range as the mid- to high-end graphics and desktop publishing programs. This, combined with the introduction of CD-ROM typeface collections, has moved digital type away from being an expensive, specialized tool, towards becoming a commodity. As a result of both this and the brief photocomposition interregnum, the previously established companies have undergone major shakeups, and even some major vendors, such as American Type Founders, have failed to successfully make the

digital transition, and gone bankrupt instead (although at this time ATF appears to be undergoing a resurrection). More recently, even major digital type foundries have–dare one say foundered?–on the shoals of ubiquitous cheap typefaces (even a licensing deal with Corel Corp seems to have been insufficient to save URW).

Although there is a new accessibility of type design tools for hobbyists and professional graphic artists, the decreasing value of individual typefaces has resulted in a decrease in the number of working type designers per se (both independents and company-employed).

28.3 Type Forms Through the Centuries

One must keep in mind that although typefaces may have come into use at a particular point in time, they often continued in general use far beyond that time. Even after the rise of old style typefaces in the late 1500s, the blackletter type was commonly used for setting text for several centuries (well into the 1900s in Germany). With later interpretations of earlier forms being relatively common, the *style* of a given typeface may belong to a quite different period from that of the typeface itself! Further, many typefaces have very complex histories: a type could have been originally designed in metal at one time, reworked by someone else later, made into a phototypesetting face by another person, and then later created in digital form by yet another designer—who might have been working off of any of the above as the basis of their work.

The classification system used here (old style, transitional, modern, sans serif, slab serif, etc.) has the virtues of being both simple and widely used. However, the precision and artistic accuracy of this system is perhaps dubious: see Robert Bringhurst's Elements of Typographic Style or his article in the first issue of Serif magazine for a more thorough system.

In discussing the differences between type, one must refer to a number of technical terms. For illustrations of these terms, see also the downloadable graphics file TYPHS_72.GIF or TYPHS300.GIF. The numbers refer to the dots per inch of the graphic when scaled to a full page: 72 dpi is a low resolution suitable for screen viewing, while 300 dpi is better-suited to laser printing. With any luck, both should be available for FTP or download from the same site as this file. If so, you would be well advised to refer to these pictures for illustrations of both these terms and the differences between different categories of typefaces. If you are a newcomer to typography, some sort of visual reference is essential to understand the differences between fonts explained here. Your options include: the aforementioned graphics files; type samples from a book, manual or font vendor's catalog; or simply viewing or printing out the fonts you have available on your computer system, if you have a reasonable variety.

28.3.1 Definitions

Contrast: The degree of difference between the thick and thin strokes in a font (if any).

Stress (axis): The angle at which contrast occurs, usually ranging from vertical to a somewhat back-slanted diagonal. This can best be noted by looking at, for example, the letter "O" and noting if the bottom left is thicker than the top left, and the top right is thicker than the bottom right. If this difference exists, the letter has diagonal stress. If the two halves of the "O" are a mirror image of each other, with the sides thicker than the top/bottom, then the letter has vertical stress. If the top and bottom of the "O" are the same thickness as the sides, there is neither contrast nor stress.

Serifs: Those "finishing strokes" or "fillips" going off the ending lines of a letter. For example, when the number "1" or the letter "i" are drawn with a bar across the bottom, the two halves of the bar are serifs. If the serif is joined to the letter by a slight flaring out, it is said to be "bracketed."

28.3.2 Early Letterforms

Although writing itself can be traced back to several millennia B.C., to Egyptian hieroglyphics and Sumerian cuneiform inscriptions, modern letter forms have their most immediate heritage in Roman inscriptions from around 50- 120 AD, such as the one on the base of Trajan's Column in the Roman Forum (114 AD, digital version by Twombly for Adobe, 1989).

Although early Latin writing was heavily influenced by these chiseled- in-stone letterforms, over the centuries it evolved into a variety of other shapes, including uncials and the related Carolingian script. It is through this period of the sixth to tenth centuries that we see the development of the lower case (minuscule) letter as a different shape from the upper case (capital).

Type forms similar to what we now think of as "normal" letter shapes evolved from the Carolingian (or Caroline) minuscule. The Carolingian letters are so-called because of their adoption by the Emperor Charlemagne (late 10th century) as a standard for education. Digital revivals of these exist, such as Carol Twombly's Charlemagne (1989).

By the fifteenth century, italics also existed, in the form of a cursive script which had developed in Rome and Florence. However, italics at this time were a completely separate entity from the upright letterforms, as they remained in the early days of printing.

28.3.3 Blackletter

The first printed types exemplify what most people think of as medieval or "old English" lettering, with ornate capitals, roughly diamond-shaped serifs, and thick lines. As a group, these typefaces are called "blackletter." They evolved from the Carolingian by a gradual movement towards narrowing and thickening of lines.

The general sort of blackletter used by Gutenberg in his first Bible is called textura (a shareware digital version of Gutenberg's bible face is available, called "Good City Modern"). The other sorts of blackletter are fraktur, bastarda and rotunda. Probably the most common blackletter revival typefaces in use today are Cloister Black (M.F. Benton, 1904, from J.W. Phinney) and Fette Fraktur.

It is worth noting that although these typefaces seem very hard to read to us today, this is due as much to familiarity as to any objective lesser clarity. Fraktur was in use in Germany well into the 1900s, though it was gradually being superseded by Roman typefaces. The Nazis at first fostered a return to Fraktur, then outlawed it as a "Jewish typeface" in 1940.

Studies from mid-century found that people can read blackletter with a speed loss of no more than 15%. However, there is subjectively more effort involved. Blackletter is today most appropriate for display or headline purposes, when one wants to invoke the feeling of a particular era.

28.3.4 Old Style Typefaces: Centaur, Bembo, Jenson, Garamond, Caslon

E.P. Goldschmidt, as explained by Stanley Morison, claimed that "the supersession of black-letter was not due to any 'technical advance,' it was the visible expression of a changed attitude of mind." The Renaissance was typified by an obsession with things "classical," in the Greco-Roman sense, which had major implications for typography. The neo-classical letterforms were somewhat more condensed than the Carolingian shapes, but much rounder and more expanded than the blackletter.

Old style type is generally considered "warm" or friendly, thanks to its origins in Renaissance humanism. The main characteristics of old style typefaces are low contrast with diagonal stress, and cove or "bracketed" serifs (serifs with a rounded join to the stem of the letter). The earliest (Venetian or Renaissance) old style typefaces (originally 15th-16th Century) have very minimal contrast, and a sloped cross-bar on the lower-case "e." One such is Bruce Rogers' Centaur (1916), based on Jenson. Similarly, Monotype's Bembo (1929) is based on the work of Francesco Griffo, circa 1499.

Italics at this point were still independent designs, and were generally used completely separately; a whole book could be set in italics. Probably the most famous italic of the period is Arrighi's

(1524), which may be seen today as the italic form of Centaur. Likewise, the italic form of Bembo is based on the italic of Tagliente (also 1524).

Later or baroque old style type (17th Century) generally has more contrast, with a somewhat variable axis, and more slope of italic. The most common examples are the types of Garamond and Caslon, many variant revivals of which exist in digital form.

28.3.5 Transitional Type: Baskerville, Fournier

"Transitional" type is so-called because of its intermediate position between old style and modern. The distinguishing features of transitional typefaces include vertical stress and slightly higher contrast than old style typefaces, combined with horizontal serifs. The most influential examples are Philippe Grandjean's "Romain du Roi" for the French Crown around 1702, Pierre Simon Fournier's work circa 1750, and John Baskerville's work from 1757 onwards. Although today we remember Baskerville primarily for his typeface designs, in his own time people were much more impressed by his printing, which used an innovative glossy paper and wide margins.

Later transitional types begin to move towards "modern" designs. Contrast is accentuated, and serifs are more flattened. Current examples of such are based on originals from approximately 1788-1810, and are dominated by British isles designers, such as Richard Austin (Bell, 1788), William Martin (Bulmer) and Miller & Richard (Scotch Roman).

For currently available examples of transitional type, there are many types which bear Baskerville's name, descending from one or another of his designs. Less common today is P.S. Fournier's work, although several versions of it are available in digital or metal form. Although Scotch Roman has been a very common face in metal type usage since Monotype's 1920 revival, it is not a common digital face. Bell, on the other hand, is included in a Microsoft Font Pack, and Bulmer has received more attention since its revival by Monotype in late 1994.

28.3.6 Modern Type: Didot, Bodoni, Walbaum

"Modern" typefaces are distinguishable by their sudden-onset vertical stress and strong contrast. Modern serifs and horizontals are very thin, almost hairlines. Although they are very striking, these typefaces are sometimes criticized as cold or harsh, and may not be quite as readable for very extensive text work, such as books.

A number of designers, perhaps semi-independently, created the first modern typefaces in the late 1700s and early 1800s. One of the first, and ultimately the most influential, was Giambattista Bodoni, of Parma, Italy. Ironically, historians of type often relate the development of the "modern"

letterforms to a then-current obsession with things Roman—in this case the strong contrast and sharp serifs of classical Roman inscriptions. Although similar interests

Today, the most common "modern" typefaces are the dozens of reinterpretations of Bodoni's work (which itself evolved over time). One of the most successful reinterpretations is the 1994 ITC Bodoni by Stone et. al., featuring three different optical sizes. Although little is seen of Didot, a reinterpretation by J.E. Walbaum (ca. 1800) sees occasional use.

28.3.7 Sans Serif & Slab Serif

These type forms made their first appearances around 1815-1817. Both are marked by simpler letterforms with (usually) relatively uniform stroke weight, lacking significant contrast, often geometric in underlying design.

The earliest forms of sans and slab typefaces tended to be heavy, often monolithic, display faces, but there quickly evolved a wide range of styles. Although the earliest designs are not much used today, their descendants are common enough.

28.3.7.1 Sans Serif (a.k.a. Gothic or Grotesque)

Sans serif letters have no serifs, as the name suggests. The low contrast and absence of serifs makes most sans typefaces harder to follow for general reading. They are fine for a sentence, passable for a paragraph, but are difficult to use well in, say, the text of a book. The terminology of sans serif types can be confusing: essentially, gothic or grotesque are both generic names for sans serif (although Letter Gothic, confusingly, is more of a slab serif type).

In sans serif faces, the italics are often, although not always, simply a sloped (mechanically obliqued) version of the roman letters, making them totally subordinate to the roman.

By far the most common sans is Helvetica (1951, Miedinger), despite being abhorred by many typographers. Helvetica does have the advantage of coming in a huge range of weights and widths, which makes it versatile, and its ubiquitous character makes it easy to match. Other general-purpose sans serifs include Univers (Frutiger, 1952+), Arial (Monotype), Franklin Gothic (M.F. Benton, 1903) and Frutiger (Frutiger, 1975).

Sprouting from the Art Deco movement in the 1920s and 30s (see Art Deco), radical geometrical shapes began to be used as the basis for sans serif designs.

There are a few other common sans faces which do not fall cleanly into the above categories. Eric Gill's 1928 Gill Sans has an almost architectural quality, and its greater contrast and humanistic design makes it better-suited than most sans serif typefaces to setting bodies of text. The same can perhaps be said of a number of late 20th Century humanistic sans faces (see below)

28.3.7.2 Slab Serif (Egyptian)

These faces have block-like rectangular serifs, sticking out horizontally or vertically, often the same thickness as the body strokes. There is some debate about the origin of slab serif typefaces: did they originate by somebody adding serifs to a sans face, or were they conceived independently?

But even if they had a separate genesis as a family, it is certainly the case that many of the most common and popular slab serif forms have been created by adding slab serifs to sans faces by the same designer (e.g. Adrian Frutiger's 1977 Glypha from his Univers, Herb Lubalin's 1974 Lubalin Graph from his Avant Garde). Other slab serif faces include Berthold City (Trump, 1930), Memphis (Weiss, 1930), Serifa (Frutiger, 1968) and Silica (Stone, 1990).

The Clarendons or Ionics are an offspring of the slab serif typefaces in which the serifs are bracketed. These are often used in newspaper work, because their sturdy serifs hold up well under adverse printing conditions. The most famous member of this sub-family is Century Schoolbook (M.F. Benton, 1924-35).

28.3.8 Decorative & Display Type

28.3.8.1 Fat Faces

The "Fat Face" types were an offshoot of the moderns, intended for display purposes (that is, to be attention-getting for use in large sizes, particularly advertising). The first such types appeared from 1810-1820. They further exaggerated the contrast of modern typefaces, with slab-like vertical lines and extra emphasis of any vertical serifs, which often acquired a wedge shape. Bodoni Ultra, Normande and Elephant are all examples of fat face types which are closely based on early to mid-19th Century originals, and are available in digital form.

28.3.8.2 Wood Type

Wood type answered some of the needs of display advertising during the industrial revolution. It derives its name from the fact that instead of being made of metal, the type is carved from wood,

cut perpendicular to the grain. It is distinguished by strong contrasts, an overall dark color, and a lack of fine lines. It may be unusually compressed or extended. Many wood types have an "Old West" feel, because they are most strongly associated with America in the 1870-1900 period. Some of the wood types most widely available today are those in an Adobe pantheon released in 1990, which includes Cottonwood, Ironwood and Juniper (Buker, Lind & Redick).

28.3.8.3 Script, Brush, Italic & Freehand

Script typefaces are based on handwriting; but often this is handwriting with either a flexible steel nib pen, or a broad-edged pen, and is thus unlike modern handwriting.

Some common scripts based on steel nib styles include Shelley (Carter, 1972), Coronet (Middleton, 1937-38), and Snell Roundhand (Carter, 1965, based on Snell ca. 1694).

Script faces based more on the broad-edged tradition include the contemporary Park Avenue (Smith, 1933).

There are also monoline scripts, which lack significant contrast in the letter strokes. One such is Freestyle Script.

Brush typefaces look as if they were drawn with that instrument, which most of them were, at least in the original design from which the metal/film/digital face was created. Some of them resemble sign-painting lettering, such as Balloon (Kaufmann, 1939), Brush Script (Smith, 1942), and Dom Casual (Dom, 1952).

Brushwork can also be the basis for script, as with Present Script (Sallaway, 1974) and Mistral (Excoffon, 1953)

Although modern typography typically relegates the italic to a second- class citizenship subordinate to the roman, there are still some italic typefaces designed as such in their own right. The best known is doubtless Zapf Chancery (Zapf, 1979). Others include Medici Script (Zapf, 1974) and Poetica (Slimbach, 1992).

28.3.8.4 Art Nouveau

The late Victorian era, from 1880 to World War I, was characterized by this ornamental style of art, with its organic, asymmetrical, intricate and flowing lines. This "Art Nouveau" (French, meaning "new art") produced similarly distinctive typography, which saw a revival during the 1960s.

There are a fair number of digital revivals of art nouveau faces, although few are widely used. Some of the more common digital art nouveau typefaces are Arnold Boecklin (Weisert, 1904), Artistik, Desdemona, Galadriel and Victorian.

28.3.8.5 Art Deco

If Art Nouveau was about finding beauty in organic intricacy, Art Deco was perhaps about finding beauty in geometric simplicity. First appearing in the 1920s and 30s, Art Deco made a comeback in the 1970s and 80s as well.

Almost by definition, Art Deco meant sans serif type. The most common such face is Avant Garde (1974, Lubalin), which is striking but hard to read at length. A more graceful geometric sans is Futura (Renner, 1927-39). There are also more quirky faces in this category, such as Kabel (Koch, 1927-30). A recent popular Art Deco display face is ITC Anna (1991?).

28.3.9 Synthesis

Many of the most interesting typefaces of the twentieth century does not fit any of the above categories, or at least not easily. The reason is that they reflect not merely a single style, but cumulative experience, and the merger of different styles. This is perhaps true even of that most mundane of typefaces, Times New Roman (Lardent/Morison, 1931), which has old style, transitional and modern elements.

28.3.9.1 Synthesis and Serif Type

Although there are many practitioners of this synthesis, the most famous is Hermann Zapf. His Palatino (1948) and Zapf Renaissance (1987) are modern typefaces with the spirit of Renaissance letterforms. Melior (1952), Zapf Book (1976), and Zapf International (1977) all reflect an obsession with the super-ellipse, a rectangulated circle, as the basis for letter shapes.

There have also been many modern revivals of old style which, while close to old style in spirit, are not direct revivals of a specific original, and show modern influences in the proportions or lettershapes. These include the Granjon-inspired Galliard (Carter, 1978) and Minion (Slimbach, 1989).

28.3.9.2 Synthesis and Sans Serif Type

After 1950, many designers began to explore a wide range of starting points as the basis for sans serif designs. Aldo Novarese's Eurostile (1964-5) takes sans serif forms and distorts them towards square and rectangular shapes. Zapf's 1958 Optima is a masterful blend of sans serif shapes with Roman and calligraphic influences. Shannon (Holmes & Prescott Fishman, 1981) is a sans serif based on celtic manuscript proportions. Several designers have reinterpreted ancient Greek lettering for a modern sans serif alphabet: most popularly Carol Twombly's Lithos (1989), and most recently Matthew Carter's Skia GX (1994). Koch's Neuland (1930?) has a rough-hewn strength. Hans Eduard Meier's Syntax (1969) is one of the earliest sans typefaces which clearly echo renaissance roman letterforms. More recent sans faces often draw on a humanistic background, from Spiekerman's Meta to Vereschagin's Clear Prairie Dawn.

28.3.9.3 "Grunge" Typography

The most recent typographic wave is one which has sometimes been called grunge typography, after the musical movement originating in Seattle. Although it is far too early to judge the ultimate impact of grunge, I see the form as the merger of the industrial functionalist movement called Bauhaus (contemporary with Art Deco, named after the architectural school) with the wild, nihilistic absurdism of Dadaism. Grunge, like many typographic/artistic movements before it, is a rebellion; but this rebellion denies not only the relevance of anything previous, but sometimes even the relevance of legibility itself, in the belief that the medium *is* the message.

As grunge type designer Carlos Segura of T-26 says, "Typography is beyond letters. Some fonts are so decorative, they almost become 'visuals' and when put in text form, they tell a story beyond the words–a canvas is created by the personality of the collection of words on the page."

Grunge typefaces and typography are seen in magazines such as RayGun. Some examples of grunge typography are the work of Barry Deck (Template Gothic, Cyberotica, Truth), Nguyen's Droplet, Goren's Morire and Lin's Tema Cantante.

28.4 Sources

28.4.1 Published Sources:

Although much of this information is based on prior knowledge, I also actively consulted the following publications:

Bauermeister, Benjamin. A Manual of Comparative Typography. Van Nostrand Reinhold Co., New York, NY: 1988. ISBN 0-442-21187-2.

Bringhurst, Robert. The Elements of Typographic Style. Hartley & Marks, Vancouver, BC: 1992. ISBN 0-88179-033-8. The modern classic in the field.

Byers, Steve. The Electronic Type Catalog. Bantam Books, New York: 1991. ISBN 0-553-35446-9.

Eisenstein, Elizabeth L. The Printing Press as an Agent of Change. Cambridge University Press, New York: 1979. ISBN 0-521-29955-1.

Harper, Laurel. "Thirstype: Quenching a Type Craving" in How: the Bottomline Design Magazine, vol. 10, #1, Jan-Feb 1995. Although not usually a thrilling magazine, had several pieces on typography in this issue (see Segura, below).

Letraset Canada Limited. Letraset Product Manual. Letraset, Markham, Ontario, Canada: 1985.

Meggs, Philip B. "American Type Founders Specimen Book & Catalog 1923" in Print Magazine, vol. 48 #1, Jan-Feb 1994. Contains some interesting info on the effects of industrialization on the type industry.

Sutton, James & Bartram, Alan. An Atlas of Typeforms. Percy, Lund, Humphries & Co., Hertfordshire, UK: 1968. ISBN 1-85326-911-5.

Morison, Stanley & Day, Kenneth. The Typographic Book: 1450-1935. University of Chicago Press, Chicago: 1963.

Segura, Carlos & Nelson, Lycette. "Typography in Context: Never Take a Font at Face Value" in How: the Bottomline Design Magazine, vol. 10, #1, Jan-Feb 1995.

Tracy, Walter. Letters of Credit: a View of Type Design. David R. Godine Co.: 1986.

Updike, Daniel Berkeley. Printing Types: Their History, Forms & Use. Harvard Press: 1962.

Zapf, Hermann. "The Expression of Our Time in Typography" in Heritage of the Graphic Arts. R.R. Bowker Company, New York: 1972. ISBN 0-8352-0213-5.

28.4.2 Personal Contributions:

In addition to written sources, which are identified above, I would like to thank the following for their helpful comments and corrections (any errors are, of course, my responsibility): Robert Hemenway, Mary Jo Kostya, and Dan Margulis

29 The Role of National Orthography in Font Design

This article was constructed from postings by Anders Thulin, Charles A. Bigelow, and "fieseler" from Jan 1994.

An open question: what role does national orthography play in the asthetics of a given font?

Given that uppercase letters occur more frequently in German than in English, are German font designs better for typesetting German (because the designer is more concious of the relationship between capitals and lowercase)? Similarly, are French designs better for typesetting French because the designer is more atuned to the appearance of accents?

Speaking of accents, there are apparently fonts in which the dots over the "i" and "j" are not at the same height as the dieresis over accented vowels. (Does anyone have an example of this?) Surely this is an error that a designer accustomed to working with accented letters is unlikely to make?

30 Interesting Fonts

There's no end of interesting fonts, so this is really just a catch-all category.

30.1 Highway Gothic

Kibo (James Parry) provides the following discussion of Highway Gothic:

Highway Gothic is The Font Company's name for their interpretation of the font used on most official road signs in the United States. (The Font Company added a lowercase to most styles.)

I don't think it has an official name. There is a government publication which shows the fonts (revised in the seventies to make the heights metric); I got a copy of it once, from a library specializing in transportation, and digitized Series E(M) (normal-width bold caps with lowercase, the only USDOT font with lowercase) for a special project. I don't think the specs have changed since the seventies.

Besides E(M) with lowercase, there is a slightly lighter alphabet without lowercase, and three condensed styles. I recall there was also a set of really distorted letters for use in painting vehicle lanes, plus a few symbols for bike paths etc. The alphabets included letters and digits *only*—any periods or hyphens you see on signs are apparently unofficial.

30.2 Where can I get extravagant initial caps?

Don Hosek writes:

I doubt that most decorated initials can be made to work in the type 1 format because of their complexity. Color only makes things worse.

One of the best choices for medieval and renaissance decorated alphabets hasn't been mentioned yet: BBL Typographic (they have an ad on p. 39 of Serif 1). A demo disk is available for \$10, B&W alphabets are \$50 each and full color alphabets are \$60.

BBL Typographic
137 Narrow Neck Road
Katoomba, NSW 2780
AUSTRALIA
011-61-47-826111

011-61-47-826144 FAX

also distributed by:

Medieval & Renaissance Texts & Studies
LN G99
State University of New York
Birmingham, NY 13902-6000

I know the work only from the Serif ad, but it's gorgeous there (even nicer in color, although they decided not to spend the extra money for color in their ad... only a select few in Katoomba & Claremont have seen the ad in full color). Of course Serif-related disclaimers apply.

Jon Pastor contributes:

Check out the Aridi initials, color EPS initials, available on the Monotype CD (and, presumably, on the Adobe CD as well, although they don't advertise this; Monotype did, in a recent mailing).

To which Don Hosek amends:

The Aridi initials are part of the Type Designers of the World collection and are available on the MT CD but not the Adobe CD. Adobe has their own line of decorated initials available on their CD. Also see the catalogs from FontHaus, FontShop and Precision Type.

If you want something really unique, why not hire a calligrapher. It may be cheaper than you think.

Robert Green adds:

Although they might not be on the Adobe CD, the Fall 1994 Font & Function advertises an Adobe "Initial Caps" collection of decorative initial caps designed by Marwan Aridi.

31 Pronounciation of Font Names

Below each of the following font names, a suggested English pronounciation is given. This information was collected from a (relatively) long discussion on comp.fonts. If you disagree, or have other suggestions, please let me know.

31.1 Arnold Boecklin

"Ar" as in car, "nold" as in "old" with an "n" on the front. "Boeck" is tricker. The "oe" is actually an umlaut "o" in German, and the closest sound to most English speakers is an "er". So try "Berklin" if you want to come close to the original. Otherwise, just say "Boklin", with a long o, like in "boat".

31.2 Benguiat

Ben-Gat. This according to an ITC brochure.

31.3 Courier

I would pronounce Courier not like Jim Courier, but the French way: Ku-rie, where "Ku" is pronounced like "coo", only short, and "rie" is pronounced "ree-eh".

31.4 Didot

Stressed at the last syllable. "Dee-DOOH" (not nasal).

31.5 Fette Fraktur

"Fet" as in "get" with a "te" that rhymes with "way". "Frak" rhymes with "mock", and "tur" with "tour".

31.6 Fenice

Feh-nee'-chey

31.7 Garamond

"Gara-": Use a french "r" instead of an english one. Both "a"s are pronounced like the "u" in the word "up". "-mond": the last syllable is stressed, and you don't pronounce the "n" and "d", but the whole "ond" is a nasal "o". Hold your nose closed and say "Ooh", then you get the right sound. The "ant" in "Avant-Garde" is very similar to this sound, it is a nasal situated between "a" and "o".

31.8 Helvetica

Hell-veh'-ti-ka

31.9 Koch Roman

Pronounced like scottish 'Loch', but with K instead of L.

31.10 LaTeX

Lamport lists lah'-tech, lah-tech', lay'-tech and lay'-tecks as valid on p.4. Last I talked to him he'd settled into lay'-tech which has always been my pronunciation as well. Somewhere, I heard that LL does explicitly rule out L.A.-tech, but he's from northern California which explains a lot.

31.11 Mos Eisley

moss eyes-lee

31.12 Novarese

No-vahr-ay'-zay

31.13 Palatino

pa-la-TEEN-oh

31.14 Peignot

There's some contention here, suggested pronouncations:

pay-nyoh'

"P" like "P" in 'Post", "ei" like "a" in "fan", "gn" like "n" in "noon" plus "y" in "yes", "ot" – long, closed "o" (I don't know English examples), stressed.

"P" like "P" in 'Post", "ei" like "a" in "many", "gn" like "n" in "noon" plus "y" in "yes", "ot" – long, closed "o" (I don't know English examples), stressed.

31.15 Sabon

Sah-bon'

31.16 TEX

Rhymes with Blech, (as in "Blech, that tasted awfull!")

31.17 Veljovic

Vel'-yo-vitch

31.18 Zapf

Like "tsapf". The "a" is pronounced like a short version of the well known tongue-depresser vowel "aaahhh". Perhaps a better English analogy would be the "o" in "hop" or "hops".

32 What is it?

This section identifies common names for several glyphs.

32.1 The “@” Character

The "at" sign or "commercial at" sign. In the past, it has also meant "each" or "each at". Consider the following example supplied by Clive Burton:

Qnty	Unit	Item	Unit Price	Extended Price
12	reams	bond paper	@ 5.50	66.00

Here' "@" means each at or simply each.

PostScript calls this the "at" sign.

32.2 The “#” Character

This mark has several common names: 'hash', 'hatch', 'pound sign', and 'octothorp' among them. The name "pound sign" is an Americanism that causes some confusion in countries that use the pound for currency.

It was also noted that the # is a medieval abbreviation for Latin “numerus” - it is a cursive 'n' with a horizontal slash through it, much modified and abstracted.

One possible derivation of the name “octothorp” was provided by Charles Bigelow:

> ... old English "thorp" meant 'hamlet' or 'village' (I'm not sure of the difference, except maybe hamlet is smaller, as its apparent diminutive suffix would suggest), and is derived from a much older Indo-European word *treb- for 'dwelling', which turns out to mean 'beam' or 'timber' in Latin "trabs", winding up as "trave" in Anglo-Latin, like "architrave" - the beam resting on a column, or "trab-" as in "trabecula" - a small supporting beam or bar. As Voltaire said, etymology is a science in which the vowels count for nothing and the consonants for very little.
>
> So, maybe "octothorp" means "8-beams", which makes a kind of sense if we take the 8 projections to be the thorps, or trabs or traves. Though it's only a "quadrathorp" if we think that the beams connect.

Another explanation has it that the octothorp is a “thorp” surrounded by eight cultivated fields.

Both of these etymologies received some skepticism amongst the readers who commented on comp.fonts.

PostScript calls this the "numbersign".

33 Equivalent Font Names

Morgan S. Brilliant, Jon Pastor, and Frank F. Smith have each contributed to the following list of equivalent font names.

The following table shows trade/common names and the equivalent names used by other vendors. The vendor or trademark holder's name is shown in parenthesis following each typeface name.

Aachen Bold (Letraset)
: Aardvark (Corel)

Activa (Bitstream, Inc.)
: Kuenstler 480

Ad Lib
: Adelaide (Corel)

Adsans (Linotype AG and/or its subsidiaries)
: Humanist 970

Akzidenz Grotesk (H. Berthold AG)
: Gothic 725

Albertus (Monotype Corporation plc)
: Flareserif 821

Aldine 401 (Monotype Corporation plc)
: Bembo

Aldine 721 (Monotype Corporation plc)
: Plantin

Algerian (S. Blake)
: Algiers (Corel)

Allegro
: Alto (Corel)

Amelia (VGC)
: Amy (Corel)

Americana (ATF)
: Amherst (Corel)

Antique Olive (Fonderie Olive)
: Incised 901

Arnold Bocklin
: Arabia (Corel)

Arquitectura (IC)
: Architecture (Corel)

Avant Garde (ITC)
: Avalon (Corel)

Badloc (IC)
: Bedrock (Corel)

Balloon (ATF)
: Bassoon (Corel)

Bamboo (ATF)
: Bard (Corel)

Bauhaus (ITC)
: Bahamas (Corel)

Bauhaus Heavy (ITC)
: BahamasHeavy (Corel)

Bauhaus Light (ITC)
: BahamasLight (Corel)

BeeBopp (IC)
: Beehive (Corel)

Bembo (Monotype Corporation plc)
: Aldine 401

Benguit (ITC)
: Bangkok (Corel)

Bernhard Tango (VGC)
: BallroomTango (Corel)

Bisque (VGC)
: Brisk (Corel)

Bitstream Arrust Black BT (Bitstream)
: Bitstream Arrus Black BT (WordPerfect)

Block (H. Berthold AG)
: Gothic 821

Bodoni Campanile (Ludlow Industries (UK) Ltd.)
: Modern 735

Bodoni Poster
: Bodnoff (Corel)

Book Jacket (VGC)
: Brochure (Corel)

Bookman (ITC)
: Brooklyn (Corel)

Broadway (ATF)
: Bravo (Corel)

Broadway Engraved (ATF)
: BravoEngraved (Corel)

Brody (ATF)
: Briquet (Corel)

Brush 445 (H. Berthold AG)
: Palette

Brush 738 Bison

Brush Script (ATF)
: Banff (Corel)

Busorama (ITC)
: Bosanova (Corel)

Buster (Letraset)
: Busker (Corel)

Cable (Linotype AG and/or its subsidiaries)
: Geometric 231

Calligraphic 421 (Linotype AG and/or its subsidiaries)
: Codex

Calligraphic 810 (Linotype AG and/or its subsidiaries)
: Diotima

Carolus Roman
: Carleton (Corel)

Carta (Adobe)
: GeographicSymbols (Corel)

Cartoon Cancun (Corel)

Cascade (Linotype AG and/or its subsidiaries)
: Freehand 471

Cascade Script (Adobe)
: Castanet (Corel)

Casino (IC)
: Carino (Corel)

Caslon (ATF)
: Casablanca (Corel)

Caslon Antique (ATF)
: CasablancaAntique (Corel)

Caslon Open Face
: CasperOpenFace (Corel)

Caslon Openfacce (Bitstream)
: Caslon Openface (WordPerfect)

Centaur (Monotype Corporation plc)
: Venetian 301

Century Old Style
: CenturionOld (Corel)

Champagne (IC)
: Campaign (Corel)

Charlemagne (Adobe)
: Charlesworth (Corel)

Choc (Letraset)
: Chalk (Corel)

Choc (Fonderie Olive)
: Staccato 555

City (H. Berthold AG)
: Square Slabserif 711

Codex (Linotype AG and/or its subsidiaries)
: Calligraphic 421

Comic Book (IC)
: Cosmic (Corel)

Comic Book Two (IC)
: CosmicTwo (Corel)

Cooper Black
: Cupertino (Corel)

CopperPlate Gothic (VGC)
: CopperPot (Corel)

Coronet (Ludlow Industries (UK) Ltd.)
Ribbon 131

Cottonwood (Adobe)
Cottage (Corel)

Croissant (Letraset)
Crescent (Corel)

Decorative 035 (Tetterode Nederland (Lettergieterij Amsterdam))
Profil

Delphin Dauphin (Corel)

Diotima (Linotype AG and/or its subsidiaries)
Calligraphic 810

Dom Casual
DawnCastle (Corel)

Dutch 801 (Linotype AG and/or its subsidiaries)
Times Roman

Dutch 801 (Montype Corporation plc)
Times Roman

Electra (Linotype AG and/or its subsidiaries)
Transitional 521

Elektrik (VGC)
Eklektic (Corel)

Englische Screibschrift (H. Berthold AG)
English 157

English 157 (H. Berthold AG)
Englische Screibschrift

Enviro (Letraset)
Envision (Corel)

Eras (ITC)
Erie (Corel)

Eras Black (ITC)
ErieBlack (Corel)

Eras Contour (ITC)
ErieContour (Corel)

Eras Light (ITC)
ErieLight (Corel)

Estro (ATF)
: Expo (Corel)

Eurostile (Adobe)
: Euromode (Corel)

Eurostile (Linotype AG and/or its subsidiaries)
: Square 721

Exotic 350 (Linotype AG and/or its subsidiaries)
: Peignot

Fairfield (Linotype AG and/or its subsidiaries)
: Transitional 551

Fette Fraktur (ITC)
: Frankenstein (Corel)

Firenze (ITC)
: Florence (Corel)

Flareserif 821 (Monotype Corporation plc)
: Albertus

Formal Script 421 (Bitstream, Inc.)
: Mermaid

Formal Script 421 (Linotype AG and/or its subsidiaries)
: Ondine

Franfurt (TFCo)
: FrankHighlight (Corel)

Frankfurt (TFCo)
: FrankHighlight (Corel)

Franklin Gothic (ITC)
: FrankfurtGothhic (Corel)

Franklin Gothic Heav (ITC)
: FrankfurtGothicHeavy (Corel)

Freehand 471 (Linotype AG and/or its subsidiaries)
: Cascade

Freehand 521 (Ludlow Industries (UK) Ltd.)
: Mandate

Freehand 575
: Jefferson

Freehand 591
: Bingham Script

Freestyle Script (Letraset)
: Freeport (Corel)

Fritz Quadrata (ITC)
: France (Corel)

Frutiger (Linotype AG and/or its subsidiaries)
: Humanist 777

Futura 2 (FTNSA)
: Fujiyama2 (Corel)

Futura Black (Bauer)
: FujiyamaBlack (Corel)

Futura Cnd Extra Bol (FTNSA)
: FujiyamaExtraBold (Corel)

Futura Cnd Extra Bold (FTNSA)
: FujiyamaExtraBold (Corel)

Futura Cnd Light (FTNSA)
: FujiyamaLight (Corel)

Futura Condensed (FTNSA)
: Fujiyama (Corel)

Gallia
: Galleria (Corel)

Garamond (ITC)
: Gatineau (Corel)

Garamond, American
: Garamond No. 3

Garamond, Classic (Linotype AG and/or its subsidiaries)
: Sabon

Garamond, Elegant (Linotype AG and/or its subsidiaries)
: Granjon

Garamond, Italian (Officine Simoncini s.p.a.)
: Simoncini Garamond

Garamond, Original (Linotype AG and/or its subsidiaries)
: Stempel Garamond

Geometric 231 (Linotype AG and/or its subsidiaries)
: Cable

Geometric 415 (Linotype AG and/or its subsidiaries)
Metro

Geometric 706 (Linotype AG and/or its subsidiaries)
Neuzeit Grotesk

Geometric SlabSerif 703 Light (Bitstream)
GeometricSlabSerif703Light (WordPerfect)

Geometric Slabserif 703 (Linotype AG and/or its subsidiaries)
Memphis

Geometric Slabserif 712 (Monotype Corporation plc)
Rockwell

Geometric Slabserif 712 (Bitstream, Inc.)
Slate

Gill Sans (Monotype Corporation plc)
Humanist 521

Gill Sans Ultra Bold (Monotype)
GillbertUltraBold (Corel)

Glasnost (C&G)
Czar (Corel)

Glyphic Series (VGC)
Glacier (Corel)

Gold Rush (ATF)
GoldMine (Corel)

Gothic 725 (H. Berthold AG)
Akzidenz Grotesk

Gothic 821 (H. Berthold AG)
Block

Goudy Old Style
GoldenOldStyle (Corel)

Granjon (Linotype AG and/or its subsidiaries)
Garamond, Elegant

Graphik (IC)
Griffon (Corel)

Graphik Shadow (IC)
GriffonShadow (Corel)

Hairpin (VGC)
: Harpoon (Corel)

Hammersmith (Bitstream, Inc.)
: Humanist 521

Hanseatic (Linotype AG and/or its subsidiaries)
: Swiss 924

Harlow (Letraset)
: Hollow (Corel)

Hebrew (Letraset)
: Alefbet (Corel)

Helv. Cnd. Black (Linotype)
: SwitzerlandCondBlack (Corel)

Helv. Cond. Light (Linotype)
: SwitzerlandCondLight (Corel)

Helvetica Arial (Microsoft)

Helvetica (Linotype AG and/or its subsidiaries)
: Swiss 721

Helvetica (Linotype)
: Switzerland (Corel)

Helvetica Black (Linotype)
: SwitzerlandBlack (Corel)

Helvetica Condensed (Linotype)
: SwitzerlandCond (Corel)

Helvetica Inserat (Linotype)
: SwitzerlandInserat (Corel)

Helvetica Light (Linotype)
: SwitzerlandLight (Corel)

Helvetica Narrow (Linotype)
: SwitzerlandNarrow (Corel)

Hobo HomewardBound (Corel)

Honda (ITC)
: Heidelberg (Corel)

Humanist 521 (Monotype Corporation plc)
: Gill Sans

Humanist 521 (Bitstream, Inc.)
: Hammersmith

Humanist 777 (Linotype AG and/or its subsidiaries)
: Frutiger

Humanist 970 (Linotype AG and/or its subsidiaries)
: Adsans

Incised 901 (Fonderie Olive)
: Antique Olive

Incised 901 (Bitstream, Inc.)
: Provence

Industrial 736 (Societea Nebiolo)
: Torino

Informal 011 (Linotype AG and/or its subsidiaries)
: Neuland

Ionic No. 5 (Linotype AG and/or its subsidiaries)
: News 701

Ironwood (Adobe)
: Ireland (Corel)

Juniper (Adobe)
: Jupiter (Corel)

Kabel Bold
: KabanaBold (Corel)

Kabel Book (ITC)
: KabanaBook (Corel)

Kaufmann (Kingsley/ATF)
: Koala (Corel)

Korinna (ITC)
: Korinthia (Corel)

Kuenstler 480 (Bitstream, Inc.)
: Activa

Kuenstler 480 (Linotype AG and/or its subsidiaries)
: Trump Medieval

Kunstler Script (Linotype)
: Kastler (Corel)

L.C.D. (Letraset)
LiquidCrystal (Corel)

Lapidary 333 (Monotype Corporation plc)
Perpetua

Letter Gothic
Monospaced (Corel)

Linoscript (Linotype)
Linus (Corel)

Linotext (Linotype)
Lincoln (Corel)

Lithos (Adobe)
Lithograph (Corel)

Lithos Light (Adobe)
LithographLight (Corel)

Machine (ITC)
Motor (Corel)

Mandate (Ludlow Industries (UK) Ltd.)
Freehand 521

Melior (Linotype AG and/or its subsidiaries)
Zapf Elliptical 711

Memphis (Linotype AG and/or its subsidiaries)
Geometric Slabserif 703

Mermaid (Bitstream, Inc.)
Formal Script 421

Mermaid (Bitstream)
Merlin (Corel)

Metro (Linotype AG and/or its subsidiaries)
Geometric 415

Micr (IC) Keypunch (Corel)

Mistral (M.Olive)
Mystical (Corel)

Mistral (Fonderie Olive)
Staccato 222

Modern 735 (Ludlow Industries (UK) Ltd.)
Bodoni Campanile

Monospace 821
: Helvetica Monospaced

Neuland (Linotype AG and/or its subsidiaries)
: Informal 011

Neuland Newfoundland (Corel)

Neuzeit Grotesk (Linotype AG and/or its subsidiaries)
: Geometric 706

New Baskerville (ITC)
: Nebraska (Corel)

New Century Schoolbo
: NewBrunswick (Corel)

New Century Schoolbook
: NewBrunswick (Corel)

New Yorker (IC)
: NewOrder (Corel)

New Yorker Engraved (IC)
: NewOrderEngraved

News 701 (Linotype AG and/or its subsidiaries)
: Ionic No. 5

Nuptial Script
: Nuance (Corel)

Ondine (Linotype AG and/or its subsidiaries)
: Formal Script 421

Optima (Linotype)
: Ottawa (Corel)

Optima (Linotype AG and/or its subsidiaries)
: Zapf Humanist 601

P.T.Barnum (Bitstream)
: BigTop (Corel)

Paintbrush (IC)
: Palette (Corel)

Palatino (Linotype)
: PalmSprings (Corel)

Palatino (Linotype AG and/or its subsidiaries)
: Zapf Calligraphic

Palette (H. Berthold AG)
Brush 445

Paper Clip (VGC)
Pipeline (Corel)

Parisian (Kingsley/ATF)
Paragon (Corel)

Park Avenue (ATF)
Paradise (Corel)

Peignot (Linotype AG and/or its subsidiaries)
Exotic 350

Peignot (Linotype)
Penguin (Corel)

Peignot Light (Linotype)
PenguinLight (Corel)

Pepita (Monotype)
Pepper (Corel)

Perpetua (Monotype Corporation plc)
Lapidary 333

Plantin (Monotype Corporation plc)
Aldine 721

Plaza (Letraset)
Playwright (Corel)

Ponderosa (Adobe)
Posse (Corel)

Post Antiqua (H.Berthold AG)
ProseAntique (Corel)

Poster Bodoni
Bodoni-WP (WordPerfect)

Present Script (Linotype)
President (Corel)

Princetown (TFCo)
Indiana (Corel)

Princetown (TFCo)
IndianaSolid (Corel)

Profil (Tetterode Nederland (Lettergieterij Amsterdam))
: Decorative 035

Provence (Bitstream, Inc.)
: Incised 901

Pump Triline (Letraset)
: PowerLine (Corel)

Quicksilver (D.Morris)
: Quantum (Corel)

Revival 565
: Berling

Revue (Letraset)
: Renfrew (Corel)

Ribbon 131 (Ludlow Industries (UK) Ltd.)
: Coronet

Rockwell (Monotype Corporation plc)
: Geometric Slabserif 712

Sabon (Linotype AG and/or its subsidiaries)
: Garamond, Classic

Simoncini Garamond (Officine Simoncini s.p.a.)
: Garamond, Italian

Slate (Bitstream, Inc.)
: Geometric Slabserif 712

Slogun (ZSoft)
: Shogun (Corel)

Sonata (Adobe)
: MusicalSymbols (Corel)

Souvenir (ITC)
: Southern (Corel)

Square 721 (Linotype AG and/or its subsidiaries)
: Eurostile

Square Slabserif 711 (H. Berthold AG)
: City

Squire (M.Neugebauer)
: Scribe (Corel)

Staccato 222 (Fonderie Olive)
: Mistral

Staccato 555 (Fonderie Olive)
: Choc

Stempel Garamond (Linotype AG and/or its subsidiaries)
: Garamond, Original

Stencil : Stamp (Corel)

Stop (Nebiolo)
: Scott (Corel)

Surf Style (ITC)
: Surreal (Corel)

Swiss 721 (Linotype AG and/or its subsidiaries)
: Helvetica

Swiss 911 : Helvetica Compressed

Swiss 921 : Helvetica Inserat

Swiss 924 (Linotype AG and/or its subsidiaries)
: Hanseatic

Symbol (ITC)
: GreekMathSYmbols (Corel)

Symbol (ITC)
: GreekMathSymbols (Corel)

Tekton (Adobe)
: Technical (Corel)

Thor (VGC)
: Viking (Corel)

Thunderbird
: ThunderBay (Corel)

Tiffany (ITC)
: Timpani (Corel)

Tiffany Heavy (ITC)
: TimpaniHeavy (Corel)

Time (Linotype)
: Toronto (Corel)

Times Roman (Linotype AG and/or its subsidiaries)
Dutch 801

Times Roman (Monotype Corporation plc)
Dutch 801

Torino (Societea Nebiolo)
Industrial 736

Traffic (T.Hultgren)
Trafalgar (Corel)

Transitional 521 (Linotype AG and/or its subsidiaries)
Electra

Transitional 551 (Linotype AG and/or its subsidiaries)
Fairfield

Trump Medieval (Linotype AG and/or its subsidiaries)
Kuenstler 480

Umbra (Kingsley/ATF)
Umbrella (Corel)

Univers (Linotype AG and/or its subsidiaries)
Zurich

Univers Black (Linotype)
USABlack (Corel)

Univers Light (Linotype)
USALight (Corel)

University Roman (Letraset)
Unicorn (Corel)

Uptight (ITC)
Uptown (Corel)

VAG Rounded
Vogue (Corel)

Venetian 301 (Monotype Corporation plc)
Centaur

Vivaldi (VGC)
Vivienne (Corel)

Zapf Calligraphic (Linotype AG and/or its subsidiaries)
Palatino

Zapf Chancery (ITC)
: ZurichCalligraphic (Corel)

Zapf Dingbats (ITC)
: Dixieland (Corel)

Zapf Elliptical 711 (Linotype AG and/or its subsidiaries)
: Melior

Zapf Humanist 601 (Linotype AG and/or its subsidiaries)
: Optima

Zurich (Linotype AG and/or its subsidiaries)
: Univers

Zurich (Linotype AG and/or its subsidiaries)
: Univers

Some fonts are published by several vendors using the same name. This table shows the typeface name and the vendors that supply it. Generally this means that one vendor licensed the face from another.

Augsburger Initials
: The Font Bureau, Inc., Microsoft

Baskerville Old Face
: URW, Microsoft

Bell MT
: Monotype, Microsoft

Bell MT Bold
: Monotype, Microsoft

Bell MT Italic
: Monotype, Microsoft

Bernhard Modern BT
: Bitstream, WordPerfect

Bernhard Modern Bold BT
: Bitstream, WordPerfect

Bernhard Modern Bold Italic BT
: Bitstream, WordPerfect

Bernhard Modern Italic BT
: Bitstream, WordPerfect

Bitstream Arrus BT
: Bitstream, WordPerfect

Bitstream Arrus BT Bold
: Bitstream, WordPerfect

Bitstream Arrus BT Bold Italic
: Bitstream, WordPerfect

Bitstream Arrus BT Italic
: Bitstream, WordPerfect

BitstreamArrus Black BT Italic
: Bitstream, WordPerfect

Blackletter 686 BT
: Bitstream, WordPerfect

Braggadocio
: Monotype, Microsoft

BriemScript
: Gunnlaugur SE Briem, Microsoft

Britannic Bold
: URW, Microsoft

Brush 738 BT
: Bitstream, WordPerfect

Castellar
: Monotype, Microsoft

Centaur
: Monotype, Microsoft

CommonBullets
: Corel, Corel

Contemporary Brush
: Filmotype, Microsoft

Contemporary Brush B
: Filmotype, Microsoft

Desdemona
: The Font Bureau, Inc., Microsoft

Eckmann
: URW, Microsoft

Edda
: The Font Bureau, Inc., Microsoft

Elephant
: Carter & Cone Type Inc., Microsoft

Elephant Italic
: Carter & Cone Type Inc., Microsoft

Engravers' Gothic BT
: Bitstream, WordPerfect

Eurostile
: URW, Microsoft

Eurostile Bold
: URW, Microsoft

Futura Bold
: URW, Microsoft

Futura Medium
: URW, Microsoft

Futura Oblique
: URW, Microsoft

GeometricSlabSerifLight Italic
: Bitstream, WordPerfect

Gill Sans Ultra Bold
: Monotype, Microsoft

Gradl
: The Font Bureau, Inc., Microsoft

Harrington
: The Font Bureau, Inc., Microsoft

Humanist 521 Condensed BT
: Bitstream, WordPerfect

Humanist 521 Condensed Bold BT
: Bitstream, WordPerfect

Humanist 521 Light BT
: Bitstream, WordPerfect

Humanist 521 Light Italic BT
: Bitstream, WordPerfect

Impact
: Monotype, Microsoft

Keystroke
: Corel, Corel

Kids
: Corel, Corel

Memorandum
: ITC, Corel

Mistral
: URW, Microsoft

New Caledonia
: Linotype-Hell AG, Microsoft

New Caledonia Bold
: Linotype-Hell AG, Microsoft

New Caledonia Italic
: Linotype-Hell AG, Microsoft

Old English Text MT
: Monotype, Microsoft

Onyx
: Monotype, Microsoft

Onyx BT
: Bitstream, WordPerfect

OzHandicraft BT
: Bitstream, WordPerfect

Parade
: Filmotype, Microsoft

Peignot Medium
: URW, Microsoft

Playbill
: URW, Microsoft

Ransom
: The Font Bureau, Inc., Microsoft

Ransom Bold
: The Font Bureau, Inc., Microsoft

Ransom Bold Italic
: The Font Bureau, Inc., Microsoft

Ransom Italic
: The Font Bureau, Inc., Microsoft

Ribbon 131 BT
: Bitstream, WordPerfect

Shelley Volante BT
: Bitstream, WordPerfect

Stencil
: URW, Microsoft

Stop
: URW, Microsoft

Swiss 721 Black Extended BT
: Bitstream, WordPerfect

Wide Latin
: URW, Microsoft

Wingdings 2
: Bigelow & Holmes, Inc., Microsoft

Wingdings 3
: Bigelow & Holmes, Inc., Microsoft

The following table summarizes typeface names for which no equivalent name is known. The vendor is listed for each font. Many of these fonts are builtin to the HP LaserJet line of printers.

AdineKirnberg
: shareware

Albertus Extra Bold
: Hewlett-Packard

Albertus Medium
: Hewlett-Packard

American-Uncial-Normal
: shareware

Antique Olive
: Hewlett-Packard

Antique Olive Bold
: Hewlett-Packard

Antique Olive Italic
: Hewlett-Packard

Broadway-WP
: WordPerfect

BroadwayEngraved-WP
: WordPerfect

CG Omega
: Hewlett-Packard

CG Omega Bold
: Hewlett-Packard

CG Omega Bold Italic
: Hewlett-Packard

CG Omega Italic
: Hewlett-Packard

CG Times Hewlett-Packard

CG Times Bold
: Hewlett-Packard

CG Times Bold Italic
: Hewlett-Packard

CG Times Italic
: Hewlett-Packard

Century-WP
: WordPerfect

Clarendon Condensed
: Hewlett-Packard

CommercialScript-WP
: WordPerfect

CooperBlack
: WordPerfect

Coronet Italic
: Hewlett-Packard

Eurostile-WP
: WordPerfect

Garamond Antiqua
: Hewlett-Packard

Garamond Halbfett
: Hewlett-Packard

Garamond Kursiv
: Hewlett-Packard

Garamond Kursiv Halbfett
: Hewlett-Packard

Hobo-WP : WordPerfect

Letter Gothic
: Hewlett-Packard

Letter Gothic Bold
: Hewlett-Packard

Letter Gothic Italic
: Hewlett-Packard

Marigold : Hewlett-Packard

MurrayHill-WP
: WordPerfect

OldEnglish-WP
: WordPerfect

OldTown-WP
: WordPerfect

Stencil-WP
: WordPerfect

Symbol : Microsoft

Times New Roman
: Microsoft

Univers : Hewlett-Packard

Univers Italic
: Hewlett-Packard

Univers Bold
: Hewlett-Packard

Univers Bold Italic
: Hewlett-Packard

Univers Condensed
: Hewlett-Packard

Univers Condensed Bold
: Hewlett-Packard

Univers Condensed Bold Italic
: Hewlett-Packard

Univers Condensed Italic
: Hewlett-Packard

Wingdings
: Microsoft

34 Digital Type Design Tools

This article was constructed from a posting by Charles A. Bigelow in Jun 1994 and a posting by Clive Bruton in Jan 1995.

34.1 How do the various digital type designing tools compare?

Charles A. Bigelow contributes:

Kris Holmes and I use *Ikarus* and *IkarusM*, on the Macintosh, for most of our work. We also use *Fontographer* from time to time. Both are good tools. We have not tried *TypeDesigner*. We have tried FontStudio, but don't use it.

IkarusM and *Fontographer* user interfaces are different (modulo the Mac interface). *IkarusM* displays all "on-curve" points, treating the curves as Hermite splines, which it converts to Beziers when making Type1 or Type3 fonts, and to quadratic B-splines when making TrueType fonts. On-curve points are helpful because they are intuitively more like what a naive user would expect—to change a curve, change a point on its contour. *Fontographer* uses bezier on-curve and off-curve control points. While these take a little more getting used-to, experienced users have no problems manipulating curves by moving around the off-curve control points.

Fontographer uses curve fitting of scanned input and/or mouse manipulation of points to get started on outlines. *IkarusM* uses graphics tablet input from drawn (or photographed) artwork or mouse manipulation to get started.

Both provide auto-hinting capabilities (*IkarusM* just included this in version 3.0), but I haven't compared the quality of hinting between the applications. Both provide automatic kerning capabilities, but again I haven't compared the quality carefully. *IkarusM* itself doesn't do kerning, but version 3.0 comes with *Kernus*, a separate auto-kerning system.

Fontographer has more "goodies" in terms of the the different kinds of output of fonts and screen fonts for different platforms (indeed, we prefer it for making BDF bitmaps for UNIX platforms), and in the "finer points" so to speak, of manipulating control points, whereas *IkarusM* has more internal accuracy of resolution and more geometric symmetry manipulation tools.

Fontographer has auto-tracing capability, for fitting outlines to scanned images, whereas *IkarusM* needs a separate program, *LinusM* to do that. However, *LinusM* adds several capabilities that *Fontographer* does not provide.

I have forgotten the current list price for *Fontographer* (sorry, but I'm sure a *Fontographer* user or someone from Altsys can provide it; is it around \$250 - \$300?). *IkarusM + Kernus + LinusM* is around \$900, but one should check with the URW office in Nashua, NH, to be certain of that figure and of what is included.

There are many other differences between the programs, and perhaps other users will want to point them out.

Which would I choose? Well, I have them both. Kris Holmes and I have produced over 75 typefaces with *Ikarus*, though some of those were with *Ikarus* on VAX or Sun. We are comfortable with *Ikarus* and feel that it provides the highest level of precision and control, which for our professional purposes is what we most value. Nevertheless, we find *Fontographer* to be very good tool and continually buy the updates and test it and use it for various things when we feel that it is superior to *Ikarus* in particular respects. The best thing would be to test them both, but unfortunately, one's preference for one or the other might not manifest itself until one has gained more experience.

Disclaimer: We pay the standard prices and purchase our copies of *IkarusM* and *Fontographer* and their upgrades, figuring that font tool developers deserve to be paid for their work, just like font designers. Bigelow & Holmes has font licensing arrangements with URW, the developers of *Ikarus*, but we are not paid by them.

34.2 What about FontStudio?

[Editors note: This seems like valuable information for the FAQ, which is why I've included it in a mostly wholesale fashion as Clive posted it. In general, I'm not a big fan of anonymous contributions, but in this case I've chosen to look the other way ;-). In particular, I've made no attempt to disambiguate the personal pronouns in this section!]

Clive Bruton contributes the following:

I will now do a mini compendium of all my comments as FontStudio's chief promoter, along with all the other people who support my view.

Sorry to those who are not credited, but others wish to remain *anonymous*.

The following snippets are not necessarily in chronological order, names have been changed to protect the guilty!

34.2.1 Is FontStudio Still Being Marketed?

Well it's one of those questions isn't it, it is certainly advertised in the UK and as far as I know still supported by Letraset UK, but as you have probably seen in *comp.fonts* there has been some debate over the relative merits of FontStudio vs Fontographer, my arguement suitably backed-up by ...., and there is certainly some doubt over its imediate future.

Personally I'd like to see it re-launched, if only because the market needs some stimulation in order to produce ground-breaking products, and one App/Vendor (Fontographer/Altsys) doesn't make for healthy competition, as we've seen with Quark getting fat and lazy over their upgrades for XPress with no perceived threat from PageMaker (that should change real soon).

However it (FS) retails in the UK for \$195.00 as opposed to Fontographers \$295.00, the current version is 2.0, as it has been for over two years, but then again there have been no bug fixes for it, no need!

I am sure that you could buy it in the US via Letraset directly, if you wanted to. As far as marketing goes, I have just received a software brochure from Camalot (UK software vendor) that partly showcases the full Letraset range, and FontStudio is in there with the rest.

If you can't get it in the States, I'm sure I can arrange for it to be shipped to you.

34.2.2 What About Bitmap Generation?

FontStudio's advantage is that they call the ATM API to get ATM-generated bitmaps. Fontographer generates their own—and the results are much heavier and more messy.

Yes, you're right, I did know, FS has 3 options on this, its own generation, which like Fontographers are rather heavy, ATM's which are just about perfect, and True Type, which from memory—since I only tried it a couple of times—tend to be a bit quirky.

34.2.3 FontStudio is Better [than Fontographer]?

Could you elaborate on that? Why do you suppose that FontStudio disappeared, and Fontographer is still around? Not being belligerent or challenging you, since I'm totally unfamiliar with FontStudio—but Altsys is not exactly a Goliath compared to Letraset, in terms of the size of the company or the depth of its pockets, and I'm curious why such a good product from a big font vendor disappeared.

I'll chime in here if that's OK. I'm very glad FontStudio came along; Fontographer was resting on its laurels until it got serious competition. Many people prefer FontStudio's drawing interface (which is like Illustrator's) to Fontographer's (which is, unsurprisingly, like Freehand's). There are other parts to the interface debate as well, like zoom factors, dialog complexity, and so forth, although much of it may be a matter of taste.

XXXXXXXXXXXXXXX was one of FontStudio's beta sites, and they used a lot of our advice, so it's not accidental that our designers still tend to use it until it's time to move the fonts over to the SPARCs. I use it when I'm playing with designs at home.

It looks like Letraset didn't know how to promote what it had. It's worth noting that they'yre divesting themselves of their other graphics apps, not just FontStudio. At any rate, the biggest hurdle was that Fontographer had a four-year head start, capturing the hearts of nearly everyone who was serious about making fonts. Nobody wants to relearn an app, so the competition has to be darned good to get people to switch. It has happened (witness XPress vs PageMaker) but it's not easy. Another problem was that Letraset didn't develop FontStudio, they bought it. They and the developers (now Ares, the FontMonger people) didn't get along well, and that led to a painfully slow upgrade process. Altsys got themselves in gear, and started adding features right & left, outdoing FontStudio on nearly every count (technically, not necessarily in terms of user experience).

I can only agree with what XXX has said above, plus...

Just some more background info on FontStudio/Letraset. Unfortunately Letraset never seemed to get the knack of selling software, some examples of this are, Letraset were originally the distributors of Adobe products in the UK - a job that is now carried out by Principal, they also had a full complement of other Mac software - which seems to have reverted to its authors or disappeared alltogether, it has recently released the first commercially available Plug-In for Illustrator, a derivative of LetraStudio, to allow the creation of pespective and envelope effects - who knows about this?

Back to the FontStudio/Fontographer debate, I have *tried* to use Fontographer, but as discussed above, the interface is just awful (as an aside, does anyone like FreeHand 4.0's interface?), FontStudios use of colour, pop-up menus, and general look and feel is completely at home alongside XPress and Illustrator, where as Fontographer, well... isn't!

All the buzzers and bells are there in Fontographer, but can you really take seriously a program that won't allow you to draught your own bitmaps! (Yeah I have heard about ATM, that's not the point).

Also, and I won't lay the blame *solely* at the door of Altsys, whenever I get asked to sort out a problem font, it's always been created with Fontographer. Now whether that is down to Altsys Fontographer (AF) trying to things that aren't exactly kosher (like using even/odd rule instead of winding), or the skill of the digitisers who did the work I've never been able to fathom, but it's usually fixed by importing into FontStudio (FS) and re-saving.

I hope that Ares do something with FS, otherwise sooner or later I am going to need a new program (I have found a minor screen draw problem when used with System 7.5, I've yet to try it on a PowerMac [anyone wants me to, I can send you results]), I have already looked around, and seem *a lot* more likely to buy Ikarus M than AF, it's really that bad.

I would also like to comment on XXX's point about XPress/PageMaker, I hope that Adobe can make a real killer of PM, and reverse that trend, XPress>PM that'll be the way to go!

Just to take Xpress' name in vain again (I don't hate the program, just the smug bastards that want to charge me \$190.00 to get a native version, and only a native version - Adobe has got the right attitude there!) "XPress" is to "Word for Windows", what "FontStudio" is to "Fontographer".

QED. Maybe not!

If all those in favour send me a *YAY* (addressed to `typonaut@d-supp.demon.co.uk`) and someone sends me e-addresses for Ares and Letraset, then I will forward them your support, who knows Altsys may even decide to pack the whole Fontographer game in, and Adobe can relaunch FontStudio!

35 Type Design Firms

Although it has been a long time coming, it seems only natural that the *comp.fonts* FAQ should provide a brief summary of what the various type design firms are producing.

35.1 Carter & Cone Type, Inc.

This description was constructed from postings by Don Hosek, Erik-Jan Vens, and David Lemon in Sep, 1993.

> Carter & Cone Type Inc.
> 2155 Massachusetts Avenue
> Cambridge, MA 02140
> 617-576-0398 or 800-952-2129
> 617-354-4146 FAX

We begin with Carter & Cone not because I think they should be first, but because I already have a few articles about them (I probably saved the articles more because they were about Galliard, which I have a fondness for, than anything else). Please contribute summaries about other foundries (even the foundries themselves are encouraged to contribute, althought I'd appreciate it if the advertising overtones were kept to a dull roar ;-).

35.1.1 Galliard

[Editors note: With appologies to C&C, I have the following snippet:

> >> the designer. He's in business for himself now as half of Carter &
> >> Cone (800 952 2129 voice), and he's worked Galliard over yet again.
> >> Should be cool. Support your local type designer.

Which half of C&C does this refer to?]

Don Hosek says:

The specimen sheets arrived in the mail today (along with the newest Font & Function). Carter & Cone has three faces: *ITC Galliard* [CC] which is a family of 11 fonts. The bad news is that assignments of characters into expert sets and basic fonts is non-standard (the basic font is missing fi and fl). The good news is that the fonts are quite inexpensive. The whole set can be purchased for \$150. The font is a single weight only (if bold is strictly necessary, *Bitstream Galliard Bold*

is consistent in height and can be mixed. On the other hand, designers need to learn to avoid the crutch of bold face on their pages). It is possible to purchase just those parts of the package which are needed. Those able to mix fonts on their own might be able to get a decent selection for less than \$150.

35.1.2 Sophia

Don continues,

The second font is Sophia which is a kind of quirky all-caps display face. It features a number of upper case ligatures [!] and has a kind of Greek-Turkish feel to it (not suprising, really: the face is based in 6th c. Constantinople letterforms). When I first saw this, I didn't like it, but it does grow on one. The price on this is \$60.

35.1.3 Mantinia

Finally, Don concludes,

The third font is Mantinia which is a more traditional display roman with some interesting features: e.g., more uppercase ligatures and an alphabet with superior caps in place of lower case (the La of LaTeX could be typeset without kerns or raises using this alphabet). Again, this took some growing on one, but I'm more accepting of this (and can even imagine using it for real work). The price on this is \$60.

36 What does 'lorem ipsum dolor' mean?

'Lorem ipsum dolor' is the first part of a nonsense paragraph sometimes used to demonstrate a font. It has been well established that if you write *anything* as a sample, people will spend more time reading the copy than looking at the font. The "gibberish" below is sufficiently like ordinary text to demonstrate a font but doesn't distract the reader. Hopefully.

Rick Pali submits the following from *Before and After Magazine*, Volume 4 Number 2.:

[quote]

After telling everyone that Lorem ipsum, the nonsensical text that comes with PageMaker, only looks like Latin but actually says nothing, I heard from Richard McClintock, publication director at the Hampden-Sydney College in Virginia, who had enlightening news:

"Lorem ipsum is latin, slightly jumbled, the remnants of a passage from Cicero's _de Finibus_ 1.10.32, which begins 'Neque porro quisquam est qui dolorem ipsum quia dolor sit amet, consectetur, adipisci velit...' [There is no one who loves pain itself, who seeks after it and wants to have it, simply because it is pain.]. [de Finibus Bonorum et Malorum, written in 45 BC, is a treatise on the theory of ethics very popular in the Renaisance.]

"What I find remarkable is that this text has been the industry's standard dummy text ever since some printed in the 1500s took a galley of type and scambled it to make a type specemin book; it has survived not only four centuries of letter-by-letter resetting but even the leap into electronic typesetting, essentially unchanged except for an occational 'ing' or 'y' thrown in. It's ironic that when the then-understood Latin was scrambled, it became as incomprehensible as Greek; the phrase 'it's Greek to me' and 'greeking' have common semantic roots!"

[unquote]

36.1 One Example of Lorem Ipsum Dolor

Lorem ipsum dolor sit amet, consectetaur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum Et harumd und lookum like Greek to me, dereud facilis est er expedit distinct. Nam liber te conscient to factor tum poen legum odioque civiuda. Et tam neque pecun modut est neque nonor et imper ned libidig met, consectetur

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[This version was found on CompuServe. It differs from other versions I have seen in print, increasingly so as you go along. It almost looks computer-generated, doesn’t it?]

37 Macintosh Information

38 Macintosh Font formats

38.1 Bitmap Fonts

Bitmap fonts: on the Macintosh, bitmap fonts also contain the kerning information for a font and must be installed with both type 1 and type 3 fonts. Their presence also speeds the display of commonly used font sizes.

38.2 PostScript Type 1

Postscript Type 1 fonts can be installed on the Macintosh only by using accompanying bitmapped fonts.

38.3 PostScript Type 3

Postscript Type 3 fonts are installed on the Macintosh in the same way that Type 1 fonts are.

38.4 TrueType

Truetype fonts: no bitmapped font is necessary with this type, though commonly used sizes are often supplied.

38.5 QuickDraw GX

This section was constructed from postings by Charles A. Bigelow, Peter Moller, David Opstad, and Michael Wang from Sep 93.

38.5.1 What is it?

QuickDraw GX (QDGX) is the new Mac OS engine for handling screen presentation. It has many advantages over older engines, among them the ability to get ligatures, swashes etc. on the fly. QDGX is also a 16-bit font format that allows for example users in Korea to run their machines in their native tounge as well as write.

38.5.2 How is it related to Unicode?

Although QDGX is a 16-bit encoding, it is "orthogonal" to Unicode Unicode, to use a jargon term. A TrueType font, GX or otherwise, can be encoded using the Unicode standard, but that isn't necessary. However, a TrueType font, and especially a GX font, can contain glyphs for which there is no unique Unicode encoding, e.g. the 'fi' ligature, or a swash 'a' with a trailing curlicue. TrueType GX fonts, however, contain additional information and structure that allows the QDGX system to properly substitute variant glyphs for certain characters in the text. For the above examples, QDGX will, if requested, look for the sequence 'f' + 'i' and substitute the 'fi' ligature, or look for 'a' at the end of a line and substitute the glyph 'a-trailing curlicue'.

It is really quite charming to see this happen, and it makes the font [...] a clever, trained circus dog that does tricks than a simple font. The GX fonts begin to show an additional personality beyond the image of the glyphs. In fact, the font can contain a state machine that controls the substitution process—in effect, a computer program. There is provision for another state machine controlling kerning as well, to get around the problems that can arise with simple pair-based kerning.

David Opstad contributes the following:

The bidirectional text reordering algorithm defined in Unicode is fully implemented in GX (in fact, during our testing of GX we uncovered some problems with the Unicode specification!) Also, and most unfortunately, since Unicode is the product of an international committee process there were certain compromises that were made in the design, so there really are Unicode character codes for certain ligatures and contextual forms (e.g. the "Basic Glyphs for Arabic Language" codes starting at U+FE70). Note, however, that GX does *not* use these; we do Arabic contextual processing the same way we do Roman contextual processing. Indeed, it is this uniformity of approach that is, I believe, one of GX's main strengths.

One of my greatest hopes (that keeps me going after having worked on getting GX done for over five years now) is that we're going to see a real renaissance of fonts and creativity in font designs. GX finally gets us back to the elegance of calligraphy, with the repeatability and precision of the computer.

38.5.3 What about rotation?

QDGX supports full 3X3 transformations (including perspective) on all objects in the graphics system, including text. Anti-aliasing is not included in GX 1.0, but we're looking at it for future versions.

38.5.4 Is QDGX limited to TrueType fonts?

Michael Wang contributes:

Just to clarify, the component of QuickDraw GX that deals with font features like automatic ligature substitution is called the Line Layout Manager (which I'll abbreviate as LLM), and LLM features are independent of scaler technology. In other words, a Type 1 font can have all of the LLM features that a TrueType font can have under QuickDraw GX.

In fact, Apple and Adobe bundle a GX version of ATM with the QuickDraw GX release along with a Type 1 GX version of Tekton Regular which includes lots of additional glyphs and supports most of the LLM features. If you are a Macintosh developer, there are beta GX versions of ATM and Tekton that you can play around with on the QuickDraw GX 1.0b1 release that is part of the WWDC CD.

Lawrence D'Oliveiro contributes:

One implication of GX for font installation is that Type 1 fonts no longer come in "bitmap" vs "screen" versions that live in separate files: under QuickDraw GX, they live in "sfnt" resources, and install no differently from TrueType fonts.

As of 1 Mar 95, QuickDraw GX 1.0.1 is the current release.

39 Frequently Requested Mac Fonts

39.1 Greek Fonts

This section was constructed from a posting by John Amanatides in Jan 1995.

There are three ways to get Greek out of a Mac. Approach one is to simply use the Symbol font; this solution is the easiest but Symbol doesn't have accents and you cannot easily exchange files with friends in Greece. Approach two is go all the way and install Apple's Greek system software on your Mac. It would make it identical to a machine sold in Greece and is really only an option for the diehards. Approach three is to just get a Greek keyboard driver and Greek typefaces. This article talks mostly about approach three while it does also mention the others.

First some background. Until the early '80s the Greek alphabet included quite a lot of different diacritical marks. Thus if you are interested in classical Greek you will need to get a polytonic version of the typeface. Modern Greek now only uses accents, simplifying the use of the alphabet and this is normally what you will get when you ask for a Greek typeface.

There are several encodings of the Greek alphabet. ISO-8859-7 is the most standard. It is an 8-bit encoding that uses the regular 7-bit ASCII standard in the lower 128 positions and Greek in the upper 128. Unfortunately, Apple did not use it (sigh). Apple's encoding is slightly different in the upper 128 positions. All modern Greek typefaces for the Mac seem to use this encoding and if you use it you can exchange files with your friends in Greece (and use Greek dictionaries!). If you are interested in classical Greek things become a little trickier. I don't know if there is a standard but Linguist's Software's (see below) encoding seems to be the most popular.

39.1.1 Sources of Greek Fonts for the Mac

39.1.1.1 Apple

You can go all the way with Apple and get their Greek system software but getting it is non-trivial. In North America the only way to get it seems to be to get the "Apple Developer Mailing" from APDA. Designed for developers, you get a CD mailed to you monthly. The CD contains the most recent worldwide Mac system software along with a lot of other stuff. It costs \$250 US and you get updates for a year. The Greek system software contains TrueType versions of GrCourier, GrHelvetica, GrTimes and several bitmap versions of some of Apple's other typefaces along with the Greek keyboard driver.

APDA 800-282-2732 US
800-637-0029 Canada
716-871-6555

A second place to get Greek system software is in Greece. Apple's distributor is:

Rainbow Computer S.A.
Elia Eliou 75
Neos Kosmos, Athens
Greece 117 44
30-1-9012892 Voice
30-1-9012540 FAX

Just because you have the Greek system software doesn't mean you have to install the whole system; you can just take the Greek typefaces and the Greek keyboard driver and use them with your current system software.

Note: Linguists' Software (see below) also market version 6.0.3 of the Greek operating system.

39.1.1.2 Linotype-Hell

Linotype sells a variety of Type1 Greek typefaces in both modern and polytonic versions and in a variety of weights/styles: Times, Helvetica, Baskerville, New Century Schoolbook and Souvenir. The easiest way to purchase them is to get Linotype's CD of locked typefaces (a new one is coming out in Dec. '94). The CD costs \$49 US and comes with 4 free fonts. A Greek keyboard driver comes with the typefaces. Linotype can be reached at:

Linotype-Hell Company
425 Oser Avenue
Hauppage, NY, 11788
USA
800-633-1900
516-434-3616 FAX

These typefaces are also distributed by FontShop (see below) Note: the new CD works on both a Mac and a PC and when you unlock a typeface you unlock for both systems.

39.1.1.3 FontShop

FontShop is an international chain of stores which supplies a wide variety of typefaces to both professionals and the rest of us. Their North American address is:

FontShop Canada Limited
510 Front Street West
Toronto, Ontario
Canada M5V 3H3
800-363-6687
416-348-0916 FAX

39.1.1.4 Monotype

Monotype offers two Greek typefaces on their locked CD: Times New Roman Greek and Arial Greek. Each typeface comes in four weights/styles. Their CD lists for \$49 and you get 8 free fonts (just enough for both of their Greek typefaces :-). You can reach Monotype at:

Monotype Typography Inc.
Suite 2630, 150 South Wacker Drive
Chicago, IL, 60606
USA
800-MONOTYP (800-666-6897)
312-855-9475 FAX

These typefaces are also distributed by FontShop. Note: you get a 5 CPU license.

39.1.1.5 Linguist's Software

Linguist's Software has typefaces for over 250 world languages and gives several options for those interested in Greek. First, you can purchase the Greek operating system for the Mac version 6.0.3. This includes GrTimes and GrHelvetica (Type 3) as well as several bit-mapped system fonts. Second, you can purchase their modern Greek typefaces Olympus and Philippi (Times and Helvetica clones) in four weights/styles and in both Type1 and TrueType along with a keyboard driver for System 7. Finally, they have their own TrueType and Type1 typefaces in the LaserGreek package. These are of particular interest to Greek scholars since they include extra diacritics for ancient/N.T. Greek. This package now includes a Uncail typeface. LaserGreek: \$99; Modern Greek + keyboard driver: \$99; LaserGreek + GreekOS: \$139; LaserGreek + Modern Greek + keyboard driver: \$139.

Linguist's Software
PO Box 580
Edmonds, WA 98020-0580
USA
206-775-1130
206-771-5911 FAX

39.1.1.6 Ecological Linguistics

Ecological Linguistics also provides typfaces for a wide variety of world languages. They have a polytonic version of Times (GreekTimes) in their GreekClassical package and monotonic versions of Times and Helvetica (GkTimes, GkHelvetica) in four weights/styles in their GreekModern package. Both the GreekClassical and GreekModern packages are \$60 US each and come with a keyboard driver.

Ecological Linguistics
P.O. Box 15156
Washington, D.C., 20003
U.S.A.
202-546-5862

39.1.1.7 MacCampus

MacCampus of Germany provides Greek and other Eastern European typefaces. The Greek typefaces come in two flavors: those that are based on the modern Greek keyboard layout and those based on the Symbol font layout. MacCampus provides a keyboard driver so that you can use the former type on non-Greek Macs.

The typefaces available are:

Modern Greek (Greek layout): Olympia (Helvetica clone) and Tiryns (Times clone) in 4 weights/styles

Classical Greek (extra diacritics, Symbol layout): Agora Times, Parmenides (light, sans-serif)

MacCampus
C. Kempgen
An den Weihern 18
D-96135 Stegaurach
Germany
(0951) 296739
(0951) 296425 FAX

MacCampus typefaces are distributed by FontShop.

39.1.1.8 Font World

Another Greek typeface distributor is Font World. They also sell a variety of Eastern European typefaces. They provide a package of keyboard drivers for a variety of different world languages.

The modern Greek typefaces are: FW Palace GK (Palatino?), FW Baskerfield GK, FW Peace GK (sans serif) & condensed version, FW Pithos GK (Lithos?), FW Stencil GK, FW Textbook GK, FW Tourist GK (Souvenir) and FW World GK (Times?). They come in a variety of weights/styles and go for about \$100-\$200.

Font World, Inc.
2021 Scottsville Road,
Rochester, NY 12623
USA
716-235-6861
716-235-6950 FAX

39.1.1.9 SkepsiS

SkepsiS is a Greek publishing company that is heavily into Macs. They have created and sell several nice typefaces in several weights/styles: Corfu (New Century Schoolbook?), Ithaca (Souvenir?), Rhodes (University?), Mykonos (Courier?), Paros (Antique Olive?), Samos (modern serif), GtcFutura (Futura?), Naxos (Eurostile?), Ios (?) The cost for a package containing the above is 60,000 drachmas.

SkepsiS Ltd
El. Benizelou 184
T.K. 176 75, Kallithea
Athens, Greece
30-1-952-2086
30-1-952-2088 FAX

39.1.1.10 Magenta

Magenta is a Greek company that sells typefaces for Macs and PCs. Their catalog lists over 70 typefaces with names like MgBodoni, MgOptima, MgAvantGarde, etc in a variety of weights/styles. Most are modern Greek but they also have a few classical typefaces. Each typeface family goes for about 8,500 drachmas.

Magenta Ltd
Antimaxou 17
115 28 Athens
Greece
30-1-722-9292 phone/FAX

Note, I have tried to contact Magenta recently and have gotten no response.

39.1.1.11 Fronteiras

Fonteiras is a German company that produces non-roman typefaces. They have 26 Greek typefaces, display and text, both polytonic and monotonic. Some of the families include clones of Dynamo, Stencil, Broadway, Revue, Futura Black, Lithos, Industria, Insignia, Palatino, Helvetica, Times, etc. Packages go for about \$150-\$200 US and include a Greek keyboard driver. The monotonic typfaces have kerning tables and some have real italics. (Most other vendors only have obliques.)

Fronteiras
Luisenstr. 22
D-60316 Franfurt
Germany
49-069-4980498 phone/FAX
100443.1305@compuserve.com

39.1.1.12 Freeware/Shareware

There is a free classical Greek typeface called Ismini that is available on the net at:

`mac.archive.umich.edu:mac/system.extensions/font/type1/ismini.cpt.hqx`

Unfortunately, I don't think it uses the same encoding as Linguist's Software.

39.2 Other Fonts

Many fonts are available at various archives. The king of Macintosh font archives is `mac.archive.umich.edu`. On `mac.archive.umich.edu`, the fonts are located in the following folders:

```
/mac/system.extensions/font/type1
/mac/system.extensions/font/type3
/mac/system.extensions/font/truetype
```

The following fonts are in Type 1 format for the Macintosh. Some are also available in TrueType format.

- Tamil

  Paladam, T. Govindram
- Hebrew

  ShalomScript, ShalomOldStyle, ShalomStick, Jonathan Brecher

- Japanese

  Shorai (Hirigana, with application)

- Star Trek

  StarTrekClassic, Star TrekClassicMovies, StarTrekTNGCrille, StarTrekTNG Titles, TNG monitors, StarFleet, Klinzai (Klingon font)

- Command-key symbol

  Chicago (TrueType or bitmap, key: Ctrl-Q), Chicago Symbols (Type3, key: 1), EncycloFont (Type3, key: d)

- Astrologic/Astronomic symbols

  Hermetica (Type1), InternationalSymbols (Type 3, Mars and Venus only), MortBats (Type3), Zodiac (bitmap)

- IBM OEM Line Drawing Characters

  Try Adobe PrestigeElite or Adobe LetterGothic. They have all the characters you want, but the 'line draw' characters are unencoded — you will need tools to reencode the outline font itself and make a new PFM metric files.

  Or try IBMExtended from Impramatur Systems in Cambridge, Mass. It already is encoded using IBM OEM encoding (some DOS code page).

  The IBM version of Courier distributed freely under the X11 Consortium also contains the appropriate characters. It is distributed in PC format, however. Again, the font will have to be reencoded for Windows. Appropriate AFM files for this font can be obtained from: `http://www.ora.com/homepages/comp.fonts/FAQ-tools.html`.

Many of these mac fonts are available in files that are either entitled *xxxx*`.sit` or *xxxx*`.cpt`. *xxxx*`.sit` files are Stuffit archives. *xxxx*`.cpt` files are Compact Pro archives. StuffitLite (shareware $25) and Compact Pro (shareware $25) are available at the standard ftp sites. Uncompressors for these programs (free) are also available at the archive sites. Check the utilities/compression utilities folders.

40 Commercial Font Sources

Commercial fonts can be obtained from a number of different companies, including the large font houses: Adobe, Font Haus, Font Company, Bitstream, and Monotype. At these companies, fonts cost about $40 for a single face, and must be purchased in packages. Adobe, Bitstream, and Monotype also sell pre-designated type collections for slightly lower prices.

Image Club sells a wide selection of fonts for about $50 for a 4 font family.

Other, cheaper companies sell fonts of lesser quality, including KeyFonts, which sells a set of 100 fonts for $50 and Casady & Green's Fluent Laser Fonts, a set of 79 fonts for $99. Casady & Greene also sells Cyrillic language fonts in Times, Bodoni, and Helvetica sell for about $40 for each 4 font family.

Foreign language fonts, ranging from Egyptian hieroglyphics to Cyrillic can be obtained from Ecological Linguistics.

Please consult the vendor list for a more complete list of vendors.

41 Mac Font Installation

- System 7

  Install the fonts by opening the suitcase containing the bitmap file and dropping the fonts into your system suitcase, located inside your system folder. You will need to quit all other applications before doing this. For a TrueType font, the icon for the font will have a stack of "A"s in it, instead of just one. Dropping it into your system suitcase will make all sizes of the font available. For Postscript type 1 fonts, you also need to place the printer font in the extensions folder in your system folder. If you are using ATM you need to place these fonts in the root level of your system folder (not inside another folder). Using Suitcase, a font management utility, you can avoid cluttering your system folder with printer fonts.

  You can make new suitcases of fonts (generally not needed, but used by those who use Suitcase) by using Font DA mover. It operates the same as in system 6, except that the most recent version must be used.

- System 6

  Bitmap fonts can be installed using Font DA mover to move the fonts, located inside suitcases, into your system. You will need to restart your computer to make these fonts available. Printer fonts must be placed in the system folder, not inside any other folder.

  Truetype fonts can be used with system 6 if you get the Truetype init. Then the fonts can be installed in your system with Font DA mover. Suitcase can also be used under system 6.

42 Mac Font Utilities

- SUITCASE

  Suitcase is a nifty little system extension that lets you avoid having to install fonts into your system. In system 6, it means that you can avoid restarting your system every time you want to install a new font.

  In system 7, Suitcase lets you avoid quitting all applications before making fonts available. Some programs, like Quark Xpress will automatically update their font list when you open a new suitcase, allowing much more flexibility in opening and closing font suitcases and making different sets of fonts available.

  Suitcase appears in your Apple menu in both system 7 and 6 and allows you to open suitcases, as though they were files, thus making the fonts contained in them accessible to programs.

  In addition, when suitcase is installed, printer fonts can be stored with the bitmap suitcases they correspond to, instead of having to drop them into your system folder.

  The most recent version of Suitcase is compatible with TrueType. Suitcase is about $54 from the mail order places.

- Carpetbag

  A shareware program with functionality equivalent to Suitcase.

- MASTER JUGGLER

  Does similar things

- ATM

  Adobe Type Manager is an Init and Control panel allows accurate screen display, at any size of PostScript type 1 fonts. It's function is replicated with Truetype (but for different outline font format). With it installed, you can print fonts of any size to non-PostScript printers. When using ATM, printer fonts must either be stored with the bitmap files opened with suitcase (when using Suitcase), or they must be stored in the root level of the system folder (with System 7.0, printer fonts must be stored in the Extension folder if you are not using Suitcase). ATM is now available, with the System 7.0 upgrade, as well as directly from adobe with 4 Garamond fonts.

  ATM is not built into System 7.1 as previously expected. With System 7.1, printer fonts must be stored in the Fonts folder if you are not using Suitcase.

  If you are using version 7.x prior to 7.1, the following hack allows you to have a Font folder (if you don't use Suitcase):

  Open the second 'DCOD' resource from the ATM 68020/030 file. Do an ASCII search for the string "extn" and change it to "font" (it's case sensitive). Save, close, and Reboot.

  This process should work for 68000 machines using the proper ATM file instead.

- Super ATM

  This is a utility that will create fonts, on the fly, that match the metrics of any Adobe-brand fonts you don't have. It does a remarkably good job of mimicry because it uses two "generic" Multiple Master typefaces, serif and sans serif to simulate the appearance of the missing typefaces. (There is a 1.4 megabyte database file that allows Super ATM to simulate the fonts that aren't there.) You also get Type On Call (a CD-ROM), which has locked outline fonts, and unlocked screen font for all but the most recent faces in the Adobe Type library.

- TTconverter

  A shareware accessory available at the usual archives will convert Truetype fonts for the IBM into Macintosh format.

- reAdobe

  Converts text (PFA) format PostScript Type 1 fonts into Mac format.

- unAdobe

  Converts Mac format PostScript Type 1 fonts into text (PFA) format.

- Microsoft Font Pack

  If you work with a mixture of Macs and PCs running Windows 3.1, this is a good deal; 100 TrueType fonts compromising the Windows 3.1 standard set and the two Font Packs for Windows. This includes various display fonts, the Windows Wingdings font, and the Lucida family.

A variety of programs, for example, Font Harmony, etc. will allow you to change the names and ID numbers of your fonts.

Fontmonger and Metamorphosis will let you convert fonts among several formats (type 1 and 3 and Truetype for the Mac and PC), as well as letting you extract the font outlines from the printer fonts.

43 Making Outline Fonts

This is very, very difficult. Many people imagine that there are programs that will simply convert pictures into fonts for them. This is not the case; most fonts are painstakingly created by drawing curves that closely approximate the letterforms. In addition, special rules (which improve hinting, etc.) mandate that these curves be drawn in specific ways. Even designing, or merely digitizing, a simple font can take hundreds of hours.

Given that, there are two major programs used for font design on the Macintosh, Fontographer ($280) and FontStudio ($400). These programs will allow you to import scanned images, and then trace them with drawing tools. The programs will then generate type 1, 3, TrueType and Bitmap fonts for either the Macintosh or the IBM PC. They will also generate automatic hinting. They also open previously constructed outline fonts, allowing them to be modified, or converted into another format.

As far as I know, there are no shareware programs that allow you to generate outline fonts.

44 Problems and Possible Solutions

1. Another font mysteriously appears when you select a certain font for display.

   This is often the result of a font id conflict. All fonts on the Macintosh are assigned a font id, an integer value. When two fonts have the same id, some programs can become confused about the appropriate font to use. Microsoft word 4.0 used font id's to assign fonts, not their names. Since id's can be different on different computers, a word document's font could change when it was moved from one computer to another. Other signs of font id problems are inappropriate kerning or leading (the space between lines of text). Some font ID problems can be resolved by using Suitcase, which will reassign font ID's for you, as well as saving a font ID file that can be moved from computer to computer to keep the id's consistent. Font ID problems can also be solved with several type utilities, which will allow you to reassign font id's. Most newer programs refer to fonts correctly by name instead of id number, which should reduce the frequency of this problem.

2. When using a document written in MSWord 5.0, the font mysteriously changes when you switch from your computer at home to work, or vice versa.

   This is the result of a bug in MSWord 5.0. The MSWord 5.0 updater, which can be found at the info-mac archives at sumex (in the demo folder), will fix this bug.

45 Creating Mac screen fonts

45.1 Creating Mac screen fonts from Type 1 outlines

Peter DiCamillo contributes the following public domain solution:

BitFont is a program which will create a bitmapped font from any font which can be drawn on your Macintosh. In addition to standard bitmapped fonts, it works with Adobe outline fonts when the Adobe Type Manager is installed, and works with TrueType? fonts. BitFont will also tell you how QuickDraw will draw a given font (bitmapped, ATM, or TrueType) and can create a text file describing a font and all its characters.

BitFont was written using MPW C version 3.2. It is in the public domain and may be freely distributed. The distribution files include the source code for BitFont.

Berthold K.P. Horn contributes the following solution.

This is a commercial solution. A font manipulation package from Y&Y includes:

AFMtoPFM, PFMtoAFM, AFMtoTFM, TFMtoAFM, AFMtoSCR, SCRtoAFM, TFMtoMET, PFBtoPFA, PFAtoPFB, MACtoPFA, PFBtoMAC, REENCODE, MODEX, DOWNLOAD, SERIAL, and some other stuff I forget.

To convert PC Type 1 fonts to Macintosh use PFBtoMAC on the outline font itself; then use AFMtoSCR to make the Mac 'screen font' (repository of metric info). You may need to use PFMtoAFM to first make AFM file.

To convert Macintosh font to PC Type 1, use MACtoPFA, followed by PFAtoPFB. Then run SCRtoAFM on screen font to make AFM file. Finally, run AFMtoPFM to make Windows font metric file.

Y&Y are the 'TeX without BitMaps' people (see ad in TUGboat):

Y&Y makes DVPSONE, DVIWindo, and fonts, for use with TeX mostly, in fully hinted Adobe Type 1 format.

Y&Y, Inc., 45 Walden Street, Concord MA 01742 USA
(800) 742-4059
(508) 371-3286 (voice)
(508) 371-2004 (fax)

Mac Screen fonts can be constructed from outline fonts using Fontographer, as well.

46 MS-DOS Information

The easiest way to get outline fonts under MS-DOS is with Microsoft Windows 3.x or OS/2 2.x.

Microsoft Windows 3.0 with Adobe Type Manager (ATM) and OS/2 2.0 support PostScript Type1 fonts.

Microsoft Windows 3.1 supports TrueType fonts natively.

Bitmap fonts are available in a variety of formats: most formats are designed with the printer in mind and not the display since (prior to graphical environments like Windows, GEM, and OS/2) the majority of work under MS-DOS was done with a character-based interface.

47 Frequently Requested MS-DOS fonts

Many fonts are available at various archives. The biggest font archive for MS-DOS format fonts is ftp.cica.indiana.edu. Note: you can use any Mac format Type1 font on your PC by converting it to PC format with the free/shareware as described below.

The following fonts are in Type 1 format for MS-DOS. Some are also available in TrueType format.

- Hebrew

  ShalomScript, ShalomOldStyle, ShalomStick
- Japanese

  Shorai
- Star Trek

  Crillee, TNG monitors
- IBM OEM Line Drawing Characters

  Try Adobe PrestigeElite or Adobe LetterGothic. They have all the characters you want, but the 'line draw' characters are unencoded — you will need tools to reencode the outline font itself and make a new PFM metric files.

  Or try IBMExtended from Impramatur Systems in Cambridge, Mass. It already is encoded using IBM OEM encoding (some DOS code page).

  The IBM version of Courier distributed freely under the X11 Consortium also contains the appropriate characters. Again, the font will have to be reencoded for Windows. Appropriate AFM files for this font can be obtained from: `http://www.ora.com/homepages/comp.fonts/FAQ-tools.html`.

  Lee Cambell suggests the following alternative:

  Line Drawing characters are also available on ftp sites as gc0651.exe which is a self-expanding archive. It is on cica (and mirrors thereof). From the text file that comes with it, it looked like it was distributed by Microsoft. I printed some text in the normal A-z range and it looked identical to the truetype Courier font distributed with Windows. Perhaps it is an upgrade to that font. I didn't try the linedraw glyphs, so I can't say how they look.

48 MS-DOS Font Installation

If you have any information that you feel belongs in this section, it would be greatly appreciated.

- Windows
  - Pat Farrell contributes the following description of font installation under Windows.

    Installing Fonts into Windows:

    This only covers Windows 3.1 with ATM. Font is a four-letter word in Windows versions prior to 3.1 due to the distinctions between screen fonts and printer fonts. The upgrade price of Windows 3.1 is justified by the integration of TrueType into the package and the inclusion of useful fonts for all printers.

    Commercial fonts usually have installation instructions with their manuals. The approach may differ from the method used for PD and shareware fonts.

    To install PD and shareware fonts in Windows 3.1:

    1. Copy the fonts onto a suitable scratch area (i.e. a floppy, or any temporary area of your hard disk.
    2. Execute “Control Panel” by double-clicking on the icon in the Windows Program Manager’s “main” group.
    3. Double-click on the Fonts icon.
    4. Double-click on the “Add” button.
    5. Select the scratch directory holding the new fonts.
    6. A list of the fonts will be displayed. You can manually select the fonts you like, or you can use the “Select All” button.
    7. Make sure the “Copy Fonts to Windows Directory” check-box is checked. This will copy the fonts from the scratch area to your Windows directory.
    8. Click on the “Ok” button.
  - Special notes for Windows applications:

    Word for Windows (W4W) stores font/printer information in its own initialization files. After you add new fonts, you have to tell W4W that the printer can use the new fonts. Do this by selecting "Printer Setup“ from the W4W main "File" menu item, click on the "Setup” button, and then click on two “Ok” buttons to back out of the setup mode.
  - Note concerning Windows 3.1 upgrade:

    There are two upgrade packages available from Microsoft for Win3.1. There is the standard version which contains TrueType support, and about six font families (Times New Roman, Arial, Courier, Symbols, Wingdings, etc.). It costs something like $50 (US). The second version contains a number of TrueType fonts that includes equivalents for the 35 standard Postscript fonts. This adds an additional $50, which is a pretty good value. However, if you

plan on buying Microsoft's PowerPoint, it includes the same additional fonts/typefaces. So you can save money by not buying the fonts twice.

- More about Windows
  - [Q:] Why are don't the TrueType fonts that come with Microsoft products (Word-for-Windows, PowerPoint, Windows 3.1 TrueType Font Pack, etc.) display and print properly on my system?
  - [A:] The font matching algorithm in Win3.1 is fairly simplistic. If you install lots of TrueType fonts, the algorithm can get confused. In this case, "lots" is more than 50 or so.
- According to Luann Vodder who supports Microsoft Word on CompuServ:

  "There is a procedure which Windows must go through when an application requests a font. Each font contains a list of attributes such as Family, FaceName, Height, Width, Orientation, Weight, Pitch, etc. When an application requests a font, it fills out a logical font for Windows containing the necessary attributes, then starts going through a font mapping algorithm to determine which of the installed fonts most closely matches the requested (logical) font. Penalties are applied against fonts whose attributes do not match the logical font, until the fonts with the fewest penalties are determined. If there is a "tie", Windows may need to rely on the order of the fonts in the WIN.INI file to determine the "winner".

  If the fonts you want are in your WIN.INI file, and show up in Windows' Control Panel, then try moving them higher in your WIN.INI file with a file edittor such as SYSEDIT."
- Kesh Govinder suggested the following warning:

  CAUTION: While many Windows 3.1 users would like to have many TrueType fonts at their disposal (and they are many available in the PD) a word of caution. A large number (>50) TT fonts will slow down your windows startup time. This occurs as every installed font is listed in the win.ini file, and Windows has to go through the entire file before starting up. While this may not affect most users, it will especially affect users of CorelDraw!, so be warned.

- Other Programs

  It is an unfortunate fact that almost all MS-DOS programs do things differently. Your best bet is to read the manual that comes with the program you want to use.

49 What exactly are the encodings of the DOS code pages?

DOS uses 'code pages' for 'IBM OEM' encoding of fonts. There are six code pages supplied with DOS 5.0:

```
437 (English)
850 (Multilingual - Latin I)
852 (Slavic - Latin II)
860 (Portugal)
863 (Canadian French)
865 (Nordic)
```

(The character code range 0 - 127 is the same in all code pages).

The problem is that MS idea of how to define what a code page is, is to show a low resolution print out of the glyphs! Which is fine for the letters of the alphabet, numerals and the obvious punctuation marks, but worthless for accents (is it 'cedilla' or 'ogonek'? is it 'caron' or 'breve'?) and many other characters. For example, 249 is a small dot, while 250 is a slightly larger dot. Is one of these supposed to be 'bullet' (which already occurs at 7)? Or is one of them maybe supposed to be 'middot' or 'dotcentered'? Is 228 supposed to be 'Sigma' or 'summation'. Is 225 supposed to be 'beta' or 'germandbls'? Etc etc

And what is the character that looks like 'Pt' in code position 158?

Anyway, surely there is a table somewhere that defines precisely what these encodings are supposed to be. That is, a table that gives for each code number the name and/or a description of the character.

50 MS-DOS Font Utilities

- PS2PK

  PS2PK allows you to convert PostScript Type1 fonts into bitmap fonts. The bitmap files produced are in TeX PK format.
- PKtoSFP

  PKtoSFP allows you to convert TeX PK fonts into HP LaserJet softfonts.
- PFBDir/PFBInfo

  PFBDir and PFBInfo format and display the “headers” in a binary Type1 font.

51 Converting fonts under MS-DOS

52 Converting Mac Type 1 fonts to MS-DOS format

Converting Macintosh Type1 fonts into PC Type1 fonts can be done using purely free/shareware tools. I've outlined the procedure below. Make sure you read the "readme" files that accompany many fonts. Some font authors specifically deny permission to do cross-platform conversions.

52.1 The tools you need

`XBIN`	`xbin23.zip` in `/pub/msdos/mac` on `oak.oakland.edu` (or other mirrors)
`UNSIT`	`unsit30.zip` in `/pub/msdos/mac` on `oak.oakland.edu`
`UNSITI`	`unsiti.exe` in `/pub/onset/util` on `ftp.std.com` Peter Gentry indicates that this program can extract `SIT` archives that use the newer compression techniques that `unsit` doesn't recognize.
`UNCPT`	`ext-pc.zip` in `/pub/pc/win3/util` on `ftp.cica.indiana.edu`
`REFONT`	`refont14.zip` from `http://www.ora.com/homepages/comp.fonts/FAQ-tools.html`
`BMAP2AFM`	`bm2af02.zip` from `http://www.ora.com/homepages/comp.fonts/FAQ-tools.html`

XBIN converts Mac "BinHex"ed files back into binary format. BinHex is the Mac equivalent of UUencoding, it translates files into ascii characters so that mailers can send them around without difficulty. It also aids in cross platform copying too, I'm sure. BinHexed files generally have filenames of the form "xxx.yyy.HQX".

UNSIT explodes "Stuffit" archives. Stuffit archives generally have filenames of the form "xxx.SIT". UNSIT will ask if you want to seperate resource and data forks. Yes, you do. There has been some confusion about whether or not you want headers. I'm inclined to conclude that it can be made to work either way. Personally, I say no.

UNCPT explodes "Compactor" archives. The ext-pc implementation is called "extract" and does not require windows (even thought it's in the windows section on cica). Compactor archives generally have filenames of the form "xxx.CPT".

REFONT converts Mac type1 fonts into PC type1 fonts. It also converts Mac TrueType fonts to PC TrueType format. And vice-versa.

BMAP2AFM constructs AFM files from the metric information contained in Mac screen fonts (.bmap files). The screen font files do not have any standard name (although they frequently have

the extension .bmap). The screen fonts have file type “FFIL” which, in combination with some common sense, is usually sufficient to identify them.

I’ve listed the tools that I’ve used and the sites that are reasonable for me to retrieve them from. It’s probably a good idea to check with archie for closer sites if you’re not in North America. These tools run under MS-DOS. XBIN and UNSIT can also be run under Unix.

52.2 How to do it?

Collect the Mac fonts from the archive or BBS of your choice. Most of these files will be in BinHexed format. As a running example, I’m going to use the imaginary font “Plugh.cpt.hqx”. When I download this font to my PC, I would use the name “PLUGH.CPX”. The actual name you use is immaterial.

Run XBIN on PLUGH.CPX. This will produce PLUGH.DAT, PLUGH.INF, and PLUGH.RSR. The data fork of the Mac file (the .DAT file) is the only one of interest to us, you can delete the others.

If the original file had been “Plugh.sit.hqx”, we would be using the UNSIT program. Since I chose a .cpt file for this example, I’m going to run UNCPT.

Run UNCPT on PLUGH.DAT. You want to extract the AFM file (if present), the documentation or readme file (if present), and the Type1 outline file. The AFM and README files will be in the data fork of the archive file. The Type1 outline will be in the resource fork. The AFM and README files have Mac “TEXT" type. The Type1 outline file has "LWFN” type. I’m not trying to describe this part in a step-by-step fashion. Use the docs for UNCPT and UNSIT as a guide. If you got this far you probably won’t have much difficulty. If you do, drop me a line and I’ll try to help.

If the font does not contain an AFM file, extract the screen font. Screen fonts frequently have the extension .bmap and are “FFIL” type files. Use Bmap2AFM to construct an AFM from the screen font. If the archive _does_ contain an AFM file, it’s safe to bet that the author’s AFM will be better than the one created by Bmap2AFM.

Finally, run REFONT on the Type1 outline that you extracted above. The result should be an appropriate PC type1 outline. REFONT will create a PFM file for you from the AFM file, if you desire.

Remember to register your shareware...

52.3 Other comments

`vkautto@snakemail.hut.FI` makes the following observations:

- UNCPT is easier to use than UNSIT
- UNCPT has to be run twice. I usually do it like this

  ```
  extract *.cpt -f
  ```

  ```
  extract *.cpt -f -r
  ```
- When using "unsit30" you probably want the outline file with the MacHeader and the others without it. I think that REFONT requires it but I am not sure.
- REFONT works usually ok. You want a PFA (ASCII) file which is directly usable on NeXT (you may need to convert carriage-returns to newlines but I am not sure if it is necessary).

  The biggest problem is with the .afm files that are completely missing or generated by the tools that don't do their job properly.
- BMAP2AFM requires some extra files (ie. other than bmap2afm.exe) to work properly.

53 Converting PC Type 1 and TrueType fonts to Mac format

53.1 Refont

Refont (version 1.4) can convert (in both directions) between PC and Mac formats of Type1 and TrueType fonts. Note: it _cannot_ convert _between_ formats, only architectures. The procedure described above outlines how to convert a Mac archive into PC format so that you can get at the data. Presumably, the process can be reversed so that you can get at the data on the Mac side as well. Unfortunately, I don't have a Mac so I can't describe the process in detail.

53.2 Font Manipulation Package

The Y\&Y Font Manipulation package can convert PFA/B files into Mac format and AFM files into Mac screen fonts.

54 Converting PC Type 1 fonts into TEX PK bitmap fonts

The release of PS2PK by Piet Tutelaers is a godsend to those of us without PostScript printers. PS2PK converts PC/Unix format Type 1 fonts into TeX PK files. Used in conjunction with the AFM2TFM utility for creating TeX metric files, this allows almost anyone to use Type 1 PostScript fonts. PS2PK is distributed under the GNU License and has been made to run under MS-DOS with DJGPP's free GNU C compiler. The PC version requires a 386 or more powerful processor. Check with Archie for a source near you.

Note: if TeX PK files are not directly usable for you, there seems to be a fair possibility that LaserJet softfonts would be useful. If so, check below for instructions on converting TeX PK files to LaserJet softfonts.

55 Converting TeX PK bitmaps into HP LaserJet softfonts (and vice-versa)

There is some possibility that someone will yell 'conflict of interest' here, but I don't think so. I wrote the following utilities:

PKtoSFP: convert TeX PK files to LaserJet (bitmapped) softfonts

SFPtoPK: convert LaserJet (bitmapped) softfonts to TeX PK files

But they are completely free, so I don't gain anything by "advertising" them here. These are MS-DOS platform solutions only. If you know of other solutions, I would be happy to list them.

56 TrueType to HP LaserJet bitmap softfonts (HACK!)

If you have the tools, the following suggestion does work, but it isn't easy and it hasn't been automated. To be honest, I haven't really tested it.

If you are using Windows 3.1, get a LaserJet printer driver (you don't need the printer, just the driver). Using the LaserJet driver, direct output to a file and print a simple file containing all the letters you want in the softfont in the font that you are converting. When the print job has completed, the output file will contain, among other things, a LaserJet softfont of the TrueType font you selected. If you know the LaserJet format, you can grab it out of there.

I didn't say it was easy ;-)

This method will not work with ATM [ed: as of 7/92] because ATM does not construct a softfont; it downloads the whole page as graphics.

Here is an overview of the LaserJet bitmap softfont format. It should help you get started. If you have any questions, ask norm. If anyone wants to write better instructions... ;-)

Many details are omitted from this description. They are thoroughly discussed in the HP Technical Reference for each model of laser printer. I recommend purchasing the Tech Ref. If you have additional questions and do not plan to purchase the Tech Ref (or do not wish to wait for its arrival), you can ask norm.

An HP LaserJet softfont can occur almost anywhere in the output stream destined for the printer. In particular, it does _not_ have to be wholly contiguous within the output file. In fact, fonts can be "intermixed" at will. The following "pieces" make up a font:

A begin font descriptor command (followed by the descriptor) and a series of begin character descriptor commands (followed by their associated data). When a new character descriptor is encountered, it is added to the *current* font (which may change between descriptors).

In the discussion that follows, the following notational conventions are followed:

Key elements are surrounded by quotation marks. The quotation marks are not part of the element. Spaces within the element are for clarity only, they are not part of the element. All characters (except `ESC` and #, described below, are *literal* and must be entered in the precise case shown).

`ESC` means the escape character, ASCII character number 27 decimal.

means any decimal number. The meaning of the number is described in the commentary for that element.

- What is a font descriptor?

  A font descriptor begins with a font descriptor command and is followed immediately by the data for the descriptor. Font descriptors define data global to the font. In general, more recent printers are less strict about these parameters than older printers.

- What is the font descriptor command?

  "`ESC ) s # W`"

  In this command, # is the number of bytes in the descriptor. The first element of the descriptor indicates how many of these bytes should be interpreted as the font descriptor (the remaining bytes are commentary only–to the printer, at least). This area is frequently used for copyright information, for example, although some systems insert kerning data into this area.

- What is the font descriptor data?

  The data is:

```
UI  Font descriptor size
UB  Descriptor format
UB  Font type
UI  Reserved (should be 0)
UI  Baseline distance
UI  Cell width
UI  Cell height
UB  Orientation
 B  Spacing
UI  Symbol set
UI  Pitch
UI  Height
UI  xHeight
SB  Width Type
UB  Style
SB  Stroke Weight
UB  Typeface LSB
UB  Typeface MSB
UB  Serif Style
SB  Underline distance
UB  Underline height
UI  Text Height
UI  Text Width
UB  Pitch Extended
UB  Height Extended
UI  Cap Height
UI  Reserved (0)
UI  Reserved (0)
A16 Font name
```

```
??  Copyright, or any other information
```

UI = unsigned integer, SI = signed integer, UB = unsigned byte, SB = signed byte, B = boolean, and A16 =sixteen bytes of ASCII.

After the font name, ?? bytes of extra data may be inserted. These bytes pad the descriptor out to the length specified in the begin font descriptor command.

Note: integers are *always* in big-endian order (MSB first).

- What is a character descriptor?

  A character descriptor describes the character specific info and the layout of the bitmap. Newer printers can accept compressed character bitmaps.

- What is a character descriptor command?

  "ESC * c # E"

  The # is the length of the descriptor, in bytes.

- What is the character descriptor data?

```
UB  Format
 B  Continuation
UB  Descriptor size
UB  Class
UB  Orientation
SI  Left offset
SI  Top offset
UI  Character width
UI  Character height
SI  Delta X
??  Character (bitmap) data.
```

  Although older printers cannot accept characters that include continuations, newer printers can. If the "continuation" field is 1, the character bitmap data begins immediately after that byte and the remaining fields _are not_ present.

- Ok, now I understand the data, what do I look for in the output stream?

  `ESC * c # D`
  : defines the font number (remember the number).

  `ESC ) s # W`
  : defines the font descriptor (as described above).

  `ESC * c # E`
  : specifies the character code (the #, in this case). The next character descriptor maps to this position in the font. Characters do not have to appear in any particular order.

  `ESC ( s # W`
  : defines the character descriptor (as described above).

> Remember, these can occur in any order. Experimentation with the particular driver you are using may help you restrict the number of different cases that you have to be prepared for.

Please report your experiences using this method to norm (both to satisfy his own curiosity and to help improve the FAQ).

57 MS-DOS Screen Fonts (EGA/VGA text-mode fonts)

Editors note: the following description was mercilessly stolen from comp.archives on 02SEP92. It was originally Yossi Gil's posting.

FNTCOL14.ZIP contains more than 200 text mode fonts for EGA/VGA displays. It includes fonts in different sizes for Hebrew, Greek, Cyrillic, math symbols and various type styles including smallcaps and script.

It is available at `borg.poly.edu:/pub/reader/dos/fntcol14.zip`

58 OS/2 Information

[ed: Except as otherwise noted, the entire OS/2 section of the comp.fonts FAQ List is derived from the "Draft OS/2 Font FAQ" posted by David J. Birnbaum.]

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[ed: Since this section of the FAQ is wholly derived from David's document, some sections contain information repeated elsewhere in the comp.fonts FAQ.]

58.1 David Birnbaum's Introduction

4 June 1993

A couple of weeks ago I posted an inquiry to comp.fonts, comp.os.os2.misc, and the OS2-L ListServ concerning some apparent peculiarities in the way OS/2 handles font files. These "peculiarities" actually reflect regular, systematic differences in OS/2, Windows, and DOS font handling, which are not conveniently described in end-user documentation. This posting is intended to spare others some of the confusion I encountered as a result of this paradigm shift.

This is the first (draft) distribution of this document and corrections and suggestions are welcome. I am grateful to Henry Churchyard, Marc L. Cohen, Bur Davis and Kamal Mansour for helpful discussions; they are not, of course, responsible for any misinterpretation I may have inflicted on their comments.

59 Preliminaries

Character: an informational unit consisting of a value (usually a byte) and roughly corresponding to what we think of as letters, numbers, punctuation, etc.

Glyph: a presentational unit corresponding roughly to what we think of as letters, numbers, punctuation, etc.

Character vs glyph: Glyph and character are not necessarily the same; the character <a> may be mapped to a Times Roman Lower Case <a> glyph in one font and to a Helvetica Lower Case <a> glyph in another font. Change of glyphs normally means a change in style of presentation, while change in characters normally means a change in information. There are gray areas and the definitions provided above are general, approximate, and imprecise.

Character set: an inventory of characters with certain assigned values. ASCII is a 7-bit character set that specifies which "character cell" (byte value) corresponds to which informational unit.

Code Page: essentially synonymous with character set.

Font: A collection of glyphs. A specific font may be isomorphic with a specific character set, containing only glyphs corresponding to characters in that set, with these glyphs mapped to the same byte values as the characters they are intended to represent. PostScript fonts often contain additional (unmapped) characters. Most importantly, PostScript fonts may sometimes be remapped by an operating environment, which is what leads to the disorienting cross-environment mismatch that spurred my original posting.

Fonts may be bitmapped or outline in format; a bitmapped format corresponds to a particular size and weight for a particular device or device resolution, while a single outline font is used to generate multiple sizes as needed. Within an outline font system, different weights (bold, semibold, italic, etc.) may be encoded as separate font resources (separate outline files used to generate the glyphs) or may all be generated from a single outline (slanting characters to make "italics," fattening them for "bold," etc.).

60 Fonts under DOS

I used a large assortment of fonts under DOS for intricate multilingual work. My setup at that time consisted of a library of bitmapped fonts that could be sent to my HP LaserJet II printer, as well as a set of fixed-size, fixed-width screen fonts that were supported by my Hercules Graphics Card Plus (not the same as Hercules Graphics; the "Plus" included an ability to store 3072 screen glyphs and display any of these together, while standard character-mode displays were normally limited to 256 or 512 such entities).

Using XyWrite as a word processor, I would enter a "Mode" command to change fonts and character sets simultaneously; this would make different sets of screen glyphs available at the keyboard and would insert a font-change command for my printer into the text stream. The "Mode" and font-change commands were not displayed on the screen. The result was not WYSIWYG, since I was limited to fixed-width screen display and since I had far more printer glyphs available than the 3072 limit imposed by my video card; I used a brightness attribute to indicate bold, I used the same screen font for different sizes of printer fonts, etc. This worked and worked well, in that I could see (for example) Russian, Greek, English, Polish, and other characters simultaneously on the screen and I could print documents combining them.

Architecturally, what was going on was that the character sets (code pages) and fonts were entirely isomorphic and were hard- coded. If I put a particular Russian letter into cell 246 of my screen and printer fonts, that character was always there, and any strategy that would let me access this cell (remapped keyboards, numeric keypad) was guaranteed always to find the same character.

61 Windows

I recently began using PostScript fonts in Windows with AmiPro as my word processor. These fonts came with printed cards indicating the glyph mappings; I could look at the card and it would tell me that a specific character lived in cell 246, and if I entered Alt-0246 at the numeric keypad that glyph would appear on the screen. If I loaded the font into Fontographer for Windows, these glyphs would be arrayed in cells according to the map provided by Adobe with the fonts. Fontographer also revealed that these fonts had other, "unmapped" glyphs assigned to cells above 255.

Given what appeared to be a hard correspondence among what I saw in Fontographer, what was printed in Adobe's maps, and what was displayed when I entered something at the keyboard, I naively assumed that PostScript fonts were operating much like my bitmapped fonts under DOS. There were some obvious differences, the primary one being that glyphs of different sizes were all drawn from the same font resource files under PostScript, but it appeared as if a glyph lived in a certain cell.

62 Differences between Windows and OS/2

This assumption was incorrect; PostScript fonts can be subdivided into two types, one of which observes hard and invariant encodings similar to those that apply to my bitmapped fonts, while the other represents a completely different font mapping strategy. This difference became apparent only when I attempted to share PostScript fonts between Windows and OS/2 and got some unexpected results.

A PostScript font under Windows involves two files, a PFB (PostScript Font Binary) file, which contains the PostScript instructions needed to draw each glyph and some mapping information, and a PFM (Printer Font Metrics) file, which encodes width and kerning information. A PostScript font under OS/2 also uses the same PFB file, but instead of the PFM file it uses an AFM (Adobe Font Metrics) file. The AFM and PFM files contain much of the same basic information (although the AFM file is somewhat more complete); the most important differences are in format (AFM is plain text, PFM is binary) and use (OS/2 uses AFM, Windows uses PFM).

63 Installation under Windows and Win-OS/2

The OS/2 2.0 Font Palette tool (see below for changes to be introduced with 2.1) by default installs fonts (both PFB and AFM files) into the "\os2\dll" directory. Win-OS/2 by default installs PFB files into "\psfonts" and PFM files into "\psfonts\pfm". These defaults can be changed; since OS/2 and Win-OS/2 use the same PFB files, the user can save disk space by allowing these to be shared (through installing into the same directory, e.g., install OS/2 fonts into the "\psfonts" directory instead of "\os2\dll".) Note that fonts must be intalled and removed through the Font Palette; if you copy, move, or delete a font file without using the Font Palette, the system configuration files are not updated and all hell breaks loose.

Deleting fonts from Win-OS/2 causes the system to update the win.ini file to remove references to the font, but does not delete any files physically. Deleting fonts from the OS/2 Font Palette updates the os2.ini configuration file *and* physically deletes the AFM and PFB files from the disk. This means that if you are sharing PFB files between OS/2 and Win-OS/2, you can delete a Win-OS/2 font without hurting native OS/2 operations, since the PFB reamins installed where OS/2 thinks it is. But if you delete an OS/2 font using the Font Palette, the PFB file is erased from the disk even though the win.ini file is not updated, so that Win-OS/2 thinks it is still there.

64 FontSpecific PostScript Encoding

Every PFB file contains an "encoding vector"; this is a plain text line embedded near the head of the PFB file. Encoding vectors are of two types: AdobeStandardEncoding and everything else. Adobe usually uses the label "FontSpecific" for fonts that are not encoded according to AdobeStandardEncoding, and I use it as a cover term here for any such font.

If you look at the readable plain text information at the head of a FontSpecific type font, it includes a range of text that begins:

```
/Encoding 256 array
```

followed by a bunch of lines, each of which includes a number (which corresponds to a cell in the font layout) and the name of the glyph that lives in that cell. The unreadable binary data below this array specification lists the name of each glyph and the PostScript instructions for how the glyph is to be drawn. There may be PostScript code for drawing glyphs that are not included in the mapping array, but only glyphs mentioned in the array specification are available to applications.

FontSpecific type fonts *are* comparable to the bitmapped fonts I used under DOS. Each character physically is assigned to a specific cell within the font file and operating environments are not allowed to remap these. The glyph in cell 246 will be the same in both Windows and OS/2.

65 AdobeStandardEncoding

AdobeStandardEncoding is a specific mapping of certain glyphs to certain cells; in this respect it resembles FontSpecific encoding. Because it is standardized, the array is not spelled out in the PFB file; the line

```
/Encoding StandardEncoding def
```

tells Adobe Type Manager (ATM, either the Windows and Win-OS/2 version or the native OS/2 version) that the encoding is "standard," and the environments are expected to know what this standard is without having the array spelled out in each font file.

Although AdobeStandardEncoding is a real mapping, there is an importance difference between it and various FontSpecific mappings: operating environments are expected to remap AdobeStandardEncoding fonts according to their own requirements. That is, although AdobeStandardEncoding does assign glyphs to cells, no operating environment actually uses these assignments and any environment remaps the glyphs before rendering them. Confusion arises because Windows and OS/2 remap such fonts in different ways.

66 AdobeStandardEncoding under Windows (and Win-OS/2)

An AdobeStandardEncoding font under Windows is remapped according to a character map (code page) that MicroSoft calls Windows ANSI (can other code pages be installed in Windows?). This determines which character resides in which cell and the font is remapped so that glyphs and characters will correspond. Since Fontographer for Windows is a Windows application, it displays glyphs not in the cells in which they live according to AdobeStandardEncoding, but in the cells to which they get reassigned under the remapping to Windows ANSI. There is nothing explicit in the PFB file that associates these characters with the specific cells in which they appear under Windows.

67 AdobeStandardEncoding under OS/2

OS/2 operates within a set of supported code pages; two system- wide code pages are specified in the config.sys file and an application is allowed to switch the active code page to any supported code page (not just these two). DeScribe, for example, currently operates in code page (CP) 850, which includes most letters needed for western European Latin alphabet writing. CP 850 does not contain typographic quotes, en- and em-dashes, and other useful characters. It does contain the IBM "pseudographics," which are useful for drawing boxes and lines with monospaced fonts.

When the user inputs a value (through the regular keyboard or the numeric keypad), the application checks the active CP, looks up in an internal table the name of the character that lives in that cell within that CP, and translates it into a unique number that corresponds to one of the 383 glyphs supported by OS/2 (the union of all supported code pages). This number is passed to PM-ATM (the OS/2 ATM implementation), which translate the glyph number into the glyph name that PostScript fonts expect and searches the font for that name. The system never looks at where a glyph is assigned under the AdobeStandardEncoding array; rather, it scans the font looking for the character by name and gives it an assignment derived from the active code page. This is the remapping that OS/2 performs on AdobeStandardEncoding type fonts.

As a result, a situation arises where, for example, <o+diaeresis> is mapped to cell 246 under Windows ANSI but to cell 148 under CP 850. Using the identical PFB file, this glyph is accessed differently in the two operating environments.

68 Consequences for OS/2 users

If your font has a FontSpecific encoding, there are no unexpected consequences; the same glyphs will show up at the same locations in both Windows (Win-OS/2) and native OS/2. Regardless of what the active code page is, if the font has a FontSpecific encoding OS/2 goes by cell value; a specific glyph is hard-coded to a specific cell and OS/2 will give you whatever it finds there, even if what it finds disagrees with what the active code page would normally predict. In other words, FontSpecific encoding means "ignore the mapping of the active code page and rely on the mapping hard-coded into the font instead."

If your font has an AdobeStandardEncoding encoding, the following details obtain:

1) The same PFB file may have glyphs that are accessible in one environment but not another. For example, if DeScribe thinks it is operating in CP 850, there is no access to typographic quotes, even if those do occur in the PFB file and even if Windows can find them in the same exact font file. DeScribe could switch code pages, but if the application isn't set up to do so (and DeScribe currently isn't), those characters are absolutely inaccessible to the user.

2) If the active code page includes a character that isn't present in the font, OS/2 has to improvise. For example, AdobeStandardEncoding fonts do not normally include the IBM pseudographics, yet the user who inputs the character value for one of these sends the system off to look for it. As described above, OS/2 first checks the active font for the glyph name that corresponds to that character and, if it finds it, displays it. If the glyph isn't found, OS/2 looks to the system Symbol font. This is not reported back to the user in DeScribe; if I have Adobe Minion active (AdobeStandardEncoding, no information anywhere in the font files for pseudographics) and input a pseudographic character, DeScribe tells me it is still using Adobe Minion, even though it has fetched the character it displays and prints from the Symbol font, a different font resource file.

69 Advice to the user

OS/2's code page orientation provides some advantages, in that it separates the character set (code page) mapping from the encoded font mapping. The main inconvenience isn't a loss of function, but a disorientation as users become accustomed to the new paradigm.

If you need a glyph that you know is in your PFB file but that isn't in the active code page (and if you can't change code pages within your application), you can't get at it in OS/2 without tampering with the font files. To tamper, you can use font manipulation tools to redesignate the PFB file as FontSpecific ("Symbol" character set to Fontographer). If you then map the glyphs you need into one of the lower 256 cells (with some limitations), they will be accessible in all environments. The Fontographer manual does not explain what the "Symbol" character encoding label really does, it just tells you not to use it except for real symbol fonts. In fact you should use it for any font that will not correspond in inventory to the code page supported by your application, which means any non-Latin fonts.

You do not have to recode all your fonts, and you wouldn't normally want to do so, since Fontographer hinting is not nearly as good as Adobe's own hand-tuning and regenerating a font regenerates the hints. All you have to do is make sure you have one FontSpecific type font installed that includes your typographic quotes, etc. for each typeface you need. Within DeScribe, you can then write a macro that will let you switch fonts, fetch a character, and switch back, thereby allowing you to augment any group of fonts with a single, shared set of typographic quotes (or whatever) that you put in a single FontSpecific font. Alternatively, OS/2 also supports CP 1004, which does contain typographic quotes and other characters used for high-quality typography, but the user may not be able to convince an application to invoke this code page if it was not designed to do so.

You can have any number of FontSpecific fonts installed, which means that there is a mechanism for dealing with unsupported character sets (code pages).

You can also tinker with the font files to try to trick the operating system. For example, using Fontographer or other utilities, you can change the name assigned to a glyph description within the PFB file. If you want to use AdobeStandardEncoding and you want to see a specific glyph at a specific cell when DeScribe thinks it's using CP 850, you have to make sure that the name assigned to the description of that glyph is what DeScribe expects to find. OS/2 doesn't care whether, say, <o+diaeresis> really looks like <o> with two dots over it, as long as it bears the right name.

This second approach is obviously far more complex and provides much more opportunity for error. Its advantage is that OS/2 does not support case conversion and sorting (other than in machine order) for unsupported code pages, since these operations depend on character names. Keeping supported names from supported code pages while changing the artwork is one way to maintain

order and case correspondences while increasing the range of glyphs actually supported. I have not experimented with this approach, since the use I would get out of the adding functionality (over the FontSpecific encoding approach) is not worth the amount of effort required.

70 OS/2 2.1 and beyond

OS/2 2.1 will change some aspects of font handling. First, OS/2 2.0 GA+SP has a bug that can cause OS/2 to crash when an AFM file with more than 512 kern pairs is read. This is fixed in 2.1. (This bug is separate from a design limitation in MicroSoft Windows that causes large kern tables to be read incorrectly. This problem is still under investigation; watch this space for a report.)

Fonts in 2.1 will be installed by default into the "\psfonts" directory, so that they will normally be shared with Win-OS/2 fonts. (The user will still be able to specify a directory; all that will change is the default). The user will also be able to instruct the Font Palette not to delete font files when fonts are uninstalled, so as to avoid clobbering a Win-OS/2 font by removing it from native OS/2 use through the Font Palette (although the default will still be to delete the physical font files).

OS/2 will stop using AFM files and will replace these with OFM files, a binary metrics file (different from PFM) that OS/2 will compile from the AFM file during font installation. This will speed font loading, since the system will not have to parse a plain text metrics file. Additionally, the OS/2 PostScript printer driver used to install its own, large font files, but will now use the OFM and PFB files, thereby saving 50k-200k of disk space per installed font outline.

IBM's long-term goal is to replace the 383-entity inventory of supported glyphs with Unicode. This is very much a long-term goal and there is not even a hint of when it might become available. It has its own problems, stemming from the fact that Unicode is essentially a character standard and glyph and character inventories may differ is assorted ways, but it will be a significant step in the proverbial right direction.

71 Unix Information

See also the 'utilities' section for more information. Most of the utilities described in that section run under Unix.

The bulk of this section was contributed by Johannes Schmidt-Fischer in Jun 1993.

71.1 Unix Font Formats

Most printers attached to Unix hosts are PostScript printers. As a consequence, most Unix users are also using PostScript fonts. If you are not using a PostScript printer, you need a front-end, like GhostScript, to convert the PostScript into a format compatible with your printer.

There is no Unix specific Postscript Type 1 format. The most often used (and most easily usable) format is Adobe's PFA format. The other often used format is PFB format. The PFB format is more compact (by about 50%), but in order to use it you need make sure that your font downloading tools are prepared to convert PFB to PFA on fly.

Postscript Type 3 fonts are no problem, they can be handled the same way as Type 1 fonts.

Most Unix tools expect to get character metric information from AFM files. You may have difficulty using fonts collected off of the 'Net if they do not include AFM files

71.2 Font Installation

71.2.1 Application

It depends. (Well, what did you expect me to say? ;-)

71.2.2 Printer using an ExitServer

Convert PFB fonts into PFA format if necessary and then send them to printer inside a wrapper like so:

```
%!PS-Adobe-2.0 ExitServer Job
```

```
serverdict begin 0 exitserver  % 0: substitute your password
...                            % font in PFA-format
%%EOF
```

Or include them directly in your print job:

```
%!PS-Adobe-2.0
...                            % font in PFA-format
...                            % other initialisation
%%Page: 1 i                        % beginning of your job...
...                            % ...
%%EOF
```

72 Sun Information

Someone mailed a file of Sun-related font tips. Unfortunately, I cannot find the file. If you have any suggestion for this section (or if you are the person that mailed me the other list), please forward your suggestions to norm.

[Note: much of this information is obsolete, based on the SunOS4/Solaris2.1 server. The Solaris 2.3 and later servers are based on the standard X11R5 server but with Display PostScript added, so you can do Type 1 in the "normal" way (fontdir+mkpsres)]

73 Fonts Under Open Windows

The following information regarding fonts under Open Windows was donated by Liam R.E. Quin from the Open Windows FAQ.

74 Does OpenWindows support Type 1 PostScript fonts?

Type 1 fonts are supported starting with the NeWSprint 2.0 and Solaris 2.0 (OpenWindows 3.0.1) releases.

There are also 57 F3 format fonts supplied with OpenWindows which are fully hinted. Documentation on the F3 font format and the F3 font interpreter, TypeScaler, is available from Sun.

75 Improving font rendering time

Although the Sun type renderer (TypeScaler) is pretty fast, it's not as fast as loading a bitmap. You can pre-generate bitmap fonts for sizes that you use a lot, and you can also alter and access the font cache parameters. If you have a lot of memory you might want to increase the font cache size.

```
$ psh -i
Welcome to X11/NeWS Version3      <--- psh will say this at you
currentfontmem =                  % type this line ...
300                               % ... my server was using 300 Kbytes
1024 setfontmem
                                  % Just to check:
currentfontmem =
1024
```

See pp. 328ff of the NeWS 3.0 Programmer's Guide. You need to say `psh -i` so that the PostScript packages are loaded - see the psh man page.

You could also add the following line to your `$HOME/.openwin-init` file to perform this task every time you start OpenWindows:

```
echo 1024 setfontmem | psh -i > /dev/null 1>&2
```

76 Making bitmap fonts for faster startup

Sun supports the F3 scalable outline format. These descriptions are stored in .f3b files. The makeafb program is used to create a bitmap font at a particular size which is stored in a .afb file, which is an Adobe ASCII format for font bitmaps. X11/NeWS really prefers a binary format though for speed and other reasons, so convertfont is used to "compile" the font into a font binary or .fb file.

Once this is done, X11/NeWS needs to understand the relationship between the .f3b file and all the bitmaps which are based on it. Thus, the bldfamily program makes these correlations and stores the data in the font family or .ff file.

bldfamily also builds a global list of all fonts stored in the working directory, writing the results out to the file Families.list. If one wishes to create font aliases, these can be added to the Synonyms.list file by hand and bldfamily will then add them to Families.list for you. X11/NeWS uses Families.list to construct the font list it advertises to applications.

To go from F3 to BDF, use makeafb to generate a bitmap font in .afb format. Then use one of convertfont's many options to change to this to .bdf format and from there it should be clear.

```
$ mkdir $HOME/myfonts
$ cd $HOME/myfonts
$ makeafb -20 -M $OPENWINHOME/lib/fonts/Bembo.f3b
Creating Bembo20.afb
$ convertfont -b Bembo20.afb
Bembo20.afb->./Bembo20.fb
Chars parameter greater than number of characters supplied.
$ ls
Bembo20.afb   Bembo20.fb      Synonyms.list
$ bldfamily
* Bembo                      ./Bembo.ff (Encoding: latin)
cat: ./Compat.list: No such file or directory
$ xset +fp `pwd`
$ xset fp rehash
```

If you want the server to see your new font directory every time, add this directory to your FONTPATH environment variable in one of your start-up files, e.g. .login or .profile.

77 Converting between font formats (convertfont, etc.)

You can also use F3 fonts with an X11 server, by converting them to a bitmap (X11 bdf format) first. Your license restricts use of these fonts on another machine, and unless you have NeWSPrint you shouldn't use them for printing. Having said all that... you can use makeafb and convertfont to generate bdf files that you can compile with bdftosnf or bdftopcf.

Use `mftobdf` (from the SeeTeX distribution) to convert TeX `PK` fonts to X11 `BDF` format, which you can then use with either X11 or OpenWindows.

78 Xview/OLIT fonts at 100 dpi

There aren't any. More precisely, the various text fonts, such as Lucida Typewriter Sans, are available at 100 dpi, and in fact are scalable under OpenWindows. The glyph fonts used to be bitmaps, which don't scale very well, but starting with OpenWindows 3.2, the OpenLook UI glyph fonts are provided in scalable format as well.

79 Where can I order F3 fonts for NeWSprint and OpenWindows?

600 F3 fonts are available for unlocking from Printer's Palette, a CD available with NeWSprint 2.0.

In addition, F3 fonts are available from the following sources:

```
Linotype AG                        Linotype Company
Mergenthaler Allee 55-75           425 Oser Avenue
6236 Eschborn Germany              Hauppague, NY  11788
49/(61 96) 4031                    (800) 336-0045
FAX 011/49/6196-982185             FAX 516-434-2055
attn: F3 Font Production           attn: F3 Font Production

Monotype Plc.                      Monotype Typography
Salfords Redhill RH1 5JP           53 W. Jackson Boulevard Suite 504
England                            Chicago, IL  60604
44/(737) 765959                    (800) 666-6893
FAX 011/44/737-769243              FAX (312) 939-0378
attn: F3 Font Production           attn: F3 Font Production

U R W                              U R W
Harksheider Strasse 102            One Tara Boulevard Suite 210
D2000 Hamburg Germany              Nashua, NH  03062
49/(40) 606050                     (603) 882-7445
49/(40) 60605148                   (603) 882-7210
attn: F3 Font Production           attn: F3 Font Production

Bigelow & Holmes                   Autologic
P. O. Box 1299                     1050 Rancho Conejo Boulevard
Menlo Park, CA  94026              Newbury Park, CA  91320
415/326-8973                       (800)235-1843, or (805)498-9611 in CA
FAX (415) 326-8065                 FAX (805) 499-1167
attn: F3 Font Production           attn: F3 Font Production
```

80 NeXT Information

If you have any suggestions for this section, please forward your suggestions to norm.

81 Tell me about NeXTstep fonts

NeXTstep fonts are Adobe Type 1 fonts stored in ASCII (PFA) format. There are several rules about how fonts must be installed before they work.

I'd like to thank Henry for rewriting this section.

81.1 Basic Format

NeXTstep fonts live in one of three folders:

`/NextLibrary/Fonts`
: Contains system fonts. In general, you will not install any new fonts here.

`/LocalLibrary/Fonts`
: Contains fonts which are accessible to every user on a system or a network.

`~/Library/Fonts`
: (where ~ is your home folder) means fonts which are private to a specific user.

A NeXTstep font is actually a folder containing various components of the font. Components are:

- the outline font file – REQUIRED
- the font metrics (AFM) file – REQUIRED
- one or more screen font (bitmap) files – OPTIONAL

81.2 Font Folder and Font Filename Requirements

The name of the folder containing a font and the name of the font file itself must follow strict rules – the names can NOT be any old name you like. For a font to work correctly, the base folder and font filename MUST BE THE SAME as the name of the outline font. This is usually the same as the value of the FontName field in the AFM file or the value of the /FontName key in the actual font itself. Suppose you have a font called Headhunter. The Headhunter font must live within a folder called

```
Headhunter.font
```

within one of the three folders mentioned above. Within the Headhunter.font folder, you must have the two files

```
Headhunter        ( the outline file )
Headhunter.afm    ( the AFM file )
```

If you have a bitmap file for Headhunter, it must live in a file

```
Headhunter.bepf   ( the bitmap file )
```

Variations such as Bold, Italic, etc., should be their own font files in their own folder. So if you have a font called Headhunter-Bold, you need to create a folder called

```
 Headhunter-Bold.font
```

within one of the three folders mentioned above. Within the Headhunter.font folder, you must have the two files

```
Headhunter-Bold       ( the outline file )
Headhunter-Bold.afm   ( the AFM file )
```

If you have a bitmap file for Headhunter, it must live in a file

```
Headhunter-Bold.bepf  ( the bitmap file )
```

81.2.1 For NeXTstep 1.0 ONLY, you also need to take the following steps:

- If they do not already exist, create the following folders:
  - `~/Library/Fonts/outline`
  - `~/Library/Fonts/afm`
  - `~/Library/Fonts/bitmap`
- In each of these folders, create a symbolic link to the corresponding component file in each font.

81.2.2 For NeXTstep 2.0 and up:

The font description is taken from the font folder itself, so you don't need to do this. It may be beneficial to simply create these folders and put nothing in them, but I'm not sure it matters.

Certain "old" applications which haven't upgraded to the NeXTstep 2.0 scheme of fonts may depend on these folders being present.

The last step is to get the system to recognize the new font(s). You may have noticed the existence of three files in the Fonts folder: .fontdirectory, .fontlist, and .afmcache. These are files the system looks at to see which fonts exist.

The easiest way to update them is to simply start up an application and open the font panel. It should recognize that the update time stamp on the Fonts folder has changed, and update the files accordingly. It is probably a good idea to simply delete the three above files beforehand.

You should get a message window saying "incorporating information on new fonts. Please wait (this may take xx seconds)". Your new fonts should be available now.

If this does not work, you can update them manually. Open up a Terminal shell and go to your Fonts folder. At the prompt, type two commands:

```
buildafmdir
cacheAFMData afm
```
(the parameter is the <*afm dir*>)

The new fonts will not work if the cacheAFMData command is not run, and since it is an undocumented command, it is a common culprit.

[ed: the cacheAFMData step may not be required in 3.0 OS]

I believe this is true. Looks like the PasteBoard Services runs `cacheAFMData` in 3.0.

You should now be able to see and preview your fonts in the font panel.

If you are still having problems with your font, such as the `<< Unusable font >>` message, consult NeXTAnswers. There are some useful suggestions for debugging faulty fonts there. It is also always helpful to look at existing fonts to see how they are installed.

One note on the NeXTAnswers. Supposedly there are only a few discrete values which are allowed to appear in the weight field of the font: “Ultra Light”, “Thin”, “Light”, “Extra Light”, “Book”, “Regular”, “Plain”, “Roman”, “Medium”, “Demi”, “Demi-Bold”, “Semi-Bold”, “Bold”, “Extra Bold”, “Heavy”, “Heavyface”, “Black”, “Ultra”, “UltraBlack”, “Fat”, “ExtraBlack”, and “Obese”. However, I have a few fonts where this is not the case (“standard” is a common entry) and have had no problems as of yet. But it would probably be wiser to be on the safe side.

See below for a definitive list.

82 Tell me more about NeXTstep fonts

Outline files should be in PFA or hexadecimal ASCII format. The font name should be taken either from the outline (font) file or the AFM file. In both case the name is given after the word "FontName" at the beginning of the file)

As a matter of fact, fonts don't strictly HAVE to be in all hexadecimal ASCII format. The eexec portion of the font can be in binary if you wish, and in fact some Mac->NeXTstep or PFB->NeXTstep font converters simply strip off the Mac/PFB storage format headers and leave the binary sections as binary.

However, if you wish to send such a font across a serial channel to a PostScript printer, you will need some way to unpack the binary eexec portion to seven-bit ASCII before sending the font.

82.0.1 Converted Fonts After Conversion

After conversion they are just like any other freeware or shareware font that you can get in NeXTstep-format from the archives. That's just outline and AFM files but no bitmapped screen fonts. So small point size means poor resolution on screen but they most of should print OK if they are any good (= usually made with Fontographer).

82.0.2 About Conversion Utilities

82.0.2.1 NeXTstep utilities

- `unfont`

  You can find a package, named something like `pcATMfont2NeXT.tar.Z`, from NeXT archives (`cs.orst.edu`) that converts PC fonts to NeXT format (PFB -> PFA).

  The most useful tool for me has been "`unfont`" which converts the .pfb (binary outline) font to ASCII outline font.

  I usually use it like this

  ```
  $ unfont new_font.pfb >NewFont
  ```

  If the conversion was successful all I have to after that is maybe to rename the font correctly and move the outline file in the correct .font folder.

- `Opener.app`

  Opener seems to be a very useful application since it can open several kinds file packages on NeXTstep that are common on other platforms. E.g. "`.sit`", "`.hqx`", "`.zoo`", "`.zip`", "`.z`", etc.

  I haven't used it a lot but looks very promising.

- T1utils-1.1

  This is collection of command-line programs that manipulate PS Type 1 fonts and one of them can also do the PFB->PFA conversion (t1ascii?).

Basic unarchiving of Mac and PC files.

On your Unix machine:

`xbin` Converts `.hqx` to:

- `.data` Rename and transfer to PC (or use `opener.app` on NeXT?)
- `.info` Discard
- `.rsrc` Discard

`unzip` Converts `.zip` to:

- `.inf` Discard
- `.wfn` Discard
- `.pfm` Discard (unless it can generate a better `AFM` file)
- *everything else* Transfer to NeXT

On a PC:

`xbin` Converts `.hqx` to:

- `.data` Rename and transfer to PC (or use `opener.app` on NeXT?)
- `.info` Discard
- `.rsrc` Discard

`extract -f ...` Converts `.cpt` to:

- *file with no extension* This is usually the outline font. `Refont` and transfer to NeXT.
- `.afm` Transfer to NeXT.

`.pfm` Discard (unless it can generate a better `AFM` file)

`.bma` Discard if you have an `AFM` file.

`unsit30 -eb ...`

Converts `.sit` to:

file with no extension
: This is usually the outline font. `Refont` and transfer to NeXT.

`.afm` Transfer to NeXT.

`.pfm` Discard (unless it can generate a better `AFM` file)

`.bma` Discard if you have an `AFM` file.

`refont` Converts outline formats from Mac to NeXT format (`PFA`).

`pkunzip` Converts `.zip` to:

`.inf` Discard

`.wfn` Discard

`.pfm` Discard (unless it can generate a better `AFM` file)

everything else
: Transfer to NeXT

On a NeXT

`Opener.app`

Converts archive formats (`.sit`, `.hqx`, `.zip`) to NeXT format.

`unfont` Converts `PFB` files to NeXT format.

`afm` Converts `AFM` files to NeXT format `AFM` files (CR/LF hackery)

82.0.3 Installation

There are scripts (installfont) available that can handle the installation process but here is how you do it manually.

- .font

  After all that you have to create the .font folder, move the outline and .afm files there and start fighting with the strangely formatted .afm file. The most common problems are font name mismatch between outline and AFM files (family name is incorrect or too long, etc) and missing fields (ex. no ItalicAngle entry) in the AFM file.

- buildafmdir AND cacheAFMData

  buildafmdir puts its complains to Console but cacheAFMData put them on stdout or stderr (ie. Terminal Window).

  PARSE ERRORS ———— "Parse error 10000011 ..." comes from mismatch between of CharMetrics declared in the .afm and actually found. I haven't been able to figure out the other strange parse errors.

  buildafmdir in the 3.0 release has the limitation of not being able to install more that 255 fonts in any one font folder. This is supposed to be fixed in 3.1.

- The Dreaded `<<Unusable Font>>` Message

  <<Unusable Font>> appears in the font panel when you have run buildafmdir and it finds things it thinks are wrong with the AFM file. Errors can also be generated by parsing routines inside the PasteBoard Services.

  <<Unusable Font>> almost NEVER has anything to do with the font itself, since buildafmdir doesn't actually look inside the font. Errors in the font due to faulty conversion will likely show up at the time the PostScript server actually attempts to define the font or render characters from the font.

  The only error I have ever seen from a converted font was the results of a naive Macintosh to PFA converter, which didn't understand that the POST resources in a Macintosh format Type 1 font do not have to be in order, nor do the POST resources all have to be contiguous – they can be interspersed with other resources. The results were that a comment resource ended up in the middle of the eexec section of the font and the PostScript interpreter threw out lots of errors.

  <<Unusable Font>> almost ALWAYS occurs because there is something wrong with the AFM file you installed. Here is a partial list of problems that can occur with AFM files:

  - Carriage-return characters (^M) at ends of lines.

    This happens when you get incomplete translations from PC files, which use carriage-return-line-feed combinations at ends of lines.

    Solution: edit away the carriage returns. Make sure the lines are terminated only by line-feed characters.

  - Spaces or tabs at ends of lines.

    Fixed in NeXTstep 3.1.

  - Missing fields.

    NeXTstep DEMANDS that certain fields be present in the AFM file. Required fields are: FontName, FullName, FamilyName, Weight, EncodingScheme, and ItalicAngle. If any of these fields are missing, you will get the <<Unusable Font>> message.

    Solution: fill in the required fields.

- Incorrect Weight field.

  `buildafmdir` accepts only a certain set of values for the Weight field. Acceptable values are: "Ultra Light", "Thin", "Light", "Extra Light", "Book", "Regular", "Plain", "Roman", "Medium", "Demi", "Demi-Bold", "Semi-Bold", "Bold", "Extra Bold", "Heavy", "Heavyface", "Black", "Ultra", "UltraBlack", "Fat", "ExtraBlack", and "Obese".

- Character information count mismatches.

  AFM files contain several sets of information which are introduced by a "`Start`*xxxxx nnn*" line where the xxxxx is the name of the section (such as StartCharMetrics) and nnn is the purported number of lines of information of this type to follow. Sad to say, many many AFM files supplied by vendors and others are such that the actual number of lines of data do not match the number stated on the Startxxxxx line. When this error occurs in the AFM file, buildafmdir emits a Parse Error message to the console and the font will be marked unusable. The parse error messages from buildafmdir is of the form:

  `Parse error` nnnnnnnn xx yy

  where nnnnnnnn is the error number, xx is the number of lines of information claimed to exist, and yy is the number of lines actually read. The nnnnnnnn are are:

  10000011 mismatch in the StartCharMetrics section
  10000012 mismatch in the StartTrackKern section
  10000013 mismatch in the StartKernPairs section
  10000014 mismatch in the StartComposites section
  10000015 mismatch in a composite character specification

  I have converted many fonts from the Berkeley Macintosh User Group CD ROM and fully half of the supplied AFM files are incorrect.

- Other AFM file errors.

  Parse error numbers 10000001 through 10000010 means some kinds of syntax errors in the AFM data file. Any of these errors mean that the AFM file is truly hosed.

83 Porting fonts to the NeXT

83.1 Porting PC/Unix Type 1 Fonts

You must have the .pfb and .afm files

A PC Adobe font is stored in binary format, so the first step is to convert it to ascii.

There are a couple of utilities out there which can do this. I think t1utils can do it, and there is a nice utility called pcATMfont2Next which has a couple of tools to do this (unfont and pfb2ps). Look for the file pcATMfont2Next.tar.Z; it is available on many ftp sites.

Also, since NeXTstep run on Unix, there is the customary problem of converting the CRs (carriage returns) that PCs use to the LFs (Linefeeds) that Unix uses. The easiest way to do this is to use tr to delete the octal for the CR character from both the .afm and outline file. The command to do this is:

```
tr -d '\015' < inputfile  > outputfile
```

The unfont program will do this automatically when it converts the .pfb file, but pfb2ps does not. I'm not sure if t1utils' utility does or not.

Once you have the outline file, you can go ahead and install it by the process outlined above.

Otto J. Makela (`otto@jyu.fi`) posted a terrific cshell script to comp.fonts, which automates just about everything for you. It converts the .pfb to ASCII format, extracts the name from the FontName field, creates the font folder, copies in the component files with the correct name, and runs buildafmdir and cacheAFMData when done. A newer version of this script is now available from the standard NeXT step archives (Sonata, etc.).

83.2 Porting Mac Type 1 Fonts

A variety of programs and scripts exist to convert Macintosh format Type 1 fonts to UNIX format. Their ability to do a complete job varies. Common traps which naive font converters fall into are:

- not dealing with Macintosh POST which are out of order.
- not dealing with Macintosh POST which are interspersed with other resources.

- not dealing at all with POST Type 4 resources where the font program starts in resource fork of the file but the remainder of the data is in the data fork.

  Most naive converters we've looked at have this problem. This means that most Type 3 fonts won't convert at all.
- not dealing with MacBinary headers.

84 Font availability

[The archive site at `sonata.purdue.edu` seems to have disappeared.]

85 Why can I only install 256 fonts on my NeXT?

Included to NS3.0 there's a new 'buildafm'-routine (for non-NeXTers: 'buildafm' is a shell script which announces a new font to the computer) at `/usr/bin/buildafmdir`. The new one only allows to install about 256 fonts. Running the new 'buildafmdir' to install a new font surpresses every font above this number. Workaround: Re-install the 'old buildafmdir' from NS2.1 at /usr/bin/buildafmdir and everything should be fine!

(thanks to: Rob Parkhill and d'Art Computers/Germany d'art)

[ed: and my thanks to Borris Balzer for sending this to me]

86 Amiga Information

Daniel Amor contributes the following sections:

86.1 Font Concepts

The Amiga is able to use two different concepts of fonts. First of all there are the bitmap fonts. These fonts are created by drawing a letter pixel for pixel onto the screen. The advantage is that they look good at small sizes, but are not very good for printout. Also they don't look very good when you change their size. Therefore you have to recreate the font for each size. Second there are the vector fonts. They are created by curves which are stored as mathematical formula. This has the advantage that changing the sizes does not effect the output. But this only applies for larger sizes and print-outs. Vector fonts also use less memory.

86.2 Amiga Font Formats

1. Agfa IntelliFont (suffix: .type or .lib) is the native font format on the Amiga. You can use it in any application and it can be converted to the standard bitmap format using the system utilities '`IntelliFont`' (OS 3.x) or '`Fountain`' (OS 2.x).
2. Postscript Type 1 fonts can be used within many applications, it can be used in every word processor and DTP program. There are two versions of the Type 1 format: Binary and ASCII (suffix: .pfb & .pfa). The Amiga software uses the Binary format, but you can easily convert them with TypeSmith or some PD software products (z.B. PFB2PFA) . In Addition to the files mentioned above, there are the metrics files with the suffixes .afm or .pfm. They contain information about the size (width) of the letters and most programs expect this file to be in the same directory as the font file.
3. Postscript Type 3 fonts (suffix: .ps or nothing) are not often used on the Amiga, but some applications do support this font format (e.g. PageStream). There are also some download utilities from PD sources available.
4. Truetype fonts (suffix: .ttf) are not very common on the Amiga, there is one word processor supporting this format (Wordworth 3.0). Due to the lower quality of the format, Amiga users tend to use higher quality for their DTP, DTV and word processing... There are also two formats: Mac & Windows available. The Amiga software is able to use the Windows format.
5. DMF fonts is the privat format of PageStream (suffix: .dmf), since PageStream is the market leader in DTP programs on the Amiga, so this format is very common!
6. Bitmap fonts (suffix: .font and numbers in a directory by the name of the font, sometimes .otag when converted from IntelliFont) were used in the OS 1.x, but have been replaced by

the superior IntelliFont Format in OS 2.0. Under 2.0 or higher you still are able to use the bitmap fonts for small sizes, but for printouts you should use the IntelliFont format or any other vector font format mentioned above.

7. Colour Bitmap fonts (same suffixes as Bitmap Fonts, but the numbers have in addition a C, e.g. 35C) are also very common on the Amiga, they are mainly used for DTV applications, like the Video Toaster and Scala.

86.3 Frequently Requested Amiga Fonts

1. First place to look for fonts is the AMINET archive. This is the biggest archive of Amiga software and there you will find also quite a lot of fonts. The Aminet consists of many mirrors around the world. Here are some of them:
   1. ftp.wustl.edu,
   2. ftp.luth.se,
   3. ftp.eunet.ch,
   4. ftp.uni-paderborn.de,
   5. ftp.doc.ic.ac.uk.

   Just log in as ftp and go to the directory

   /pub/aminet/text/font.
2. Another good ftp server to look is the CICA-server:
   1. ftp.cica.indiana.edu

   To this server are also some mirrors around the world available.
3. Also a good place to look for is the following WWW server:
   1. http://www.ora.com/homepages/comp.fonts/ifa
4. Another good place is the Fresh Fonts I CD-ROM, there you will almost certainly find some nice fonts. The CD is available from
   1. Fred Fish / Amiga Library Services (orders@amigalib.com)
   2. Stefan Ossowski / Schatztruhe GmbH

   The CD is for free when buying another CD from that company.

   You can also access the HTML pages on the CD under the following address:
   1. http://macke.gris.informatik.uni-tuebingen.de:4711/~damor/

86.4 Commercial Font Sources

Commercial fonts can be obtained from a number of different companies, including the large font houses: Adobe, Font Haus, Font Company, Bitstream, and Monotype. At these companies, fonts cost about $40 for a single face, and must be purchased in packages. Adobe, Bitstream, and Monotype also sell pre-designated type collections for slightly lower prices.

There are also a lot of PD reseller who have a vast quantity of fonts, check out your local Amiga magazin for more information.

Please consult the vendor list for a more complete list of vendors.

86.5 Non-Latin fonts on the Amiga

Due to the really bad information policy by C= there was actually no information about non-latin fonts. But still it is possible to use them, without difficulty. You just have to get yourself some additional files. First of all you need the non-latin font files. There is a large selection of them on the Fresh Fonts CD-ROM mentioned above. In order to use the non-latin font files, you have to get yourself the appropriate keymap file, this will remap the keys on the keyboard to the appropriate letters of the foreign alphabet, e.g. in order to use a Russian font, you should set the russian keymap file in the preferences (via PREFS/INPUT).

Not only that you can write with a non-latin alphabet, you can also localize your workbench. How about a Greek workbench or a Hebrew workbench? Have a look into the AMINET archive (mentioned above) for these files!

In addition to this you can easily use Hebrew & Arabic in any word processor incl. writing from right-to-left! This can be easily done by setting the kerning value to negative values (like this the cursor moves left and not right) and moving the characters into the negativ part! You can get fonts from me with this feature!

86.6 Amiga Font Installation

The installation of Postscript, DMF and Truetype fonts is described by the application that use them. Please refer to the manuals of the software packages.

The installation of IntelliFonts is very easy. Just start '`IntelliFont`' (OS 3.x) or '`Fountain`' (OS 2.x) and follow the guidelines from within the program.

In order to install bitmap fonts, either copy them to the logical device FONTS: or assign the directory with your bitmap fonts:

```
ASSIGN Fonts: <your_directory> ADD
```

Right after this you can start your application and use them. When using non-latin fonts, don't forget to set the appropriate keymap file!

86.7 Amiga Font Utilities

1. IntelliFont

   IntelliFont is the system program by OS 3.x which lets you install Agfa IntelliFonts and converts them to bitmap fonts. The program is located in the drawer '`SYS:System/`'. For more information read your Workbench 3.x manual.

2. Fountain

   Is the preceding program to IntelliFont and comes with the now obsolete OS 2.x. Please read the section about Fountain in your Workbench 2.x manual.

3. PFB2PFA

   This neat little utility lets you convert Postscript Binary files to Postscript ASCII files. This is needed in order to use DOS & Amiga Adobe Type 1 fonts on the Mac!

4. CacheFont

   This great program caches the fontlist for you, in order to save a huge amount of time. The program looks for all fonts available on the system and creates a special cache-file on disk.

5. TypeSmith

   This is the best font converter on the Amiga, besides this function it is also a full blown font editor (see below) :-). The program is able to convert between:

   1. Truetype
   2. DMF
   3. Adobe (Type 1 & 3)
   4. IntelliFont
   5. Bitmap (Amiga, Adobe, DMF)

86.8 Making Outline Fonts

This is very, very difficult. Many people imagine that there are programs that will simply convert pictures into fonts for them. This is not the case; most fonts are painstakingly created by drawing

curves that closely approximate the letterforms. In addition, special rules (which improve hinting, etc.) mandate that these curves be drawn in specific ways. Even designing, or merely digitizing, a simple font can take hundreds of hours.

The easiest way of learning how to create fonts, is to have a look at existing fonts and try to change some letters.

Given that, there are two major programs used for font design on the Amiga, TypeSmith 2.5 ($150) and FontDesigner ($100). These programs will allow you to import scanned images, and then trace them with drawing tools. The programs will then generate Adobe type 1, 3, TrueType, AGFA Intellifont, DMF and Bitmap fonts for either the Amiga, the Macintosh or the IBM PC. They will also generate automatic hinting. They also open previously constructed outline fonts, allowing them to be modified, or converted into another format.

As far as I know, there are no shareware programs that allows you to generate outline fonts.

There are also two programs for creating bitmap fonts. Personal Fonts Maker and Calligrapher. The second one has not been updated for several years, but it still is a good tool to work with. The first Program was created by adding some features to a good bitmap paint program (Personal Paint).

There are some shareware tools to create bitmap fonts which you can convert to outline (vector) fonts with TypeSmith.

86.9 Problems and Possible Solutions

1. Pagestream does not recognize your newly installed font.

   This happens when you have two fonts with the same ID. The solution is to load such a font into a font editor and enter a new ID for one of the fonts. Still it might happen that you choose another one, that has already been used by!

2. Your application does not find the IntelliFont.

   This happens when you haven't set the locigal device FONTS: to your drawer. You can change this by typing the following command into your SHELL or add this line to your '`S:User-Startup`' file:

   ```
   ASSIGN Fonts: <your_drawer> ADD
   ```

3. You're using a non-latin font and the wrong characters appear when typing.

   This happens when you forget to set the appropriate keymap file. Enter the Prefs directory and start the program '`INPUT`'. There you can choose your keymap file.

86.10 Adobe Type 1 fonts for the Amiga

Darrell Leland contributes the following information:

There are now three high end DTP packages for the Amiga that can directly or indirectly use Adobe Type 1 Fonts or AGFA Compugraphic fonts. The best of the lot in both my and Amiga World's opinions is SoftLogik's Pagestream, currently in version 2.2 but about to go to version 3.0. Pagestream can take Adobe fonts in MS-DOS format directly with no format conversion needed. All you have to do is get them on an Amiga format disk, which is very easy using the new version of Commodore's Workbench operating system. Pagestream has import modules for MacWrite, Adobe Illustrator, and every other format in the universe (seems like). It is generally a very stable and well behaved program with a lot of features. I haven't had a chance to see 3.0 yet, but they are claiming it's going to be a real killer. We shall see. It does color seps, twists and rotates fonts, etc. Pagestream's job has been made easier with Commodore's (about time) release of their own Postscript printer drivers and Preferences postscript printer control tools.

SoftLogik also sells a program called Typesmith, which is (at last!) a structured font maker/editor for the Amiga. Typesmith will work with both formats mentioned above plus SoftLogik's own font format, which I get the impression they are discontinuing in favor of Postscript. They also sell ArtExpression, a very nice structured drawing package that does everything I can think of. I understand SoftLogik has also been getting several Mac and PC font makers to make Amiga fonts for them too. They even have a program system that allows programs to publish to other programs, sort of like in Mac System 7.0. They are lisencing it out to any Amiga developer who pays a paltry sum to lisence it.

87 Atari ST/TT/Falcon Information

Erlend Nagel contributed the following information about the Atari ST/TT/Falcon.

88 SpeedoGDOS

SpeedoGDOS is similar to ATM.

88.1 Fonts included with SpeedoGDOS 4.x

14 fonts are included with SpeedoGDOS 4.x.

Bitstream Cooper Black, Dutch 801 Roman, Dutch 801 Bold, Dutch 801 Italic, Dutch 801 Bold Italic, Monospace 821, More Wingbats SWC, Park Avenue, Swiss 721, Swiss 721 Bold, Swiss 721 Italic, Swiss 721 Bols Italic, Symbol Monospaced, and VAG Rounded

88.2 Fonts included with SpeedoGDOS 5.x

24 fonts are included with SpeedoGDOS 5.x. All fonts included with SpeedoGDOS 4.x plus the following:

American Garamond Roman, American Garamond Bold, American Garamond Italic, American Garamond Bold Italic, AD LIB Regular, Allegro Regular, Amelia Regular, and Cataneo Bold

89 Atari File Formats

89.1 Atari Font formats

The standard Atari OS in ROM does not support any type of fonts. To use different fonts in applications, either the application has to have built-in support for some font format, or an add-on program is needed. This add-on program is called a GDOS, a Graphical Device Operating System. There are many different versions of GDOS.

The earliest versions of GDOS supported only GEM bitmap fonts (*.FNT). These versions include GDOS, AMC-GDOS (Atari), G-plus (Codehead) and Font-GDOS (Atari again). Font-GDOS (available for free) added caching to the font-manager, so not all fonts need to reside in memory at the same time.

FontGDOS and FSM-GDOS were develloped in parallel and are both successors of Atari-GDOS (1.x). The FSM stands for Font Scaling Manager and allowed vector fonts to be used. FSM-GDOS was only included with Wordflair II and G-Man. FSM-GDOS also still supported GEM bitmap fonts. The font format is the QMS/Imagen format.

After FSM-GDOS, Atari introduced SpeedoGDOS 4.0, using Speedo font scaling technology licensed from Bitstream. 14 fonts are included with this version (see 1.15). SpeedoGDOS 4.0 and 4.1 can use GEM bitmap, Atari encrypted and commercially encrypted Speedo fonts. As of version 4.2 also the publicly available X11 Speedo fonts can be used. SpeedoGDOS offers improved speed and reliability over FSM-GDOS, as well as track- and pair-kerning.

Recently Compo Software introduced SpeedoGDOS 5.x which supports GEM bitmap, Speedo, Truetype and Type 1 fonts. Included are 22 Speedo fonts (see 1.15).

For more information about the GDOS format, consult the GDOS FAQ: `ftp://ftp.cs.tu-berlin.de/pub/atari/`
The "??" is the version number; as of 01 Mar 95, the versions are: 24 in English and 25 in German. A LaTeX version of the German edition is also available.

Also recently introduced was NVDI 3.0 by Behne & Behne, which supports GEM bitmap, Speedo and Truetype fonts. The biggest difference when compared to SpeedoGDOS 5.x is the improved speed, because NVDI is written in Assembler instead of C. Only 2 fonts are included with NVDI 3.0.

These fonts are transparent to programs. There are a few other options that require support by the program using the fonts. Two major font formats are supported in this way on the Atari, namely Signum!2/Signum!3 fonts and Calamus fonts.

The Signum!2 font format is a bitmapped font format supported by many wordprocessors and some drawing packages. Amazing print quality on 9-needle printers. Many high quality designs are available in Signum!2 and Signum!3 format (Mostly German), especially for some special languages like Polish. There are also many PD fonts available in this format.

The Calamus (*.CFN) format was introduced by DMC, in their Calamus DTP program that uses soft-RIPping. The Calamus font format has no hinting since it is meant to be used on very high resolution type setting machines. Also supported by Digital Art's (DA's) software. Many professional designs are available in this format, as well as a lot of PD fonts.

89.2 Atari Font Format Extensions

File formats specific to the Atari platform:

- `.E24`
  Bitmapped Signum!2 screen font.
- `.L30`
  Bitmapped Signum!2 printer font for Laser and Deskjet printers.
- `.OTL`
  Vector font table used by FSM-GDOS.
- `.P9`
  Bitmapped Signum!2 printer font for Hi-Res 9-needle printers (214*196 dpi).
- `.P24`
  Bitmapped Signum!2 printer font for 24-needle printers.
- `.QFM`
  Vector font used by FSM-GDOS.

90 Frequently Requested Atari Fonts

Some fonts, including a few Speedo fonts are available from various archives. The most important Atari archive is `atari.archive.umich.edu`.

Most fonts can be had from PD/Shareware distributors around the world...

91 X11 Information

This section needs a lot of work. At the time of this release, I'm not in a position to write it so I'm leaving it basically blank. Even if you don't have time to write it, if you know what *should* be in this section, please forward it to norm.

92 Getting X11

The standard location for X software is `ftp.x.org`.

93 Historical Notes about X11

The X Window System has been in widespread use through releases 3, 4, and now 5 of X Version 11.

Fonts weren't really treated by the X Consortium very well until X11 release 5 (X11R5). In X11R3 and X11R4, the default format used by the X servers was called SNF (server normal format). Basically the font was formatted on disk in such a way that the X server could quickly read and use it (it was basically a memory-dump). The important element of the SNF format is that it was not a portable format: it depended on the architecture of the machine running the server (little endian vs. big endian, for example) and as a consequence you needed different directory structures for different systems on your network. On top of that, several systems vendors implemented their own font format, making font portability even more difficult.

With X11R5, two things changed: the font service protocol was defined as a standard and interoperable way for an X server to obtain fonts (independent of their format, origin, or current location on disk) and the default format for storing fonts was changed from SNF to PCF (Portable Compiled Font). PCF is a format originally developed by DEC. Its primary advantage is that it is not architecture dependent. That is, if you compile a font to PCF format on different systems, then you may end up having two different PCF files, but each system will be able to read the other's file correctly.

94 X11 Font Formats

There are many different font formats that can play a role in an X11 system configuration. The following table summarizes some of the common formats:

- BDF

  The Bitmap Distribution Format (BDF) is the standard format for distribution of fonts. It is an ASCII format so it can easily be edited it with your favourite editor or E-mailed to other users. As the name suggests, it stores bitmap fonts only.

  Another virtue of the BDF format is that most font format converters convert to or from this format. Means if you want to go from format A to format B, neither of which is BDF, then you are likely to convert A to BDF, then BDF to B.

  The BDF format is defined by Adobe. A document describing the format is available by ftp from Adobe's file server at "ps-file-server@adobe.com". It is also available in the standard X distribution. Look under `../X11R4(5)/mit/hardcopy/BDF`. This document is also reproduced in any text describing the X standard.
- SNF

  The Server Normal Format (SNF) is an older format for bitmap fonts. The format is X Server and host dependent. This means that if you have two SNF files, their actual format may be different. Also, if you have an "`snftobdf`" utility, it may not be able to read font files from other systems. Convert to BDF format before you move it off the host system.

  `Snftobdf` is one utility that can generate a BDF file from a SNF file. It was part of the X11R4 contrib release. To compile under X11R5, you need some of the X11R4 snf include files.
- PCF

  The Portable Compiled Font (PCF) format is a binary format for bitmap fonts. The binary contains sufficient information to be readable by other systems.
- PHIGS

  These fonts are only applicable in PEX environments. PHIGS fonts don't really have any relationship to the normal X font mechanism.
- DWF

  The DECWindows Fonts (DWF) are bitmap fonts.
- Intellifont

  These are HP scalable fonts.
- PFA/PFB

  These are Adobe Type 1 PostScript fonts.

  They can be used in X11R5 based X servers and font servers because IBM has donated a renderer for this format to the X Consortium. The renderer can be found on the X11R5 contrib, and on `ftp.x.org`.

- Speedo

  This is a format from Bitstream, Inc. Bitstream has also donated a font renderer to the X Consortium, and a couple of fonts.

  I have been told that in order to use commercial fonts from BitStream, you must patch the renderer somewhat to make it use the right decryption code for the font.

- FB

  These are Sun X11/NeWS format bitmap fonts used by the Sun OpenWindows system.

  You can use "convertfont" which comes with OpenWindows to convert to/from BDF.

- F3/F3B

  This is the scalable Sun Folio format, also used by OpenWindows.

  You can use "convertfont" to convert to (not from) BDF.

95 X11 Font Server

95.1 X11 Release 5

With X11 Release 5, the X Consortium has created a network-based standard font protocol. As a user of the X Window System, you have an X server on your desktop, which does the interface between the hardware (screen, mouse, keyboard), and the X network protocol. This X server needs fonts. Before X11R5, the only way it could get to those fonts was to make font directories readable for the X server on that host, either by NFS-mounting or by copying.

With the X Font Service protocol, you just tell your X server that it must use the services of a font server, which is a daemon process sitting on a host on your network. The font server is a program which talks a standardized protocol on the network, and which is capable of reading several font formats.

The font server sources are modular, such that it is easy to add a renderer for an additional font format to the existing code. This is obviously also the intention: the X Consortium provides the core technology, and supposes that all systems vendors will add font renderers for their proprietary formats to the code, and then ship that to their customers.

If you have a multi-vendor environment, then you are supposed to run a font server on every host that carries the font files. Then all of the X servers on your network can put all the fonts they need in their font path. Automatically, IBM fonts will be requested from the font server on an IBM host, DEC fonts from a DEC host, etc.

Other benefits of using font server technology include the ability of the font server to implement caching, provide for fault-tolerant setup, etc.

A final example of the good use of the font server is the combination of a font server with a Type 1 font renderer. As mentioned above, IBM donated a Type 1 font renderer which can easily be built into the X font server. As the Type 1 font format, and the ATM format are the same, it is perfectly possible to use commercial ATM fonts with the X Window System. See also `/contrib/fonts/lib/font/Type1/` in the X11 distribution.

95.2 X11 Release 6

The X11R6 font server is very similar to the X11R5 server described above. Under X11R6, the font server has been renamed to *xfs* and the Type 1 rendering engine is now incorporated into the base distribution—it is no longer a contributed package.

96 Fonts and utilities for X11

Here's a quick list of possible steps to get from "what you got" to X:

- Mac format bitmaps:

  No idea. If *you* know how to read a Mac format bitmap file on some other platform, please tell norm.

- PC format bitmaps:

  Conversion to BDF is possible from TeX PK format and LaserJet softfont format. Other conversions are also within the realm of possibility. Feel free to ask norm for more information if you have a specific conversion in mind.

- TeX PK format bitmaps:

  PKtoBDF gets us directly to BDF format from here.

- Mac format postscript:

  Under MS-DOS, conversion to PC format postscript allows the font to be accessed with PS2PK (under *nix or MS-DOS). See above for TeX PK to X conversions.

- PC/Unix format PostScript

  Conversion to TeX PK with PS2PK allows you to get to BDF (indirectly).

- XtoBDF, getbdf, FStoBDF

  `XtoBDF` and `getbdf` are two public-domain applications which are capable of asking an X server to give them all it knows about a given font. They then print the BDF representation of that font on stdout.

  You can use these if you have an X server that can read some font file, but nothing else can.

  `FStoBDF` is distributed with X11R5.

  If you use one of these programs, you may actually be converting a scalable font into a bitmap font, but converting a bitmap font to a scalable one is not currently possible.

97 Utilities Information

I have just started collecting information about font utilities. I will gladly add any information that you can pass my way. Please send your submissions to norm.

I would appreciate it if you could include a paragraph or so of description and the appropriate site/filename for retrieval.

98 How do I convert AFM files to PFM files

You can get `afm2pfm` and `pfm2afm` files from `http://www.ora.com/homepages/comp.fonts/FAQ-tools.html`.

99 PS2PK

PS2PK is a utility for converting Type1 postscript fonts into TeX PK files. The source code is distributed and it has been compiled for both *nix boxes and MS-DOS based machines.

Here is the original announcement:

```
                    Ps2pk-1.2 available
                    -------------------
                         (June 1992)

Version 1.2 of ps2pk is now available on:
ftp.urc.tue.nl (address: 131.155.2.79)
directory:    /pub/tex
files:        ps2pk12.README         (  1k)    This file
              ps2pk12.tar.Z          (391k)    Sources
              ps2pk386.zip           (232k)    MSDOS executables
              utopia.tar.Z           (342k)    Adobe Utopia font family
              courier.tar.Z          (207k)    IBM Courier font family

For people having difficulties in handling UNIX '.tar.Z' format I
have made some UNIX tools (only executables) available in:
directories:  /pub/unixtools/dos
              /pub/unixtools/vms

See the system specific TARZ file for some help.

Ftp.urc.tue.nl can not handle E-mail requests. But sites are free
to put the ps2pk12 stuff on any server that can.
```

99.1 When do you need ps2pk?

Ps2pk is a tool that converts a PostScript type1 font into a corres- ponding TeX PK font. The tool is especially interesting if you want to use fully hinted type1 fonts in your DVI previewer (instead of the unhinted type1 fonts currently used in GhostScript) or on a printer that has no PostScript interpreter.

In order to use the ps2pk generated fonts your driver and previewer need to support virtual fonts. The reason is that PostScript fonts and TeX fonts do have a different font encoding and handle ligatures in a different way. With virtual fonts the PostScript world (encoding + ligatures) can be mapped to the old style TeX world on which the current plain macro packages still are based (despite the fact that TeX3.0 can handle 8bits).

It is also possible to use the ps2pk generated PK fonts directly

100 TEX Utilities

There are many TeX font utilities. For TeX related questions, I direct you to comp.text.tex or the Info-TeX mailing list. I will happily list any utilities here that the comp.fonts public feels should be present. I am listing MetaFont because it is the obvious font-specific component of TeX and PKtoSFP because it allows anyone to use PS2PK to create LaserJet softfonts.

Liam R. E. Quin is the original author of the MetaFont section. It has been hacked at a bit by norm to make it fit the tone of the comp.fonts FAQ. Assume that norm is responsible for any errors, not Liam.

100.1 MetaFont

100.1.1 About MetaFont:

Metafont is a programming language for describing fonts. It was written by Donald Knuth and is documented in

```
Computers & Typesetting/C: The METAFONTbook
Knuth, Donald E.
Addison Wesley, 1986
ISBN 0-201-13445-4, or 0-201-13444-6 (soft cover)
Library access: Z250.8.M46K58, or 686.2'24, or 85-28675.
```

A font written in MetaFont is actually a computer program which, when run, will generate a bitmap ('raster') for a given typeface at a given size, for some particular device.

100.1.2 What do you need in order to use the fonts:

You cannot print the MetaFont fonts directly (unless you want a listing of the program, that is). Instead, you must generate a bitmap font and use that to print something.

If you are using TeX, the sequence of steps is something like this:

`MF` to *MetaFont* to `GF`
: Convert a MetaFont program into a bitmapped font. Also produces a `TFM` file.

`MF` to *MetaFont* to `TFM`
: Covnert a MetaFont program into a `TFM` file. Also produces a `GF` bitmapped font.

`GF` to *GFtoPK* to `PK`
: Convert a `GF` bitmapped font into a compressed `PK` font.

`TEX + TFM` to *TEX* to `DVI`
: Produce a device independent output file.

`DVI + PK` to *dvi driver* to *output format*
: Produce a device-specific output file (or preview).

The above steps are idealized. In reality, you have to make sure that the fonts get installed in the correct places and you may have to adjust description files, etc. The friendly folks on comp.text.tex can probably get it staightened out for you if you can't find a local guru.

If you are not using TeX, it's almost impossible to predict. At some point in the above sequence, you'll insert some other conversion program and proceed differently. Here, for example, is how you might use TeX fonts with WordPerfect and a LaserJet printer.

`PK` to *PKtoSFP* to `SFP`
: Convert a TEX `PK` file into an HP LaserJet softfont.

`SFP` to *SFP2Auto* to `TFM`
: Make HP AutoFont Tagged Font Metric file.

`SFP + HP AutoFont TFM` to *PTR* to *Installed in WP*
: Install the new font in WordPerfect.

Use WordPerfect as you normally would.

101 MFPic

MFpic is a macro package for including pictures in TeX documents. The idea behind this package is to have Metafont do the actual drawing, and store the pictures in a font that TeX can include in the document. The macros have been designed so that the user should never have to learn Metafont to use these macros—the TeX macros actually write the Metafont file for you.

102 fig2MF

Briefly, *fig2MF* uses the mfpic macros to create formatted, commented MF code from the fig graphics language. This means that programs like xfig can be used as interactive font creation tools. I wrote *fig2MF* so that I could portably illustrate TEX documents, but I suppose one could use it to design letterforms as well.

The package consists of a single C source code file, modified mfpic macros, documentation, and sample fig files. It is available at the shsu archives.

103 GNU Font Utilities

Here is a brief description of the programs included:

- `imageto` extracts a bitmap font from an image in PBM or IMG format, or converts the image to Encapsulated PostScript.
- `xbfe` is a hand-editor for bitmap fonts which runs under X11.
- `charspace` adds side bearings to a bitmap font.
- `limn` fits outlines to bitmap characters.
- `bzrto` converts a generic outline font to Metafont or PostScript.
- `gsrenderfont` renders a PostScript outline font at a particular point size and resolution, yielding a bitmap font.
- `fontconvert` can rearrange or delete characters in a bitmap font, filter them, split them into pieces, combine them, etc., etc.
- `imgrotate` rotates or flips an IMG file.

We need volunteers to help create fonts for the GNU project. You do not need to be an expert type designer to help, but you do need to know enough about TeX and/or PostScript to be able to install and test new fonts. Example: if you know neither (1) the purpose of TeX utility program 'gftopk' nor (2) what the PostScript 'scalefont' command does, you probably need more experience before you can help.

If you can volunteer, the first step is to compile the font utilities. After that, contact me [ed: Karl Berry] (karl@gnu.ai.mit.edu). I will get you a scanned type specimen image. The manual explains how to use these utilities to turn that into a font you can use in TeX or PostScript.

You can get the source by ftp from any GNU archive site.

You can also order tapes with GNU software from the Free Software Foundation (thereby supporting the GNU project); send mail to `gnu@prep.ai.mit.edu` for the latest prices and ordering information, or retrieve the file DISTRIB from a GNU archive.

104 Font Editors

- Editors for BDF fonts

  There is a bdf font editor that comes with HP/Apollo workstations. It's called 'edfont'. It's not the best but it works.

  Gary reports:

  The standard X distribution for X11R5 contains "xfed", which allows you to play with BDF fonts. "xfedor" has a more elaborate user interface, and is available on most contrib directories.

  The last time I tried:

  "xfedor" couldn't handle BDF files with more than 256 characters.

  "xfed" aborts if the BDF file contains a COMMENT line with no other text. The workaround is to edit the BDF file, to put text after the word COMMENT. A single blank space is sufficient. For some reason, the standard BDF files included in the X release contain blank spaces on the otherwise empty COMMENT lines. It was probably easier to add the space to the COMMENT lines of every BDF file than it was to fix the lex code for xfed. :-)

- Editors for PK fonts

  The GNU font utilities include an X-based editor called Xbfe which edits bitmapped fonts under X.

  Eberhard Mattes' emTeX includes PKedit.

105 The T1 Utilities

This is a snippet from the README file for I. Lee Hetherington's `t1utils` package:

t1utils is a collection of simple type-1 font manipulation programs. Together, they allow you to convert between PFA (ASCII) and PFB (binary) formats, disassemble PFA or PFB files into human-readable form, reassemble them into PFA or PFB format. Additionally you can extract font resources from a Macintosh font file (ATM/Laserwriter).

106 Where to get bitmap versions of the fonts

There are archives containing the bitmaps of many of these fonts at various sizes and resolutions. The fonts must have been generated for the correct print engine: e.g. write-white or write-black. The archives generally hold only the sizes used by TeX. These are 'magstep' sizes, and are not exact point sizes. It is probably better to generate them from the Metafont sources yourself if you can.

The best place to look for raster fonts was almost certainly: mims-iris.waterloo.edu

but it isn't any more, the fonts have all gone. Let me know if you find them elsewhere. Most people seem to have moved to using PostScript fonts or Bitstream ones instead now.

Some other sites are:

```
ftp.cica.indiana.edu
mac.archive.umich.edu
ftp.shsu.edu
ftp.tex.ac.uk
ftp.dante.de
```

The occasional posting of ftp sites to comp.misc and comp.archives lists these and several other sites.

107 Converting between font formats

Conversions to and from pbm and pk format were posted to comp.text.tex and to alt.sources on the 9th of August, 1990 by Angus Duggan. The program is pbmtopk, and there are also at least two patches.

Chris Lewis' psroff package includes a program to go from pk both to the HP LaserJet and to PostScript.

John McClain `<ophelp@tamvenus.bitnet>` has some conversion programs for various graphics formats to/and from pk files.

A PC program, CAPTURE, turns HPGL files into PK format, US$130 from Micro Programs Inc., 251 Jackson Ave., Syosset, NY 11791 U.S.A.

Metaplot can take pen-plotter files and prouce metafont files. Note: Pat Wilcox is no longer at Ohio State.

Kinch Computer Company sell .pk fonts derived from PostScript fonts. Kinch Computer Co., 501 S. Meadow St.Ithaca, NY 14850 U.S.A. telephone: +1 607 273 0222; fax: +1 607 273 0484

108 Getting fonts by FTP and Mail

If you are using ftp, you will need either the name of the host or the Internet number. For example, to connect to ftp.ora.com, listed as ftp: ftp.ora.com [198.112.208.11] you will need to type something like

```
ftp ftp.ora.com
```

If that doesn't work, try using the number:

```
ftp 198.112.208.11
```

If that doesn't work, on Unix systems you can use `nslookup` (it's usually `/usr/etc/nslookup`) to find the host number – it might have changed. Type the entire host name, and after a few seconds nslookup will give you the address. Of course, if you have `nslookup` installed, the first form will probably work...

Once you have connected, you will need to go to the appropriate directory, lists its contents, and retrieve the files.

Most of the machines listed here run Unix, and you use "ls" and "cd" to list files and to change directories. On machines that run VMS, you will have to put square brackets around directory names, like [this].

Remember that although Metafont sources are text files, pk fonts are not ASCII, and you will have to use binary mode for them. In general, use text mode for README files and *.mf files, and binary mode for other font files. Files ending in .Z are compressed binary files – you will need to use binary mode, and then uncompress the files when you get them.

There is an ftp-by-mail BITNET service, BITFTP, for BITNET users.

Before getting large files by mail, please remember to get permission from all intervening sites. Ask your site administrator, who can send mail to Postmaster at each site on the way if necessary.

109 MetaFont to PostScript Conversion

There are (I believe) three programs that perform this task. At least one of them is called "mf2ps". If you have any more information about these tools, please let me know.

Chang Jin-woong reports that he found the "mf2ps" package with Archie. It is written by Shimon Yanai <yanai@israearn.bitnet> and Daniel M. Berry <dberry@cs.technion.ac.il>. The source programs are written in Pascal.

MetaFog, a commercial conveter by Richard Kinch, is available on request to TrueTeX owners.

110 How to use Metafont fonts with Troff

If, when you run troff, you get the message 'typesetter busy', you have the original Ossanna-troff, also called otroff. Chris Lewis has a package which will let you use TeX fonts with troff – it's called psroff, and comes with documentation.

```
ftp: gatekeeper.dec.com (16.1.0.2) pub/misc/psroff-3.0
ftp: ftp.cs.toronto.edu [128.100.1.105] pub/psroff-3.0/*
```

If, when you run troff, you get something like this:

```
x T 300
x res 300 1 1
```

you have ditroff. This is sometimes called titroff or psroff. In this case, you will probably need to do the following:

1. convert the font to your printer's format
2. generate a width table for the font
3. add the font to the DESC file for the appropriate device
4. arrange for troff to download the font
5. tell troff about the font by running 'makedev DESC' in the right place.

If, when you run troff, you get something like this:

```
X hp(SCM)(CM)(AF)(AD) 300 1 1
Y P default letter 2550 3300 0 0 90 90 2460 3210
```

you have sqtroff:

1. convert the font to your printer's format
2. generate a width table for the font
3. add the font to the DESC file for the appropriate device
4. put the font in the appropriate raster directory
5. tell sqtroff about the font by running 'sqmakedev DESC' or 'sqinstall'.

In each case, you should be able to get help from your vendor.

Note that Chris Lewis' psroff package has software to make width tables for troff from pk files.

111 PKtoBDF / MFtoBDF

From the SeeTeX distribution, programs to help previewers under X11. They convert TEX `PK` files into X11 BDF fonts (which can be further converted into one or more server native formats).

112 PKtoPS

Included in the psroff distribution, this utility converts `PK` fonts into PostScript fonts (bitmaps, I presume). If you have any more information about these tools, please let me know.

113 PKtoSFP / SFPtoPK

Convert fonts from TEX `PK` format to HP LaserJet softfont (bitmap) format.

114 PostScript to MetaFont

ps2mf started out as a way of creating bitmaps via MF for TeX. Only, when I had just finished it, Piet Tutelaers came with ps2pk. This was a far superior way runtime-wise. He uses the IBM X11-R5 fontutilities library, which is extremely ugly code. But, it works. So, to generate bitmaps, I suggest everyone use ps2pk.

To generate a MF outline description, ps2mf is *the* tool. Yannis Haralambous has just started a project where he wants to create meta-ized fonts for MF from Postscript descriptions. ps2mf does the basic conversion. This project wants to revive the use of MF for it is a truly beautiful program with enormous possiblities.

The following information comes from the README file for ps2mf:

This is pfb2mf. It is a copyleft program. See the file COPYING for more details. I suggest that for the translation of Type-One to readable PostScript you use I. Lee Hetherington's Type-1-Utils. You can find these somewhere on obelix.icce.rug.nl in pub/erikjan.

If you find any bugs, please do report.

If you have any complaints, please do report.

Now for some info about the different stages. This package contains four programs:

- pfb2pfa
- pfa2chr
- chr2ps
- ps2mf

114.1 pfb2pfa

pfb2pfa will decompress an IBM (!) Postscript type 1 fontfile into readable and downloadable hexadecimal data.

The resulting file still contains two layers of encryption:

- eexec encryption
- charstring encryption

114.2 pfa2chr

pfa2chr will do an eexec-decryption of a readable hexadecimal font file to a fontfile with encrypted charstrings.

114.3 chr2ps

chr2ps will perform a charstring-decryption of a font file with encrypted charstrings to fontfile with postscript commands for type 1 fonts.

With a "-" as filename, these programs will read from <stdin> and write to <stdout>. This way you can pipe the results, as in:

```
pfb2pfa garmnd - | pfa2chr - - | chr2ps - garmnd
```

This will create a `garmnd.ps` from `garmnd.pfb` without explicitely creating the intermediate files.

These previous stages can be replaced by (when using Lee Hetherington's type-1-utils):

t1disasm garmnd.pfb garmnd.ps

114.4 ps2mf

This last stage will convert to a MetaFont program with the use of the corresponding `.afm` file and a mapping configuration file. It can convert to an ordinary form with Bezier controlpoints. It can also generate a curl specification. For this last option specifify -C.

115 Mac Bitmaps to BDF Format

I [ed: who?] have posted a program which I hacked together for extracting all NFNT and FONT resources from a MacBinary form of a standard Mac file and dumping the fonts as Adobe BDF files. It has only been compiled and tested on a Sun system to date. It can be fetched from `METIS.COM`, `/pub/mac2bdf.c`.

I wrote this tool to be able to use Mac Bitmaps under X Windows and OpenWindows (which take Adobe BDF format files).

116 Vendor Information

116.1 Type/Font Vendors

The following list is based on information from Masumi Abe, Norm Walsh and many others. I (Don Hosek) have been calling vendors and attempting to make sure information is up to date. I have removed a number of vendors who do not sell fonts. Fonts bundled with applications (e.g., the bitmap fonts which are part of Quicken) are not considered enough to merit inclusion in the list. Also, a number of the vendors on the list actually were selling various printing software but no fonts per se and were likewise removed. Finally, some companies seem to have disappeared, most likely gone out of business. I've indicated the verification date of any information which appears on the list. I would appreciate aid in contacting those companies which are listed as unverified (particularly companies outside the US). Please send updates and corrections to me at `dhosek@pitzer.edu`

Achtung Entertainment
508 N. College Ave. #215
Bloomington, IN 47404
no phone number

TrueType (shareware) for Macs, 300+ fonts. HyperCard demo disk $3.00 (refundable/order)

ADH Software
P.O. Box 67129
Los Angeles, CA 90067

(Mac)

Adobe Systems Incorporated
1585 Charleston Rd.
P.O. Box 7900
Mountain View, CA 94039-7900
(415) 961-4400
(800) 344-8335
Verified: 16 Feb 1994

: Type 1 (Mac, PC)
: Originals, designs licensed from
: Linotype, Monotype, Berthold, and
: others

Agfa Division, Miles Inc.
90 Industrial Way
Wilmington, MA 01887
(800) 424-TYPE
(508) 657-0232
FAX: (508) 657-8568
Verified: 17 Feb 1994

: Type 1 Truetype, (PC, Mac),
: Intellifont (PC), Compugraphic
: typesetter fonts. Originals,
: fonts licensed from Adobe.

Allotype Typographics
1600 Packard Rd. Suite #5
Ann Arbor, MI 48104
(313) 663-1989

: Downloadable Fonts (Mac)
Kadmos (Greek)
Czasy & Szwajcarskie
Demotiki

Alphabets, Inc. : Type 1, TrueType (PC, Mac)
P.O. Box 5448 : New and licensed designs
Evanston, IL 60204-5448
(800) 326-8973
(708) 328-2733
Verified: 9 Feb 1994

Alphatype Corp.
220 Campus Dr., Suite 103
Arlington Heights, IL 60004
(708) 259-6800

Altsys Corporation, : FONTastic Fonts,
269 West Renner Road, : Fontographer Fonts (Mac)
Richardson,
Texas 75080.
(214) 680-2060.

Artworx Software Co. (Mac)
1844 Penfield Rd. Hebrew Typefaces
Penfield, NY 14526
(716) 385-6120
(800) 828-6573

Architext, Inc. (HP/IBM)
121 Interpark Blvd. Suite 1101
San Antonio, TX 78216
(512) 490-2240

Asiagraphics Technology Ltd. (Mac)
9A GreatMany Centre Chinese, Japanese, Korean, Thai
109 Queen's Road East
Wanchai, Hong Kong
(5) 8655-225
Fax: (5) 8655-250
Modem: (5) 865-4816

Autologic, Inc. (Mac)
1050 Rancho Conejo Blvd.
Newbury Park, CA 91320
(805) 498-9611

Azalea Software, Inc.
PO Box 16745
Seattle WA 98116-0745 USA
800 48-ASOFT 206 932.4030 206 937.5919 FAX
azalea@igc.org

Bear Rock Technologies,
4140 Mother Lode,
Shingle Springs,
California 95682-8038.
(916) 672-0244

Berthold of North America
7711 N. Merrimac Avenue
Niles, IL 60648
(708) 965-8800

Bitstream, Inc.
Athenaeum House
215 First St.
Cambridge, MA 02142
(617) 497-6222
(800) 237-3335

A representative of Bitstream sent the following correction to me.

Bitstream offers:

**1100 PostScript Type 1 fonts for the Mac & PC. (These can be ordered direct from Bitstream or thru several resellers.) ** Bitstream Type Treasury – the Bitstream Type Library for the Mac (Type 1 format) on CD ROM.

** Bitstream Type Essentials–a series of 4 Typeface Packages for PC & Mac that were selected to work well for different jobs (Letters, Memos & Faxes; Newsletters, Brochures & Announcements; Spreadsheets, Graphs & Presentations; Headlines).

**Bitstream Typeface Packages for the PC – 52 packages (most with 4 faces each) that include a total of over 200 faces, with mutiple font formats in each package (Bitstream Speedo, Type 1, Bitstream Fontware)

** Bitstream TrueType Font Packs 1 & 2 for Microsoft Windows ** Bitstream PostScript Font Packs 1 & 2 for the PC ** Bitstream FaceLift for Windows ** Bitstream FaceLift for WordPerfect - both are font scaling/font management utilities.

** Bitstream MakeUp for Windows - a type manipulation/ special effects program.

** Bitstream Li'l Bits – a new product line of novelty fonts in TrueType format for Windows 3.1. The first release began shipping last week and includes The Star Trek Font Pack, The Flintstones Font Pack and The Winter Holiday Font Pack.

We offer OEM customers an extensive range of non-latin type (as you have noted in the current listing), but these faces are not currently available to individual end-users.

We also offer font-scaling and rasterizing technology to OEM customers.

Blaha Software/Janus Associates : Big Foot (Mac) (HP/IBM)
991 Massachusetts Ave.
Cambridge, MA 02138
(617) 354-1999

Blue Sky Research : Type 1 (Mac)
534 SW Third Avenue, #816 : Computer Modern in PostScript
Portland, OR 97204
(800) 622-8398

Carter & Cone

Casady & Greene, Inc. : Fluent Fonts, Fluent Laser Fonts (Mac)
26080 Carmel Rancho Blvd. #202 Russian/Ukranian/Bulgarian/Serbian
P.O. Box 223779 Cyrillic, Greek, Hebrew, Kana, Polish
Carmel, CA 93922 Glasnost
(408) 484-9228
(800) 331-4321 ————-no longer valid
(800) 851-1986 (California)-no longer valid

Caseys' Page Mill (Mac)
6528 S. Oneida Court
Englewood, CO 80111
(303) 220-1463

Castle Systems : (Truetype, Type1) (Mac, IBM)
1306 Lincoln Avenue : Revivals of art deco faces,
San Ragael, CA 94901-2165 : calligraphy, variations of
(415) 459-6495 : existing designs

Century Software (MacTography) font developer for MacTographyc
702 Twinbrook Parkway : LaserFonts (Mac)
Rockville, MD 20851
(301) 424-1357

Callifonts
P.O. Box 224891
Dallas, TX 75222
(214) 504-8808

Coda Music Software

1401 E. 79th St.
Mineapolis, MN 55425-1126
(612) 854-1288
(800) 843-1337

Compugraphic Corporation (Mac) (HP/IBM)
Type Division
90 Industrial Way
Wilmington, MA 01887
(800) 622-8973 (U.S.)
(800) 533-9795 (Canada)

Computer EdiType Systems (HP/IBM)
509 Cathedral Parkway, Ste. 10A
New York, NY 10025
(212) 222-8148

Computer Peripherals, Inc. : JetWare (HP/IBM)
2635 Lavery Ct. #5
Newbury Park, CA 91320
(805) 499-5751

Computer Prod. Unlimited (Mac)
78 Bridge St.
Newburgh, NY 12550
(914) 565-6262

Coniglio Communications
124 Woodside Green #2B
Stamford, CT 06905-4918
(203) 975-8111
coniglio@aol.com; citycenter@aol.com

Conographic Corp. (Mac) (HP/IBM)
17841 Fitch
Irvine, CA 92714
(714) 474-1188

Corel Systems Corp. (HP/IBM)
1600 Carling Ave.
Ottawa, Ontario, CANADA KIZ 7M4
(613) 728-8200

Data Transforms (HP/IBM)
616 Washington St.
Denver, CO 80203
(303) 832-1501

Devonian International software Co. (Mac)
P.O. Box 2351 Cyrillic
Montclair, CA 91763
(714) 621-0973

Digi-Fonts (HP/IBM)
528 Commons Drive Greek, Cyrillic
Golden, Colorado 80401
(303) 526-9435
Fax: (303) 526-9501

Digital Type Systems (DTS) (HP/IBM)
38 Profile Circle
Nashua, NH 03063
(603) 880-7541

Dubl-Click Software, Inc. : World Class Fonts (Mac)
9316 Deering Ave.
Chatsworth, CA 91311
(818) 700-9525

Ecological Linguistics (Mac)
P.O. Box 15156 Cyrillic, Greek
Washington, DC 20003
(202) 546-5862

The Electric Typographer : Type 1 and TrueType (Mac & PC)
2216 Cliff Dr. : Original designs
Santa Barbara, CA 93109
(805) 966-7563
Verified: 9 Feb 1994

EmDash : EmDash Fonts (Mac)
P.O. Box 8256
Northfield, IL 60093
(312) 441-6699

The Font Company
12629 N. Tatum Boulevard
Suite 210
Phoenix, AZ 85032
(602) 996-6606

The Font Factory (HP/IBM)
2400 Central Parkway
Ste. J-2
Houston, TX 77092

FontCenter (HP/IBM)
509 Marin St., #121
Thousand Oaks, CA 91360
(805) 373-1919

Font FunHouse CD-ROM (PC/Mac)
Wayzata
PO Box 807
Grand Rapids, Minnesota 55744
(800) 735-7321

FontHaus North America (United States)
1375 King's Hwy East
Fairfield, CT 06430
(800) 942-9110 or (203) 367-1993
(203) 367-1860 Fax

FontHaus UK (Faces Ltd.)
44-127-638-888
349 Yorktown Road
College Town, Camberley
Surrey GU15 4PX
UK

FontHaus Australia (Lasermaster Aus. Pty. Ltd.)
61-3-747-9301
#31 Rosina Drive
Melton, Victoria 3337
Australia

FontHaus France (Signum Art)
33-1-48-89-6046
Fax: 33-1-48-89-6045
94 avenue Victor Hugo
94100 Saint Maur des Fosses
France

FontHaus Germany (Elsner & Flake)
49-40-39-88-3988
Friedensallee 44
22765 Hamburg
Germany

FontHaus Sweden (FontBolaget)
46-8-16-81-00
Tulegatan 15 A
113 53 Stockholm
Sweden

FontHaus is a manufacturer of typefaces and a licensed reseller for Adobe, Monotype, Bitstream, Elsner+Flake, Giampa Textware, Treacyfaces, Panache Graphics, and others around the world.

FontHaus discounts most Adobe fonts up to 40% off list price, and have CD-ROM discs available so you can buy individual fonts instead of entire families. All their fonts are available in Macintosh Type 1; most are also available in PC format; and a growing number are in TrueType format. In addition, some type manufacturers support other platforms through thier CD-ROM font libraries (i.e. Monotype for Mac, PC, or NeXT). Contact them regarding availability for the fonts and formats you want.

FontHaus ships internationally and also has several agents overseas, although these agents may not have everything available as the main office here in the US.

Rhyscon Systems (Canada)
PO Box 245 Clarkson PO
Mississauga Ontario L51 3Y1
416 278 2600
416 278 3298 Fax

TypoGabor (France)
5, rue de 8 Mai 1945
92586 Clichy (Paris)
33 1 4739 6600
33 1 4739 0638 Fax

Elsner+Flake Fontinform GmbH (German)
Friedensallee 44
D-22765 Hamburg
49 40 3988 3988

Signus Limited (Britain)
South Bank TechnoPark
90 London Road
London SE1 6LN
71 922 8805
71 261 0411 Fax

Font Bolajet (Sweden, Finland, Norway)
Kungstengaten 18
113 57 Stockholm
46.8.16.81.00

Font World (Mac)

2021 Scottsville Rd. Cyrillic, Hebrew
Rochester, NY 14623-2021
(716) 235-6861

Genny Software R&D (Mac)
P.O. Box 5909
Beaumont, TX 77706
(409) 860-5817

Gradco Systems Inc.
7 Morgan
Irvine, CA 92718
(714) 770-1223

Handcraftedfonts Co.
Box 14013
Philadelphia, PA 19122-0013
Tel/Fax: 215-634-0634

Our fonts are licensed to Monotype Typography, ITC DesignPalette, International TypeFounders, Precision Type and Phil's Fonts.

Hewlett-Packard (HP/IBM)
P.O. Box 15
Boise, ID 83707
(208) 323-6000

ICOM Simulations, Inc.
648 S. Wheeling Rd.
Wheeling, IL 60090
(312) 520-4440
(880) 877-4266

Image Club Graphics, Inc. : (Mac & PC)
729-24th Ave. SE
Calgary, AB
T2G 5K8
Canada
(800) 661-9410
(403) 262-8008 (Canada)

Image Processing Systems :Turbofonts (HP/IBM)
6409 Appalachian Way, Box 5016
Madison, WI 53705
(608) 233-5033

Invincible Software (Mac)
9534 Burwick
San Antonio, TX 78230
(512) 344-4228

Kabbalah Software
8 Price Drive
Edison, NJ 08817
(908) 572-0891
(908) 572-0869 Fax

Hebrew fonts for PC and Mac. While I am part owner, so I am biased, we have been reviewed in the October 27 1992 issue of PC Mag as having high-quality fonts.

Keller Software (HP/IBM)
1825 Westcliff Dr.
Newport Beach, CA 92600
(714) 854-8211

Kensington Microware Ltd. (Mac)
251 Park Ave. S
New York, NY 10010
(212) 475-5200

Kingsley/ATF Type Corp. (Mac)
200 Elmora Ave.
Elizabeth, NJ 07202
(201) 353-1000
(800) 289-TYPE

Laser Technologies International : Lenord Storch Soft Fonts
15403 East Alondra Blvd. (HP/IBM)
La Mirada, CA 90638
(714) 739-2478

LaserMaster Corp. : LM Fonts (HP/IBM)
7156 Shady Oak Rd.
Eden Prairie, MN 55344
(612) 944-9330
(800) LMC-PLOT
Fax: (612) 944-0522

LeBaugh Software Corp : LeFont (HP/IBM)
2720 Greene Ave.
Onaha, NE 68147
(800) 532-2844

Letraset USA : LetraFont (Mac)
40 Eissenhower Dr.
Paramus, NJ 07653
(201) 845-6100
(800) 634-3463

Linguists' Software, Inc. (Bitmap, Type 1, Truetype) (Mac, IBM)
P.O.Box 580 Fonts for numerous alphabets. Not all
Edmonds, WA 98020-0580 fonts available in all languages.
(206) 775-1130 They support ~50 languages.
Fax: (206) 771-5911
Verified: 16 Feb 1994

Linotype Company (Mac)
425 Oser Ave.
Hauppauge, NY 11788
(800) 842-9721 (US)
(516) 434-2706 (FAX)

MacTography
326-D North Stonestreet Ave.
Rockville, MD 20850
(301) 424-3942

Megatherium Enterprises : Mac The Linguist 2 (Mac)
P.O. Box 7000-417
Redondo Beach, CA 90277
(310) 545-5913

Metro Software, Inc. (HP/IBM)
2509 N. Cambell Ave., Ste. 214
Tucson, AZ 85719
(602) 299-7313

Microcosm
819 Devon Court
San Diego, CA 92109
619-488-4462
619-488-3087 fax
email: Tom Wright <wright@siggraph.org>

Provides fonts for resale to (mostly Unix & MS-DOS) software companies & hardware comapnies in its own portable file format together with portable C font rendering code. Pricing plans include royalty-free option & end-user site licenses. Standard Type-1 & TrueType formats also supplied. Font files from your artwork available too.

Modern Graphics :Organic Fonts (Mac)
P.O. Box 21366
Indianapolis, IL 46221
(317) 253-4316

Monotype Typography Inc.
Suite 504-53 West Jackson Blvd.
Chicago, IL 60604
(312) 855-1444
(800) MONOTYPE

Network Technology Corp. : LaserTEX Font Library (HP/IBM)
6825 Lamp Post Lane
Alexandria, VA 22306
(703) 765-4506

Nippon Information Science Ltd. (NIS) (Mac)
Sumire Bldg. 4F
5-4-4 Koishikawa
Bunkyo-ku, Tokyo 112
Japan
(03) 945-5955

Olduvai Corporation : Art Fonts (Mac)
7520 Red Road, Suite A
South Miami, FL 33143
(305) 665-4665
(800) 822-0772 (FL)

Page Studio Graphics : PIXymbols (Mac)
3175 N. Price Rd. #1050
Chandler, AZ 85224
(602) 839-2763

Paperback Software : KeyCap Fonts
2830 9th St.
Berkeley, CA 94710
(415) 644-2116

PenUltimate Fonts : Vernacular type for Mac and PC
14101 Walters Rd. #805 : Custom font design
Houston, TX 77014
Houston, TX 77014
E-Mail: PenUltimte@aol.com Send $2 for catalog

Prosoft (HP/IBM)
7248 Bellair Ave., P.O. Box 560

North Hollywood, CA 91605
(818) 764 3131

Qume Corp. (HP/IBM)
2350 Qume Dr.
San Jose, CA 95131
(800) 223-2479

Ragnarok Font Line: Scriptorium Font Library
POB 140333 120+ original calligraphic, display
Austin, TX 78714 and art font designs. SASE for catalog.
(512) 472-6535 $15 for 12 font sampler disk. Specify
Macintosh or PC preference when ordering.

R.M.C. : PrintR fonts (HP/IBM)
12046 Willowood Dr.
Woodbridge, VA 22192
(703) 494-2633

Richard Beatty Designs : Type 1 and TrueType (PC, Mac)
2312 Laurel Park Highway : 45 fonts decorative elements
Hendersonville, NC 28739 : 270 alphabets, 50 original
(704) 696-8316 : rest translated from lead and
Verified: 9 Feb 1994 : phototype. Goudy a specialty

S. Anthony Studios : Fonts Vol. 1
889 DeHaro Street
San Francisco, CA 94107

Scholar's Press : (Mac)
P.O. Box 15399 : 2 Greek fonts
Atlanta, GA 30333-0399
(404) 727-2320
FAX: (404) 727-2348
Verified: 9 Feb 1994

Scriptorium Font Library
(See Ragnarok)

SoftCraft, Inc.
16 North Carrol St., Suite 220
Madison, WI 53703
(608) 257-3300
FAX: (608) 257-6733
Verified: 9 Feb 1994

Software Complement : (TrueType, Type 1) (Mac, IBM, Next)

8 Penn Ave. : Designer of fonts for Cassidy & Greene
Metamoras, PA 18336 : Custom logos and signatures.
(717) 491-2492
FAX: (717) 491-2443
Applelink: SOFTCOMP
CompuServe: 70244,3214
Verified: 16 Feb 1994

Straightforward : ZFont (HP/IBM)
15000 Halldale Ave.
Gardena, CA 90249
(310) 324-8827

SWFTE International (HP/IBM)
Box 5773
Wilmington, DE 19808
(800) 237-9383

SystemSoft America, Inc. : Kanji
P.O. Box 4260
Vero Beach, FL 32964

Typographics Ltd. : Typo
46, Hehalutz St.
Jerusalem 96222
Israel

U-Design, Inc. : TrueType, Type1 (Mac & PC)
270 Farmington Avenue : Originals, licensed designs clones
Hartford, CT 06105
(203) 278-3648
BBS: (203) 525-5117
FAX: (203) 278-3003
Verified: 9 Feb 1994

The Underground Phont Archive (TrueType,Shareware)
395 Kaymar Dr.
Amherst, NY 14228
USA.

Varityper, Inc. : (Mac)
11 Mt. Pleasant Ave.
East Hanover, NJ 07936
(800) 631-8134 (US except NJ)
(201) 887-8000 ext. 999 (NJ)

VS Software : HP Bitmaps (PC)

P.O. Box 6158 : CG, ITC and original fonts
Little Rock, AR 72216
(501) 376-2083
Verified: 9 Feb 1994

Weaver Graphics : HP Bitmaps (PC only),
5165 S. Hwy A1A : Adobe Type 1, Truetype (PC and Mac)
Melbourne Beach, FL 32951 : Mostly clone fonts, some originals
(407) 728-4000
Fax: (407) 728-5978
Verified: 9 Feb 1994

Wu Corp. : FeiMa (Mac) Chinese wordprocessor
46 West Avon Rd.
Avon, CT 06001
(203) 673-4796

Y&Y, Inc. : Type 1 format, Mac, PC, Unix
45 Walden Street : Computer Modern, Lucida Bright
Concord, MA 01742 : AMS, LaTeX/SliTeX, MathTime
(800) 742-4059 : Lucida Sans Typewriter etc
(508) 371-3286
Fax: (508) 371-2004
71172.524@compuserve.com

ZSoft Corp. : Soft Type
450 Franklin Rd. Suite 100
Marietta, GA 30067
(404) 428-0008
Fax: (404) 427-1150

116.2 Clip Art Vendors

This section was submitted by Dmitry S. Simanenkov in Aug, 1993.

Although not directly related to type, a list of clip art vendors seems to compliment the list of type/font vendors.

3G Graphics, Inc. eps borders, simbols for MAC
114 Second Ave.South, Suite 104
Edmonds, WA 98020
(206) 774-3518
(206) 771-8975

ArtBytes
Ozerkova 51-2-13
Peterburg
198903
Russia
simon@dc1.phys.samson.spb.su

Hi-Fi Borders for security paper, stock, certificate etc.
bitmap & eps, CorelDraw
IBM & MAC

ArtBeats
20083
San Bernardino, CA, 92406
(800) 444-9392
(714) 881-1200

Best Impression
3844 W. Channel Islands Blvd.
Suite. 234
Oxnard, CA 93035
(805) 984-9748

Dynamic Graphics, Inc.
Designers Club, Creative Art
6000 N. Forest Park Dr.
Peoria, IL 61656-1901
(800) 255-8800
(309) 688-8800
(309) 688-5873

FM Waves
70 Derby Alley
San Francisco, CA 94102
(800) 487-1234
(415) 474-7464

Grafx Associates
12811
Tucson, AZ 85732-2811
(800) 628-2149

Borders

Kinetic Presentation, Inc.
250 Distillery Commons
Louisville, KY 40206
(502) 583-1679

Metro Image Base, Inc.
18623 Ventura Blvd
Suite 210
Tarzana, CA 91356

(800) 525-1552
(818) 881-1997

Micrografx, Inc.
1303 Arapaho Rd.
Richardson, TX 75081
(800) 733-3729
(214) 234-1769

Migraph, Inc.
200 S.333 Rd. Suite 220
Federal Way, WA 98003
(800) 223-3729
(206) 838-4677

Multi-Ad Service, Inc.
1720 W. Detweiller Dr.
Peoria, IL 61615
(800) 447-1950
(309) 692-1530

Qualitas Trading Co.
6907 Norfolk Rd.
Berkley, CA 94705
(510) 848-8080

RT Computer Graphics
2257 Calle Cacique
Santa Fe, NM 87505

Stephen & Associates
8681 N. Magnolia Ave Suite E
Santee, CA 92071-4456
(619) 562-5803

Studio Advertising Art
43912
Las Vegas, NV 89116
(800) 453-1860
(702) 641-7041

Sun Shine CD-ROM, Visual Delights
4351
Austin, TX 78765
(512) 453-2334

Short Contents

1 General Information 1
2 Font Houses 2
3 What's the difference between all these font formats? 4
4 What about "Multiple Master" fonts? 8
5 Is there a methodology to describe and classify typefaces? 9
6 What is the "f" shaped "s" called? 10
7 What about "Colonial" Typefaces? 11
8 What is "Point Size"? 15
9 Where can I get ... fonts. 18
10 Where can I get fonts for non-Roman alphabets? 20
11 What about fonts with the International Phonetic Alphabet (IPA) symbols? 21
12 How can I convert my ... font to ... format? 23
13 Are fonts copyrightable? 27
14 Typeface Protection 29
15 File Formats 38
16 Ligatures 43
17 Built-in Fonts 45
18 Glossary 46
19 Bibliography 50
20 Font Encoding Standards 59
21 PostScript 60
22 TrueType 62
23 Unicode 64
24 Can I Print Checks with the MICR Font? 67
25 Rules of Thumb 68
26 Acknowledgements 70
27 A Brief Introduction to Typography 72
28 A Brief History of Type 76
29 The Role of National Orthography in Font Design 91
30 Interesting Fonts 92
31 Pronounciation of Font Names 94
32 What is it? 97
33 Equivalent Font Names 99
34 Digital Type Design Tools 122
35 Type Design Firms 127

36 What does 'lorem ipsum dolor' mean? 129
37 Macintosh Information 132
38 Macintosh Font formats 133
39 Frequently Requested Mac Fonts 136
40 Commercial Font Sources 143
41 Mac Font Installation 144
42 Mac Font Utilities 145
43 Making Outline Fonts 147
44 Problems and Possible Solutions 148
45 Creating Mac screen fonts 149
46 MS-DOS Information 151
47 Frequently Requested MS-DOS fonts 152
48 MS-DOS Font Installation 153
49 What exactly are the encodings of the DOS code pages? 155
50 MS-DOS Font Utilities 156
51 Converting fonts under MS-DOS 157
52 Converting Mac Type 1 fonts to MS-DOS format 158
53 Converting PC Type 1 and TrueType fonts to Mac format 161
54 Converting PC Type 1 fonts into TEX PK bitmap fonts 162
55 Converting TeX PK bitmaps into HP LaserJet softfonts (and vice-versa) 163
56 TrueType to HP LaserJet bitmap softfonts (HACK!) 164
57 MS-DOS Screen Fonts (EGA/VGA text-mode fonts) 168
58 OS/2 Information 169
59 Preliminaries 170
60 Fonts under DOS 171
61 Windows 172
62 Differences between Windows and OS/2 173
63 Installation under Windows and Win-OS/2 174
64 FontSpecific PostScript Encoding 175
65 AdobeStandardEncoding 176
66 AdobeStandardEncoding under Windows (and Win-OS/2) 177
67 AdobeStandardEncoding under OS/2 178
68 Consequences for OS/2 users 179
69 Advice to the user 180
70 OS/2 2.1 and beyond 182
71 Unix Information 183
72 Sun Information 185
73 Fonts Under Open Windows 186
74 Does OpenWindows support Type 1 PostScript fonts? 187

75 Improving font rendering time . . . 188
76 Making bitmap fonts for faster startup . . . 189
77 Converting between font formats (convertfont, etc.) . . . 190
78 Xview/OLIT fonts at 100 dpi . . . 191
79 Where can I order F3 fonts for NeWSprint and OpenWindows? . . . 192
80 NeXT Information . . . 193
81 Tell me about NeXTstep fonts . . . 194
82 Tell me more about NeXTstep fonts . . . 197
83 Porting fonts to the NeXT . . . 202
84 Font availability . . . 204
85 Why can I only install 256 fonts on my NeXT? . . . 205
86 Amiga Information . . . 206
87 Atari ST/TT/Falcon Information . . . 212
88 SpeedoGDOS . . . 213
89 Atari File Formats . . . 214
90 Frequently Requested Atari Fonts . . . 216
91 X11 Information . . . 217
92 Getting X11 . . . 218
93 Historical Notes about X11 . . . 219
94 X11 Font Formats . . . 220
95 X11 Font Server . . . 222
96 Fonts and utilities for X11 . . . 224
97 Utilities Information . . . 225
98 How do I convert AFM files to PFM files . . . 226
99 PS2PK . . . 227
100 ■ TEX Utilities . . . 229
101 ■ MFPic . . . 231
102 ■ fig2MF . . . 232
103 ■ GNU Font Utilities . . . 233
104 ■ Font Editors . . . 234
105 ■ The T1 Utilities . . . 235
106 ■ Where to get bitmap versions of the fonts . . . 236
107 ■ Converting between font formats . . . 237
108 ■ Getting fonts by FTP and Mail . . . 238
109 ■ MetaFont to PostScript Conversion . . . 239
110 ■ How to use Metafont fonts with Troff . . . 240
111 ■ PKtoBDF / MFtoBDF . . . 241
112 ■ PKtoPS . . . 242
113 ■ PKtoSFP / SFPtoPK . . . 243
114 ■ PostScript to MetaFont . . . 244

115■Mac Bitmaps to BDF Format 246
116■Vendor Information 247

Table of Contents

1 General Information 1

2 Font Houses 2

2.1 Adobe Systems, Inc. 2
2.2 Compugraphic 2
2.3 designOnline(tm) 2
2.4 Miles, Agfa Division 2
2.5 Quadrat Communications 2

3 What's the difference between all these font formats? 4

4 What about "Multiple Master" fonts? 8

5 Is there a methodology to describe and classify typefaces? 9

6 What is the "f" shaped "s" called? 10

7 What about "Colonial" Typefaces? 11

7.1 Why does colonial printing have that "Colonial" feel? 11
7.2 What fonts are good for mock-colonial uses? 11
7.3 What fonts could a colonial printer have had? 13

8 What is "Point Size"? 15

8.1 Knuth's Assertion 16

9 Where can I get ... fonts. 18

10 Where can I get fonts for non-Roman alphabets? 20

11 What about fonts with the International Phonetic Alphabet (IPA) symbols? 21

11.1 Shareware or free (PostScript Type 1 and/or TrueType): 21

11.2 Shareware or free (TEX): ... 21
11.3 Commercial: ... 22

12 How can I convert my ... font to ... format? ... 23

12.1 Converting Between TrueType and Adobe Type 1 Formats ... 23
12.1.1 FontMonger by Ares Software ... 23
12.1.2 Alltype by Atech Software ... 23
12.1.3 Fontographer by Altsys Co. ... 23
12.1.4 Metamorphosis by Altsys Co. ... 23
12.2 Converting Between Other Scalable Formats ... 24
12.3 Why Do Converted Fonts Look So Bad? ... 24
12.4 Smoothing Bitmaps ... 25

13 Are fonts copyrightable? ... 27

14 Typeface Protection ... 29

14.1 Preamble ... 29
14.1.1 Who makes type designs? ... 29
14.1.2 The problem of plagiarism ... 30
14.1.3 Kinds of protection for type ... 31
14.1.3.1 Trademark ... 31
14.1.3.2 Copyright ... 32
14.1.3.3 Design Patent ... 34
14.1.3.4 Invention Patent ... 34
14.1.3.5 Trade Secret ... 35
14.1.3.6 Ethics ... 35
14.1.4 Further reading ... 36
14.1.5 Disclaimer ... 36

15 File Formats ... 38

15.1 File Format Extensions ... 38
15.2 Font Formats ... 39
15.3 Font Format Extensions ... 40

16 Ligatures ... 43

17 Built-in Fonts ... 45

18 Glossary ... 46

19 Bibliography ... 50

20 Font Encoding Standards 59

20.1 What is a character set? 59
20.2 What is an encoding vector? 59
20.3 Where can I get them? 59

21 PostScript 60

21.1 What About PostScript UNIQUEIDs? 60
21.2 Can a Type 1 Font Be Shaded? 60

22 TrueType 62

23 Unicode 64

23.1 What Is Unicode? 64
23.2 What is the Unicode Consortium? 64
23.3 Unicode Editing 64
23.3.1 Is a special keyboard required? 65
23.3.2 Is roman-to-Unicode conversion available? 65
23.4 Are there PostScript or TrueType fonts available? 65

24 Can I Print Checks with the MICR Font? 67

25 Rules of Thumb 68

26 Acknowledgements 70

27 A Brief Introduction to Typography 72

27.1 Comments by Laurence Penney: 72
27.2 Comments by Don Hosek: 75

28 A Brief History of Type 76

28.1 Foreword 76
28.2 Type Technology—The Four Revolutions 76
28.2.1 Gutenberg (ca. 1450-1480) & The Impact of Printing ... 76
28.2.2 Industrial Revolution: Steam, Line-casting & Automated Punch-cutting (start 1870-95; end 1950-65) 77
28.2.3 Photocomposition (Intertype et. al., start 1950-60, end 1975-85) 78
28.2.4 Digital (start 1973-83) 79
28.3 Type Forms Through the Centuries 80
28.3.1 Definitions 81

28.3.2 Early Letterforms 81
28.3.3 Blackletter 82
28.3.4 Old Style Typefaces: Centaur, Bembo, Jenson, Garamond, Caslon 82
28.3.5 Transitional Type: Baskerville, Fournier 83
28.3.6 Modern Type: Didot, Bodoni, Walbaum 83
28.3.7 Sans Serif & Slab Serif 84
28.3.7.1 Sans Serif (a.k.a. Gothic or Grotesque) 84
28.3.7.2 Slab Serif (Egyptian) 85
28.3.8 Decorative & Display Type 85
28.3.8.1 Fat Faces 85
28.3.8.2 Wood Type 85
28.3.8.3 Script, Brush, Italic & Freehand 86
28.3.8.4 Art Nouveau 86
28.3.8.5 Art Deco 87
28.3.9 Synthesis 87
28.3.9.1 Synthesis and Serif Type 87
28.3.9.2 Synthesis and Sans Serif Type 88
28.3.9.3 "Grunge" Typography 88
28.4 Sources 88
28.4.1 Published Sources: 88
28.4.2 Personal Contributions: 90

29 The Role of National Orthography in Font Design 91

30 Interesting Fonts 92

30.1 Highway Gothic 92
30.2 Where can I get extravagant initial caps? 92

31 Pronounciation of Font Names 94

31.1 Arnold Boecklin 94
31.2 Benguiat 94
31.3 Courier 94
31.4 Didot 94
31.5 Fette Fraktur 94
31.6 Fenice 95
31.7 Garamond 95
31.8 Helvetica 95
31.9 Koch Roman 95
31.10 LaTeX 95
31.11 Mos Eisley 95

31.12 Novarese 95
31.13 Palatino 96
31.14 Peignot 96
31.15 Sabon 96
31.16 TEX 96
31.17 Veljovic 96
31.18 Zapf 96

32 What is it? 97

32.1 The "@" Character 97
32.2 The "#" Character 97

33 Equivalent Font Names 99

34 Digital Type Design Tools 122

34.1 How do the various digital type designing tools compare? 122
34.2 What about FontStudio? 123
34.2.1 Is FontStudio Still Being Marketed? 124
34.2.2 What About Bitmap Generation? 124
34.2.3 FontStudio is Better [than Fontographer]? 124

35 Type Design Firms 127

35.1 Carter & Cone Type, Inc. 127
35.1.1 Galliard 127
35.1.2 Sophia 128
35.1.3 Mantinia 128

36 What does 'lorem ipsum dolor' mean? 129

36.1 One Example of Lorem Ipsum Dolor 129

37 Macintosh Information 132

38 Macintosh Font formats 133

38.1 Bitmap Fonts 133
38.2 PostScript Type 1 133
38.3 PostScript Type 3 133
38.4 TrueType 133
38.5 QuickDraw GX 133
38.5.1 What is it? 133
38.5.2 How is it related to Unicode? 134
38.5.3 What about rotation? 134

38.5.4 Is QDGX limited to TrueType fonts? 135

39 Frequently Requested Mac Fonts 136

39.1 Greek Fonts 136
39.1.1 Sources of Greek Fonts for the Mac 136
39.1.1.1 Apple 136
39.1.1.2 Linotype-Hell 137
39.1.1.3 FontShop 137
39.1.1.4 Monotype 138
39.1.1.5 Linguist's Software 138
39.1.1.6 Ecological Linguistics 139
39.1.1.7 MacCampus 139
39.1.1.8 Font World 139
39.1.1.9 SkepsiS 140
39.1.1.10 Magenta 140
39.1.1.11 Fronteiras 141
39.1.1.12 Freeware/Shareware 141
39.2 Other Fonts 141

40 Commercial Font Sources 143

41 Mac Font Installation 144

42 Mac Font Utilities 145

43 Making Outline Fonts 147

44 Problems and Possible Solutions 148

45 Creating Mac screen fonts 149

45.1 Creating Mac screen fonts from Type 1 outlines 149

46 MS-DOS Information 151

47 Frequently Requested MS-DOS fonts 152

48 MS-DOS Font Installation 153

49 What exactly are the encodings of the DOS code pages? 155

50 MS-DOS Font Utilities 156

51 Converting fonts under MS-DOS 157

52 Converting Mac Type 1 fonts to MS-DOS format 158

52.1 The tools you need 158
52.2 How to do it? 159
52.3 Other comments 160

53 Converting PC Type 1 and TrueType fonts to Mac format 161

53.1 Refont 161
53.2 Font Manipulation Package 161

54 Converting PC Type 1 fonts into TEX PK bitmap fonts 162

55 Converting TeX PK bitmaps into HP LaserJet softfonts (and vice-versa) 163

56 TrueType to HP LaserJet bitmap softfonts (HACK!) 164

57 MS-DOS Screen Fonts (EGA/VGA text-mode fonts) 168

58 OS/2 Information 169

58.1 David Birnbaum's Introduction 169

59 Preliminaries 170

60 Fonts under DOS 171

61 Windows 172

62 Differences between Windows and OS/2 173

63 Installation under Windows and Win-OS/2 174

64 FontSpecific PostScript Encoding 175

65 AdobeStandardEncoding 176

66 AdobeStandardEncoding under Windows (and Win-OS/2) 177

67 AdobeStandardEncoding under OS/2 178

68 Consequences for OS/2 users 179

69 Advice to the user 180

70 OS/2 2.1 and beyond 182

71 Unix Information 183

71.1 Unix Font Formats 183
71.2 Font Installation 183
71.2.1 Application 183
71.2.2 Printer using an ExitServer 183

72 Sun Information 185

73 Fonts Under Open Windows 186

74 Does OpenWindows support Type 1 PostScript fonts? 187

75 Improving font rendering time 188

76 Making bitmap fonts for faster startup 189

77 Converting between font formats (convertfont, etc.) 190

78 Xview/OLIT fonts at 100 dpi 191

79 Where can I order F3 fonts for NeWSprint and OpenWindows? 192

80 NeXT Information 193

81 Tell me about NeXTstep fonts 194

81.1 Basic Format 194
81.2 Font Folder and Font Filename Requirements 194
81.2.1 For NeXTstep 1.0 ONLY, you also need to take the following steps: 195
81.2.2 For NeXTstep 2.0 and up: 195

82 Tell me more about NeXTstep fonts 197

82.0.1 Converted Fonts After Conversion 197
82.0.2 About Conversion Utilities 197
82.0.2.1 NeXTstep utilities 197
82.0.3 Installation 199

83 Porting fonts to the NeXT 202

83.1 Porting PC/Unix Type 1 Fonts 202
83.2 Porting Mac Type 1 Fonts 202

84 Font availability 204

85 Why can I only install 256 fonts on my NeXT? 205

86 Amiga Information 206

86.1 Font Concepts 206
86.2 Amiga Font Formats 206
86.3 Frequently Requested Amiga Fonts 207
86.4 Commercial Font Sources 208
86.5 Non-Latin fonts on the Amiga 208
86.6 Amiga Font Installation 208
86.7 Amiga Font Utilities 209
86.8 Making Outline Fonts 209
86.9 Problems and Possible Solutions 210
86.10 Adobe Type 1 fonts for the Amiga 211

87 Atari ST/TT/Falcon Information 212

88 SpeedoGDOS ... 213
88.1 Fonts included with SpeedoGDOS 4.x ... 213
88.2 Fonts included with SpeedoGDOS 5.x ... 213

89 Atari File Formats ... 214
89.1 Atari Font formats ... 214
89.2 Atari Font Format Extensions ... 215

90 Frequently Requested Atari Fonts ... 216

91 X11 Information ... 217

92 Getting X11 ... 218

93 Historical Notes about X11 ... 219

94 X11 Font Formats ... 220

95 X11 Font Server ... 222
95.1 X11 Release 5 ... 222
95.2 X11 Release 6 ... 223

96 Fonts and utilities for X11 ... 224

97 Utilities Information ... 225

98 How do I convert AFM files to PFM files ... 226

99 PS2PK ... 227
99.1 When do you need ps2pk? ... 227

100 TEX Utilities ... 229
100.1 MetaFont ... 229
100.1.1 About MetaFont: ... 229
100.1.2 What do you need in order to use the fonts: ... 229

101 MFPic ... 231

102 fig2MF ... 232

103 GNU Font Utilities 233

104 Font Editors 234

105 The T1 Utilities 235

106 Where to get bitmap versions of the fonts 236

107 Converting between font formats 237

108 Getting fonts by FTP and Mail 238

109 MetaFont to PostScript Conversion 239

110 How to use Metafont fonts with Troff 240

111 PKtoBDF / MFtoBDF 241

112 PKtoPS 242

113 PKtoSFP / SFPtoPK 243

114 PostScript to MetaFont 244

114.1 pfb2pfa 244
114.2 pfa2chr 245
114.3 chr2ps 245
114.4 ps2mf 245

115 Mac Bitmaps to BDF Format 246

116 Vendor Information 247

116.1 Type/Font Vendors 247
116.2 Clip Art Vendors 261