

fonts

Fonts for the MAPS

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Ever since the redesign of the MAPS (actually, it wouldn't hurt to have another one by now), we have used Times, with real small-caps and old-style figures, for body text; Frutiger for headings and special items, and narrowed Courier as monospaced font. Under the hood, however, font support has been redone twice.

Encodings

\TeX references characters by number, and expects certain characters at certain slots. This assignment of characters to slots is called an encoding. With macros, you can make \TeX expect a different encoding.

\TeX 's native encoding has some peculiarities:

- it only uses the first 128 slots
- it doesn't contain accented characters; these are synthesized from base characters and accents
- the first eleven slots contain Greek capitals
- it doesn't contain the Polish Ł or Ł, but it *does* contain the slash of these characters as a separate character

OT1 is a slight modification of \TeX 's native encoding which is more suitable for commercial fonts.

\TeX specialists don't like synthesized accented characters because they interfere with hyphenation. Therefore, this encoding is being superseded by 8-bits encodings which use most of the 256 available slots and include the more important accented characters outright.

The most widely used such encoding is T1. Unfortunately, it lacks a number of symbols such as the dagger- and copyright symbols. This necessitated the introduction of the text companion- or TS1 encoding. On top of that, some of the accented characters, which do not normally occur in Western European languages, don't occur in commercial Type 1 fonts. These characters have to be synthesized with the use of virtual fonts. Below, more about virtual fonts.

An alternative encoding is texnansi or LY1. It limits itself to characters present in commercial Type 1 fonts, but contains most of the characters from the TS1 encoding, and

is sufficiently complete for typesetting Western European languages. It has been introduced by Y&Y with their commercial \TeX distributions, which don't support virtual fonts at all. Y&Y offers support files for texnansi for free at their website www.yandy.com.

An aside: once we can move to Omega, Unicode and large character sets, these annoying issues should automatically disappear (or maybe get replaced with other annoying issues).

Virtual fonts

A virtual font is a recipe for dvi-drivers for synthesizing new fonts from other fonts. Such a recipe might create accented glyphs by placing accent glyphs above base characters, or selectively scale glyphs, or borrow some glyphs from other fonts.

\TeX will only handle the resulting metrics, and won't care that they came from a virtual rather than a real font. Virtual accented characters are fine as far as \TeX hyphenation goes.

The main problem with virtual fonts is that they add complexity to an already overly complex \TeX installation. To use a font in T1 encoding, we need a tfm for the real font, e.g. ptmr8r.tfm, plus a tfm for the virtual font: ptmr8t.tfm, plus the recipe: ptmr8t.vf. Quite likely, we also need the text companion font, which means another two files: ptmr8c.tfm and ptmr8c.vf. In contrast, for texnansi encoding a single file ptmr8y.tfm would suffice.

Fontinst

Adobe has its own afm format for storing font metrics. Installing commercial Type 1 fonts is largely a matter of converting Adobe's afm font metrics to \TeX 's tfm font metrics.

TrueType fonts can also be used with \TeX . Mainstream \TeX distributions contain a number of utilities for handling TrueType fonts. For pdftex in particular, using TrueType fonts is not much different from using Type 1 fonts. Although below I'll write about Type 1 fonts, most of it is also relevant for TrueType.

The major free \TeX distributions offer two ways to install commercial fonts in \TeX : fontinst and afm2tfm. Both derive \TeX font metrics from such an afm-file.

Fontinst *only* lets you use virtual fonts. There is a command `\latinfamily` that lets you install one font family at one fell swoop: 'raw' fonts, the old OT1 encoding, the

newer T1 encoding, its companion TS1 encoding, all these with artificial small-caps and artificially slanted versions where [not totally in]appropriate. The complexity of the interface deters people from attempting more fine-grained control of fontinst, so using fontinst probably will add a lot of clutter to your system. On the plus side, fontinst also generates L^AT_EX support files and mapfile fragments.

The initial MAPS font setup, first used for issue 19, contained OT1-encoded tfms generated with fontinst. It was necessary to delve into the low-level interface of fontinst to replace the regular figures of Times with old-style figures. Somehow, the real small-caps never got activated. This got fixed for MAPS 24, at least, for the L^AT_EX articles. At that occasion, the encoding was changed from OT1 to T1 plus TS1.

afm2tfm and afm2pl

Afm2tfm, which is a companion program to dvips, doesn't do virtual fonts in its default mode. It simply converts one afm to one tfm, and writes a mapfile line to standard output. It does support slanting, widening/narrowing and reencoding. Unfortunately, for some reason it isn't designed to write kerning- or ligature information to the tfm in its default mode.

On the Y&Y site you can read how you can apply afm2tfm in a roundabout way and create tfms which *do* have their original kerns and ligatures.

Afm2pl is my own adaptation of afm2tfm. If you are interested: you can find it at www.ntg.nl/afm2pl.html. It does preserve kerns and ligatures. Instead of tfm files, it produces pl files, which are their human-editable ascii counterparts. You can convert back and forth between pl and tfm with the pltotf and tftopl utilities, which are part of any T_EX installation.

Although afm2pl by itself can't do small-caps, it *can* create all-caps fonts, since that is simply a matter of reencoding. The distribution contains an encoding vector for this. The latest, source-only distribution optionally does letterspacing, which can make an all-caps font look much nicer.

For this MAPS issue, I used afm2pl to generate texnansi-encoded tfms. However, fontinst was needed to create Times fonts with old-style figures and to create artificial small-caps for the Frutiger family.

At some future date, Taco Hoekwater and I hope to put together a fontinst replacement for mere mortals and a graphical font installer. These projects are still in an embryonic state.