
The T_EX PostScript Software Package

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Introduction

This report describes the T_EX_PS Software Package. T_EX_PS stands for T_EX-PostScript. This package contains, among other things, a new DVI to PostScript driver and the facility to use PostScript fonts in T_EX.

The software's copyright is in the GNU spirit (Free Software Foundation, Cambridge, MA): it is free except for a nominal distribution charge for those of you who order the software because of the lack of access to ftp. The software must be passed on according to the same terms, also if you port the software to a new operating system, for instance. See the end of this article for more information on how the software is distributed.

In this short report I will describe the following programs:

1. *dvitps*, the driver, which converts DVI files into PostScript files¹.
2. *pdf2tfm*, a program to generate TFM files for PostScript fonts which makes PostScript fonts accessible in T_EX.
3. *printpdr*, an auxiliary program which will be discussed later.

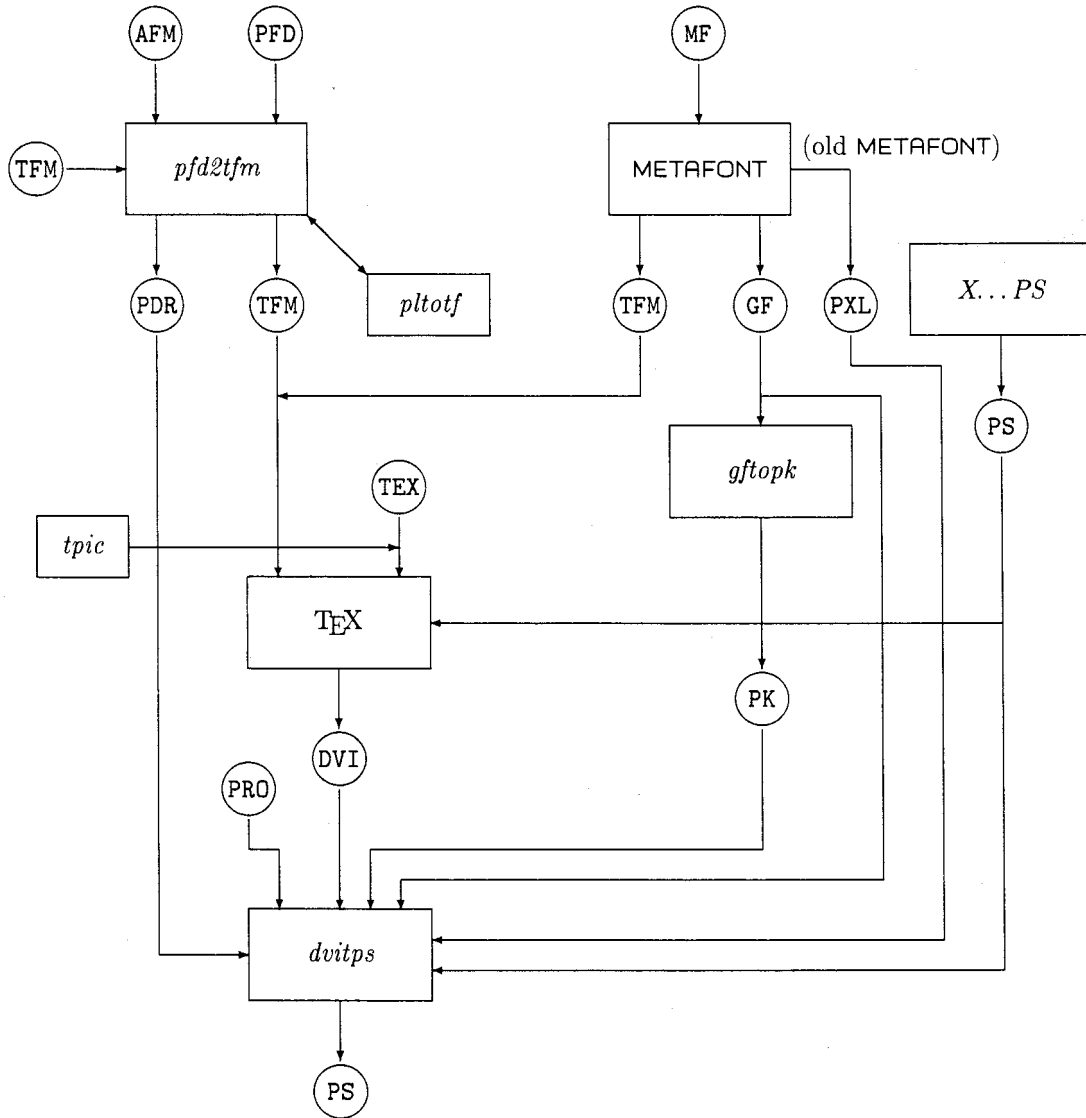
Features of the T_EX_PS Software Package

Here is a list of features of the T_EX_PS Software Package. The main emphasis below will be on *dvitps* which is the central part of this software package.

1. The software runs under UNIX (currently tested on VAXes and SUNs (BSD 4.x)); ports to other flavors of UNIX should be straightforward.
2. The software is very easy to install. A central file contains all local definitions and a small C program is used to update all makefiles.
3. The software comes with a *150 page manual* which explains it thoroughly. The manual contains numerous examples intended to be a testbed for the software.
4. *Manual pages* (done in *troff* . . .) are included.
5. The software was *tested carefully* at various locations before its release and should perform according to its specification. Continuous support by the author is offered.

¹ The driver is not called *dvi2ps* because there are already so many different PostScript drivers called *dvi2ps* floating around.

6. *dvitps* allows the use of the usual pixel based fonts of T_EX. All three pixel file types PXL, GF and PK are supported. Fonts may have up to 256 characters.
7. *PostScript fonts* can be used in T_EX! The program *pdf2tfm* converts AFM files into TFM files which then can be accessed by T_EX. Ligature and kerning information from AFM files is used by *pdf2tfm*. This program also generates PDR files which are accessed by *dvitps*.
8. PostScript fonts can be *tilted*, *stretched*, and *modified* in various other ways.
9. The *encoding vector* of the PostScript fonts used is under complete user control. In other words, every character of a PostScript font can be mapped to any character code offering full flexibility. Defaults are provided, making the encoding vector of PostScript fonts as close as possible to the encoding vectors of the usual T_EX fonts. The encoding vector is among the information stored in the previously mentioned PDR files.
10. Encoding vectors can be printed out using the program *printpdr*.
11. It is *dvitps* and not the PostScript interpreter inside the printer which is "in charge of positioning." *dvitps* generates only integer position coordinates and movements. The term 'integer' here is used with respect to the resolution of the PostScript printer. As a consequence it was possible to make *dvitps* follow the rules of *dvi-type*, the model device driver, precisely. *dvitps* includes, for instance, a maxdrift control.
12. *dvitps* has an option to *reset the virtual memory of the PostScript printer* used every *n* pages.
13. *dvitps* has an option to *show all attempts to locate font files*.
14. *dvitps* has an option to *generate "conforming documents"*, i.e. PostScript files conforming to a standard defined by Adobe, Inc. This allows PostScript files generated by *dvitps* to be included into other PostScript files.
15. *Font emulation* is provided. Font emulation means that the spacing and positioning of characters within T_EX refers to one TFM file but printing by *dvitps* is done by using a font with a different TFM file. This can be used to print documents which were processed with TFM files for which no pixel files are available. This situation occurs when native fonts of phototypesetters are used and the producer of the phototypesetter does not make any pixel files available.



A data flow diagram explaining the connection between TeXPS, TeX and METAFONT.

16. PostScript fonts can be extended so that *arbitrary PostScript procedures can be executed* in place of certain character codes.
17. The *inclusion of PostScript figures in T_EX documents* is possible with macros of the psfig macro package.
18. *Figures generated with tpic* can be included into a T_EX document.
19. *X Window screen dumps (X11.3)* can be included into a T_EX document.

An Overview

The data flow diagram contains an overview of the T_EXpS Software Package. Observe that this figure contains as subdiagram the flow of information when generating fonts with METAFONT and processing a document by T_EX using METAFONT based fonts.

The left side of the figure shows the programs added by T_EXpS. The *pdf2tfm* program generates TFM files from AFM files and PFD files. PFD files contain, for instance, encoding vector specifications. The resulting TFM files are read in by T_EX to produce a document with PostScript fonts. The *pdf2tfm* program may read in TFM files itself for the purpose of font emulation. The *pdf2tfm* program also produces PDR files which are read in by *dvitps*. These PDR files contain width information and encoding vector information which is needed by *dvitps*.

Observe also that *tpic* can be used with our *dvitps*. *tpic* generates a T_EX source code file which in turn generates \specials which are included into the DVI file.

Finally with the help of the psfig macros, PostScript based figures generated by some program *X...PS* can be included into a T_EX document. Such a program should but does not need to generate a bounding box comment in its PostScript output which is read in by the psfig macros to reserve the proper space in the T_EX document. The rest of the PostScript file is discarded by T_EX, and only read in by *dvitps*.

PRO files mentioned in the figure are prologue files which contain certain standard PostScript definitions read in by *dvitps*.

Availability

The software of the T_EXpS package consists of the following parts:

1. Source code for the three basic programs *dvitps*, *pdf2tfm* and *printpdr*.
2. The L^AT_EX source of a 150 page document describing the software.
3. Manual pages.

4. The basic set of AFM files needed to produce the corresponding TFM and PDR files.
5. The sources of *pltotf* (needed by *pdf2tfm*) and of *maketd*, a program to compute dependencies of C program sources.

The software is made available in the following two ways:

1. Use ftp to the machine *csseq.tamu.edu* and retrieve the file *dvitps.tar.Z* from there.
2. Send \$80.00 (\$110.00 outside the continental US, shipped air mail) to Stephan v. Bechtolsheim, 2119 Old Oak Drive, West Lafayette, IN 47906 and you will receive a SUN cartridge plus a complete set of the documentation.

Acknowledgements

The software was developed by the author as part of a consulting contract with the Menil Foundation in Houston, Texas. It was a combined decision by the author of this software and the Menil Foundation to make this software available to the T_EX community at large.

My email address is *svb@cssun.tamu.edu*. Feel free to contact me for further information.