
VT_EX/Free 8.44b Manual

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This is the documentation for the free releases of the VT_EX document compiler.

Currently, there are freeware versions for OS/2 (VT_EX/2) and Linux (VTeX/Lnx). If this document refers to both versions, it will use the generic term VT_EX/Free. If the document refers to something which is also true for the commercial Windows version, it will just use the bare VT_EX.

8.44 New or changed features of the program or the distribution are marked appropriately.

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1 What is V_TE_X/Free?

V_TE_X/Free is a partial port of the V_TE_X/Windows T_EX compiler to OS/2 and Linux. It does not include any Shell and/or Visual Tools and there is currently no intention to port those. Even the port of the compiler itself is partial. Out of the five modes of V_TE_X/Win, only **PDF**, **PS** (PostScript) and **DVI** are supported, but not **HTML** and **SVG**). The DVI mode is essentially useless, since the main advantages of V_TE_X's DVI mode under Windows rely on the V_TE_X DVI drivers which have not been ported. Thus, for all practical purposes, V_TE_X/Free should be viewed as a PDF and PS mode compiler only.

The PDF and PS modes are very similar in the operation; the implementation code is essentially the same and both the lower-level (`\special's`) and the high-level (configuration files for `graphicx`, `PSTricks` etc.) are almost identical. This documentation, therefore, equally applies to both modes; differences, where exist, are specifically marked.

V_TE_X/Free *does* include the full PostScript support (G_EX) of the Windows version. This includes both inclusion of (encapsulated) PostScript files and inline PostScript, including support for `PSTricks`, `PSfrag`, `XYpic` and `GEXX`. G_EX can be used in either the PDF or the PostScript mode; in PDF mode G_EX acts as an integrated PS→PDF distiller; in the PS mode, it acts as a PS→PS distiller.

The OS/2 port needs OS/2 Warp 3 or later, and at least 16 MB of physical memory. Below these limits performance may be unacceptably slow. The Linux port is for the x86 platform only; it requires Linux version 2.0 and at least 16 MB of physical memory (without X11) or 32 MB (with X11).

2 Brief V_TE_X Documentation

2.1 Invocation and usage

The name of the V_TE_X executable is `vtex.exe` with OS/2 and `vtexlnx` on Linux. Thus, the syntax of the command line is, for instance on OS/2:

```
vtex [options] @format file[.tex]
```

(In contrast to versions of V_TE_X/L_{nx} prior to 7.4, you need no longer specify the full path of the executable.)

In case the name of the format is not given, it defaults to `vtex` – as opposed to `plain` with many other T_EX implementations.

V_TE_X options are entered on the command line preceded by a dash (-) character; multiple options should be separated by a space. The options that use alphabetic characters are case-insensitive.

The distribution comes with four shell scripts, which provide all necessary options to run V_TE_X in PDF or PostScript mode with the Plain or L^AT_EX formats:

<code>vplain</code>	Plain T _E X	PDF
<code>vplainp</code>	Plain T _E X	PostScript
<code>vlatex</code>	L ^A T _E X	PDF
<code>vlatexp</code>	L ^A T _E X	PostScript


You may want to modify these scripts according to your personal needs, e.g., specify fast static path caching (see section 2.4.2).

V_TE_X supports the following command-line options:

- d Selects the DVI mode (default). DVI files generated by V_TE_X are compatible with MicroPress' DVI drivers only, unless the -c option (see below) is also selected.
- \$p Selects the PDF mode; see section 3.2 for details.
- \$s Selects the PostScript mode: see section 3.2 for details.
- c Compatibility mode: Almost all V_TE_X extensions are disabled. DVI files created in this mode are compatible with most non-MicroPress drivers.
Not useful for PDF and PS output!
- i IniT_EX mode.
- n# where # is the initial T_EX running mode:
 - 0 batch
 - 1 nonstop
 - 2 scroll
 - 3 errorstop (default)

- q Quick run. This switch disables the output. While you need to compile L^AT_EX documents at least twice (and, often, three times), there is really no need to produce the formatted output on the passes before the last one. Using the -q switch will result in approximately 50% time saving on a PDF mode compilation, which would mean 25% overall time saving on a two-pass L^AT_EX compilation with -q used on the first pass, and 33% overall time saving on a 3-pass L^AT_EX compilation with two dummy runs.
- 2 Enable “extended mode”, i.e., the ϵ -T_EX extensions. The option can be specified when typesetting a document or when making a format. In the latter case extended mode will be enabled whenever that format gets loaded. See also [etex_man.pdf](#).
- p Path caching options, see section 2.4.2
- ov Resolve .vf files. In PDF and PS mode, this option is necessary to use virtual fonts. In DVI mode, this option will result in .vf-free .dvi files.
- oc Include complete fonts. This option applies to the PDF and PS modes only and disables font subsetting. In most cases there is no reason to use this switch, since it leads to larger (often, much larger) output. However, if you intend to post-process the documents with Adobe Acrobat (Exchange), you may have to use this switch due to the general bugginess of the Adobe handling of subsetted fonts.
- ox Enable G_EX.
- ox2 Enable G_EX with PostScript Level II support.
- oxp, -ox2p Ditto, and force all Type 1 fonts to be processed via G_EX.
- ob2 Make G_EX recognize all 35 “base” fonts, which belong to PostScript Level II. (Default is to support the “Base 14” only.)
- e Security settings; see section 3.13.
- of=*file* Specify the FontMap file, see section 2.3.1
- ofr=*file* Use compiled FontMap; see section 2.3.7.
- ofw=*file* Compile FontMap; see section 2.3.7.
- =*file* Specify alternative main configuration file, see the below section 2.2.
- 83 Disable use of “long” file names with V_TE_X/2, e.g., for use with a FAT file system.

See section 3.2 for further options related with PDF or PostScript generation only.

 The L^AT_EX system in the V_TE_X/Free distribution cannot be used in DVI mode. A number of configuration files in the distribution are prepared for PDF or PostScript mode only, or rely silently on features that would require MicroPress’ DVI driver.

2.2 The main configuration file

Search paths and some general settings are determined by a “general” configuration file, whose name is `vtex.ini`, on both Unix and OS/2. With OS/2, the file resides in the same directory as the `VTEX` executable. With Unix, it is searched first in the directory `$HOME`, then in `/etc`. A different configuration file can be specified through the option “`-=`” on the command line (see above).


The main configuration file is a typical Windows-style INI file, which is divided into several sections, each defining its variables. Several sections are not applicable to the `VTEX`/Free distributions and have been omitted from this description.

2.2.1 Paths

The section `[Directories]` defines program paths. The following paths are important:

`PGMDIR` : `VTEX` binaries, default `vtex/bin/`
`INCDIR` : generic `TEX` include path, default `vtex/src/`
`FMTDIR` : Format directories, default `vtex/fmt/`
`TMPDIR` : Temporary directory, default `vtex/tmp/`
`GRFDIR` : Graphics file include directories, default `vtex/src/`
`TFMDIR` : `.tfm` include directory, default `vtex/tfm/`
`VFSDIR` : `.vf` include directory, default `vtex/vfs/`
`ENCDIR` : `.enc` include directory, default `vtex/enc/`
`BIBDIR` : BibTeX database files (`.bib`)
`BSTDIR` : BibTeX style files (`.bst`)
`MSTDIR` : MakeIndex style files

Multiple directories should be separated with semicolons, and the trailing path separator must be included as well. Automatic subdirectory searches can be turned on on any of these directories by appending a `+` to the directory name.

The second important section is `[FINCLUDE]` The `.tex` include path in `VTEX` is format-dependant. Assuming that you compile with the “`latex`” format, `VTEX` will check the `FINCLUDE` section to see if a particular include path for this format is listed; if it is, it will be used rather than the generic `INCDIR` setting. From version 8.31 on, the format-dependent path is honored also  when generating a format, i.e., in `IniTEX` mode. However, it applies only to those files that are loaded from the main input file, whereas the main input file itself must be located in the `INCDIR` path.

Note that the `FINCLUDE` directory match works by prefix comparison. This means that if your format is, for instance, `latexhv` (HV-Math based `LATEX 2ε`), `VTEX` will first check `[FINCLUDE]` for `LATEXHV=`, if this fails, it will try `LATEXH=`, followed by `LATEX=` etc. With the default settings, the match will be achieved at `LATEX=`. The purpose of this logic is to allow compact specifications for a set of related formats.

The include path defined in the `FINCLUDE` section may reference the generic include path (`INCDIR`) with the `*` symbol. By default, we define

```
VTEX=*
PLAIN=*
LATEX=/vtex/12e/*
```

which means that Plain-based or VTeX-based documents search only `/vtex/src`, while L^AT_EX documents first search `/vtex/12e`, and then `/vtex/src`.

Automatic subdirectory searches can be turned on on any of these directories by appending a `+` to the directory name

2.2.2 T_EX memory

In the section `[HUGETEX]`, T_EX's initial `hyph_size`, `trie_size` and `trie_op_size` memory can be specified (in bytes). The hyphenation memory sizes can grow dynamically. If needed, `mem_size` can also be tuned; note that you have to specify it in units of 64k memory words, e.g., `mem_size=16`. The default value is 8; changing this would require a format rebuild.

2.2.3 Return codes and PostScript interpreter memory

The `[COMPILER]` section deals with further internals:

`retcodes=n1,n2,n3,n4` allows to modify the default return values. The four numbers correspond to the return code for clean compilation, warnings, errors and fatal errors (cf. T_EX's history). The assumed default is `retcodes=0,1,2,3`. The configuration file supplied with VTeX/Free sets `retcodes=0,0,1,1`, which is suitable for use under *Make*.

`VMSIZE` allows to specify the memory size of the PostScript interpreter. It defaults to 5 MB, if no setting exists in `vtex.ini`. This is usually sufficient, but if G_EX crashes on "vmerror", you can increase the value, e.g., `VMSIZE=6000000`.

2.3 Configuring the font usage

2.3.1 The FontMap (FM) file

Font usage in the PDF and PostScript modes is primarily controlled by a configuration file, whose name is usually given on the command line using the option `-of`; VTeX will search for this file along the T_EX include path.

The FM file is made up from a number of "sections". Each section is started by a keyword, followed by the contents of the section included in braces. The particular sections are:

`LOCAL-OS2`, `LOCAL-LNX` These sections define local variables, which can subsequently be referred to in the font mapping ("aliasing") files; `LOCAL-OS2` is evaluated with OS/2 only, whereas `LOCAL-LNX` is for Linux. For instance, the FM files supplied with VTeX/Free define in the `LOCAL-LNX` section:

TEXMF = "/usr/local/vtex/texmf/"

The LOCAL-... sections allow to use the same FM file on different platforms in dual-boot environments.

TYPE1 This section lists the font aliasing files for Type 1 fonts.

TRUETYPE This section lists the aliasing files for TrueType fonts.

OPENTYPE This section lists the aliasing files for OpenType fonts.

VF3 This section lists optional mapping files for virtual fonts; see the below section 2.3.6.

The files listed here must reside in the \TeX include path.

When no FM file is given on the command line, a number of default settings come into effect:

LOCAL... No local variables are defined.

TYPE1 Only one single aliasing file named `aliasing.pst` (Win, OS/2) or `type1.rc` (Unix) will be used.

TRUETYPE Only one single aliasing file named `aliasing.tt` will be used.

OPENTYPE Only one single aliasing file named `aliasing.ot` will be used.

VF3 Only one single mapping file named `vfwrap.fm` will be used.

2.3.2 The “aliasing” files

These files establish the relation between the font names used by \TeX (i.e., the TFM's) and the physical font files (Type 1, TrueType or OpenType). On other \TeX systems they would be called “font map files”. The files are ASCII and can be manually edited if needed. $\text{V}\TeX$ will search for these file along the \TeX include path.

An aliasing file is made up from two sections, separated by an empty line.

The first section lists the directories that include the font files referenced in the second section. Each line is in the format

`%<N> = <directory>`

where `<N>` is a unique (non-repeating) integer number and `<directory>` is a full directory path, ending with a slash. For example,

`%1 = PFM`

`%2 = $TEXMF$fonts/type1/micropress/cm/`

`%3 = $TEXMF$fonts/type1/micropress/ams/`

defines three directories that can be referenced later through their number. Note, that the slash is used as a directory separator with OS/2, too! This is not a requirement, but using slash allows to maintain the same `.ali` files on Unix and OS/2. `$TEXMF$` refers to the variable `TEXMF`, which must have been defined in the FM file – see above. The variable name `VTEX` is predefined and points to the $\text{V}\TeX$ root directory. (This is relevant for $\text{V}\TeX$ /Win. only.)

The second section of the file contains the list of fonts. Each line has the format

@<Font-name> = <File-name> %<access><File-dir>,<pfm-dir>[options]

for Type 1 aliasing files and

@<Font-name> = <File-name> %<File-dir>[options]


for TrueType and OpenType .ali files,

where

FontName The PostScript FontName of the font e.g., Times-Roman. This name *must* match the name given in the font file exactly, except for the base font substitutes, see section 2.3.3

File-name The .tfm file name for the font as referenced by T_EX. It must be the same as the name of the related font file, unless the latter is explicitly specified.

access Usually, nothing. Fonts that are built-in in the PDF or PostScript interpreter (“base fonts”) should have a ! mark to prevent their (unnecessary) downloading into the document. Fonts that are to be embedded in full must be given a ~ mark. Full embedding is an escape provision in case you encounter a font which V_TE_X cannot subset. (Shall this happen, please let us know.)

 **File-dir** The number of the directory that contains the file for this font. V_TE_X cannot search for Type 1 fonts recursively in a given directory (sub)tree! The default extension of the file is .pfb for Type 1, .ttf for TrueType and .otf for OpenType fonts.

pfm-dir The number of the directory that contains the .pfm file for this font. This applies to Type 1 .ali files only; the presence of the .pfm file is not required, and this entry is in no way used by the V_TE_X compiler.

Additional options that can be specified:

b=file-name The name of the actual font file (basename), in case it differs from the TFM name; the extension (.pfb/.ttf/.otf) may be omitted.

r=map-name Reencoding map file; the extension (.enc) may be omitted.

g G_EX-loading: full processing of the font (Type 1 only) in G_EX. This option allows to use Type 1 fonts that are not valid ATM fonts.


m=... MM flags (Type 1 only); see the document [mm_man.pdf](#).

Examples:

```
@cmr10 = cmr10 %2,1
```

```
@Symbol = psyr %!3,1,b="usyr"
```

Note that the “Symbol” font is built-in and so marked.

 In V_TE_X/Free, the .pfm directories are never actually accessed, but because the syntax for this file is identical to the Windows version, you need to define at least a dummy directory.

2.3.3 Base font substitution

TeX can use non-Adobe “Base 35” font files. For copyright reasons, these fonts usually carry incorrect `/FontName`’s; this may cause the problems as follows: Assume you have an `.eps` file which needs Palatino, but does not embed it. Loading URW’s Palatino clone will not help, since its `/FontName` is hardwired as `/URWPalladioL-Roma`, while the `.eps` program would look for `/Palatino-Roman`.

TeX can overcome the problem by “patching” the `/FontName` of the substitutes upon loading. For instance, the `/FontName` of URW Palladio Roman (`uplr8a`) can be turned into Palatino-Roman through the following record in the mapping file:

```
@Palatino-Roman = pplr8a %9,1,b="uplr8a"
```

The following substitutions are supported:

- ▷ All of the 35 base fonts can be replaced with URW’s “clones”, i.e., the fonts from `<CTAN:fonts/urw/base35/>`
- ▷ The 4 Times fonts can be replaced with MicroPress’ TM-Text or Monotype Times New Roman PS.
- ▷ The 4 Helvetica fonts can be replaced with MicroPress’ HV-Text or Monotype Arial.

Actually using Times New Roman PS and Arial is not a good idea, because they differ considerably from the originals; yet TeX is prepared for this option.

2.3.4 Re-encoding

Type 1 and OpenType fonts typically contain more characters than accessible directly. These additional characters, “hidden” inside the font implementation, include ligatures (usually, “fi” and “fl” only), accented characters, and others. The visible characters are only a subset of what can be made available. To make things worse, the *default* layout of third-party fonts (e.g, `StandardEncoding` in the case of Type 1 fonts) makes only a small and almost useless subset of the font immediately available. The layout of the CM fonts which are supplied with TeX/Free is, however, already suitable for TeX and no re-encoding needs to be applied to these fonts.

TeX allows you to configure Type 1 and OpenType fonts to follow a desired character layout with full ligature support. TeX comes with several encodings, including `TeXBase1Encoding` (file `8r.enc`), which is used by the virtual fonts of the PSNFSS system. Additional encodings can be easily made by the user. See the next section for the details on the format of these files.

Since there may be more than one TeX font based on a single physical font and multiple encodings, they have to be distinguished by different font names and TeX metric `.tfm` files. Note that the font names can be chosen arbitrarily in this case. With fonts to be reencoded, the entries in the aliasing file contain an additional option to support this:

```
r="<encoding file name>"
```

The extension `.enc` of the encoding file may be omitted

- ☞ For each reencoded font there must also be an entry and a `.tfm` file which reference the “raw” (not reencoded) font under its actual name. Otherwise the font cannot be used in \TeX , i.e., within PSTricks, PSfrag, in-line PostScript code etc.

Example: The following lines within an aliasing file declare two instances of the Charter Roman font, “raw” and reencoded:

```
@CharterBT-Roman      = bchr8a %2,1
@CharterBT-Roman-8r   = bchr8r %2,1,r="8r",b="bchr8a"
```

2.3.5 Encoding files

The available encodings are stored in files with extension `.enc` within the ENCDIR subdirectory. Each file should declare a PostScript array of exactly 256 symbol names:

```
/MyEncoding [
    /.notdef /.notdef /.notdef /.notdef
    ....
    /A /B /C /D /E /F
    ....
    /a /b /c /d /e /f
    ....
] def
```

Comment lines are allowed and should start with the `%` character. These names define the layout of the reencoded font. Note that if you specify a symbol name that actually does not occur in the base font, the entry will be blank (`/.notdef`).

The number of entries in the encoding vector must not exceed 256.

2.3.6 Font mapping files for virtual fonts

These files may list virtual fonts, which are to be converted to Type 3 wrapper fonts, instead of being fully resolved. Each line has the format

```
@<virtual font> % x="<bounding box>",e="<encoding>"
```

where:

bounding box: Desired bounding box for the entire font. Optional; if not present, `0 0 1000 1000` will be used. Generally, the default is good enough, but smaller values will produce more efficient output.

encoding: Encoding file to describe the encoding of the virtual font. Optional; if not present, glyph names like `/X00`, `/X01` etc. will be used.

The main purpose of this feature is to fully support searching and copying from the Adobe Reader window with fonts, that are made up from composite glyphs, such as the virtual AE fonts. For instance, the record for AE Roman looks like this:

```
@aer10 % x="-500 -200 500 800",e="ec"
```

Notice that searching and copying *requires* the encoding to be specified.

A minor disadvantage of “VF wrapping” is, that Acrobat Reader 3 is somewhat slow in displaying the resulting PDF files. With respect to the PDF output size, use of Type 3 fonts for VF’s will typically increase the size of smaller documents, but decrease the size of the large ones.

2.3.7 Using precompiled FontMap files

Beginning with version 8.0, V_TE_X also supports FontMap precompiling. A compiled FontMap (.cfm) contains a binary dump of an .fm file as well as some additional information extracted from the fonts themselves; use of a compiled FontMap improves the performance of the V_TE_X compiler.

To compile an FM file (for example, name.fm), use the

```
vtex -ofw=name
```

command line. This compiles name.fm into mapname.cfm, which resides in the formats directory.

To make V_TE_X load the information from a compiled FM file, use the -ofr=name switch:

```
vtex -ofr=name ... myfile.tex
```

☞ The speed improvement offered by compiled FontMaps is not very large, so this is recommended mostly in batch production environments.

2.4 File I/O

2.4.1 Reading files

The following directories are searched for files to be read (font metrics, packages, .tex files to be included etc.), in decreasing order of precedence, unless an absolute path is specified:

1. The working directory,
2. the directory of the main document, which may be different from V_TE_X’s working directory,
3. the include paths, as configured in vtex.ini.

2.4.2 Path caching

While the CPU speed of the modern computers makes the document compilation fast, the file search performed by the operating system could be very slow. As a result, T_EX may spend a considerable amount of time searching for files to be read. This bottleneck can be eliminated with *path caching*.

Path caching acts on macros and include files, which are read by T_EX, as well as on the T_EX font metrics files (.tfm) and the virtual fonts (.vf).

The path caching in V_TE_X comes in two models:

- ▷ Dynamic path caching: at the beginning of each compilation, V_TE_X builds a full list of the contents of the include directories in memory; when a file needs to be opened, V_TE_X uses the memory table to get directly to it, without the need for additional searches.
- ▷ Static path caching: the cache is built once and stored as a file; on each compilation, the cache is read and is used to locate files. The path cache files have extension `.ffs` and are stored in the format directory of V_TE_X. Since different T_EX formats may have different search paths, you need a separate file for each format you use. For example, `latex.ffs` is the name of the path cache file for L^AT_EX.

Static path cache is more efficient than dynamic, since it is faster to load a cache from disk than to search the entire include paths (even once). However, static path cache may need to be rebuilt when you modify the include paths or add more files to the include directories. Otherwise, searching for files, which have been added or moved, will be unnecessarily slow, or T_EX may not find the files at all, depending on the cache settings (see below).

- ☞ Since the directory of the document is always searched *before* the path cache, a file in this directory is guaranteed to have precedence over a duplicate one, whose location has been memorized in the path cache. As a result, a static cache is not affected, when include files or special macro packages are stored together with a document in one directory.

The command-line options that govern cache operations are:

- pu Use dynamic cache.
- pw Write static cache file.
- pr Read static cache file.

Example:

```
vtex further options @latex sample2e
```

compiles the standard L^AT_EX sample file without path cache. This is the slowest.

```
vtex -pu further options @latex sample2e
```

compiles the same file using dynamic cache (faster).

```
vtex -pw @latex
```

writes out the static path cache for the L^AT_EX format. Note that this operation does not compile any document; it just writes the cache and exits.

```
vtex -pr further options @latex sample2e
```

compiles the file using the static cache (fastest).

There are two modifiers allowed after the path cache options:

- t produces a console trace. You can use it to detect duplicate file names and see which of the duplicates will actually be used by V_TE_X. This modifier can be used with `-pw` and `-pu` (`-pwt`, `-put`).
- 0 specifies cache-only search. Usually, if the required file is not found in the cache, V_TE_X will attempt to find it on disk anyway. With this modifier, V_TE_X will not spend time looking for the files on disk. This

modifier is used with both `-pu` and `-pr`. The additional time savings from the use of this switch come mostly from non-searching for `.vf` files (which applies only if you specified the `-ov` option).

- ☞ Using `-pu0` is recommended under normal circumstances. This is the setting in the supplied shell scripts.
- ☞ `-pr0` saves additional time over `-pr`, but may cause unexpected errors if the static cache file is out of date. For example, if you copied a new style into a directory which is on the include path, with `-pr0` it would not be seen by \TeX until you rebuild the cache. Use this switch only, if you are aware of the consequences!

2.4.3 Writing files

In case there is no absolute path specified, files written by \TeX , such as the auxiliary files for \LaTeX , are created in the directory of the main document, which may be different from the working directory. The final PDF or PostScript files are, however, written to the working directory.

- ☞ In PostScript mode, \TeX uses to create a temporary file with the name of the main document and the extension `.~~~` in the working directory, so this extension should not be used for other purposes.

3 PostScript and PDF generation

3.1 General


The \TeX document compiler supports generating PDF and PostScript files in addition to the traditional DVI files.

This has been designed to be totally transparent to use. No changes are required to your document source. All additional features, such as the hyperlinks and outline entries supported by the Portable Document Format, are supported via `\special` commands, rather than syntax changes.

The PDF and PostScript backends also support *most* of the \TeX extensions. This chapter explains most of the PDF/PS mode specifics. Omitted are the more interesting parts, which are explained in separate manuals:

- ▷ \GEX , the integrated PostScript→PDF compiler, see [gex.pdf](#).
- ▷ Form and JavaScript support, see [forms.pdf](#).

Most features shown in the latter document require Acrobat 4 or better!

-  The PDF-specific features explained later in this chapter, such as hyperlinks or the PDF outline, are disabled in PostScript mode, unless \TeX has been called with the `k` subswitch – see below. The related `\specials` or use of the `hyperref` macro package have no effect. *With* the `k` option, `pdfmark` commands are generated. This is useful, if you intend to post-process the document with a PS→PDF distiller. The shell scripts for running \TeX in PostScript mode do *not* enable `pdfmark` generation by default.

3.2 Command-line options

To create a `.pdf` file, you should supply the `-$p` option to the \TeX document compiler. For example (OS/2)

```
vtex [options] -$p[(subswitches] @format file[.tex]
```

or (Linux)

```
vtexlnx [options] -\ $p[{subswitches] @format file[.tex]
```

The counterpart for the PS mode is the `-$s` option with the same syntax.

Under most Unix shells you will need to precede the `$` with the `\` escape, as shown above. Alternatively, you can use `@` instead of `\$`. Furthermore, some shells are unhappy about `(` as well; you may use `{` instead, as indicated.

The *subswitches* part includes the options (switches) that are specific for the PS and PDF mode. Note that this part must not contain embedded spaces; all options are separated by commas. The mode-specific switches are:

- c `c=<number>` specifies the compression level (0 through 9). This option affects only Flate-compressed parts of the document. Higher number indicates stronger compression (meaning: smaller .pdf file and slower compilation).
- d `d` specifies to end lines in .pdf files with the DOS [CR][LF] sequence, rather than the default [CR].
- f `f=<output spec>` specifies how fonts should be embedded into the document.
- g `g=<output spec>` specifies how graphic images should be embedded into the document.
- h `h=<dimen>` specifies the document MediaBox or BoundingBox height.
- j “join” fonts: When a Type 1 or TrueType font is used both in unmodified and modified (e.g., slanted) form, it will be embedded only once, thus saving space. However, additional code is required for switching between the two variants then. In long documents, this may occur very often, so that they may become actually longer.
- r `r=<number>` specifies the build resolution for .if4 fonts. `r=*` embeds them as Type 3 outlines.
- k enables generation of pdfmark commands (PostScript mode only).
- t `t=<output spec>` specifies how text should be embedded into the document.
- v makes V_TE_X embed a font one time only, even if it is used with multiple encodings.
- w `w=<dimen>` specifies the document MediaBox or BoundingBox width.
- z forces emission of an empty AcroForm record (PDF mode only). As a result, the Acrobat Reader 4 on Linux can reload the PDF file without having to unload it first. (On OS/2 or Windows the z switch is useless.) The switch is intended to be used *only* during the development of your document, not for the final version. Final versions of PDF files intended to be distributed should be recompiled without the z switch. Files that are compiled with the z switch and also use JavaScript may exhibit problems with some versions of Acrobat 5 on Windows.
- ! Do not load the “base” Type 1 fonts into G_EX unless they are actually required, thus speeding up G_EX.
- `_<char>` replaces underscores in internally generated font names with the indicated character, for compatibility with Acrobat Reader 3; this is currently relevant in conjunction with MM fonts only. The `vlatex` and `vplain` shell scripts on OS/2 include “_@”.

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The `<output spec>` may include these letters:

- a ASCII85 output
- h Hex output
- b Binary output (default)

- c CFF conversion of Type 1 fonts (with `f=` key only), see section 3.4.
- n No compression of the output (default)
- f Flate compression of the output

In the case of the conflicting options (for example, `n` and `f`), the last specification is taken. Thus, `f=nb` is the same `f=b`. The default options do not need to be specified.

The following specifications are particularly useful:

- ▷ `f=a, g=a, t=b` : when used in PDF mode, this will create an ASCII-editable .pdf file. Note that `t=b` is not a misprint: the text portion of the generated .pdf file always contains only printable characters and does not need to be further encoded. Note further, that here “ASCII-editable” .pdf files means that such files *usually* can be loaded into a text editor, changed in a minor way, saved, and then loaded into the Acrobat, which should be able to repair them. *usually* does not mean *always*, of course. Naturally, to make manual corrections to the .pdf format you should know the format.
- ▷ `f=cf, g=f, t=f`: this will create the smallest .pdf file.

Use of Flate compression in the PS mode is supported, but should be restricted to the cases when the PostScript output is to be processed by a Level III processor. These include Ghostscript, Acrobat Distiller 4 and above, but not the majority of the printers.

3.3 Font usage in PDF and PostScript documents

VT_EX-built PDF and PostScript files currently support these font formats:

Type 1 This is the recommended format.

IF4 VT_EX native fonts; currently not supplied with VT_EX/Free.

TrueType In general, we strongly recommend *not using* TTFs. Some reasons for this are:

- ▷ Type 1 fonts almost always deliver higher quality.
- ▷ Currently, VT_EX/Free cannot reencode TrueType fonts.
- ▷ TrueType fonts cannot be used in/with G_EX.
- ▷ TrueType fonts often cause problems with cross-platform usage.

OpenType For the time being, use of OpenType fonts with VT_EX is very much theory, because there are no tools to create the required T_EX metrics for these fonts. Furthermore, they can be used with PDF mode only, and cannot be loaded into G_EX. The latter restriction means practically, that in-line PostScript code such as PS-Tricks cannot make use of OTFs.

PDF mode, but not the PS mode, also supports CID fonts (used in CJK).

☞ VT_EX/Free does *not* support the METAFONT format.

To avoid generating bad output files, VT_EX checks for the presence of an acceptable font file whenever the font is referenced in the document. Further,

before starting the compilation of a document, \TeX ensures that all fonts referenced in the format file correspond to valid (i.e., in a supported file type) fonts. If a valid font is not available, \TeX will generate an error and substitute the `nullfont`. Note that this behavior may produce documents that are formatted differently as `.dvi` and as `.pdf`.

At the time of the font availability check \TeX also decides which format and font file to use. The check is done as follows:

- ▷ If the font is listed in one of the the font mapping files, it will be used. Otherwise,
- ▷ if the font file with extension `.if4` is present in the `VTEX\IF4` subdirectory, it will be used. (In practice, this is irrelevant for \TeX /Free.)

3.4 CFF conversion

One of the major enhancements in version 7.3 is the ability of the \TeX compiler to convert Type 1 fonts to the new CFF format. The Compact Font Format is much more efficient than Type 1; it cuts down the size of the font files by a factor of 2 or more. Since in typical \TeX documents the fonts contribute most to the size of the `.pdf` output, such documents, when recompiled with CFF compression enabled, often would become much smaller.

The operation of the CFF converter is transparent to the end-user; the CFF converter is enabled with the `-$p(f=c` command-line key, or, for the most possible compression, with `-$p(f=cf`: this will perform Flate compression on top of the CFF conversion. and is the default setting in the shell scripts `latex` and `plain`.

CFF conversion can be performed in either PDF or PS modes; however, while in the PDF mode, the PDF readers (both Adobe Reader and Ghostscript) understand embedded CFF fonts, in the PS mode, Ghostscript is the only application which is able to process `.ps` files with embedded CFF fonts. Adobe applications are mostly unable, even if it was Adobe that invented the CFF format and published the specs for CFF embedding into the `.ps` files. CFF embedding in the PS mode generally should be avoided; however, the `-$s(f=c` switch is available for special-purpose processing.

3.5 MediaBox and BoundingBox

The default MediaBox in the PDF file generated by \TeX (or the BoundingBox in a PostScript file, resp.) is based on the settings of `\hsize` and `\vsize`. The result does not always make sense, so you can override it by using the command line options `w` and `h` (see section 3.2) or from within the document and with higher priority through the non-standard `dimen's` `\mediawidth` and `\mediaheight`. This has the advantage that the settings are stored with the document.

An improved strategy to determine the media size is applied, when the \TeX format file of the \TeX /Free distribution is used: At `\begin{document}`,

VT_EX sets the media size to `\paperwidth × \paperheight`. However, if the length `\stockwidth` has been defined, VT_EX sets the media size to `\stockwidth × \stockheight` instead. (The lengths `\paperwidth` and `\paperheight` are to reflect the logical page size, whereas `\stockwidth` and `\stockheight` may indicate a different physical media size.) L^AT_EX document classes are, unfortunately, not required to define `\paperwidth` and `\paperheight`, so the shell scripts `latex` and `latexmk` specify a fallback of A4 on the command line, using the `w` and `h` options

8.44 The shell scripts for Plain T_EX, too, use the `w` and `h` options to set the MediaBox to A4 size, which you can still override using `\mediawidth` and `\mediaheight`.

To summarize this, the MediaBox or BoundingBox is determined, in descending order of precedence, by

1. `\mediawidth` and `\mediaheight`,
2. `\stockwidth` and `\stockheight` (with L^AT_EX only),
3. `\paperwidth` and `\paperheight` (with L^AT_EX only),
4. the command line options `w` and `h`,
5. `\hsize` and `\vsize`.

3.6 Links

One of the advantages of `.pdf` files is the ability to produce hyperlinks. On the low level, this is accomplished by VT_EX `\special` commands:

`!aref...` Start a hyperlink

`!endaref` End a hyperlink. This `\special` has no arguments.

`!aname` Define a target.

Both `\special{!aref...}` and `\special{!aname...}` have additional arguments. The most important one is the label specification which should be the first and has one of three formats:

`*<Number>` This denotes a local (non-exportable) label.

`Name` This denotes a global (exportable) label. `Name` generally should contain only alphanumeric characters. Name resolution is case-sensitive.

`!<Number>` This denotes a page number label.

Note that global labels are accessible from other `.pdf` documents while local labels are not; on the other hand, local labels result in somewhat smaller document files. Note also VT_EX always generates a label `PageNNN` on each document page, which can be used for external references.

Example of a simple hyperlink follows:

```
See \special{!aref Gnues}Gnues\special{!endaref}
for more details. ...
\special{!aname Gnues}\section{Gnues}
```

To produce a link to another `.pdf` file, use the global (or page) label format and precede the name with `<filename>` specification. For example:

```
See documentation on
\special{!aref <f=pdfspec.pdf>!8}pdf\special{!endaref}
    %% Refer file pdfspec.pdf, Page 8.
file format for more details.
```

Note that if you do not provide the target file for an external link given in this form you will a warning

```
Invalid file specification object.
```

from the Adobe Reader. This error does not mean a structural problem in the .pdf file, but merely an absence of the target file.

The appearance of the link itself can be controlled in two ways:

- ▷ Via \TeX itself, you can, for example, underline the link, or color it, or produce a colorbox over the link.
- ▷ Via .pdf syntax you can specify the attributes of the link. The attribute specification can appear in the `!aref` command after a semicolon and `a=`; everything that follows `a=` through the end of the special is passed over to the Adobe Reader as the link attribute. For example,

```
\special{!aref Name;a=</Border [0 0 0]>}
```

will produce a link without the default border. Specifying

```
\special{c"FF0000}\special{!aref Name;a=</Border [0 0 0]>}
```

```
.....
```

```
\special{!endaref}\special{c"000000}
```

will produce red-colored links without border. For more details on link attributes, see the PDF documentation, as published by Adobe.

The `\special{!aref}` and `\special{!endaref}` commands should come in pairs: for each `\special{!aref}` there should be a matching `\special{!endaref}`. Furthermore, a matching pair should be given on *the same \TeX nesting level*. For example,

```
...
\smallskip
\special{!aref Label}See section 5
\special{!endaref}
for more details.
...
```

is incorrect and will cause a backend error, since `\special{!aref}` appears in the vertical mode, while `\special{!endaref}` appears in the horizontal. One way to avoid (or minimize) such nesting errors is to always place `\leavevmode` before a `\special{!aref}`; the other is to place everything (`\special{!aref}`, `\special{!endaref}` and the text between them) into an `\hbox`.

In the PS mode, hyperlinks (as well as the outline entries, described in the next section, are emitted as `pdfmarks`. `pdfmarks` are ignored by most of PostScript interpreters but processed by PS→PDF converters (Distiller, Ghostscript in `ps2pdf` mode). Emission of `pdfmarks` in \TeX 's PS mode makes sense only

if you intend to post-process the .ps output and then feed it to a PS→PDF converter.

- ☞ With L^AT_EX we recommend to generate hyperlinks through the `hyperref` package, rather than directly using the above low-level commands.

3.7 Outline

You can supplement the .pdf file with an outline. The low-level interface for this is the V_TE_X `\special{!outline}` command. The general syntax of this command is

```
\special{!outline Label;i=Id,p=Parent,s=Status,t=Text,c=rrggbb,f=#}  
where
```

- ▷ Label is as described in the previous section (local, global, or page). For local or global tags you should have a defining `\special{!aname ...}`.
- ▷ The Id (i=) is a unique integer number identifying this outline record. You must not have two outline entries with the same id.
- ▷ The Parent (p=) is the id number of the parent entry, or 0 for the topmost entry.
- ▷ The Status (s=) is the letter 'o' (open) or 'c' (closed) identifying the initial state of the outline at this node. It is used only for the non-leaf nodes of the outline (i.e., the nodes that have subchildren). Due to bugs in many version of the Adobe Reader, we strongly recommend keeping all entries closed.
- ▷ The Text (t=) is the text for the outline. Since this text is not formatted by T_EX, you should use only “normal” characters within it. For example, putting `\TeX` within the outline entry text is a very bad idea.
- ▷ The color of an outline entry can be specified with the `c=rrggbb` key. For example, to specify a red entry, use `c=FF0000`. This feature is of limited use at this time, since versions of Acrobat before 5, as well as all versions of Ghostscript ignore color specifications.
- ▷ The font style of an outline entry can be specified with the `f=#` key. The # value can be 0 (normal, default), 1 (bold), 2 (italic), or 3 (bold italic). For example, to specify a bold italic entry, use `f=3`. This feature is of limited use at this time, since versions of Acrobat before 5, as well as all versions of Ghostscript ignore style specifications.

V_TE_X version 6.12 and later processes the `\char` commands within the outline title specifications. You can use this to place accented letters into the outline entries. An example L^AT_EX file, `otlchrs.tex`, is supplied in the `texmf/doc/vtex/examples` subdirectory.

The `\char` command should be followed by a decimal, hex (with a leading “”), or an octal number (with a leading “”). Use of decimal is discouraged, since it may lead to errors due to varying size of a decimal number. Hex and octal are safe since they always require a fix number of digits (2 and 3).

- ☞ If you are a L^AT_EX user, please consider using a predefined high-level style such as the `hyperref` package by S. Rahtz, rather than programming the low-level commands.

3.8 Page transitions

The information in this section applies to the PDF mode only.

Starting with version 6.4, V_TE_X supports Adobe Reader transition effects, which can be used to spice up a pdf-coded presentation.

Transition effects are coded using the `\special{!trans ...}`. It takes the form:

```
\special{!trans +$<CODE$>$[, $<TIME$>$]+ \verb+}
```

The `<TIME>` part is optional; if present, it indicated the transition time in milliseconds. The possible transition codes are:

- ▷ W0, Wipe at 0 degree angle.
- ▷ W90, Wipe at 90 degree angle.
- ▷ W180, Wipe at 180 degree angle.
- ▷ W270, Wipe at 270 degree angle.
- ▷ D, Dissolve.
- ▷ BH, Blinds, horizontal.
- ▷ BV, Blinds, vertical.
- ▷ G0, Glitter at 0 degree angle.
- ▷ G270, Glitter at 270 degree angle.
- ▷ G315, Glitter at 315 degree angle.
- ▷ XI, Box, In.
- ▷ XO, Box, Out.
- ▷ SHI, Split, Horizontal, In.
- ▷ SVI, Split, Vertical, In.
- ▷ SH0, Split, Horizontal, Out.
- ▷ SV0, Split, Vertical, Out.

These are the only transition values supported by the Reader. An example Plain T_EX file, `trans.tex`, is supplied in the `texmf/doc/vtex/examples` subdirectory. This file shows all available transitions.

- ☞ With L^AT_EX, page transitions should be specified using the generic `hyperref` package instead of the V_TE_X-specific `\special{!trans ...}` command.

3.9 Thumbs

The information in this section applies to the PDF mode only.

Starting with version 6.5, V_TE_X supports page thumbs generation. Page thumbs are shown by the Adobe Reader when the “Thumbnails” sub-Window is open.

V_TE_X supports two `\special{...}` commands for thumbs generation:

- ▷ `\special{!thumb ...}`
- ▷ `\special{!dthumb ...}`

The first command affects only the current page; the second sets the default to be used on the rest of the document. Both `\special`'s have identical syntax and parameters.

There are also two ways the thumbs can be generated. You can specify the thumb image as an external file, or ask \TeX to generate a low-res page approximation dynamically. The first option is selected with the `f=` parameter in the `\special{...}` syntax; all the other parameters select the second option.

The valid parameters are:

- `f=` Select an image file. The image file must be a bitmapped graphics file (not `.eps`). This option is mutually exclusive with the rest.
- `w=` Define (in pixels) the width of the thumb to generate.
- `h=` Define (in pixels) the height of the thumb to generate.
- `c=` Define (hex, rrggbb) the color of the thumb.
- `b=` Define (hex, rrggbb) the background color of the thumb.

Multiple parameters are separated with a comma. Examples:

- ▷ `\special{!thumb f=pic.gif}` loads the thumb for the current page from the `pic.gif` file.
- ▷ `\special{!thumb h=110,w=85}` creates 110×85 black and white thumb for the current page.
- ▷ `\special{!dthumb h=110,w=85,c=ff0000,b=00ff00}` creates 110×85 red-on-green thumbs for all subsequent pages.

Notes:

- ▷ specifying no parameters disables thumbs either for the current page only (`\special{!thumb}`) or for all subsequent pages (`\special{!dthumb}`).
- ▷ The global default is no thumbs.
- ▷ After a `\special{!thumb...}` the thumb settings revert to those given by the preceding `\special{!dthumb...}`, or, if there were not one, to the no-thumbs default.
- ▷ Adobe Reader rescales the thumbs in all cases. Thus, only the proportion between the `w=` and `h=` settings matters; doubling the values of `w=` and `h=` will not change the thumbs appearance except for a small improvement in quality.

3.10 Annotations

The information in this section applies to the PDF mode only.

VT_EX allows to place text annotations into the PDF file. This could be quite useful if you are working on a document with a colleague: text annotations could be used as “internal notes” to be deleted later.

This note has been produced with:

```
\special{!annotate w=5cm, h=4cm, t=For exa...}
```

The parameters understood by this `\special` are:

`t=` Annotation text, should always be the last parameter.

`w=` Open annotation width (dimen).

`h=` Open annotation height (dimen).



`a=` Annotation attributes (enclose in `<...>`, see PDF reference for additional details).

For example, use `a=</C [1 0 0]>` to have the annotation appear in red, rather than the default yellow:



```
\special{!annotate a=</C [1 0 0]>,t=like this}
```

The text within annotations may contain embedded `\char` commands which are resolved as explained in section 3.7.

3.11 Non-Latin characters in Outlines and Annotations

Acrobat 4+ allows to put non-Latin characters into outlines and annotations. These characters are coded in Unicode. To simplify the task of entering such text, VT_EX 6.5+ adds a couple of new primitives:

- ▷ `\unicode` is a 256-character table which defines the Unicode values for all characters. This table behaves in a way similar to the `\catcode` or `\lccode` tables.
- ▷ `\unithex` expands tokens into Unicode double-tokens, similarly to the usual `\the` operator.

Equipped with these operators, we can easily enter non-Latin text into annotations.

Similar technique works with outlines. Notice that `\char254\char255` is the usual Unicode text prefix marker; it must be supplied to inform the Adobe Reader that the following text is indeed in Unicode.

- ☞ Unicode text in annotations/outlines will be visible only on computers that have the required system fonts. In Win95/98/NT this specifically means installing the multilingual support options of the operating system.

3.12 PDF information special

The `\special{!pdfinfo...}` command is used to set the general PDF display and information options. The tail of the command can contain one or more of the following tags:

`a=<...>` Define the Author of the document.
`t=<...>` Define the Title of the document.
`s=<...>` Define the Subject of the document.
`k=<...>` Define the Keywords of the document.
`p=<...>` Define the Page Mode of the document.

The Author, Title, Subject and Keywords fields can be viewed in the Adobe Reader by going into the **[File]/[Document Info]** selection.

The Page Mode field defines how the document should be opened by the Reader; notice that specifying illegal keys for Page Mode may lead to crashes:


`/UseOutlines` means that the document should be opened with the outline visible.

`/UseThumbs` means that the document should be opened with the thumbnails visible.

`/FullScreen` means that the document should be opened in the full screen mode.

If you need to set more than one display option, use multiple `\special's`.

In the PostScript mode this information is emitted as pdfmark's.

 With L^AT_EX, we recommend to use the generic interface provided by the `hyperref` package instead of the low-level `\special{!pdfinfo...}` command.

3.13 PDF security settings

PDF security settings can be specified on the command line as the argument of the option `-e`, i.e.,

`-esettings`

or through a `\special` command:

`\immediate\special{!security settings}`

The *settings* are a string of key-value pairs, separated by commas (not spaces):

`U=password,O=password,Pflag,Cflag,Aflag,Mflag`

The meaning of the keys is:

- U User password: the password to read (“open”) the document.
- O Owner password: the password to override all security settings or change them with Adobe Exchange. (In Acrobat terminology: “security password”)
- P Printing the document.
- C Copying of text or graphics to the clipboard.
- A Adding and changing text notes and AcroForm fields.
- M Modifying the PDF document, other than by adding or changing text notes and AcroForm fields.

with

password A string, whose length should be limited to 32 characters. If there are spaces, commas or quotes in the string, it must be enclosed in doublequotes ("). If doublequotes are used in the password, double them.

flag + or -, to allow or deny the particular action.

It is not necessary to supply all 6 keys. Notice, however, that the default value of the P, C, A, and M keys is “deny”, if unspecified.

If a security special is issued after any output has been generated, you will get a nasty error message. `\immediate` before this `\special` is therefore strongly advised, and issuing it as the first command in your document is a good idea.

Example:

```
\immediate\special{!security U="Aldous Huxley",O=Island,P+}
```

The password `Aldous_Huxley` is required to read the document; printing will be allowed. Copying to the clipboard, adding annotations, modifying the document or changing the security settings is protected by the password `Island`.

- ☞ Specifying security settings on the command line is somewhat tricky with Unix: If there are passwords enclosed in doublequotes, the entire argument of `vtexlrx` must *additionally* be enclosed in single quotes.
- ☞ With L^AT_EX we recommend using Heiko Oberdiek’s macro package `pdfcrypt`, which provides a high-level key-value interface to the security settings. It is supplied with V_TE_X/Free.

3.14 PDF Page Labels

Acrobat 4+ supports the new *Page Label* feature. Page Labels affect the way pages are numbered in Reader menus and controls; they have no effect on the “printed page” portion of the document.

Page labels are useful if you are creating online documentation which uses a page sequence other than the default 1,2,3...; for example, if some pages are numbered with roman numerals, and some with arabic digits. To have the Reader number the pages the same way in its menus, use the `\special{!pdfpagelabels...}` command:

```
\special{!pdfpagelabels
  /Nums [ 0 << /S /r >> % From page 0, roman (/r)
        3 << /S /D >> % From page 3, arabic digits (/D)
  ]
}
```

Notice that unlike most other `\special`’s in V_TE_X, here the syntax is taken from the PDF 1.3 specifications verbatim. The five numbering styles supported by PDF 1.3 are

```
/r  lower case roman numbers
/R  upper case roman numbers
/d  digits
```

/a lower case latin letters
/A upper case latin letters


Two additional optional keys that can be used within the page label specifications are the prefix (/P, to be followed by a string), and starting value for the range (/St, to be followed by an integer, default 1). The prefix specifies additional text to be appended to the left of the labels; the numbering starts with the starting value. For example:

```
\special{!pdfpagelabels
  /Nums [ 0 << /S /D /P (Intro-) >>
        5 << /S /D /St 6>>
        200 << /S /D /P (App-) /St 201 >>
  ]
}
```

Here, all the numbering is done with digits, but the Introduction and the Appendix pages are marked so.

The `\special{!pdfpagelabels...}` command may appear anywhere in the document; if more than one is specified, the last specification is used. \TeX does not check the validity of the arguments.

This `special` has no effect on previewing under Acrobat 3 or Ghostscript.

 If you are using \LaTeX , the task of constructing the Page Labels specifications can be given to `hyperref`; with other formats, you need to build the specification manually.

3.15 Bitmapped graphics inclusion

Bitmapped graphics inclusion should be done through the macro package `graphicx`; see the document `texmf/doc/latex/graphics/grfguide.pdf` for a general description of the package. This section explains, which graphics file formats are supported, how \TeX processes bitmapped files in the PDF and PS modes, and additional `\includegraphics` keys that can be of use in fine-tuning the performance. Further facilities for brightness, contrast and colorspace adjustment, as well as for image downsampling, are described in the [\$\text{\TeX}\$ documentation](#).

3.15.1 Supported graphics formats

The \TeX /Free compiler features all of the bitmapped graphics filters also found in the Windows version: **BMP** (Windows BMP), **GIF**, **JPEG**, **PCX**, **PNG**, **TARGA** and **TIFF** images can all be included directly. As to JPEG, more modern types (progressive) will be included correctly, but Acrobat Reader 3 will not be able to show them right (gray rectangle only); Reader 4+ *will* show them.

When generating PDF output, one can also include **AVI** movies. Notice that the Adobe Reader does not include a movie player and relies on an external tool. On Unix and OS/2 rendering of `.avi` movies in PDF documents is probably not (yet) supported at all.

3.15.2 Image size

The physical size of bitmapped graphics on the printed page can be specified in two ways:

- ▷ The desired height and/or width can be specified through the `height=` and `width=` keywords of the `\includegraphics` command. Upon rendering to an output device, the original bitmap will be scaled to these dimensions.
- ▷ Use the keyword `atres=resolution`. \TeX will then determine the physical dimensions of the image from its size in pixels and the indicated resolution in dpi. When printed at this very resolution, the bitmap needs not to be scaled; when the resolution of the output device is different, the bitmap will be scaled appropriately.

3.15.3 Compression and fine-tuning

Few ground rules to start with:

1. \TeX supplies two distinct techniques for loading the bitmapped files: direct processing and loading into the integrated PostScript interpreter, \GEX . In many cases the results are identical, but there are several differences, explained below. The default behavior is to process the pictures directly: this is always faster. However, there are some advantages in going through \GEX : for example, you can post-process the images with the \GEX imaging plugins (see the [\$\text{\GEX}\$ documentation](#)).

To load a bitmapped image for \GEX inclusion processing, use the `viagex` key for the `\includegraphics` command.

2. The default processing logic for the direct picture inclusion is to try to preserve the structure of the image as it comes from the original file. For JPEG images, it means graphics inclusion of DCT-compressed data, exactly as it was stored in the source file; for other images it means copying the color space as specified in the original file. Assuming that the original file was optimally built, this logic produces optimal image in the PDF file as well as minimizes the operations on the image.

Use the `repackjpeg` key for the `\includegraphics` command to force a JPEG image to be DCT-decompressed.

3. In order to force minimal size of directly included images, you can make \TeX apply CCITT or DCT compressions. For monochrome images, CCITT often produces much more compact results than the default Flate compression. For the color images, especially the photographs, DCT often improves on Flate, *even when DCT is lossless*. Note that CCITT and DCT compression are *not* controlled by the command line option `-$p(g=f`.

The related keys for the `\includegraphics` command are `ccitt` and `dct`.

4. CCITT compression applies to monochrome images only, including imagemasks, and has no effect on color images. It may produce worse

results on some pictures which are drawn rather than scanned (specifically, if they contain gray areas emulated with bit patterns).

5. The DCT compression by default is lossless; but often you do not mind losing some data, if this does not result in clear loss of quality and reduces the PDF size. The `dctquality=###` key for the `\includegraphics` command specifies the quality loss you are willing to sustain; with the default value of 0, there is no loss, the largest allowed value is 1000000 (loss of most of the data).
6. When using G_EX (keyword `viagex`), the default processing logic for the graphics inclusion is to fully unpack the image. This means applying DCT-decompression to the JPEG files as well as de-indexing indexed graphics files. The rationale is to make the image data easily accessible to the imaging plugins; the drawback is that in many cases this will cause larger output.

You can force the image data to be re-indexed with the `reindex` key for the `\includegraphics` command.

Case study: monochrome GIF

The `herzjesu.gif` sample file is a monochrome .gif image; the original file size is 18396 bytes. This is one case when the default loading procedure will produce non-optimal results: GIF's are always built around a 256-color palette, even when only two colors (monochrome!) are needed. The default loading of this file, done with this code

```
\documentclass{article}
\pagestyle{empty}
\usepackage{graphicx}
\begin{document}
\includegraphics[width=1in]{herzjesu.gif}
\end{document}
```

will result in a 618k PDF file (uncompressed), or a 36k PDF file (flate-compressed). If the image were loaded via G_EX, with

```
\includegraphics[width=1in,viagex]{herzjesu.gif}
```

the results will be even worse: 1815k (uncompressed), or 48k (Flate-compressed). However, repacking the image, accomplished with

```
\includegraphics[width=1in,viagex,reindex]{herzjesu.gif}
```

will bring the size down to 77k (uncompressed), or 9148 bytes (flate compressed).

- ☞ Reindexing can substantially reduce the size of monochrome GIF images, or any image that has been incorrectly packed.

Case study: Photo Bitmap

The `mac400.bmp` file is a photo bitmap. The default inclusion of this image file, done with

```

\pagestyle{empty}
\documentclass{article}
\usepackage{graphicx}
\begin{document}
\includegraphics{mac400.bmp}
\end{document}

```

will result in a 402k PDF file (Flate compression). However, the use of lossless DCT compression, as in

```
\includegraphics[dct]{mac400.bmp}
```

will result in only 369k file. With

```
\includegraphics[dct,dctquality=10]{mac400.bmp}
```

the size of the file will decrease to 221k, without much quality loss. Specifying `dctquality=100` makes the size fall to 70k, with some loss for printing, but not for the screen display; at `dctquality=1000` the file size will be down to 20k (with a very visible quality degradation).

- ☞ Use of DCT compression often decreases the size of the PDF files, even when the compression is lossless. Notice that the `dct` key will have *no* effect on JPEG images which are already DCT compressed. If you would like to recompress/degrade JPEG images, use the key `repackjpeg` together with `dct` and `dctquality`.

3.15.4 Imagemasks

The `imagemask` keyword for the `\includegraphics` command applies to monochrome bitmapped images only. By default, images are not subjected to text color changes. With `imagemask` on, the images are treated as image-masks: they assume the text color.

`imagemask` has a second application besides the ability to color images: when this keyword is specified, the image becomes *transparent*; this allows to overlap text and images without the risk of the image erasing the text.

3.16 PostScript and PDF file inclusion

Both the PDF and PostScript backend fully support inclusion of (encapsulated) **PostScript** files. The file type is recognized from their extension `.ps` or `.eps`. From version 8 on, \TeX /Free can also read gzip-compressed PostScript files with the extension `.gz`, `ps.gz` or `eps.gz`.

In PDF mode, PostScript→PDF translation is performed by the GeX converter. With the PostScript backend, PostScript files can be included without using GeX: they are simply passed unchanged to the `.ps` output. *With* GeX, however, the PostScript code is reinterpreted and optimized. One of the benefits of this is the combining of the fonts and other resources that are often repeated in included PostScript files.

In PDF mode \TeX /Free can read **PDF** graphics, too. This facility requires GeX to be enabled.

You can use the L^AT_EX packages `graphicx`, `graphics`, or `epsfig` to include PostScript or PDF images. They constitute different interfaces to the same macro code; see the document `texmf/doc/latex/graphics/grfguide.pdf` for the documentation. Of the three choices, `graphicx` is the one we recommend. A further, obsolete, package `psfig` is provided for use with legacy documents and supports only PostScript graphics.

3.16.1 Page selection

Using `graphicx.sty`, a single page of a multi-page PostScript or PDF file can be selected for inclusion. Notice that this feature requires G_EX. The `\includegraphics` command provides an additional key `page=` to specify the *absolute* page number within the file. Default behavior is to include the first page only.

Pages of external PDF and PostScript document can also be inserted and rearranged using the L^AT_EX macro package `pdfpages`, version 0.3a or better. (The package is not part of the V_TE_X/Free distribution.)

3.16.2 Font handling in included PostScript graphics files

By default, G_EX will behave like a normal PostScript Level I or II interpreter and “knows” only the particular base fonts. Thus, inclusion of EPS files may cause problems, if they refer to fonts which are neither base fonts nor embedded in the EPS file: G_EX will simply replace any unknown font with Helvetica. G_EX can, however, be told to recognize *all* Type 1 fonts, which have been installed for use with V_TE_X as explained in section 2.3, by issuing of the command

```
\special{pS: 1 .autofontload}
```

☞ in your T_EX document. Notice that `.tfm` files for the raw (not reencoded) fonts must exist, even though they are normally not used by T_EX!

EPS files created by Adobe Illustrator may constitute a further problem: They may refer to the Monotype ArialMT and TimesNewRomanPSMT typefaces (base fonts of the Distiller) and include some tricky code to build ugly Type 3 equivalents, if the PostScript interpreter does not provide the fonts. Even if you install them, loading of the fonts through the above `\special` does not help, because the substitution occurs, before G_EX will have looked up the fonts in the aliasing files. Instead, load the fonts explicitly through the following commands, before processing such EPS files:

```
\special{pS: /Arial-BoldItalicMT .loadfont}
\special{pS: /Arial-BoldMT .loadfont}
\special{pS: /Arial-ItalicMT .loadfont}
\special{pS: /ArialMT .loadfont}
\special{pS: /TimesNewRomanPS-BoldItalicMT .loadfont}
\special{pS: /TimesNewRomanPS-BoldMT .loadfont}
\special{pS: /TimesNewRomanPS-ItalicMT .loadfont}
\special{pS: /TimesNewRomanPSMT .loadfont}
```


You may, of course, restrict yourself to those fonts which are actually needed. See also the sample file `tryAI.tex` in the `texmf/doc/vtex/examples` directory.

Base fonts in EPS graphics

EPS files can safely refer to PostScript base fonts such as “Times-Roman”, regardless of whether \TeX provides the original base font or any substitute (see section 2.3.3). EPS files must, however, *not* refer to the names of fonts, that are actually used as substitutes, such as “NimbusRomNo9L-Regu”; these are no longer accessible under their original names. This differs fundamentally from the behavior of `dvips`, which does not resolve references to missing base fonts in EPS graphics, whereas the base font substitutes remain explicitly accessible.

EPS files should normally not *include* any base fonts. Yet this may occur in rare cases, and it may constitute a problem, when these fonts are embedded as subsets rather than in full: When invoked with the “!” option (see section 3.2), \TeX may happen to use these incomplete fonts, rather than loading its own font files, which results later in missing characters. The only workaround is to call \TeX without the “!” subswitch then. Notice that the `latex` and `latex` shell scripts include the switch, because it speeds up \TeX , and the problem is not very likely to occur.

3.16.3 Including METAPOST output

METAPOST output files (`.mps`) are valid EPS, provided that they have been generated with the METAPOST variable `prologues` set to 2. METAPOST does *not* embed fonts; yet you need not issue the `autofontload` command as described above, since \TeX will recognize the file type `.mps` and sets `autofontload` itself.

`.mps` files generated with `prologues=0` are, however, *not* valid PostScript. (Only the `dvips` program can handle them immediately.) Particularly, these files do *not* contain valid PostScript commands to load the fonts. In case you need to include this type of file into a \TeX document and cannot re-make it using `prologues=2`, you may add some PostScript commands manually before the `\includegraphics` command(s) so as to enable proper processing. For instance, if the `.mps` file uses the fonts `cmr10`, `cmmi10` and `cmsy10`:

```
\special{pS: %
  /cmsy10 /cmsy10 def
  /cmmi10 /cmmi10 def
  /cmr10 /cmr10 def
  /fshow {exch findfont exch scalefont setfont show}bind def
}
\includegraphics{file.mps}
```

3.17 Color stack issues

T_EX color support is a later addition to T_EX; Knuth's T_EX kernel does not support color directly. As a result, the color commands do not obey either T_EX syntax grouping or T_EX boxes. In most cases, this is not a problem; but in some cases, the color may *leak* beyond what was intended, sometimes to the next page. To allow a macro designer to handle colors properly, V_TE_X now adds two more `\special{...}` commands:

```
▷ \special{G{  
▷ \special{G}}
```

The first of the commands is essentially equivalent to G_EX's `\special{pS: gsave}`; the second is `\special{pS: grestore}`. However, these commands function even when G_EX has not been enabled.

For T_EX'nically minded: in V_TE_X, G_EX's kernel is active even if G_EX interpreter has not been enabled (i.e., no `-ox` switch given). It handles commands which deal with the colors and page transformations; thus some V_TE_X specials merely call G_EX, whether it is enabled in full or not. Beside the two `\special`'s listed above, this applies to the rotation specials `\special{r(..)}` and `\special{r}..` as well as the color specials `\special{c...}`, both explained in section 5. With the `-ox` switch given, some of these commands (`\special{r}...`, for example) trigger full G_EX initialization.

4 Language extensions

This chapter very briefly summarizes a few important syntax extensions in V_TE_X. A comprehensive description can be found in the V_TE_X Language Guide, which is currently provided with the commercial Windows version only.



- ▷ `\font` command: additional tags like `slant`, `outline` and others allow to alter the font shape dynamically. Modifications such as ‘`slant`’ and ‘`aspect`’ do *not* act on *TrueType* fonts, unless V_TE_X is invoked with the `j` subswitch (see section 3.2).
- ▷ `\aliasfont` primitive allows to define an alias to the another font (the latter being possibly modified using the extended `\font` syntax). See the file `texmf/vtex/config/latex.fid`, which uses `\aliasfont` and the extended `\font` syntax extensively.
- ▷ An extension to the `\parshape` primitive allows paragraphs with “holes”. See the document `parshape.tex` for an example.
- ▷ The `\exec` and `\command` primitives provide interface to launching external programs:

The `\exec` command takes two arguments; the first is the name (and the path, if required) of an application to invoke; the second is the argument string.

`\command` takes a single argument which is passed to the `command.com` or `cmd.exe` shell. Since commands like `dir` or `pause` are not programs under Windows and OS/2 but are handled by the command processor, they must be invoked via `\command`. On Linux, however, `ls` is a program, so it can be used in `\exec{}`.

- ▷ Almost unlimited number of fonts and registers: The number of fonts and TeX registers (`\count`’s, `\dimen`’s, `\box`’es) in V_TE_X is limited by 65536 (256 in standard T_EX, 32768 in ϵ -T_EX). Thus, it is entirely legal to write `\count1000=10`. These registers are allocated “on use”. You can trace register reallocation if you set `\tracingall` to a positive value. L^AT_EX register allocation does, however, not use these extra registers, so under L^AT_EX you may still run out of registers, unless you use your own allocation scheme.
- ▷ The argument to `\addtoincludepath` is evaluated as an additional include path, which is appended to the default one. Specifying complete directory trees using “+” is allowed, like in the main configuration file.

5 Implementation of the L^AT_EX packages `color` and `graphicx`

5.1 Color support

The `color` package allows to specify the color in either the RGB space or the CMYK space. On the low level this corresponds to V_TE_X color `\special's`

- ▷ `\special{c"rrggbb}`
- ▷ `\special{c:ccmmyykk}`

All letter pairs in the syntax notation above correspond to two hex digits that define a hex number in the range of 0 through 255. Dividing this number over 255 gives the appropriate color component. For example, `\special{c"FF0000}` defines the red color. This color notation is patterned over the syntax used in HTML.

The macro that converts the `color.sty` notation of the color components to V_TE_X's notation has been contributed by David Carlisle.

5.2 Text-box scaling and Rotation

These features are implemented via the new `\special{r...}` command. This command modifies the PDF Current Transformation Matrix (CTM) in the PDF backend or its `.dvi` analog in the DVI backend. There are two forms of the command:

- ▷ Save and modify the CTM:

`\special{r(c11,c12,c21,c22,0,0)}`

This will push the original CTM matrix to the stack and multiply it with the

$$\begin{pmatrix} c11 & c12 \\ c21 & c22 \end{pmatrix}$$

- ▷ Restore the CTM:

`\special{r})}`

This will pop the previous CTM from the stack.

Notice that both the V_TE_X drivers and the `.pdf` backend assume that CTM transformations are properly nested. The Graphics state stack overflows and underflows are treated as fatal errors.

Examples:

Scaling To scale a box by the factor of 2, use

`\special{r(2,0,0,2,0,0} ... box ... \special{r)}`

Non-uniform scaling To scale the y -coordinate only by the factor of three, use

`\special{r(1,0,0,3,0,0} ... box ... \special{r)}`

Flip To flip a box along the x -axis, use

`\special{r(-1,0,0,1,0,0} ... box ... \special{r)}`

Rotation To rotate a box 30° , use

`\special{r(0.866,0.5,-0.5,0.866,0,0} ... box ... \special{r)}`

Notice here that $0.866 \approx \cos(30/180 \times \pi)$ and $0.5 = \sin(30/180 \times \pi)$.

The responsibility of allocating sufficient space for the transformed box lies with the macro package designer. This allocation is automatically handled by the `\scalebox{..}` and `\rotatebox{..}` commands of the `graphicx` package.

The current implementation will transform text and rules but not graphics images within the text box.

6 The configuration of the V_TE_X/Free distribution

6.1 The file system

6.1.1 The texmf directory tree

The directory structure of V_TE_X/Free complies basically with the “TDS” standard, see <CTAN:tds>. On Unix, the root directory of the texmf tree is

/usr/local/vtex/texmf

and on OS/2 it is

drive:\texmf

on the partition (*drive*) where you have installed V_TE_X/2.

The paths are defined in the general configuration file `vtex.ini`, which resides in `/etc` (on Linux) or in `drive:\vtex\bin` (on OS/2). For instance, the file supplied with V_TE_X/2 is:

```
[Directories]
PGMDIR=c:\vtex\bin\
INCDIR=c:\texmf\vtex\config\;c:\texmf\fonts\map\vtex\
FMTDIR=c:\vtex\fmt\
TMPDIR=c:\scratch\
TFMDIR=c:\texmf\fonts\tfm\+
VFSDIR=c:\texmf\fonts\vf\+
ENCDIR=c:\texmf\fonts\enc\dvips\
BIBDIR=c:\texmf\bibtex\bib\+
BSTDIR=c:\texmf\bibtex\bst\+
MSTDIR=c:\texmf\makeindex\+
[THIRDPARTY]
A4FIX=0
[FINCLUDE]
LATEX=*;c:\texmf\tex\latex\+;c:\texmf\tex\generic\+
PLAIN=*;c:\texmf\tex\plain\+;c:\texmf\tex\generic\+;
      c:\texmf\tex\latex\graphics\
[HugeTeX]
trie_size=120000
trie_op_size=20000
[COMPILER]
RETCODES=0,0,1,1
```

(The record for PLAIN consists actually of one single line.)

☞ Notice a few V_TE_X-specific issues:

- ▷ V_TE_X-specific configuration (macro) files reside in the particular directory `texmf/vtex/config`, which comes first in the search path. When both V_TE_X/Free and another T_EX system use the same directory tree, this directory is “hidden” from the non-V_TE_X system.

- ▷ Font mapping files (`.ali`) are searched along the same path as macros; that's why `texmf/fonts/map/vtex` is listed there.
- ▷ VTeX/Free cannot search recursively for encoding files (`.enc`). Thus, these files are not distributed over several subdirectories of `texmf/fonts/map/dvips`; instead, all encoding files reside immediately in this directory. When installing a package that was made for other TDS-compliant TeX systems such as TeTeX, you may have to move any `.enc` files appropriately.
- ▷ In contrast to other TeX systems, VTeX/Free does not use a second `texmf` tree for site-specific additions. We recommend to install additional packages into the same directory tree as the material that comes with the distribution.

6.1.2 User-specific search paths

Particularly in multi-user environments, additional user-specific search paths may be required. Basically this facility is provided by VTeX/Lnx, too: On Linux (*but not on OS/2!*) the general configuration file `vtex.ini` is searched first in the `$HOME` directory. Thus, users may provide personalized copies of `/etc/vtex.ini`, with appropriately extended search paths, in their “home” directories. Notice, however, the following restrictions:

- ▷ Search paths are limited to 255 characters.
- ▷ In order to ensure a consistent setup, VTeX/Free reads only one single, system-wide `.fm` file. Thus, additional fonts should be installed only in the default system-wide `texmf` tree.
- ▷ VTeX does *not* evaluate environment variables when processing `vtex.ini`. Environment variables such as `$HOME` cannot be used to specify the search paths there.
- ▷ Using a fast static cache (`-pr` or `-pr0`) with user-specific paths would not make much sense: If the cache is under the control of the system maintainer, it would not reflect changes made in the user-specific directories, and vice versa. This affects only the TeX compiler, but not BibTeX or MakeIndex, which do not use a cache.

6.1.3 Binaries and format files

The binary programs, shell scripts and format files of the VTeX/Free distribution are not located inside the `texmf` tree. On Linux, they reside in `/usr/local/vtex/bin` and `./format`. On OS/2, they reside in `drive:\vtex\bin`, `.\dll` and `.\format`.

6.2 Font usage

6.2.1 FM and aliasing files

The V_T_EX/Free distribution includes several shell scripts to run V_T_EX with the plain or L^AT_EX formats in PDF or PostScript mode – see section 2.1. These shell scripts specify the usage of the FM files `pdf.fm` for PDF mode and `ps.fm` for PostScript mode:

```
% file pdf.fm for VTeX/Free -- PDF mode
LOCAL-OS2 {
    TEXMF = "c:/texmf/"
}
LOCAL-LNX {
    TEXMF = "/usr/local/vtex/texmf/"
}
TYPE1 {
    tm-eu.ali
    hv-eu.ali
    pdfbase.ali
    cm.ali
    misc.ali
    micropress.ali
    cmbright.ali
    concrete.ali
}
```

`ps.fm` differs from the above `pdf.fm` only with respect to the mapping files for the base fonts – see below.

The local variable `TEXMF` *must* be defined, because the aliasing files will refer to it. `TEXMF` must always point to the root directory of the `texmf` tree. A further variable `URW` may be present in FM files from older V_T_EX versions and is no longer used. Each `.ali` file refers to a certain set of fonts:

<code>pdfbase.ali</code>	the base fonts, except Times and Helvetica
<code>tm-eu.ali</code>	Times
<code>hv-eu.ali</code>	Helvetica
<code>cm.ali</code>	Computer Modern (Latin and Greek) and related fonts
<code>misc.ali</code>	various free fonts that come with V _T _E X/Free
<code>micropress.ali</code>	MicroPress' TM-Math, HV-Math, cmex10MM
<code>cmbright.ali</code>	CM Bright
<code>concrete.ali</code>	Concrete

6.2.2 Embedding of the PostScript base fonts

In **PDF** mode, i.e., using `pdf.fm` and the above-mentioned font mapping files, all base fonts are embedded as subsets into the generated files. Actually, URW's "clones" of the PostScript base fonts are used, which are shipped with V_T_EX/Free from release 8.02 on.

With the shell scripts for **PostScript** mode, in contrast, the FM file `ps.fm` is specifying a partially different set of aliasing files which make V_T_EX *not*

embed the 35 base fonts:

<code>posbase.ali</code>	for the base fonts, except Times and Helvetica
<code>tm-x.ali</code>	for Times
<code>hv-x.ali</code>	for Helvetica

This is often appropriate for PostScript output. However, if you intend to feed the `.ps` file to Acrobat, all fonts should be embedded. In that case, use the same `.fm` file as with PDF mode, i.e., `pdf.fm` in place of `ps.fm`.

6.2.3 Additional fonts, which are prepared in \TeX /Free

Adobe Euro fonts

\TeX /Free comes with a \LaTeX macro package, the font metrics and a font mapping file for the “Adobe Euro” symbol fonts. Because of legal restrictions, you need to download the fonts from Adobe’s ftp server; they are *not* distributed in conjunction with \TeX . The fonts are available for free, and installing them is highly recommended.

Download the file

`ftp://ftp.adobe.com/pub/adobe/type/win/all/eurofont.exe`

or

`ftp://ftp-pac.adobe.com/pub/adobe/type/win/all/eurofont.exe.`

This is a self-extracting archive for DOS/Win, which can also be unpacked using *unzip*. Copy all files of type `.pfb` from the subdirectory `eurofont` of the archive to the directory `texmf/fonts/type1/adobe/eurofont` of your \TeX system, and rename them to “standard” file names:

Adobe file name: standard file name:

<code>_1_____PFB</code>	<code>zpeurs.pfb</code>
<code>_1B_____PFB</code>	<code>zpeubs.pfb</code>
<code>_1I_____PFB</code>	<code>zpeuris.pfb</code>
<code>_1BI_____PFB</code>	<code>zpeubis.pfb</code>
<code>_2_____PFB</code>	<code>zpeurt.pfb</code>
<code>_2B_____PFB</code>	<code>zpeubt.pfb</code>
<code>_2I_____PFB</code>	<code>zpeurit.pfb</code>
<code>_2BI_____PFB</code>	<code>zpeubit.pfb</code>
<code>_3_____PFB</code>	<code>zpeur.pfb</code>
<code>_3B_____PFB</code>	<code>zpeub.pfb</code>
<code>_3I_____PFB</code>	<code>zpeuri.pfb</code>
<code>_3BI_____PFB</code>	<code>zpeubi.pfb</code>


Use of the fonts is described in the document `texmf/doc/latex/eurosans/README.eurosans`.

Adobe Helvetica

While most of URW’s clones of the PostScript base fonts are perfectly equivalent to Adobe’s originals, Nimbus Sans appears to have a few deficiencies

regarding the hinting. Thus, we recommend to install the original Helvetica fonts, if you can provide them. The following font files are required:

FontName:	Adobe file name:	standard file name:
Helvetica	HV_____.PFB	phvr8a.pfb
Helvetica-Bold	HVB_____.PFB	phvb8a.pfb
Helvetica-Oblique	HVO_____.PFB	phvro8a.pfb
Helvetica-BoldOblique	HVBO_____.PFB	phvbo8a.pfb

 Make sure to install version 1.006 of the Helvetica fonts; newer ones are different from the “classical” base fonts! These fonts are still available, for instance, as part of Acrobat 3. (Thus, most users of V_TE_X on OS/2 should have these fonts available.) Copy the font files to the directory `texmf/fonts/type1/adobe/helvetica` and rename them to the “standard” names given above. Then edit the configuration file `texmf/vtex/config/pdf.fm`: In the TYPE1 section replace `hv-eu.ali` with `hv-eak.ali`.

Monotype Arial and TimesNewRoman

Certain applications use the font families Monotype ArialMT and TimesNewRomanPSMT as a replacement for the Helvetica and Times typefaces. V_TE_X’s built-in PostScript interpreter may need those Monotype fonts in order to process EPS graphics, which rely on the fonts but do not include them; see section 3.16.2. This applies particularly to EPS graphics created by Adobe Illustrator.

Assuming you have the 8 needed fonts (they are part of the Adobe Reader distributions or can be ordered separately from Adobe), just copy or link the following Type 1 font files to the directory `texmf/fonts/type1/monotype/acrobat` of your V_TE_X system:

```
_abi____.pfb
_ab____.pfb
_ai____.pfb
_a____.pfb
_ebi____.pfb
_eb____.pfb
_ei____.pfb
_er____.pfb
```

Not installing the fonts will not cause any problems, unless you actually encounter a graphics file that needs them.

MicroPress CM-Bright, Concrete, TM-Math, HV-Math

V_TE_X/Free already includes the metric, macro and font mapping files for the popular Concrete, CM-Bright, TM-Math and HV-Math typefaces. The required Type 1 font files (`.pfb`) are, however, *not* part of the distribution; they can be purchased from MicroPress Inc <<http://www.micropress-inc.com/fonts>>. Note that you need the “non-V_TE_X” versions of the particular distributions, since the variants for “V_TE_X users” are packaged for use with V_TE_X for Windows only!

Having purchased these fonts, all you need to do is to copy the .pfb font files into the following directories:


CM-Bright	texmf/fonts/type/micropress/cmbright
Concrete	texmf/fonts/type/micropress/concrete
TM-Math	texmf/fonts/type/micropress/tmmath
HV-Math	texmf/fonts/type/micropress/hvmath

8.44 By default, the text fonts of the HV-Math and TM-Math collections (MPTM and MPHV) are treated as fonts of their own. i.e., they are *not* used as substitutes for Times and Helvetica. As a result, you may install them also as system fonts, and use them explicitly in other applications, for instance to create EPS graphics:

Font family: PostScript FontNames:

MPTM	MPTM, MPTM-Bold, MPTM-BoldItalic, MPTM-Italic
MPHV	MPHV, MPHV-Bold, MPHV-BoldItalic, MPHV-Italic

If you are not satisfied with the quality of URW Nimbus Sans as a Helvetica substitute and cannot provide the “real” Helvetica fonts, either, you may consider to configure VTeX so that the MPHV fonts are used as the Helvetica substitute: Edit the file `texmf/vtex/config/pdf.fm` and replace (in the TYPE1 section) `hv-eu.ali` with `hv-em.ali`.

 Notice, however, that you will no longer be able to use MPHV as fonts of their own, if you install them as Helvetica substitutes; see section 3.16.2.

Further MicroPress font collections

8.44 VTeX/Free includes the required font mapping files for a number of further font sets, which are available from MicroPress Inc.:

Typeface:	file name:
BA-Math	bam-em.ali
CH-Math	chm-eb.ali
Informal-Math	ifl-em.ali
PA-Math	pam-em.ali

Install the particular set by following the supplied instructions; then add an entry for the related mapping file to the TYPE1 section of the configuration files `texmf/vtex/config/pdf.fm` and `./ps.fm`; for instance

```
TYPE1 {  
    ...  
    bam-em.ali  
}
```

for BA-Math.

Notice that the mapping file `pam-em.ali` does *not* install the PA-Text fonts as Palatino (base font) substitutes; this has the advantage that the PA-Text fonts can be used as fonts of their own, for instance in EPS graphics.

Adobe Multiple Master fonts

Basic support for Adobe's MM fonts is provided. The document [mm_man.pdf](#) explains how to install and use them.

Add an entry for the additional font mapping file `mm.ali` to the TYPE1 section of the configuration file `texmf/vtex/config/pdf.fm`, if you want to make use of these fonts. On OS/2, it is also recommended to add the PDF-specific subswitch `_@` (see section 3.2) to the command line; otherwise the generated PDF files cannot be rendered in AR 3.

7 Support

The NTG hosts a mailing list which can be used both to ask questions and to report bugs in the software and/or installation. New versions of V_TE_X/Free will also be announced there. The list has a web interface for subscribing, unsubscribing, accessing the archives etc:

<http://ref.ntg.nl/mailman/listinfo/ntg-vtex>

If you are using the software, being on the maillist is a very good idea. This is the way to be informed about the newest features, about problems others encountered (and how they were solved), it is also the way to voice your opinion about our development and have it count.

Your feedback is very valuable to us. We have spent a plenty of efforts in making this software and the distribution and we need your feedback to know how to make it yet better. If you encounter a bug, or a inconsistency in the documentation, or if you see a way to make things work smoother, please share it with us on the maillist.

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