READ ME FIRST!

LAMS-TeX
INSTALLATION
MANUAL

The TeXplorators Corporation

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Abstract. This installation manual explains how to install LAMS-TeX on MS-DOS machines or on the Macintosh.

This manual was itself produced with the `paper` style. Appendix A explains how to use LAMS-TeX, together with some of the text files supplied, to reproduce this manual.

1. Introduction

The main Manual for LAMS-TeX is *LAMS-TeX, The Synthesis*, together with the LAMS-TeX Version `2.0` Supplement, which notes various changes for the latest version. The most important changes are covered in sections 2.1, 4.1, 4.2, 5.1, and 5.2 of the Supplement. Chapters 9 and 10 of the Supplement explain about the `paper` and `book` style (mentioned below), and Chapter 13 explains about partitioned matrices, a new feature of LAMS-TeX.

2. Cautions, Requirements, and Prerequisites

In addition to the `.log` and `.dvi` files that TeX normally writes, LAMS-TeX also writes files with the extensions `.lax`, `.ndx`, and `.toc`. Files with the extension `.aux`, `.xdx`, and `.bbl` may also be produced.

This naturally means that you should avoid these extensions for files that you make yourself, and it also means that your operating system must allow numerous files to be open at once; in MS-DOS systems your `config.sys` file should set the values `FILES=20` and `BUFFERS=16`, or higher.

To run LAMS-TeX you will need an implementation of TeX that allows the maximum main memory size (`65534` words); it must also allow at least `3000` control

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sequence names (as well as enough room for the additional fonts that come with LAMS-TEX).

In addition to macro packages, LAMS-TEX also involves some programs. As explained below, MS-DOS or Macintosh versions are supplied, as well as the C source code, for compilation on other machines.

The LAMS-TEX Manual assumes that you already know about, and are using, TEX (the basic reference here is [1], though you might well be using a more elementary introduction); for the installation, you will also need to have at least some idea of where your implementation of TEX keeps various types of files. A little familiarity with AMS-TEX is also assumed, the official reference being [3]. You do not need to know LATEX (described in [2]), except that you won't understand the name 'LAMS-TEX' unless you know that LATEX exists also.

3. Installation

LAMS-TEX consists of several macro packages to be used along with TEX, a couple of programs to process various parts of the output, and 5 new fonts, for producing commutative diagrams (see Part II of the Manual, *LAMS-TEX, The Synthesis*).

Since different implementations of TEX keep files in different places, it is not possible to provide an installation program to place all the LAMS-TEX files in the proper place; you will have to do that yourself, although there are some aids for installing the fonts properly.

1. Macro packages.

You might want to make a special directory for the LAMS-TEX macro files, or you might want to put them in a directory where your implementation of TEX normally looks for input files.

As explained in the Manual, LAMS-TEX must always be used with AMS-TEX, and in particular, with the file `amstexl.tex`.

The files `lamstex.tex` and `lasmtbl.tex` are the main macro packages for LAMS-TEX, while `lamstex.stf`, `lamstex.stb`, and `lamstex.stt` are subsidiary files used when producing tables of contents, indexes and tables.

The file `ptmatrix.tex` is used for partitioned matrices, as mentioned above. The file `bibtex.tex` is needed when interfacing with BIBTEX (as explained in Chapter 7 of the Supplement). The file `lithl.tex` has a very specialized use, explained in Chapter 11 of the Supplement, and the files `pcompat.tex` and `acompat.tex` are also quite specialized, allowing compatibility with files originally produced with `plain` TEX, and AMS-TEX, respectively; the use of these files is described at the beginning of the files themselves.

Eleven pairs of files, `alignat.tex`, `alignat.tox`, ... , `varref.tex`, `varref.tox`, come next; their function is described in Chapter 14 of the Manual.

Next come "style files". As the Manual explains, LAMS-TEX comes with a default style, which is easy to use while you are still learning about LAMS-TEX. There are also two “generic” LAMS-TeX styles—for papers and books—which comprise the files `paper.***` and `book.***`. (Eventually, many specialized style files should also be available for LAMS-TeX.) As mentioned in the Introduction, the `paper` and `book` styles are described in Chapters 9 and 10 of the Supplement; since most features of these styles are extensions of those for the default style, you should be familiar with the default style, explained in the Manual, before trying to learn about the specialized styles.

[Both the `paper` and `book` styles use 8 point type for various constructions, and they both have the control sequence `\LamSTeX` for printing the ‘LAMS-TeX’ logo, which uses the Computer Modern symbol font `cmsy8`, normally loaded only for 8 point type. The file `lamslogo.tex` allows you to print the LAMS-TeX logo even in the default style: Type ‘`\input lamslogo`’ at the beginning of your file; this will load `cmsy8` if necessary, and then define the `\LamSTeX` control sequence.]

There is also a specialized `letter.st` for letters; to find out about it, TeX the file `letter.tex`, and print it out. (The letter uses the `\LamSTeX` logo control sequence, so you will need to have the `cmsy8` font available. If you don’t have this font, simply delete the line `\input lamslogo` from the file, and replace the occurrences of `{\LamSTeX}` with something you can print, for example, ‘`LAMSTEX`’.)

2. Programs.

The LAMS-TeX programs `index` and `dvipaste` are used to process some of LAMS-TeX’s output: `index` turns the compact index files produced by LAMS-TeX into sorted, extended, files that can then be used to actually print an index (Chapter 13 of the Manual), while `dvipaste` is needed to implement LAMS-TeX’s approach to tables (see Chapter 17). These programs should be installed in the proper place for them to work on the files that are produced by LAMS-TeX. For MS-DOS there are executable files `index.exe` and `dvipaste.exe`.

For the Macintosh version of LAMS-TeX there are `dvipaste` and `index` applications. As explained in the Manual, `dvipaste` combines `.dvi` files. If you are using TeXtures, which normally doesn’t create `.dvi` files, you will first have to use the TeXtures DVItool accessory, choosing ‘Export DVI’ to create the `.dvi` files that are going to be combined; after using `dvipaste` to create a (newly named) `.dvi` file, you will have to use the DVItool accessory again, choosing ‘Import DVI’ to convert this `.dvi` file into a TeXtures document. (Sigh.)

If you have neither an MS-DOS machine nor a Macintosh, the necessary programs can be compiled from the C source code files `dvipaste.c` and `index.c`.

3. Fonts.

Installation of LAMS-TeX’s fonts for commutative diagrams is more complicated.

3.1. The `.tfm` files. Even if you aren’t going to use commutative diagrams, you will at least need the `.tfm` files `lams1.tfm`, . . . , `lams5.tfm`, since the `lamstex.tex` macro package uses them, and you will also need the `dummy.tfm` file that is used by AMS-TeX.[1] These `.tfm` files should simply be placed wherever your implementation of TeX expects to find `.tfm` files.

For versions of TeX on the Macintosh that do not use ordinary `.tfm` and `.pk` files, there are '`lamsmetrics`' and '`lamsfonts`' suitcases for TeXTURES. Just copy these suitcases into the TeXTURES '`TeX fonts`' folder, and you will be done. The suitcases contain the necessary font metrics, as well as the fonts for printing on the LaserWriter or viewing with TeXTURES—these fonts are supplied at the standard magnification, as well as the magnifications `\magstephalf`, `\magstep1`, and `\magstep2`.

In addition, there is a '`dummy`' suitcase for the `dummy` font used in AMS-TeX, which should also be transferred to the '`TeX fonts`' folder.

3.2. The `.pk` files. Installation of `.pk` files is much more complicated, not only because every implementation of TeX seems to arrange things differently, but also because different `.pk` files are required for different printers. The `.pk` files are kept in separate directories (or folders)—`300`, `240`, `180`, and `118`—where `300` is for 300 dot/inch printers, `240` for 240 dot/inch printers, `180` for 180 dot/inch printers, and `118` for "printing" on the screen (viewing) with ArborText's `preview`.

The first thing to do is to change to the subdirectory where you want to place the standard size (unmagnified) `.pk` files. The name of this subdirectory probably ends with something like that shown in the table below:

(If you are lucky, you might have an implementation of TeX that follows a more logical arrangement, like using `\300\m1000` for the unmagnified fonts for 300 dot/inch printers, `\240\m1000` for the unmagnified fonts for 240 dot/inch printers, etc.)

Each of the directories `300`, ... , `118`, has subdirectories `0`, `h`, `1`, and `2`, where the subdirectory `0` contains the unmagnified fonts for that resolution. The five files *in subdirectory* `0` *of the appropriate directory* should be copied to the hard disk, *assuming that you are in the proper subdirectory of the hard disk.*

For MS-DOS systems, there are batch files, `300.bat`, `240.bat`, `180.bat`, and `118.bat`, to do this. *Assuming that you are in the proper subdirectory of the hard disk*, and that the diskette containing the fonts is in drive `a:`, you can simply type

(1) `a:300` for 300 dot/inch printers;

[1] This font isn't all that important, but the AMS-TeX macro file does load it; only the metrics for this font are needed, since it is used only for "syntax checking", where no output is produced.

(2) `a:240` for 240 dot/inch printers;
(3) `a:180` for 180 dot/inch printers;
(4) `a:118` for 118 dot/inch previewing.

If, for some reason, the diskette has to be placed in the `b:` drive, then in the batch files all occurrences of `a:` will have to be changed to `b:`.

The Manual was actually printed with somewhat preliminary versions of these special fonts, and at certain places in the Manual, for example, on page 139, it can be seen that different portions of horizontal arrows do not align quite properly. The arrow fonts that come with LAMS-TEX have corrected these deficiencies.

Nevertheless, at 300 dot/inch, or even lower resolution, it is inevitable that there will be some jaggedness in the arrows—which are constructed by juxtaposing smaller pieces—as in the diagram below:

$$\begin{tikzcd} A \arrow[r] \arrow[d] \arrow[dr] & B \arrow[r] \arrow[d] \arrow[dr] & C \arrow[d] \\ D \arrow[r] \arrow[ur] & E \arrow[r] \arrow[ur] & F \end{tikzcd}$$

By the way, this diagram has no inherent interest, except that it happens to use characters from all five of these fonts, so printing this manual yourself, as described in Appendix A, provides a check that the fonts have been installed correctly.

If you have a Macintosh Plus or SE, things will be even worse when you view such diagrams. Because of a QuickDraw bug in the ROM, horizontal and vertical arrows usually won't have the proper heads; however, the printed version will still be correct.

Magnified fonts. You now have all the `.pk` files necessary for printing (or previewing) unmagnified documents. But in case you want to apply magnification to some documents, all the `.pk` files are also supplied at magnifications of `\magstephalf`, `\magstep1`, and `\magstep2`.

Fonts for `\magstephalf`. To install all the `.pk` files used for magnification by `\magstephalf`, you must first change to the subdirectory where the magnified files are supposed to go. The name of this subdirectory probably ends with something like that shown in the table below

(or, more logically, with something like `\m1095`.)

Now you should copy the files in subdirectory `h` of the appropriate directory on the diskette to this directory of the hard disk. For MS-DOS systems, you can simply type

(1) `a:300-h` for 300 dot/inch printers;
(2) `a:240-h` for 240 dot/inch printers;
(3) `a:180-h` for 180 dot/inch printers;
(4) `a:118-h` for 118 dot/inch previewing.

Fonts for `\magstep1`. The `.pk` files for magnification by `\magstep1` are installed similarly, in a subdirectory whose name probably ends with something like that shown in the table below

(or, more logically, with something like `\m1200`).

In this case, you should copy the files in subdirectory `1` of the appropriate directory on the diskette to this subdirectory of the hard disk. For MS-DOS systems, you can simply type `a:300-1` or `a:240-1` or `a:180-1` or `a:118-1`.

Fonts for `\magstep2`. Finally, the `.pk` files for magnification by `\magstep2` can be installed in the same way, in a subdirectory whose name probably ends with something like that shown in the table below

(or, more logically, with something like `\m1440`).

In this case, you should copy the files in subdirectory `2` of the appropriate directory on the diskette to this subdirectory of the hard disk. For MS-DOS systems, you can simply type `a:300-2` or `a:240-2` or `a:180-2` or `a:118-2`.

4. Sources.

The final set of files are source-code for programs and fonts. In addition to the `dvipaste.c` and `index.c` source code, discussed in section 2, there are the MetaFont source files `lams1.mf`, ..., `lams5.mf`, from which these fonts can be produced at any size and resolution.

Although the `dvipaste` program was written specifically for LAMS-TEX, it can actually be used for numerous general TEX purposes, in conjunction with an extra macro package `dvipaste.tex`. The file `dvipaste.doc` describes such usage, which is further illustrated by the files `boxes1.tex`, `boxes2.tex`, and `join.tex`. (None of these files are really part of LAMS-TEX.)

Appendix A. Reproduction

The files `insttbls.tex` and `inst.tex` may be used to reproduce this manual (with the current date). This provides a good test that LAMS-TEX is safely installed, since it uses so many LAMS-TEX features, but for this very reason you might want to wait until you are more familiar with LAMS-TEX before making the attempt.

Once you're ready, here's the recipe:

(1) First TEX the file `insttbls.tex`. (If you've already made a LAMS-TEX format file, *do not* use it for this file [see page 179 of the Manual], just TEX the file directly.) This will produce a `insttbls.dvi` file that you may or may not want to print, and a file `insttbls.dat`, both needed in the sequel.

(2) Now TEX the file `inst.tex`. (If you've made a LAMS-TEX format file, you can use it for this file—the first two lines of the file will essentially be ignored.) Ignore `Warning` messages. A `inst.toc` file will be produced, along with the `inst.dvi` file (which isn't any good yet, since the Contents don't appear).

(3) Now use your text editor to remove the `%` sign before the line `\maketoc` (you wouldn't want this line there the first time, because TEX would complain that it couldn't find the `inst.toc` file), and TEX the file `inst.tex` once again. This time no `Warning` messages should appear.

(3′) The new `.dvi` file now has the Contents, but the page numbers aren't correct, because inclusion of this Contents has moved some sections to the next page. So you have to TEX the file once again.

(4) Finally, use the `dvipaste` program,

```
dvipaste inst
```

to produce a new `inst.dvi` file. (With TEXtures, you must first use the DVItool accessory to produce the `inst.dvi` and `insttbls.dvi` files, then use `dvipaste`, and then use DVItool once again to create a new TEXtures document.)

Once the ingredients are properly mixed, place in a moderate laser printer for 10–20 seconds per page, allow to cool for a few seconds, and enjoy. Makes 1 copy.

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