

# The L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub> Sources

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# File a

## ltdirchk.dtx

### 1 L<sup>A</sup>T<sub>E</sub>X System Dependent Initialisations

This file implements the semi-automatic determination of various system dependent parts of the initialisation. The actual definitions may be placed in a file **texsys.cfg**. Thus for operating systems for which the tests here do not result in acceptable settings, a ‘hand written’ **texsys.cfg** may be produced.

The macros that must be defined are:

\@currdir  
  \@currdir`<filename><space>` should expand to a form of the filename that uniquely refers to the ‘current directory’ if this is possible. (The expansion should also end with a space.) on UNIX, this is \def\@currdir{./}. For more exotic operating systems you may want to make \@currdir a macro with arguments delimited by . and/or `<space>`. If the operating system has no concept of directory structure, this macro should be defined to be empty.

\input@path  
  If the primitive \openin searches the same directories as the primitive \input, then it is possible to tell (using \ifeof) whether a file exists before trying to input it. For systems like this, \input@path should be left undefined.

If \openin does not ‘follow’ \input then \input@path must be defined to be a list of directories to search for input files. The format for each directory is as for \@currdir, normally just a prefix is required, but it may be a macro with space-delimited argument. That is, if `<dir>` is an entry in the input path, T<sub>E</sub>X will try to load the expansion of `<dir><filename><space>`

So either `<dir>` should be defined as a macro with argument delimited by space, or it should just expand to a directory name, including the final directory separator, so that it may be concatenated with the `<filename>`. This means that for UNIX-like syntax, each `<dir>` should end with a slash, /.

\input@path should expand to a list of such directories, each in a {} group.

\filename@parse  
  After a call of the form: \filename@parse{\code<filename>}, the three macros \filename@area, \filename@base, \filename@ext should be defined to be the ‘area’ (or directory), basename and extension respectively. If there was no extension specified in `<filename>`, \filename@ext should be \let to \relax (so this case may be tested with \ifundefined{\filename@ext} and, perhaps a default extension substituted).

Normally one would not need to define this macro in **texsys.cfg** as the automatic tests can supply parsers that work with UNIX and VMS and Macintosh syntax, as well as a basic parser that will cover many other cases. However some operating systems may need a ‘hand produced’ parser in which case it should be defined in this file.

The UNIX parser also works for most MSDOS T<sub>E</sub>X versions. Currently if the UNIX, VMS or Macintosh parser is not used, \filename@parse is defined to always return an empty area, and to split the argument into basename and extension at the first ‘.’ that occurs in the name. Parsers for other formats may be defined in **texsys.cfg**, in which case they will be used in preference to the default definitions.

\TeXversion  
  \@TeXversion is now set automatically by the initialisation tests in this file. You should not need to set it in **texsys.cfg**, however the following documentation is left for information. L<sup>A</sup>T<sub>E</sub>X does not set this variable exactly, the automatic tests set it to:

- 2 for any version,  $v$ ,  $v < 3.0$
- 3 for any version,  $v$ ,  $3.0 \leq v \leq 3.14$
- $\langle\text{undefined}\rangle$  otherwise.

However these values are accurate enough for L<sup>A</sup>T<sub>E</sub>X to take appropriate action for these old T<sub>E</sub>XS.

If your T<sub>E</sub>X is older than version 3.141, then you should define \@TeXversion

(using `\def`) to be the version number. If you do not do this<sup>1</sup>, L<sup>A</sup>T<sub>E</sub>X will not work around a bug in old T<sub>E</sub>X versions, and so error messages will appear in a very strange format, with `^J` appearing instead of line breaks:

```
! LaTeX Error: \rubbish undefined.^J^JSee the LaTeX manual or LaTeX Companion
for explanation.^JType H <return> for immediate help.
...
1.3 \renewcommand{\rubbish}
    {}
?
```

However if you put `\def\@TeXversion{3.14}` in `texsys.cfg` the following format will be used:

```
! LaTeX Error: \rubbish undefined.

See the LaTeX manual or LaTeX Companion for explanation.
Type H <return> for immediate help.
! .
...
1.3 \renewcommand{\rubbish}
    {}
?
```

Note that this has an extra line `! .` which does not appear in error messages that use the default settings with a current version of T<sub>E</sub>X, but this should not cause any confusion we hope.

## 2 Initialisation

As this file is read at a very early stage, some definitions that are normally considered to be part of the format must be made here.

### 2.1 INITEX

```
1 <*dircheck>
2 <*initex>
3 <initex>\ifnum\catcode`\\=1
4 <initex> \errmessage
5 <initex> {LaTeX must be made using an initex with no format preloaded}
6 <initex>\fi
7 \catcode`\\=1
8 \catcode`\\=2
9 \catcode`\\=6
10 \catcode`\\=7
11 \chardef\active=13
12 \catcode`\\=11
13 \countdef\count@=255
14 \let\bgroup={ \let\egroup=}
15 \ifx\@@input\@undefined\let\@@input\input\fi
16 \ifx\@@end\@undefined\let\@@end\end\fi
17 \chardef\@inputchecko
18 \chardef\sixt@@n=16
19 \newlinechar`\\^J
20 \def\typeout{\immediate\write17}
21 \def\dospecials{\do\ \do\\\do{\{}\\do{\}}\\do\$\\do\&%
22   \\do#\\\do\~\\do\_\\do%\\\do\~}
23 \def\@makeother#1{\catcode`#1=12\relax}
```

---

<sup>1</sup>Actually if your T<sub>E</sub>X is really old, version 2, L<sup>A</sup>T<sub>E</sub>X can detect this, and sets `\@TeXversion` to 2 if it is not set in the `cfg` file.

```

24 \def\space{ }
25 \def\@tempswafalse{\let\if@tempswa\iffalse}
26 \def\@tempswatrue{\let\if@tempswa\iftrue}
27 \let\if@tempswa\iffalse
28 \def\loop#1\repeat{\def\iterate{\#1\relax\expandafter\iterate\fi}%
29   \iterate \let\iterate\relax}
30 \let\repeat\fi
31 </initex>

```

## 2.2 Some bits of 2e

```

32 <*2ekernel>
33 \def\two@digits#1{\ifnum#1<10 0\fi\number#1}
34 \long\def\@firstoftwo#1#2{#1}
35 \long\def\@secondoftwo#1#2{#2}

```

This is a special version of \ProvidesFile for initex use.

```

36 \def\ProvidesFile#1{%
37   \begingroup
38     \catcode`\ 10 %
39     \ifnum \endlinechar<256 %
40       \ifnum \endlinechar>\m@ne
41         \catcode\endlinechar 10 %
42       \fi
43     \fi
44     \@makeother\%
45     \@ifnextchar[{\@providesfile{#1}}{\@providesfile{#1}[]}}
46 \def\@providesfile#1[#2]{%
47   \wlog{File: #1 #2}%
48   \@addtolist{#2}%
49   \endgroup
50 \long\def\@addtolist#1{%
51 \def\@empty{}%
52 \catcode`\%=12
53 \def\@percentchar{}%
54 \catcode`\%=14
55 \let\@currdir\@undefined
56 \let\input\path\@undefined
57 \let\filename\parse\@undefined
58 \def\strip@prefix#1>{%
59 </2ekernel>

```

## 3 texsys.cfg

As mentioned above, any site specific definitions required to describe the filename handling must be entered into a file `texsys.cfg`. If `texsys.cfg` can not be located by \openin, we write a default version out. The default version only contains comments, so we do not actually input the file in that case. The automatic tests later will, hopefully, correctly define the required macros.

The tricky code below checks to see if `texsys.cfg` exists. If it does not, all the text in this file between START and END is copied verbatim to a new file `texsys.cfg`. If `texsys.cfg` is found, then it is simply input. This is only done when this file is being used unstripped.

```

60 <*docstrip>
61 \openin15=texsys.cfg-not-found
62 \ifeof15
63 \typeout{** Writing a default texsys.cfg}
64 \immediate\openout15=texsys.cfg
65 \begingroup
66 \catcode`\^\active%

```

```

67 \let^^M\par%
68 \def\reserved@a#1^^M{%
69   \def\reserved@b{#1}%
70   \ifx\reserved@b\reserved@c\endgroup\else%
71     \immediate\write15{#1}%
72   \expandafter\reserved@a\fi}%
73 \def\reserved@d#1START^^M{\let\do\@makeother\dospecials\reserved@a}%
74 \catcode`%#12
75 \def\reserved@c{\%END}%
76 \reserved@d
START

```

### 3.1 texsys.cfg

This file contains the site specific definitions of the four macros `\@currdir`, `\input@path`, `\filename@parse` and `\@TeXversion`.

As distributed it only contains comments, however this ‘empty’ file will work on many systems because of the automatic tests built into `ltdirchk.dtx`. You are allowed to edit this file to add definitions of these macros appropriate to your system.

The macros that must be defined are:

`\@currdir` `\@currdir<filename><space>` should expand to a form of the filename that uniquely refers to the ‘current directory’ if this is possible. (The expansion should also end with a space.) on UNIX, this is `\def\@currdir{./}`. For more exotic operating systems you may want to make `\@currdir` a macro with arguments delimited by . and/or `<space>`. If the operating system has no concept of directory structure, this macro should be defined to be empty.

`\input@path` If the primitive `\openin` searches the same directories as the primitive `\input`, then it is possible to tell (using `\ifeof`) whether a file exists before trying to input it. For systems like this, `\input@path` should be left undefined.

If `\openin` does not ‘follow’ `\input` then `\input@path` must be defined to be a list of directories to search for input files. The format for each directory is as for `\@currdir`, normally just a prefix is required, but it may be a macro with space-delimited argument. That is, if `<dir>` is an entry in the input path, TeX will try to load the expansion of

`<dir><filename><space>`

So either `<dir>` should be defined as a macro with argument delimited by space, or it should just expand to a directory name, including the final directory separator, so that it may be concatenated with the `<filename>`. This means that for UNIX-like syntax, each `<dir>` should end with a slash, /. One exception to this rule is that the input path should always contain the empty directory {} as this will allow ‘full pathnames’ to be used, and the ‘current directory’ to be searched.

`\input@path` should expand to a list of such directories, each in a {} group.

`\filename@parse` After a call of the form: `\filename@parse{<filename>}`, the three macros `\filename@area`, `\filename@base`, `\filename@ext` should be defined to be the ‘area’ (or directory), basename and extension respectively. If there was no extension specified in `<filename>`, `\filename@ext` should be `\let` to `\relax` (so this case may be tested with `\@ifundefined{\filename@ext}` and, perhaps a default extension substituted).

Normally one would not need to define this macro in `texsys.cfg` as the automatic tests can supply parsers that work with UNIX and VMS syntax, as well as a basic parser that will cover many other cases. However some operating systems may need a ‘hand produced’ parser in which case it should be defined in this file.

The UNIX parser also works for most MSDOS TeX versions. Currently if the UNIX or VMS parser is not used, `\filename@parse` is defined to always return an empty area, and to split the argument into basename and extension at the first ‘.’ that occurs in the name. Parsers for other formats may be defined in `texsys.cfg`, in which case they will be used in preference to the default definitions.

```
\@TeXversion      You should not need to set this macro in texsys.cfg. LATEX tests to set this  
automatically. See the comments in the opening section of ltdirchk.dtx.
```

The following sections give examples of definitions which might work on various systems. These are currently mainly untested as I only have access to a few systems, all of which do not need this file as the automatic tests work. All the code is commented out.

### 3.2 UNIX (web2c)

This implementation does make `\openin` and `\input` look in the same places. Acceptable settings are made by `ltdirchk.dtx`, and so this file may be empty. The definitions below are therefore just for information.

```
77 \% \def\@currdir{./}  
78 \% \let\input@path\@undefined
```

### 3.3 UNIX (other)

Apparently some commercial UNIX implementations have different paths for `\openin` and `\input`. For these one could use definitions like the following (with whatever directories are used at your site): note that the directory names should end with `/`.

```
79 \% \def\@currdir{./}  
80 \% \def\input@path{  
81 \%   {/usr/local/lib/tex(inputs/distrib/}\%  
82 \%   {/usr/local/lib/tex(inputs/contrib/}\%  
83 \%   {/usr/local/lib/tex(inputs/local/}\%  
84 \% }
```

### 3.4 MSDOS (emtex)

This implementation does make `\openin` and `\input` look in the same places. Acceptable settings are made by `ltdirchk.dtx`, and so this file may be empty. The definitions below are therefore just for information.

```
85 \% \def\@currdir{./}  
86 \% \let\input@path\@undefined
```

### 3.5 MSDOS (other)

Some PC implementations have different paths for `\openin` and `\input`. For these one could use definitions like the following (with whatever directories are used at your site): note that the directory names should end with `/`. This assumes the implementation uses UNIX style `/` as the directory separator.

```
87 \% \def\@currdir{./}  
88 \% \def\input@path{  
89 \%   {c:/tex/inputs/distrib/}\%  
90 \%   {c:/tex/inputs/contrib/}\%  
91 \%   {c:/tex/inputs/local/}\%  
92 \% }
```

### 3.6 VMS (DECUS T<sub>E</sub>X, PD VMS 3.6)

This implementation does make `\openin` and `\input` look in the same places. Acceptable settings are made by `ltdirchk.dtx`, and so this file may be empty. The definitions below are therefore just for information.

```
93 \% \def\@currdir{[]}  
94 \% \let\input@path\@undefined
```

### 3.7 VMS (???)

Some VMS implementations have different paths for \openin and \input. For these one could use definitions like the following:

```
95 % \def\@currdir{[]}
96 % \def\input@path{%
97 %   {tex_inputs:}%
98 %   {SOMEDIISK:[SOME.TEX.DIRECTORY]}%
99 % }
```

### 3.8 MACINTOSH (OzTeX 1.6)

This implementation does make \openin and \input look in the same places. Acceptable settings are made by ltdirchk.dtx, and so this file may be empty. The definitions below are therefore just for information.

```
100 % \def\@currdir{:}
101 % \let\input@path\undefined
```

### 3.9 MACINTOSH (other)

Some Macintosh implementations have different paths for \openin and \input. For these one could use definitions like the following (with whatever folders are used on your machine): note that the directory names should end with :, and they should contain *no* spaces.

```
102 % \def\@currdir{:}
103 % \def\input@path{%
104 %   {Hard-Disk:Applications:TeX:TeX-inputs:}%
105 %   {Hard-Disk:Applications:TeX:My-inputs:}%
106 % }
```

### 3.10 FAKE EXAMPLE

This example is for an operating system that has filenames of the form <area>name. For maximum compatibility with macro sets, you want name.ext to be mapped to <ext>name. and <area>name.ext to be mapped to <area.ext>name. \input does this mapping automatically, but \openin does not, and does not look in the same places as \input. <>name is the desired ‘current directory’ syntax.

the following code would possibly work:

```
107 % \def\@dir#1#2 {%
108 %   \@d@r{#1}#2..\@nil}
109 % \def\@d@r#1#2.#3.#4\@nil{%
110 %   <\ifx\@dir#1\@dir\else#1\ifx\@dir#3\@dir\else.\fi\fi#3>#2 }
111 %
112 % \def\@currdir{\@dir{}}
113 % \def\input@path{%
114 %   {\@dir{area.one}}%
115 %   {\@dir{area.two}}%
116 % }
```

END

```
117 \immediate\closeout15
If texsys.cfg did exist, then input it.
118 \else
119 \typeout{** Using the existing texsys.cfg}
120 \closein15
121 \input texsys.cfg
122 \fi
123 </docstrip>
```

If the stripped version of this file is being used (in `latex2e.ltx`) then `texsys.cfg` should be there, so just input it.

```
124 <dircheck>\input texsys.cfg
```

## 4 Setting \@currdir

`\@currdir` This is a local definition of `\IfFileExists`. It tries to relocate `texsys.aux`. If it succeeds, then the `\@currdir` syntax has been determined. If all the tests fail then `\@currdir` will be set to `\@empty`, and `ltxcheck` will warn of this when it checks the format.

```
125 \begingroup
126 \count@ \time
127 \divide \count@ 60
128 \count2=-\count@
129 \multiply \count2 60
130 \advance \count2 \time
```

`\today` The current date and time stamp.

```
131 \edef \today{%
132   \the\year/\two@digits{\the\month}/\two@digits{\the\day}:
133   \two@digits{\the\count@}:\two@digits{\the\count2}}
```

Create a file `texsys.aux` (hopefully in the current directory), then try to locate it again.

```
134 \immediate\openout15=texsys.aux
135 \immediate\write15{\today^J}
136 \immediate\closeout15 %
```

#1 is the file to try, #2 is what to do on success, #3 on failure.

```
137 \def \IfFileExists#1#2#3{%
138   \openin \inputcheck#1 %
139   \ifeof \inputcheck
140     #3\relax
141   \else
142     \read \inputcheck to \reserved@a
143     \ifx \reserved@a \today
144       \typeout{#1 found}#2\relax
145     \else
146       \typeout{BAD: old file \reserved@a (should be \today)}%
147       #3\relax
148     \fi
149   \fi
150   \closein \inputcheck}
151 \endlinechar=-1
```

If `\@currdir` has not been pre-defined in `texsys.cfg` then test for UNIX, VMS and Oz-TeX-Mac. syntax.

```
152 \ifx \currdir \undefined
153   \IfFileExists{./texsys.aux}{\gdef \currdir{./}}%
154   {\IfFileExists{[]texsys.aux}{\gdef \currdir{[]}}%
155   {\IfFileExists{[:]texsys.aux}{\gdef \currdir{[]}}{}}}
```

If it is still undefined at this point, all the above tests failed. Earlier versions interactively prompted for a definition at this point, but it seems impossible to reliably obtain information from users at this point in the installation. This version of the file produces a format with no user-interaction. Later if the format is not suitable for the system, `texsys.cfg` may be edited and the format re-made.

```
156 \ifx \currdir \undefined
157   \global\let \currdir \empty
158   \typeout{^J^J}%
```

```

159      !! No syntax for the current directory could be found^^J%
160      }%
161  \fi

```

Otherwise `\@currdir` was defined in `texsys.cfg`. In this case check that the syntax specified works on this system. (In case a complete L<sup>A</sup>T<sub>E</sub>X system has been copied from one system to another.) If the test fails, give up. The installer should remove or correct the offending `texsys.cfg` and try again.

```

162 \else
163   \IfFileExists{\@currdir texsys.aux}{}{%
164     \edef\reserved@a{\errhelp{%
165       texsys.cfg specifies the current directory syntax to be^^J%
166       \meaning\@currdir^^J%
167       but this does not work on this system.^^J%
168       Remove texsys.cfg and restart.}}\reserved@a
169     \errmessage{Bad texsys.cfg file: \noexpand\@currdir}\@end}

```

The version of `\@currdir` in `texsys.cfg` looks OK.

```

170 \fi
171 \immediate\closeout15 %
172 \endgroup
173 \typeout{^^J^^J%
174           \noexpand\@currdir set to:
175           \expandafter\strip@prefix\meaning\@currdir.^^J%
176         }

```

Stop here if the file is being used unstripped.

```

177 <*docstrip>
178 \relax\endinput
179 </docstrip>

```

## 5 Setting `\input@path`

Earlier versions of this file attempted to automatically test whether `\input@path` was required, and interactively prompt for a path if necessary. This was not found to be very reliable. The first-time installer of L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  can not be expected to have enough information to supply the correct information to the prompts. Now the interaction is omitted. After the format is made the installer can attempt to run the test document `ltxcheck.tex` through L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub> . This will check, amongst other things, whether `texsys.cfg` will need to be edited and the format remade.

`\input@path` Now set up the `\input@path`.

`\input@path` should either be undefined, or a list of directories as described in the introduction.

```

180 \typeout{^^J%
181   Assuming \noexpand\openin and \noexpand\input^^J%
182   \ifx\input@path\undefined
183     \input@path has not been pre-defined.
184     have the same search path.^^J%
185   \else
186     \input@path has been defined in texsys.cfg.
187     have different search paths.^^J%
188     LaTeX will use the path specified by \noexpand\input@path:^^J%
189   \fi
190 }

```

## 6 Filename Parsing

```
\filename@parse Split a filename into its components.  
189 \ifx\filename@parse\@undefined  
190   \def\reserved@a{.}\ifx\@currdir\reserved@a  
    \filename@parse was not specified in texsys.cfg, but \@currdir looks like  
    UNIX...  
191   \typeout{^^JDefining UNIX/DOS style filename parser.^^J}  
192   \def\filename@parse#1{  
193     \let\filename@area\empty  
194     \expandafter\filename@path#1/\}  
  
      Search for the last /.  
195   \def\filename@path#1/#2\\{  
196     \ifx\\#2\\%  
197       \def\reserved@a{\filename@simple#1.\\}%  
198     \else  
199       \edef\filename@area{\filename@area#1}%  
200       \def\reserved@a{\filename@path#2\\}%  
201     \fi  
202   \reserved@a}  
203 \else\def\reserved@a{} \ifx\@currdir\reserved@a  
  \filename@parse was not specified in texsys.cfg, but \@currdir looks like  
  VMS...  
204   \typeout{^^JDefining VMS style filename parser.^^J}  
205   \def\filename@parse#1{  
206     \let\filename@area\empty  
207     \expandafter\filename@path#1]\\}  
  
      Search for the last ].  
208   \def\filename@path#1]#2\\{  
209     \ifx\\#2\\%  
210       \def\reserved@a{\filename@simple#1.\\}%  
211     \else  
212       \edef\filename@area{\filename@area#1}[%  
213       \def\reserved@a{\filename@path#2\\}%  
214     \fi  
215   \reserved@a}  
216 \else\def\reserved@a{} \ifx\@currdir\reserved@a  
  \filename@parse was not specified in texsys.cfg, but \@currdir looks like Mac-  
  intosh...  
217   \typeout{^^JDefining Mac style filename parser.^^J}  
218   \def\filename@parse#1{  
219     \let\filename@area\empty  
220     \expandafter\filename@path#1:\\}  
  
      Search for the last :.  
221   \def\filename@path#1:#2\\{  
222     \ifx\\#2\\%  
223       \def\reserved@a{\filename@simple#1.\\}%  
224     \else  
225       \edef\filename@area{\filename@area#1}:[%  
226       \def\reserved@a{\filename@path#2\\}%  
227     \fi  
228   \reserved@a}  
229 \else  
  \filename@parse was not specified in texsys.cfg. So just make a simple parser  
  that always sets \filename@area to empty.  
230   \typeout{^^JDefining generic filename parser.^^J}
```

```

231   \def\filename@parse#1{%
232     \let\filename@area\empty
233     \expandafter\filename@simple#1.\ //}
234   \fi\fi\fi

  \filename@simple is used by all three versions. Finally we can split off the
extension.

235   \def\filename@simple#1.#2\\{%
236     \ifx\\#2\\%
237       \let\filename@ext\relax
238     \else
239       \edef\filename@ext{\filename@dot#2\\}%
240     \fi
241   \edef\filename@base{#1}%

  Remove a final dot, added earlier.

242   \def\filename@dot#1.\\{#1}

243 \else

  Otherwise, \filename@parse was specified in texsys.cfg.

244   \typeout{^^J^^J%
245     \noexpand\filename@parse was defined in texsys.cfg:^^J%
246     \expandafter\strip@prefix\meaning\filename@parse.^^J%
247   }
248 \fi

```

## 7 T<sub>E</sub>X Versions

`\@TeXversion` T<sub>E</sub>X versions older than than 3.141 require `\@TeXversion` to be set. This can be determined automatically due to a trick suggested by Bernd Raichle. (Actually this will not always get the correct version number, eg T<sub>E</sub>X3.14 would be detected as T<sub>E</sub>X3, but L<sup>A</sup>T<sub>E</sub>X only needs to take account of T<sub>E</sub>X's older than 3, or between 3 and 3.14.

```

249 \ifx\@TeXversion\undefined
250   \ifx\@undefined\inputlineno
251     \def\@TeXversion{2}
252   \else
253     \catcode`\^^J=\active
254     \def\reserved@a#1#2\@{\if#1\string^3\fi}
255     \edef\reserved@a{\expandafter\reserved@a\string^J\@}
256     \ifx\reserved@a\empty\else\gdef\@TeXversion{3}\fi
257   \fi
258 \fi
259 </dircheck>

```

## 8 ltxcheck.tex

After the format has been made, and article.cls moved with the other files to the ‘standard input directory’ as specified in `install.txt`, the format may be checked by running the file `ltxcheck.tex`.

## File b

# ltplain.dtx

### 9 Plain T<sub>E</sub>X

L<sup>A</sup>T<sub>E</sub>X includes almost all of the functionality of Knuth's original 'Basic Macros'. That is, the plain T<sub>E</sub>X format described in Appendix B of the T<sub>E</sub>XBook. However, some of the user commands are not much use so, in order to save memory, we may remove them from the kernel into a package. Here is a list of the commands that may be removed (PROBABLY NOT COMPLETE).

```
\magstep    \magstephalf  
\mathhexbox  
\vglue     \vgl@  
\hglue     \hgl@
```

This file is by now very small as most of it has been moved to more appropriate kernel files: it may disappear completely one day.

L<sup>A</sup>T<sub>E</sub>X font definitions are done using NFSS2 so none of PLAIN's font definitions are in L<sup>A</sup>T<sub>E</sub>X.

L<sup>A</sup>T<sub>E</sub>X has its own tabbing environment, so PLAIN's is disabled.

L<sup>A</sup>T<sub>E</sub>X uses its own output routine, so most of the plain one was removed.

```
1 {*2ekernel | autoload}  
2 \catcode`{\=1 % left brace is begin-group character  
3 \catcode`{\}=2 % right brace is end-group character  
4 \catcode`{\$=3 % dollar sign is math shift  
5 \catcode`{\&=4 % ampersand is alignment tab  
6 \catcode`{\#=6 % hash mark is macro parameter character  
7 \catcode`{\^=7 % circumflex and uparrow are for superscripts  
8 \catcode`{\_=8 % underline and downarrow are for subscripts  
9 \catcode`{\^{\I}=10 % ascii tab is a blank space  
10 \chardef\active=13 \catcode`{\^=\active % tilde is active  
11 \catcode`{\^{\L}=\active \outer\def^{\L}{\par}% ascii form-feed is \outer\par  
12 \message{catcodes,}
```

We had to define the \catcodes right away, before the message line, since \message uses the { and } characters. When INITEX (the T<sub>E</sub>X initializer) starts up, it has defined the following \catcode values:

```
\catcode`{\^{\C}=9 % ascii null is ignored  
\catcode`{\^{\M}=5 % ascii return is end-line  
\catcode`{\^{\0}=0 % backslash is TeX escape character  
\catcode`{\%{\I}=14 % percent sign is comment character  
\catcode`{\^{\S}=10 % ascii space is blank space  
\catcode`{\^{\D}=15 % ascii delete is invalid  
\catcode`{\A=11 ... \catcode`{\Z=11 % uppercase letters  
\catcode`{\a=11 ... \catcode`{\z=11 % lowercase letters  
all others are type 12 (other)
```

Here is a list of the characters that have been specially catcoded:

```
13 \def\dospecials{\do\ \do\\ \do\\ \do{\{} \do{\}} \do\$ \do\&%  
14 \do\# \do\^ \do\_ \do\%\ do\~}
```

(not counting ascii null, tab, linefeed, formfeed, return, delete) Each symbol in the list is preceded by , which can be defined if you want to do something to every item in the list.

We make @ signs act like letters, temporarily, to avoid conflict between user names and internal control sequences of plain format.

```
15 \catcode`@=11
```

To make the plain macros more efficient in time and space, several constant values are declared here as control sequences. If they were changed, anything could happen; so they are private symbols.

```
\@one  Small constants are defined using \chardef.
\@tw@ 16 \chardef\@one=1
\@thr@ 17 \chardef\@tw@=2
\sixt@n 18 \chardef\@thr@=3
\@cclv 19 \chardef\sixt@n=16
          20 \chardef\@cclv=255

\@cclvi Constants above 255 defined using \mathchardef.
\@m 21 \mathchardef\@cclvi=256
\@M 22 \mathchardef\@m=1000
\@MM 23 \mathchardef\@M=10000
          24 \mathchardef\@MM=20000
```

#### Allocation of registers

Here are macros for the automatic allocation of `\count`, `\box`, `\dimen`, `\skip`, `\muskip`, and `\toks` registers, as well as `\read` and `\write` stream numbers, `\fam` codes, `\language` codes, and `\insert` numbers.

```
25 \message{registers,}
```

When a register is used only temporarily, it need not be allocated; grouping can be used, making the value previously in the register return after the close of the group. The main use of these macros is for registers that are defined by one macro and used by others, possibly at different nesting levels. All such registers should be defined through these macros; otherwise conflicts may occur, especially when two or more macro packages are being used at the same time.

The following counters are reserved:

0 to 9	page numbering
10	count allocation
11	dimen allocation
12	skip allocation
13	muskip allocation
14	box allocation
15	toks allocation
16	read file allocation
17	write file allocation
18	math family allocation
19	language allocation
20	insert allocation
21	the most recently allocated number
22	constant -1

New counters are allocated starting with 23, 24, etc. Other registers are allocated starting with 10. This leaves 0 through 9 for the user to play with safely, except that counts 0 to 9 are considered to be the page and subpage numbers (since they are displayed during output). In this scheme, `\count 10` always contains the number of the highest-numbered counter that has been allocated, `\count 14` the highest-numbered box, etc. Inserts are given numbers 254, 253, etc., since they require a `\count`, `\dimen`, `\skip`, and `\box` all with the same number; `\count 20` contains the lowest-numbered insert that has been allocated. Of course, `\box255` is reserved for `\output`; `\count255`, `\dimen255`, and `\skip255` can be used freely.

It is recommended that macro designers always use `\global` assignments with respect to registers numbered

1, 3, 5, 7, 9,

and always non-`\global` assignments with respect to registers

0, 2, 4, 6, 8, 255.

This will prevent “save stack buildup” that might otherwise occur.

```

26 \count10=22 % allocates \count registers 23, 24, ...
27 \count11=9 % allocates \dimen registers 10, 11, ...
28 \count12=9 % allocates \skip registers 10, 11, ...
29 \count13=9 % allocates \muskip registers 10, 11, ...
30 \count14=9 % allocates \box registers 10, 11, ...
31 \count15=9 % allocates \toks registers 10, 11, ...
32 \count16=-1 % allocates input streams 0, 1, ...
33 \count17=-1 % allocates output streams 0, 1, ...
34 \count18=3 % allocates math families 4, 5, ...
35 \count19=0 % allocates \language codes 1, 2, ...
36 \count20=255 % allocates insertions 254, 253, ...

\insc@unt The insertion counter and most recent allocation.

\allocationnumber 37 \countdef\insc@unt=20
                  38 \countdef\allocationnumber=21

\m@ne The constant -1.
      39 \countdef\m@ne=22 \m@ne=-1

\wlog Write on log file (only)
      40 \def\wlog{\immediate\write\m@ne}

\count@ Here are abbreviations for the names of scratch registers that don't need to be
\dimen@ allocated.

\dimen@i 41 \countdef\count@=255
\dimen@ii 42 \dimendef\dimen@=0
\skip@ 43 \dimendef\dimen@i=1 % global only
\toks@ 44 \dimendef\dimen@ii=2
        45 \skipdef\skip@=0
        46 \toksdef\toks@=0

\newcount Now, we define \newcount, \newbox, etc. so that you can say \newcount\foo and
\newdimen \foo will be defined (with \countdef) to be the next counter.
\newskip To find out which counter \foo is, you can look at \allocationnumber.
\newmuskip Since there's no \boxdef command, \chardef is used to define a \newbox,
\newbox, \newinsert, \newfam, and so on.
\newhelp \LATEX change: remove \outer from \newcount and \newdimen (FMi) This is
\newtoks necessary to use \newcount inside \if... later on. Also remove from \newskip,
\newbox \newwrite and \newfam (DPC) to save later redefinition.
      47 \def\newcount{\alloc@0\count\countdef\insc@unt}
      48 \def\newdimen{\alloc@1\dimen\dimendef\insc@unt}
      49 \def\newskip{\alloc@2\skip\skipdef\insc@unt}
      50 \def\newmuskip{\alloc@3\muskip\muskipdef\@cclvi}
      51 \def\newbox{\alloc@4\box\chardef\insc@unt}
      52 \def\newhelp#1#2{\newtoks#1\expandafter{\csname#2\endcsname}}
      53 \def\newtoks{\alloc@5\toks\toksdef\@cclvi}

\newread
\newwrite 54 \def\newread{\alloc@6\read\chardef\sixt@on}
          55 \def\newwrite{\alloc@7\write\chardef\sixt@on}

\LATEX defines \newfam in ltfss.dtx.

\def\newfam{\alloc@8\fam\chardef\sixt@on}

\newlanguage
      56 \def\newlanguage{\alloc@9\language\chardef\@cclvi}

```

```

\alloc@

57 \def\alloc@#1#2#3#4#5{\global\advance\count1#1\@ne
58   \ch@ck#1#4#2% make sure there's still room
59   \allocationnumber\count1#1%
60   \global#3#5\allocationnumber
61   \wlog{\string#5=\string#2\the\allocationnumber}}


\newinsert

62 \def\newinsert#1{\global\advance\insc@unt \m@ne
63   \ch@ck0\insc@unt\count
64   \ch@ck1\insc@unt\dimen
65   \ch@ck2\insc@unt\skip
66   \ch@ck4\insc@unt\box
67   \allocationnumber\insc@unt
68   \global\chardef#1\allocationnumber
69   \wlog{\string#1=\string\insert\the\allocationnumber}}


\ch@ck

70 </2ekernel | autoload>
71 <*2ekernel | autoload | autoerr>
72 \gdef\ch@ck#1#2#3{%
73   \ifnum\count1#1<#2\else
74     (!autoload)    \errmessage{No room for a new #3}%
75   (autoload)      \@autoerr\ch@ck#1#2#3%
76   \fi}
77 </2ekernel | autoload | autoerr>
78 <*2ekernel | autoload>

\maxdimen Here are some examples of allocation.

\hideskip 79 \newdimen\maxdimen \maxdimen=16383.99999pt % the largest legal <dimen>
80 \newskip\hideskip \hideskip=-1000pt plus 1fill % negative but can grow

\p@

\z@ 81 \newdimen\p@ \p@=1pt % this saves macro space and time
\z@skip 82 \newdimen\z@ \z@=0pt % can be used both for Opt and 0
\voldb@x 83 \newskip\z@skip \z@skip=0pt plus0pt minus0pt
84 \newbox\voldb@x % permanently void box register

85 \message{compatibility for TeX 2, }

If this file is used in an old TeX we define the new features of TeX 3.0 as simple
macros or counters so that files that uses these features can be processed in such
an environment (They will however produce some other results).

86 \ifx\@undefined\inputlineno
87   \newcount\inputlineno

This could be used to detect that an old TeX is in force
88 \inputlineno-1

Extra test for MLTeX 2, RmS 91/11/07.

89 \ifx\@undefined\language
90   \newcount\language
91   \fi
92 \newcount\lefthyphenmin
93 \newcount\righthyphenmin
94 \newcount\errorcontextlines
95 \newcount\holdinginserts
96 \newdimen\emergencystretch
97 \newcount\badness
98 \let\noboundary\relax
99 \newcount\setlanguage
100 \fi

```

Assign initial values to  $\text{\TeX}$ 's parameters

101 \message{parameters,}

All of  $\text{\TeX}$ 's numeric parameters are listed here, but the code is commented out if no special value needs to be set. INITEX makes all parameters zero except where noted.

```
102 \pretolerance=100
103 \tolerance=200 % INITEX sets this to 10000
104 \hbadness=1000
105 \vbadness=1000
106 \linepenalty=10
107 \hyphenpenalty=50
108 \exhyphenpenalty=50
109 \binoppenalty=700
110 \relpenalty=500
111 \clubpenalty=150
112 \widowpenalty=150
113 \displaywidowpenalty=50
114 \brokenpenalty=100
115 \predisplaypenalty=10000

\postdisplaypenalty=0
\interlinepenalty=0
\floatingpenalty=0, set during \insert
\outputpenalty=0, set before TeX enters \output

116 \doublehyphendemerits=10000
117 \finalhyphendemerits=5000
118 \adjdemerits=10000

\looseness=0, cleared by TeX after each paragraph
\pausing=0
\holdinginserts=0
\tracingonline=0
\tracingmacros=0
\tracingstats=0
\tracingparagraphs=0
\tracingpages=0
\tracingoutput=0

119 \tracinglostchars=1
\tracingcommands=0
\tracingrestores=0
\language=0

120 \uchyph=1
\lefthyphenmin=2 \righthyphenmin=3 set below
\globaldefs=0
\maxdeadcycles=25 % INITEX does this
\hangafter=1 % INITEX does this, also TeX after each paragraph
\fam=0
\mag=1000 % INITEX does this
\escapechar='\\ % INITEX does this

121 \defaulthyphenchar='-
122 \defaultskewchar=-1
\endlinechar='^^M % INITEX does this
\newlinechar=-1      \LaTeX\ sets this in ltdefns.dtx.

123 \delimiterfactor=901
```

```
\time=now % TeX does this at beginning of job
\day=now % TeX does this at beginning of job
\month=now % TeX does this at beginning of job
\year=now % TeX does this at beginning of job
```

In L<sup>A</sup>T<sub>E</sub>X we don't want box information in the transcript unless we do a full tracing.

```
124 \showboxbreadth=-1
125 \showboxdepth=-1
126 \errorcontextlines=-1

127 \hfuzz=0.1pt
128 \vfuzz=0.1pt
129 \overfullrule=5pt
130 \maxdepth=4pt
131 \splitmaxdepth=\maxdimen
132 \boxmaxdepth=\maxdimen

\lineskip=0pt, changed by \normalbaselines

133 \delimitershortfall=5pt
134 \nulldelimiterspace=1.2pt
135 \scriptspace=0.5pt

\mathsurround=0pt
\predisplaysize=0pt, set before TeX enters $$
\displaywidth=0pt, set before TeX enters $$
\displayindent=0pt, set before TeX enters $$

136 \parindent=20pt

\hangindent=0pt, zeroed by TeX after each paragraph
\hoffset=0pt
\voffset=0pt

\baselineskip=0pt, changed by \normalbaselines
\lineskip=0pt, changed by \normalbaselines

137 \parskip=0pt plus 1pt
138 \abovedisplayskip=12pt plus 3pt minus 9pt
139 \abovedisplayshortskip=0pt plus 3pt
140 \belowdisplayskip=12pt plus 3pt minus 9pt
141 \belowdisplayshortskip=7pt plus 3pt minus 4pt

\leftskip=0pt
\rightskip=0pt

142 \topskip=10pt
143 \splittopskip=10pt

\tabskip=0pt
\spaceskip=0pt
\xspaceskip=0pt

144 \parfillskip=0pt plus 1fil
```

**\normalbaselineskip** We also define special registers that function like parameters:

```
\normallineskip 145 \newskip\normalbaselineskip \normalbaselineskip=12pt
\normallineskiplimit 146 \newskip\normallineskip \normallineskip=1pt
147 \newdimen\normallineskiplimit \normallineskiplimit=0pt
```

**\interfootlinepenalty**

```
148 \newcount\interfootnotelinepenalty \interfootnotelinepenalty=100
```

Definitions for preloaded fonts

```

\magstephalf
\magstep 149 \def\magstephalf{1095 }
150 \def\magstep#1{\ifcase#1 @m\or 1200\or 1440\or 1728\or
151 2074\or 2488\fi\relax}

Macros for setting ordinary text

\frenchspacing
\nonfrenchspacing 152 \def\frenchspacing{\sfcode`.\@m \sfcode`?@m \sfcode`!\@m
153 \sfcode`:@\@m \sfcode`@;\@m \sfcode`,,\@m}
154 \def\nonfrenchspacing{\sfcode`..3000\sfcode`?3000\sfcode`!3000%
155 \sfcode`@:2000\sfcode`@;1500\sfcode`@,1250 }

\normalbaselines
156 \def\normalbaselines{\lineskip\normallineskip
157 \baselineskip\normalbaselineskip \lineskiplimit\normallineskiplimit}

\ M Save a bit of space by using \let here.
\I 158 \def\^\M{\ } % control <return> = control <space>
159 \let\^\I\^\M % same for <tab>

\lq
\rq 160 \def\lq{'}
161 \def\rq{'}

\lbrack
\rbrack 162 \def\lbrack{[]}
163 \def\rbrack{[]}

\aa These are not from plain.tex but they are similar to other commands found here
\AA and nowhere else, being alternate input forms for characters.
164 \def \aa {\r a}
165 \def \AA {\r A}

\endgraf
\endline 166 \let\endgraf=\par
167 \let\endline=\cr

\space
168 \def\space{ }

\empty This probably ought to go altogether, but let it to the LATEX version to save space.
169 \let\empty\@empty

\null
170 \def\null{\hbox{}}

\bgroup
\egroup 171 \let\bgroup={
172 \let\egroup=}

\obeylines In \obeylines, we say \let^M=\par instead of \def^M{\par} since this allows,
\obeyspaces for example, \let\par=\cr \obeylines \halign{...}
173 {\catcode`^M=\active % these lines must end with %
174 \gdef\obeylines{\catcode`^M\active \let^M\par}%
175 \global\let^M\par % this is in case ^M appears in a \write
176 \def\obeyspaces{\catcode`\ \active}%
177 {\obeyspaces\global\let =\space}

```

\loop We use Kabelschacht's method of doing loops, see TUB 8#2 (1987). (unless that  
\iterate breaks something :-). It turned out to need an extra \relax: see pr/642 (\loop  
\repeat could do one iteration too much in certain cases).

```
178 \long\def \loop #1\repeat{%
179   \def\iterate{\#1\relax % Extra \relax
180     \expandafter\iterate\fi
181   }%
182   \iterate
183   \let\iterate\relax
184 }
```

This setting of \repeat is needed to make \loop... \if... \repeat skippable  
within another \if....

```
185 \let\repeat=\fi
```

LATEX defines \smallskip, etc. in *ltspace.dtx*.

\nointerlineskip

```
\offinterlineskip 186 \def\nointerlineskip{\prevdepth-\@m\p@}
187 \def\offinterlineskip{\baselineskip-\@m\p@
188   \lineskip\z@\lineskiplimit\maxdimen}

\vglue
\hglue 189 \def\vglue{\afterassignment\vgl@{\skip@=}
190 \def\vgl@{\par \dimen@\prevdepth \hrule \height\z@
191   \nobreak\vskip\skip@ \prevdepth\dimen@}
192 \def\hglue{\afterassignment\hgl@{\skip@=}
193 \def\hgl@{\leavevmode \count@\spacefactor \vrule \width\z@
194   \nobreak\hskip\skip@ \spacefactor\count@}
```

LATEX defines ~ in *ltdefns.dtx*.

\slash

```
195 \def\slash{/ \penalty\exhyphenpenalty} % a '/' that acts like a '-'
```

\break

```
\nobreak 196 \def\break{\penalty-\@M}
\allowbreak 197 \def\nobreak{\penalty \@M}
198 \def\allowbreak{\penalty \z@}
```

\filbreak

```
\goodbreak 199 \def\filbreak{\par\vfil\penalty-200\vfilneg}
200 \def\goodbreak{\par\penalty-500 }
```

\eject Define \eject as in plain T<sub>E</sub>X but define \supereject only in the compatibility  
file.

```
201 \def\eject{\par\break}
```

\removelastskip

```
202 \def\removelastskip{\ifdim\lastskip=\z@\else\vskip-\lastskip\fi}
```

\smallbreak

```
\medbreak 203 \def\smallbreak{\par\ifdim\lastskip<\smallskipamount
\bigbreak 204   \removelastskip\penalty-50\smallskip\fi}
205 \def\medbreak{\par\ifdim\lastskip<\medskipamount
206   \removelastskip\penalty-100\medskip\fi}
207 \def\bigbreak{\par\ifdim\lastskip<\bigskipamount
208   \removelastskip\penalty-200\bigskip\fi}
```

\math

```
209 \def\math{\mathsurround\z@}
```

**\underline** Due to L<sup>A</sup>T<sub>E</sub>X's redefinition of \underline plain T<sub>E</sub>X's \underline can be done in a simpler fashion (but do we need it at all?).

```
210 \def\underline#1{\underline{\sbox\tw@{#1}\dp\tw@\z@\box\tw@}}
```

**\strutbox** L<sup>A</sup>T<sub>E</sub>X sets \strutbox in \set@fontsize.

```
\strut 211 \newbox\strutbox  
212 \def\strut{\relax\ifmmode\copy\strutbox\else\unhcopy\strutbox\fi}
```

**\hidewidth** For alignment entries that can stick out.

```
213 \def\hidewidth{\hskip\hideskip}
```

**\narrower**

```
214 \def\narrower{  
215   \advance\leftskip\parindent  
216   \advance\rightskip\parindent}
```

L<sup>A</sup>T<sub>E</sub>X defines \ae and similar commands elsewhere.

```
217 \chardef\%='%'  
218 \chardef\&='&  
219 \chardef\#= '\#
```

Most text commands are actually encoding specific and therefore defined later, so commented out or removed from this file.

**\leavevmode** begins a paragraph, if necessary

```
220 \def\leavevmode{\unhbox\voidb@x}
```

**\mathhexbox**

```
221 \def\mathhexbox#1#2#3{\mbox{$\m@th \mathchar"#1#2#3$}}
```

**\ialign**

```
222 \def\ialign{\everycr{}\tabskip\z@skip\halign} % initialized \halign
```

**\oalign**

```
\o@align 223 \def\oalign#1{\leavevmode\vtop{\baselineskip\z@skip \lineskip.25ex%  
\oalign 224 \ialign{\##\crr\#1\crr}{}}}  
225 \def\o@align{\lineskip\z@\oalign}  
226 \def\ooalign{\lineskip\z@-\maxdimen \oalign}
```

**\sh@ft** The definition of this macro in plain.tex was improved in about 1997; but as a result its usage was changed and its new definition is not appropriate for L<sup>A</sup>T<sub>E</sub>X.

Since the version given here has been in use by L<sup>A</sup>T<sub>E</sub>X for many years it does not seem prudent to remove it now. As far as we can tell it has only been used to define \b and \d but this cannot be certain.

```
227 \def\sh@ft#1{\dimen@.00#1ex\multiply\dimen@\fontdimen1\font  
228   \kern-.0156\dimen@} % compensate for slant in lowered accents
```

**\ltx@sh@ft** This is the L<sup>A</sup>T<sub>E</sub>X version of the second incarnation of the plain macro \sh@ft, which takes a dimension as its argument. It shifts a pseudo-accent horizontally by an amount proportional to the product of its argument and the slant-per-point (fontdimen 1).

```
229 \def\ltx@sh@ft #1{  
230   \dimen@ #1%  
231   \kern \strip@pt  
232   \fontdimen1\font \dimen@  
233 } % kern by #1 times the current slant
```

L<sup>A</sup>T<sub>E</sub>X change: the text commands such as \d, \b, \c, \copyright, \TeX are now defined elsewhere.

L<sup>A</sup>T<sub>E</sub>X change: Make \t work in a moving argument. Now defined elsewhere.

\hrulefill L<sup>A</sup>T<sub>E</sub>X change: \kern\z@ added to end of \hrulefill and \dotfill to make them work in ‘tabular’ and ‘array’ environments. (Change made 24 July 1987). L<sup>A</sup>T<sub>E</sub>X change: \leavevemode added at begining of \dotfill and \hrulefill so that they work as expected in vertical mode.

```
234 \def\hrulefill{\leavevemode\leaders\hrule\hfill\kern\z@}
The box in \dotfill originally contained (in plain.tex): \mkern 1.5mu . \mkern 1.5mu;
the width of .44em differs from this by .04pt which is probably an acceptable difference within leaders.
235 \def\dotfill{%
236   \leavevemode
237   \cleaders \hb@xt@ .44em{\hss.\hss}\hfill
238   \kern\z@}

INITEX sets \sfcode x=1000 for all x, except that \sfcode‘X=999 for uppercase letters. The following changes are needed:
239 \sfcode`'=0 \sfcode`'=0 \sfcode`]=0
The \nonfrenchspacing macro will make further changes to \sfcode values.
Definitions related to output
\magnification doesn't work in LATEX.
\def\magnification{\afterassignment\m@g\count@}
\def\m@g{\mag\count@
\hsize6.5truein\vsize8.9truein\dimen\footins8truein}

\showoverfull The following commands are used in debugging:
240 \def\showoverfull{\tracingonline@ne}

\showoutput
\loggingoutput 241 </2ekernel | autoload>
242 <*2ekernel | autoerr>
243 \gdef\loggingoutput{\tracingoutput@ne
244   \showboxbreadth\maxdimen\showboxdepth\maxdimen\errorstopmode}
245 \gdef\showoutput{\loggingoutput\showoverfull}
246 </2ekernel | autoerr>
247 <autoload>\def\showoutput{\@autoerr\showoutput}

\tracingall
\loggingall 248 <*2ekernel | autoerr>
249 \gdef\loggingall{\tracingcommands\tw@\tracingstats\tw@
250   \tracingpages@ne\tracinglostchars@ne
251   \tracingmacros\tw@\tracingparagraphs@ne\tracingrestores@ne
252   \errorcontextlines\maxdimen\loggingoutput}
253 \gdef\tracingall{\loggingall\showoverfull}
254 </2ekernel | autoerr>
255 <autoload>\def\tracingall{\@autoerr\tracingall}

LATEX change: \showhyphens Defined later.
Punctuation affects the spacing.
256 <*2ekernel | autoload>
257 \nonfrenchspacing
258 </2ekernel | autoload>
```

## File c

### ltvers.dtx

## 10 Version Identification

First we identify the date and version number of this release of L<sup>A</sup>T<sub>E</sub>X, and set `\everyjob` so that it is printed at the start of every L<sup>A</sup>T<sub>E</sub>X run.

```
\fmtname
\fmtversion
1 (*2ekernel)
2 \def\fmtname{LaTeX2e}
3 \edef\fmtversion{2009/09/24}

Check that the format being made is not too old. The error message complains
about ‘more than 5 years’ but in fact the error is not triggered until 65 months.
This code is currently not activated as we don’t know if we already got to the
last official 2e version (due to staff shortage or due to a successor (think positive:-)).
4 \iffalse
5 \def\reserved@a{\#1/\#2/#3@nil{%
6   \count@\year
7   \advance\count@-#1\relax
8   \multiply\count@ by 12\relax
9   \advance\count@\month
10  \advance\count@-#2\relax}
11 \expandafter\reserved@a\fmtversion\@nil
\count@ is now the age of this file in months. Take a generous definition of ‘year’
so this message is not generated too often.

12 \ifnum\count@>65
13   \typeout{^^J%
14 !!!!!! You are attempting to make a LaTeX format from a source file^^J%
15 ! That is more than five years old.^^J%
16 ! If you enter <return> to scroll past this message then the format^^J%
17 ! will be built, but please consider obtaining newer source files^^J%
18 ! before continuing to build LaTeX.^^J%
19 ! !!!!!! ^^J%
20 !
21 !!!! You are attempting to make a LaTeX format from a source file^^J%
22 }
23   \errhelp{To avoid this error message, obtain new LaTeX sources.}
24   \errmessage{LaTeX source files more than 5 years old!}
25 \fi
26 \let\reserved@a\relax
27 \fi

This startup banner may be further modified by the code in ltfinal.dtx if a
patch file is present.

28 \everyjob{\typeout{\fmtname
29 (autoload)\space(autoload version)%
30                                     \space<\fmtversion>}}
31 \immediate\write16{\fmtname
32 (autoload)\space(autoload version)%
33                                     \space<\fmtversion>}
34 (/2ekernel)
```

# File d

## ltdefns.dtx

### 11 Definitions

This section contains commands used in defining other macros.

1 ⟨\*2ekernel⟩

#### 11.1 Initex initialisations

- \two@digits Prefix a number less than 10 with ‘0’.  
2 \def\two@digits#1{\ifnum#1<10 0\fi\number#1}
- \typeout Display something on the terminal.  
3 \def\typeout#1{\begingroup\set@display@protect  
4 \immediate\write\@unused{#1}\endgroup}
- \newlinechar A char to be used as new-line in output to files.  
5 \newlinechar‘\^J

#### 11.2 Saved versions of TeX primitives

The TeX primitive `\foo` is saved as `\@@foo`. The following primitives are handled in this way:

\@@par  
6 \let\@@par=\par  
7 %\let\@@input=\input %% moved earlier  
8 %\let\@@end=\end %%

- \@@hyph The following comment was added when these commands were first set up, 19 April 1986: the `\-` command is redefined to allow it to work in the `\ttfamily` type style, where automatic hyphenation is suppressed by setting `\hyphenchar` to `-1`. The original primitive TeX definition is saved as `\@@hyph` just in case anyone needs it.

There is a need for a robust command for a discretionary hyphen since its exact representation depends on the glyphs available in the current font. For example, with suitable fonts and the T1 font encoding it is possible to use hanging hyphens.

A suitable robust definition that allows for many possible types of font and encoding may be as follows:

```
\DeclareRobustCommand {\-}{%
  \discretionary {}%
  {\char \ifnum\hyphenchar>\font<\z@%
   \defaulthyphenchar%
  \else%
   \hyphenchar\font%
  \fi%
 }{}%
```

The redefinition (via `\let`) of `\-` within tabbing also makes the use of a robust command advisable since then any redefinition of `\-` via `\DeclareRobustCommand` will not cause a conflict.

Therefore, macro writers should be hereby warned that these internals will probably change! It is likely that a future release of L<sup>A</sup>T<sub>E</sub>X will make `\-` effectively an encoding specific text command.

```

9 \let\@@hyph=-          % Save original primitive definition
10 \def\-\{\discretionary{-}{ }{ }\}

\@dischypf
11 \let\@dischypf=-

\@@italiccorr Save the original italic correction.
12 \let\@@italiccorr=/

\@height The following definitions save token space. E.g., using \@height instead of height
\@depth saves 5 tokens at the cost in time of one macro expansion.
\@width 13 \def\@height{height} \def\@depth{depth} \def\@width{width}
\@minus 14 \def\@minus{minus}
\@plus 15 \def\@plus{plus}

\hb@xt@ The next one is another 100 tokens worth.
16 \def\hb@xt@{\hbox to}

17 \message{hacks,}

```

### 11.3 Command definitions

This section defines the following commands:

\@namedef	{ <i>NAME</i> }	
		Expands to \def\{ <i>NAME</i> }, except name can contain any characters.
\@nameuse	{ <i>NAME</i> }	
		Expands to \{ <i>NAME</i> \}.
\@ifnextchar	X{ <i>YES</i> }H{ <i>NO</i> }	Expands to <i>YES</i> if next character is an ‘X’, and to <i>NO</i> otherwise. (Uses \reserved@a–\reserved@c.) NOTE: GOBBLES ANY SPACE FOLLOWING IT.
\@ifstar	{ <i>YES</i> }{{ <i>NO</i> }}	Gobbles following spaces and then tests if next the character is a ‘*’. If it is, then it gobbles the ‘*’ and expands to <i>YES</i> , otherwise it expands to <i>NO</i> .
\@dblarg	{ <i>CMD</i> }{{ <i>ARG</i> }}	Expands to \{ <i>CMD</i> \}[ <i>ARG</i> ]\{ <i>ARG</i> \}. Use \@dblarg\CS when \CS takes arguments [ <i>ARG1</i> ]{ <i>ARG2</i> }, where default is <i>ARG1</i> = <i>ARG2</i> .
\@ifundefined	{ <i>NAME</i> }{{ <i>YES</i> }}{{ <i>NO</i> }}	: If \NAME is undefined then it executes <i>YES</i> , otherwise it executes <i>NO</i> . More precisely, true if \NAME either undefined or = \relax.
\@ifdefinable	\NAME{{ <i>YES</i> }} Executes <i>YES</i> if the user is allowed to define \NAME, otherwise it gives an error. The user can define \NAME if \@ifundefined{\NAME} is true, ‘NAME’ ≠ ‘relax’ and the first three letters of ‘NAME’ are not ‘end’, and if \endNAME is not defined.	
\newcommand	*{ <i>FOO</i> } [{ <i>i</i> }]{ <i>TEXT</i> }	User command to define \FOO to be a macro with <i>i</i> arguments ( <i>i</i> = 0 if missing) having the definition <i>TEXT</i> . Produces an error if \FOO already defined.
		Normally the command is defined to be \long (ie it may take multiple paragraphs in its argument). In the star-form, the command is not defined as \long and a blank line in any argument to the command would generate an error.
\renewcommand	*{ <i>FOO</i> } [{ <i>i</i> }]{ <i>TEXT</i> }	Same as \newcommand, except it checks if \FOO already defined.
\newenvironment	*{ <i>FOO</i> } [{ <i>i</i> }]{ <i>DEF1</i> }{{ <i>DEF2</i> }}	equivalent to: \newcommand{\FOO}[i]{ <i>DEF1</i> } \def{\endFOO}{ <i>DEF2</i> } (or the appropriate star forms).
\renewenvironment		Obvious companion to \newenvironment.

```

\@cons      : See description of \output routine.
\@car       \@car T1 T2 ... Tn\@nil == T1 (unexpanded)
\@cdr       \@cdr T1 T2 ... Tn\@nil == T2 ... Tn (unexpanded)
\typeout    {\{message\}}
\typein    Produces a warning message on the terminal.
\typein    {\{message\}}
\typein    Types message, asks the user to type in a command, then executes it
\typein    [(\|CS\|)\{MSG\}]
\typein    Same as above, except defines \|CS to be the input instead of executing it.

\typein
18 \def\typein{%
19   \let\@typein\relax
20   \@testopt\@xtypein\@typein}

21 \def\@xtypein[#1]#2{%
22   \typeout{#2}%
23   \advance\endlinechar\@M
24   \read\@inputcheck to#1%
25   \advance\endlinechar-\@M
26   \@typein}

\@namedef
27 \def\@namedef#1{\expandafter\def\csname #1\endcsname}

\@nameuse
28 \def\@nameuse#1{\csname #1\endcsname}

\@cons
29 \def\@cons#1#2{\begingroup\let\@elt\relax\xdef#1{\#1\@elt #2}\endgroup}

\@car
\@cdr 30 \def\@car#1#2\@nil{\#1}
31 \def\@cdr#1#2\@nil{\#2}

\@carche  \@carche T1 ... Tn\@nil = T1 T2 T3 , n > 3
32 \def\@carche#1#2#3#4\@nil{\#1#2#3}

\@onlypreamble This macro adds its argument to the list of commands stored in \preamblecmds to be disabled after \begin{document}. These commands are redefined to generate \notprerr at this point.
\preamblecmds
33 \def\preamblecmds{%
34 \def\@onlypreamble#1{%
35   \expandafter\gdef\expandafter\@preamblecmds\expandafter{%
36     \preamblecmds\do#1}}%
37 \@onlypreamble\@onlypreamble
38 \@onlypreamble\preamblecmds

\@star@\or@\long Look ahead for a *. If present reset \longrel@x so that the next definition, #1, will be non-long.
39 \def\@star@\or@\long#1{%
40   \@ifstar
41   {\let\longrel@x\relax#1}%
42   {\let\longrel@x\long#1}}

\longrel@x This is either \relax or \long depending on whether the *-form of a definition command is being executed.
43 \let\longrel@x\relax

```

```

\newcommand User level \newcommand.
44 \def\newcommand{\@star@or@long\new@command}

\new@command
45 \def\new@command#1{%
46   \@testopt{\@newcommand#1}0}

\@newcommand Handling arguments for \newcommand.
\cargdef 47 \def\@newcommand#1[#2]{%
\cxargdef 48 \kernel@ifnextchar [{\@xargdef#1[#2]}{%
49   {\@cargdef#1[#2]}}}

Define #1 if it is definable.
Both here and in \cxargdef the replacement text is absorbed as an argument
because if we are not allowed to make the definition we have to get rid of it
completely.
50 \long\def\cargdef#1[#2]#3{%
51   \@ifdefinable #1{\@yargdef#1\@ne{#2}{#3}}}

Handle the second optional argument.
52 \long\def\cxargdef#1[#2][#3]#4{%
53   \@ifdefinable#1{%

Define the actual command to be:
\def\foo{\@protected@testopt\foo\\foo{default}}
where \\foo is a csname generated from applying \csname and \string to \foo, ie
the actual name contains a backslash and therefore can't clash easily with existing
command names. "Default" is the contents of the second optional argument of
(re)newcommand.

The \aut@global command below is only used in the autoload format. If it is
\global then a global definition will be made.
54 (autoload)\aut@global
55   \expandafter\def\expandafter#1\expandafter{%
56     \expandafter
57     \@protected@testopt
58     \expandafter
59     #1%
60     \csname\string#1\endcsname
61     {#3}}%}

Now we define the internal macro ie \\foo which is supposed to pick up all arguments
(optional and mandatory).
62   \expandafter\@yargdef
63   \csname\string#1\endcsname
64   \tw@
65   {#2}%
66   {#4}}}

\@testopt This macro encapsulates the most common call to \ifnextchar, saving several
tokens each time it is used in the definition of a command with an optional argument. #1 The code to execute in the case that there is a [ need not be a single
token but can be any sequence of commands that 'expects' to be followed by [. If this command were only used in \newcommand definitions then #1 would be a
single token and the braces could be omitted from {#1} in the definition below,
saving a bit of memory.
67 \long\def\@testopt#1#2{%
68   \kernel@ifnextchar[{#1}{#1[{#2}]}}}

\@protected@testopt Robust version of \@testopt. The extra argument (#1) must be a single token. If
protection is needed the call expands to \protect applied to this token, and the
2nd and 3rd arguments are discarded (by \cx@protect). Otherwise \@testopt is
called on the 2nd and 3rd arguments.

```

This method of making commands robust avoids the need for using up two csnames per command, the price is the extra expansion time for the \ifx test.

```

69 \def\@protected@testopt#1{%
70   \ifx\protect\@typeset@protect
71     \expandafter\@testopt
72   \else
73     \c@protect#1%
74   \fi}

```

\@yargdef These generate a primitive argument specification, from a L<sup>A</sup>T<sub>E</sub>X [*digit*] form; in fact *digit* can be anything such that \number*digit* is single digit.

Reorganised slightly so that \renewcommand{\reserved@a}[1]{foo} works. I am not sure this is worth it, as a following \newcommand would over-write the definition of \reserved@a.

Recall that L<sup>A</sup>T<sub>E</sub>X 2.09 goes into an infinite loop with \renewcommand[1]{\@tempa}{foo} (DPC 6 October 93).

Reorganised again (DPC 1999). Rather than make a loop to construct the argument spec by counting, just extract the required argument spec by using a delimited argument (delimited by the digit). This is faster and uses less tokens. The coding is slightly odd to preserve the old interface (using #2 = \tw@ as the flag to surround the first argument with []). But the new method did not allow for the number of arguments #3 not being given as an explicit digit; hence (further expansion of this argument and use of) \number was added later in 1999.

It is not clear why these are still \long.

```

75 \long \def \@yargdef #1#2#3{%
76   \ifx#2\tw@
77     \def\reserved@b##1{[####1]}%
78   \else
79     \let\reserved@b\@gobble
80   \fi
81   \expandafter
82   \c@yargd@f \expandafter{\number #3}#1%
83 }

```

The \aut@global command below is only used in the autoload format. If it is \global then a global definition will be made.

```

84 \long \def \@yargd@f#1#2{%
85   \def \reserved@a ##1#1##2##{%
86     (autoload)\aut@global
87       \expandafter\def\expandafter#2\reserved@b ##1#1%
88     }%
89   \l@ngrel@x \reserved@a 0##1##2##3##4##5##6##7##8##9##1%
90 }

```

#### \@reargdef

```

91 \long\def\@reargdef#1[#2]{%
92   \@yargdef#1\@ne{#2}}

```

\renewcommand Check the command name is already used. If not give an error message. Then temporarily disable \@ifdefinable then call \newcommand. (Previous version \let#1=\relax but this does not work too well if #1 is \@tempa-e.)

```
93 \def\renewcommand{\@star@or@long\renew@command}
```

#### \renew@command

```

94 \def\renew@command#1{%
95   \begingroup \escapechar\m@ne\xdef\@tempa{{\string#1}}\endgroup
96   \expandafter\@ifundefined\@tempa
97     {\@latex@error{\noexpand#1undefined}\@ehc}%
98     \relax
99   \let\@ifdefinable\@rc@ifdefinable
100  \new@command#1}

```

```

\@ifdefinable Test is user is allowed to define a command.

\@@ifdefinable 101 \long\def\@ifdefinable #1#2{%
\@rc@ifdefinable 102      \edef\reserved@a{\expandafter\gobble\string #1}%
103      \@ifundefined\reserved@a
104      {\edef\reserved@b{\expandafter\@carcube \reserved@a xxx\@nil}%
105      \ifx \reserved@b\@qend \@notdefinable\else
106      \ifx \reserved@a\@qrelax \@notdefinable\else
107      #2%
108      \fi
109      \fi}%
110      \@notdefinable}

Saved definition of \@ifdefinable.

111 \let\@@ifdefinable\@ifdefinable
Version of \@ifdefinable for use with \renewcommand. Does not do the check
this time, but restores the normal definition.

112 \long\def\@rc@ifdefinable#1#2{%
113   \let\@ifdefinable\@@ifdefinable
114   #2}

\newenvironment Define a new user environment. #1 is the environment name. #2# Grabs all the
tokens up to the first {. These will be any optional arguments. They are not
parsed at this point, but are just passed to \@newenv which will eventually call
\newcommand. Any optional arguments will then be parsed by \newcommand as it
defines the command that executes the ‘begin code’ of the environment.

This #2# trick removed with version 1.2i as it fails if a { occurs in the optional
argument. Now use \@ifnextchar directly.

115 \def\newenvironment{\@star@or@long\newenvironment}

\newenvironment
116 \def\newenvironment#1{%
117   \@testopt{\@newenva#1}0}

\@newenva
118 \def\@newenva#1[#2]{%
119   \kernel@ifnextchar [{\@newenvb#1[#2]}{\@newenv{#1}{[#2]}}]

\@newenvb
120 \def\@newenvb#1[#2][#3]{\@newenv{#1}{[#2][[#3]]}]

\renewenvironment Redefine an environment. For \renewenvironment disable \@ifdefinable and
then call \newenvironment. It is OK to \let the argument to \relax here as
there should not be a @temp... environment.

121 \def\renewenvironment{\@star@or@long\renewenvironment}

\renewenvironment
122 \def\renewenvironment#1{%
123   \@ifundefined{#1}%
124   {\@latex@error{Environment #1 undefined}\@ehc
125   }\relax
126   \expandafter\let\csname#1\endcsname\relax

127 {autoload}\aut@global
128   \expandafter\let\csname end#1\endcsname\relax
129   \newenvironment{#1}

\@newenv The internal version of \newenvironment.

Call \newcommand to define the <begin-code> for the environment. \def is used
for the <end-code> as it does not take arguments. (but may contain \pars)

Make sure that an attempt to define a ‘graf’ or ‘group’ environment fails.

```

```

130 \long\def\@newenv#1#2#3#4{%
131   \@ifundefined{#1}%
132     {\expandafter\let\csname#1\expandafter\endcsname
133      \csname end#1\endcsname}%
134   \relax
135   \expandafter\new@command
136   \csname #1\endcsname#2{#3}%

137 <autoload>\aut@global
138   \l@ngrel@x\expandafter\def\csname end#1\endcsname{#4}%

\newif And here's a different sort of allocation: For example, \newif\iff foo creates
\foottrue, \footfalse to go with \iff foo.
139 \def\newif#1{%
140   \count@\escapechar \escapechar\m@ne
141 <autoload>\aut@global
142   \let#1\iffalse
143   \@if#1\iftrue
144   \@if#1\iffalse
145   \escapechar\count@}

\@if
146 \def\@if#1#2{%
147 <autoload>\aut@global
148   \expandafter\def\csname\expandafter\@gobbletwo\string#1%
149     \expandafter\@gobbletwo\string#2\endcsname
150   {\let#1#2}%

\providecommand \providecommand takes the same arguments as \newcommand, but discards them
if #1 is already defined, Otherwise it just acts like \newcommand. This imple-
mentation currently leaves any discarded definition in \reserved@a (and possibly
\\reserved@a) this wastes a bit of space, but it will be reclaimed as soon as these
scratch macros are redefined.
151 \def\providecommand{\@star@or@long\provide@command}

\provide@command
152 \def\provide@command#1{%
153   \begingroup
154     \escapechar\m@ne\xdef\@gtempa{\{\\string#1}\}%
155   \endgroup
156   \expandafter\@ifundefined\@gtempa
157     {\def\reserved@a{\new@command#1}\}%
158     {\def\reserved@a{\renew@command\reserved@a}\}%
159   \reserved@a\}%

\CheckCommand \CheckCommand takes the same arguments as \newcommand. If the command
already exists, with the same definition, then nothing happens, otherwise a
warning is issued. Useful for checking the current state before a macro pack-
age starts redefining things. Currently two macros are considered to have the
same definition if they are the same except for different default arguments.
That is, if the old definition was: \newcommand\xxx[2][a]{(#1)(#2)} then
\CheckCommand\xxx[2][b]{(#1)(#2)} would not generate a warning, but, for
instance \CheckCommand\xxx[2]{(#1)(#2)} would.
160 \def\CheckCommand{\@star@or@long\check@command}

\CheckCommand is only available in the preamble part of the document.
161 \onlypreamble\CheckCommand

\check@command
162 \def\check@command#1#2{\@check@c#1{#2}\}%
163 \onlypreamble\check@command

```

```

\@check@c \CheckCommand itself just grabs all the arguments we need, without actually looking for [ optional argument forms. Now define \reserved@a. If \\reserved@a is then defined, compare it with the “\#1’ otherwise compare \reserved@a with #1.

164 \long\def\@check@c#1#2#3{%
165   \expandafter\let\csname\string\reserved@a\endcsname\relax
166   \renew@command\reserved@a#2{#3}%
167   \@ifundefined{\string\reserved@a}{%
168     {\@check@eq#1\reserved@a}%
169     {\expandafter\@check@eq
170       \csname\string#1\expandafter\endcsname
171       \csname\string\reserved@a\endcsname}%
172 }@\onlypreamble\@check@c

\@check@eq Complain if #1 and #2 are not \ifx equal.

173 \def\@check@eq#1#2{%
174   \ifx#1#2\else
175     \@latex@warning@no@line
176       {Command \noexpand#1 has
177        changed.\MessageBreak
178        Check if current package is valid}%
179   \fi}
180 }@\onlypreamble\@check@eq

\@gobble The \@gobble macro is used to get rid of its argument.

\@gobbletwo 181 \long\def \@gobble #1{}
\@gobblefour 182 \long\def \@gobbletwo #1#2){}
183 \long\def \@gobblefour #1#2#3#4{}

\@firstofone Some argument-grabbers.

\@firstoftwo 184 \long\def\@firstofone#1{#1}
\@secondoftwo 185 \long\def\@firstoftwo#1#2{#1}
186 \long\def\@secondoftwo#1#2{#2}

\@iden \@iden is another name for \@firstofone for compatibility reasons.

187 \let\@iden\@firstofone

\@thirddofthree Another grabber now used in the encoding specific section.

188 \long\def\@thirddofthree#1#2#3{#3}

\@expandtwoargs A macro to totally expand two arguments to another macro

189 \def\@expandtwoargs#1#2#3{%
190 \edef\reserved@a{\noexpand#1{#2}{#3}}\reserved@a}

\@backslashchar A category code 12 backslash.

191 \edef\@backslashchar{\expandafter\gobble\string\\}

```

## 11.4 Robust commands and protect

Fragile and robust commands are one of the thornier issues in L<sup>A</sup>T<sub>E</sub>X’s commands. Whilst typesetting documents, L<sup>A</sup>T<sub>E</sub>X makes use of many of T<sub>E</sub>X’s features, such as arithmetic, defining macros, and setting variables. However, there are (at least) three different occasions when these commands are not safe. These are called ‘moving arguments’ by L<sup>A</sup>T<sub>E</sub>X, and consist of:

- writing information to a file, such as indexes or tables of contents.
- writing information to the screen.
- inside an \edef, \message, \mark, or other command which evaluates its argument fully.

The method L<sup>A</sup>T<sub>E</sub>X uses for making fragile commands robust is to precede them with `\protect`. This can have one of five possible values:

- `\relax`, for normal typesetting. So `\protect\foo` will execute `\foo`.
- `\string`, for writing to the screen. So `\protect\foo` will write `\foo`.
- `\noexpand`, for writing to a file. So `\protect\foo` will write `\foo` followed by a space.
- `\@unexpandable@protect`, for writing a moving argument to a file. So `\protect\foo` will write `\protect\foo` followed by a space. This value is also used inside `\edefs`, `\marks` and other commands which evaluate their arguments fully.
- `\@unexpandable@noexpand`, for performing a deferred write inside an `\edef`. So `\protect\foo` will write `\foo` followed by a space. If you want `\protect\foo` to be written, you should use `\@unexpandable@protect`. (Removed as never used).

`\@unexpandable@protect` These commands are used for setting `\protect` inside `\edefs`.

```
192 \def\@unexpandable@protect{\noexpand\protect\noexpand}
193 %\def\@unexpandable@noexpand{\noexpand\noexpand\noexpand}
```

`\DeclareRobustCommand` `\declare@robustcommand` This is a package-writers command, which has the same syntax as `\newcommand`, but which declares a protected command. It does this by having

`\DeclareRobustCommand\foo`  
define `\foo` to be `\protect\foo<space>`,  
and then use `\newcommand\foo<space>`.

Since the internal command is `\foo<space>`, when it is written to an auxiliary file, it will appear as `\foo`.

We have to be a bit cleverer if we're defining a short command, such as `\_`, in order to make sure that the auxiliary file does not include a space after the command, since `\_ a` and `\_a` aren't the same. In this case we define `\_` to be:

```
\x@protect\_\protect\_<space>
```

which expands to:

```
\ifx\protect\@typeset@protect\else
  \x@protect@\_
\fi
\protect\_<space>
```

Then if `\protect` is `\@typeset@protect` (normally `\relax`) then we just perform `\_<space>`, and otherwise `\x@protect@` gobbles everything up and expands to `\protect\_`.

*Note:* setting `\protect` to any value other than `\relax` whilst in ‘typesetting’ mode will cause commands to go into an infinite loop! In particular, setting `\relax` to `\@empty` will cause `\_` to loop forever. It will also break lots of other things, such as protected `\ifmmodes` inside `\haligns`. If you really really have to do such a thing, then please set `\@typeset@protect` to be `\@empty` as well. (This is what the code for `\patterns` does, for example.)

More fun with `\expandafter` and `\csname`.

```
194 \def\DeclareRobustCommand{\@star@or@long\declare@robustcommand}
195 \def\declare@robustcommand#1{%
196   \ifx#1\undefined\else\ifx#1\relax\else
197     \@latex@info{Redefining \string#1}%
198   \fi\fi
199   \edef\reserved@a{\string#1}%
200   \def\reserved@b{\#1}%
201   \edef\reserved@b{\expandafter\strip@prefix\meaning\reserved@b}%
}
```

```

202 <autoload>\aut@global
203   \edef#1{%
204     \ifx\reserved@a\reserved@b
205       \noexpand\x@protect
206       \noexpand#1%
207     \fi
208     \noexpand\protect
209     \expandafter\noexpand\csname
210       \expandafter@gobble\string#1 \endcsname
211   }%
212   \let\@ifdefinable\@rc@ifdefinable
213   \expandafter\new@command\csname
214     \expandafter@gobble\string#1 \endcsname
215 }

\@x@protect
\x@protect 216 \def\x@protect#1{%
217   \ifx\protect\@typeset@protect\else
218     \x@protect#1%
219   \fi
220 }
221 \def\x@protect#1\fi#2#3{%
222   \fi\protect#1%
223 }

\@typeset@protect
224 \let\@typeset@protect\relax

```

**\set@display@protect** These macros set `\protect` appropriately for typesetting or displaying.

```

\set@typeset@protect 225 \def\set@display@protect{\let\protect\string}
226 \def\set@typeset@protect{\let\protect\@typeset@protect}

```

**\protected@edef** **\protected@xdef** The commands `\protected@edef` and `\protected@xdef` perform ‘safe’ `\edefs` and `\xdefs`, saving and restoring `\protect` appropriately. For cases where restoring `\protect` doesn’t matter, there’s an ‘unsafe’ `\unrestored@protected@xdef`, useful if you know what you’re doing!

```

\unrestored@protected@xdef
\restore@protect
227 \def\protected@edef{%
228   \let\@@protect\protect
229   \let\protect\@unexpandable@protect
230   \afterassignment\restore@protect
231   \edef
232 }
233 \def\protected@xdef{%
234   \let\@@protect\protect
235   \let\protect\@unexpandable@protect
236   \afterassignment\restore@protect
237   \xdef
238 }
239 \def\unrestored@protected@xdef{%
240   \let\protect\@unexpandable@protect
241   \xdef
242 }
243 \def\restore@protect{\let\protect\@@protect}

```

**\protect** The normal meaning of `\protect`

```
244 \set@typeset@protect
```

## 11.5 Internal defining commands

These commands are used internally to define other L<sup>A</sup>T<sub>E</sub>X commands.

**\@ifundefined** Check if first arg is undefined or \relax and execute second or third arg depending,

```
245 \def\@ifundefined#1{%
246   \expandafter\ifx\csname#1\endcsname\relax
247     \expandafter\@firstoftwo
248   \else
249     \expandafter\@secondoftwo
250   \fi}
```

**\@qend** The following define \@qend and \@qrelax to be the strings ‘end’ and ‘relax’ with the characters \catcodel 12.

```
251 \edef\@qend{\expandafter\@cdr\string\end\@nil}
252 \edef\@qrelax{\expandafter\@cdr\string\relax\@nil}
```

**\@ifnextchar** \@ifnextchar peeks at the following character and compares it with its first argument. If both are the same it executes its second argument, otherwise its third.

```
253 \long\def\@ifnextchar#1#2#3{%
254   \let\reserved@d=#1%
255   \def\reserved@a{#2}%
256   \def\reserved@b{#3}%
257   \futurelet\@let@token\@ifnch}
```

**\kernel@ifnextchar** This macro is the kernel version of \@ifnextchar which is used in a couple of places to prevent the AMS variant from being used since in some places this produced chaos (for example if an fd file is loaded in a random place then the optional argument to \ProvidesFile could get printed there instead of being written only in the log file. This happened when there was a space or a newline between the mandatory and optional arguments! It should really be fixed in the amsmath package one day, but...

Note that there may be other places in the kernel where this version should be used rather than the original, but variable, version.

```
258 \let\kernel@ifnextchar\@ifnextchar
```

**\@ifnch** \@ifnch is a tricky macro to skip any space tokens that may appear before the character in question. If it encounters a space token, it calls xifnch.

```
259 \def\@ifnch{%
260   \ifx\@let@token\@sptoken
261     \let\reserved@c\@xifnch
262   \else
263     \ifx\@let@token\reserved@d
264       \let\reserved@c\reserved@a
265     \else
266       \let\reserved@c\reserved@b
267     \fi
268   \fi
269   \reserved@c}
```

**\@sptoken** The following code makes \@sptoken a space token. It is important here that the control sequence \: consists of a non-letter only, so that the following whitespace is significant. Together with the fact that the equal sign in a \let may be followed by only one optional space the desired effect is achieved. NOTE: the following hacking must precede the definition of \: as math medium space.

```
270 \def\: {\let\@sptoken= } \: % this makes \@sptoken a space token
```

**\@xifnch** In the following definition of \@xifnch, \: is again used to get a space token as delimiter into the definition.

```
271 \def\:{\@xifnch} \expandafter\def\:{\futurelet\@let@token\@ifnch}
```

\makeatletter Make internal control sequences accessible or inaccessible.

\makeatother 272 \def\makeatletter{\catcode`@11\relax}  
 273 \def\makeatother{\catcode`@12\relax}

\@ifstar The new implementation below avoids passing the *true code* Through one more \def than the *false code*, which previously meant that # had to be written as ##### in one argument, but ## in the other. The \* is gobbled by \ifstaroftwo.  
 274 \def\ifstar#1{\ifnextchar \*{\ifstaroftwo{#1}}}

\dblarg  
 275 \long\def\dblarg#1{\kernel@ifnextchar[{#1}]{\dblarg{#1}}}  
 276 \long\def\ dblarg#1#2[#1][#2]{#2}

\sanitize The command \sanitize changes the catcode of all special characters except for braces to ‘other’. It can be used for commands like \index that want to write their arguments verbatim. Needless to say, this command should only be executed within a group, or chaos will ensue.  
 277 \def\@sanitize{\makeother\ \makeother\\ \makeother\\$ \makeother\&\%  
 278 \makeother\# \makeother\^ \makeother\\_ \makeother\% \makeother\~}

\onelevel@sanitize This makes the whole “meaning” of #1 (its one-level expansion) into catcode 12 tokens: it could be used in \DeclareRobustCommand.  
 If it is to be used on default float specifiers, this should be done when they are defined.  
 279 \def \onelevel@sanitize #1{%
 280 \edef #1{\expandafter\strip@prefix
 281 \meaning #1}%
 282 }

283

## 11.6 Commands for Autoloading

284

\aut@global This command is only defined in the ‘autoload’ format. It is normally \relax but may be set to \global, in which case \newif and the commands based on \newcommand will all make global definitions.  
 285 \let\aut@global\relax

\autoload This macro is only defined in the ‘autoload’ format. It inputs a package ‘auto#1.sty’ within a local group, and with normalised catcodes. \aut@global is set to \global so that \newif \newcommand and related commands make global definitions.  
 286 \def\autoload#1{%
 287 \begingroup
 288 \makeatletter
 289 \let\aut@global\global
 290 \nfss@catcodes
 291 \catcode`\ =10
 292 \let\@latex@error@gobble
 293 \@@input auto#1.sty\relax
 294 \endgroup}

295

# File e

## ltalloc.dtx

### 12 Counters

This section deals with counter and other variable allocation.

1 ⟨\*2ekernel⟩

The following are from plain TeX:

\z@ A zero dimen or number. It's more efficient to write \parindent\z@ than  
  \parindent 0pt.

\@ne The number 1.

\m@ne The number -1.

\tw@ The number 2.

\sixt@@n The number 16.

\@m The number 1000.

\@MM The number 20000.

\@xxxii The constant 32.

2 \chardef\@xxxii=32

\@Mi Constants 1001–1004.

\@Mii 3 \mathchardef\@Mi=10001

\@Miii 4 \mathchardef\@Mii=10002

\@Miv 5 \mathchardef\@Miii=10003

6 \mathchardef\@Miv=10004

\@tempcnta Scratch count registers used by L<sup>A</sup>T<sub>E</sub>X kernel commands.

\@tempcntb 7 \newcount\@tempcnta

8 \newcount\@tempcntb

\if@tempswa General boolean switch used by L<sup>A</sup>T<sub>E</sub>X kernel commands.

9 \newif\if@tempswa

\@tempdima Scratch dimen registers used by L<sup>A</sup>T<sub>E</sub>X kernel commands.

\@tempdimb 10 \newdimen\@tempdima

\@tempdimc 11 \newdimen\@tempdimb

12 \newdimen\@tempdimc

\@tempboxa Scratch box register used by L<sup>A</sup>T<sub>E</sub>X kernel commands.

13 \newbox\@tempboxa

\@tempskipa Scratch skip registers used by L<sup>A</sup>T<sub>E</sub>X kernel commands.

\@tempskipb 14 \newskip\@tempskipa

15 \newskip\@tempskipb

\@temptokena Scratch token register used by L<sup>A</sup>T<sub>E</sub>X kernel commands.

16 \newtoks\@temptokena

\@flushglue Glue used for \right- & \leftskip = 0pt plus 1fil

17 \newskip\@flushglue \@flushglue = 0pt plus 1fil

18 ⟨/2ekernel⟩

# File f

## ltcntrl.dtx

### 13 Program control structure

This section defines a number of control structure macros, such as while-loops and for-loops.

```
1 {*2ekernel}
2 \message{control,}

\@whilenum TEST \do {BODY}
\@whiledim TEST \do {BODY} : These implement the loop
    while TEST do BODY od
    where TEST is a TeX \ifnum or \ifdim test, respectively.
    They are optimized for the normal case of TEST initially false.
```

```
\@whilesw SWITCH \fi {BODY} : Implements the loop
    while SWITCH do BODY od
    Optimized for normal case of SWITCH initially false.
```

```
\@for NAME := LIST \do {BODY} : Assumes that LIST expands to
A1,A2,
... ,An .
Executes BODY n times, with NAME = Ai on the i-th
iteration.
Optimized for the normal case of n = 1. Works for n=0.
```

```
\@tfour NAME := LIST \do {BODY}
if, before expansion, LIST = T1 ... Tn where each Ti is a
token or {...}, then executes BODY n times, with NAME = Ti
on the i-th iteration. Works for n=0.
```

NOTES: 1. These macros use no \@temp sequences.  
2. These macros do not work if the body contains anything that looks syntactically to TeX like an improperly balanced \if \else \fi.

```
\@whilenum TEST \do {BODY} ==
BEGIN
    if TEST
        then BODY
            \@iwhilenum{TEST \relax BODY}
    END

\@iwhilenum {TEST BODY} ==
BEGIN
    if TEST
        then BODY
            \@nextwhile = def(\@iwhilenum)
        else \@nextwhile = def(\@whilenoop)
    fi
    \@nextwhile {TEST BODY}
END

\@whilesw SWITCH \fi {BODY} ==
BEGIN
```

```

if SWITCH
  then BODY
    \@iwhilesw {SWITCH BODY}\fi
  fi
END

\@iwhilesw {SWITCH BODY} \fi ==
BEGIN
  if SWITCH
  then BODY
    \@nextwhile = def(\@iwhilesw)
  else \@nextwhile = def(\@whileswnoop)
  fi
  \@nextwhile {SWITCH BODY} \fi
END

\@whilenoop
\@whilenum 3 \long\def\@whilenum#1\do #2{\ifnum #1\relax #2\relax\@iwhilenum{#1\relax
\@iwhilenum 4      #2\relax}\fi}
5 \long\def\@iwhilenum#1{\ifnum #1\expandafter\@iwhilenum
6           \else\expandafter\gobble\fi{#1} }

\@whiledim
\@iwhiledim 7 \long\def\@whiledim#1\do #2{\ifdim #1\relax#2\@iwhiledim{#1\relax#2}\fi}
8 \long\def\@iwhiledim#1{\ifdim #1\expandafter\@iwhiledim
9           \else\expandafter\gobble\fi{#1} }

\@whileswnoop
\@whilesw 10 \long\def\@whilesw#1\fi{#1#2\@iwhilesw{#1#2}\fi\fi}
\@iwhilesw 11 \long\def\@iwhilesw#1\fi{#1\expandafter\@iwhilesw
12           \else\gobbletwo\fi{#1}\fi}

\@for NAME := LIST \do {BODY} ==
BEGIN \@forloop expand(LIST),\@nil,\@nil \@ NAME {BODY}
END

\@forloop CAR, CARCDR, CDRCDR \@ NAME {BODY} ==
BEGIN
  NAME = CAR
  if def(NAME) = def(\@nnil)
  else BODY;
  NAME = CARCDR
  if def(NAME) = def(\@nnil)
  else BODY
    \@iforloop CDRCDR \@ NAME \do {BODY}
  fi
  fi
END

\@iforloop CAR, CDR \@ NAME {BODY} =
NAME = CAR
if def(NAME) = def(\@nnil)
  then \@nextwhile = def(\@fornoop)
else BODY ;
  \@nextwhile = def(\@iforloop)
fi

```

```

    \@nextwhile name cdr {body}

\@tfor NAME := LIST \do {BODY}
= \@tforloop LIST \@nil \@@ NAME {BODY}

\@tforloop car cdr \@@ name {body} =
    name = car
    if def(name) = def(\@nnil)
        then \@nextwhile == \@fornoop
        else body ;
            \@nextwhile == \@forloop
    fi
    \@nextwhile name cdr {body}

\@nnil
13 \def\@nnil{\@nil}

\@empty
14 \def\@empty{ }

\@fornoop
15 \long\def\@fornoop#1\@@#2#3{}

\@for
16 \long\def\@for#1:=#2\do#3{%
17   \expandafter\def\expandafter\@fortmp\expandafter{\#2}%
18   \ifx\@fortmp\@empty \else
19     \expandafter\@forloop#2,\@nil,\@nil\@@#1{\#3}\fi}

\@forloop
20 \long\def\@forloop#1,#2,#3\@@#4#5{\def#4{\#1}\ifx #4\@nil \else
21           #5\def#4{\#2}\ifx #4\@nil \else\#5\@forloop #3\@@#4{\#5}\fi\fi}

\@iforloop
22 \long\def\@iforloop#1,#2\@@#3#4{\def#3{\#1}\ifx #3\@nil
23           \expandafter\@fornoop \else
24           \#4\relax\expandafter\@iforloop\fi\#2\@@#3{\#4}\fi}

\@tfor
25 \def\@tfor#1:={\@tfcr#1 }
26 \long\def\@tfcr#1#2\do#3{\def\@fortmp{\#2}\ifx\@fortmp\space\else
27   \@forloop#2\@nil\@nil\@@#1{\#3}\fi}
28 \long\def\@forloop#1#2\@@#3#4{\def#3{\#1}\ifx #3\@nil
29           \expandafter\@fornoop \else
30           \#4\relax\expandafter\@forloop\fi\#2\@@#3{\#4}\fi}

\@break@tfor Break out of a \@tfor loop. This should be called inside the scope of an \if. See
\@iffileonpath for an example.
31 \long\def\@break@tfor#1\@@#2#3{\fi\fi}

\@removeelement Removes an element from a comma-separated list and puts it into a control se-
quence, called as \@removeelement{\langle element\rangle}{\langle list\rangle}{\langle cs\rangle}.
32 \def\@removeelement#1#2#3{%
33   \def\reserved@a{\#1,\#2\reserved@a{\#1,\#2\reserved@b}%
34   \def\reserved@b{\#1,\reserved@b{\#2\reserved@b{%
35     \ifx,\#1\@empty\else\#1\fi}%
36   \edef{\#3}{%
37     \expandafter\reserved@b\reserved@a,\#2,\reserved@b,\#1,\reserved@a}}}

38 </2ekernel>

```

# File g

## lterror.dtx

### 14 Error handling

This section defines L<sup>A</sup>T<sub>E</sub>X's error commands.

The '2ekernel' code ensures that a \usepackage{autoerr} is essentially ignored if a 'full' format is being used that has the error messages already in the format.

```
1 <2ekernel>\expandafter\let\csname ver@autoerr.sty\endcsname\fmtversion
2 (*2ekernel | autoload)
```

#### 14.1 General commands

\MessageBreak This command prints a new-line inside a message, followed by a continuation line begun with \cmsg@continuation. Normally it is defined to be \relax, but inside messages, it is let to \message@break.

```
3 \let\MessageBreak\relax
```

\GenericInfo This takes two arguments: a continuation and a message, and sends the result to the log file.

```
4 \DeclareRobustCommand{\GenericInfo}[2]{%
5   \begingroup
6     \def\MessageBreak{^J#1}%
7     \set@display@protect
8     \immediate\write\m@ne{#2\on@line.}%
9   \endgroup
10 }
```

\GenericWarning This takes two arguments: a continuation and a message, and sends the result to the screen.

```
11 \DeclareRobustCommand{\GenericWarning}[2]{%
12   \begingroup
13     \def\MessageBreak{^J#1}%
14     \set@display@protect
15     \immediate\write\@unused{^J#2\on@line.^J}%
16   \endgroup
17 }
18 </2ekernel | autoload>
```

\GenericError This macro takes four arguments: a continuation, an error message, where to go for further information, and the help information. It displays the error message, and sets the error help (the result of typing h to the prompt), and does a horrible hack to turn the last context line (which by default is the only context line) into just three dots. This could be made more efficient.

```
19 <autoload>\def\GenericError{\@autoerr\GenericError}
20 (*2ekernel | def)
21 \bgroup
22 \lccode`@=\ %
23 \lccode`~=`\ %
24 \lccode`}=`\ %
25 \lccode`{=`\ %
26 \lccode`T=`\T%
27 \lccode`H=`\H%
28 \catcode`\ =11\relax%
29 \lowercase{%
30 \egroup%
```

Unfortunately TEX versions older than 3.141 have a bug which means that `^J` does not force a linebreak in `\message` and `\errmessage` commands. So for these old TEX's we use `\typeout` to produce the message, and then have an empty `\errmessage` command. This causes an extra line of the form

```
! .
```

To appear on the terminal, but if you do not like it, you can always upgrade your TEX! In order for your format to use this version, you must define the macro `\@TeXversion` to be the version number, e.g., 3.14 of the underlying TEX. See the comments in `ltdircheck.dtx`.

```
31 \dimen@\ifx\@TeXversion\@undefined4\else\@TeXversion\fi\p@%
32 \ifdim\dimen@>3.14\p@%
```

First the 'standard case'.

```
33 \DeclareRobustCommand{\GenericError}[4]{%
34 \begingroup%
35 \immediate\write\@unused{ }%
36 \def\MessageBreak{^J}%
37 \set@display@protect%
38 \edef%
39 %      %<-----do not delete this space!----->%
40 \err@                                %
41 {{#4}}%
42 \errhelp
43 %      %<-----do not delete this space!----->%
44 \err@                                %
45 \let
46 %      %<-----do not delete this space!----->%
47 \err@                                %
48 \empty
49 \def\MessageBreak{^J#1}%
50 \def~{\errmessage{%
51 #2.^J^J%
52 #3^J%
53 Type H <return> for immediate help%
54 %      %<-----do not delete this space!----->%
55 \err@                                %
56 }}%
57 ~%
58 \endgroup}%
59 \else%
```

Secondly the version for old TEX's.

```
60 \DeclareRobustCommand{\GenericError}[4]{%
61 \begingroup%
62 \immediate\write\@unused{ }%
63 \def\MessageBreak{^J}%
64 \set@display@protect%
65 \edef%
66 %      %<-----do not delete this space!----->%
67 \err@                                %
68 {{#4}}%
69 \errhelp
70 %      %<-----do not delete this space!----->%
71 \err@                                %
72 \let
73 %      %<-----do not delete this space!----->%
74 \err@                                %
75 \errmessage
76 \def\MessageBreak{^J#1}%
77 \def~{\typeout{! }%
78 #2.^J^J%
```

```

79 #3^J%
80 Type H <return> for immediate help.}%
81 %   %-----do not delete this space!----->%
82 \@err@ %
83 {}%
84 ~%
85 \endgroup}%
86 \fi}%
87 </2ekernel | def>

```

\PackageError  
\PackageWarning  
\PackageWarningNoLine  
  \PackageInfo  
    \ClassError  
  \ClassWarning  
\ClassWarningNoLine  
    \ClassInfo

These commands are intended for use by package and class writers, to give information to authors. The syntax is:

```

\PackageError{<package>}{<error>}{<help>}
\PackageWarning{<package>}{<warning>}
\PackageWarningNoLine{<package>}{<warning>}
\PackageInfo{<package>}{<info>}

```

and similarly for classes. The **Error** commands print the *<error>* message, and present the interactive prompt; if the author types **h**, then the *<help>* information is displayed. The **Warning** commands produce a warning but do not present the interactive prompt. The **WarningNoLine** commands do the same, but don't print the input line number. The **Info** commands write the message to the log file. Within the messages, the command **\MessageBreak** can be used to break a line, **\protect** can be used to protect command names, and **\space** is a space, for example:

```

\newcommand{\foo}{FOO}
\PackageWarning{ethel}{%
  Your hovercraft is full of eels,\MessageBreak
  and \protect\foo\space is \foo}

```

produces:

```

Package ethel warning: Your hovercraft is full of eels,
(ethel)           and \foo is FOO on input line 54.

```

```

88 {autoload}\def\PackageError{\@autoerr\PackageError}
89 </2ekernel | def>
90 \gdef\PackageError#1#2#3{%
91   \GenericError{%
92     (#1)\@spaces\@spaces\@spaces\@spaces
93   }{%
94     Package #1 Error: #2%
95   }{%
96     See the #1 package documentation for explanation.%
97   }{#3}%
98 }
99 </2ekernel | def>
100 </2ekernel | autoload>
101 \def\PackageWarning#1#2{%
102   \GenericWarning{%
103     (#1)\@spaces\@spaces\@spaces\@spaces
104   }{%
105     Package #1 Warning: #2%
106   }{%
107 }
108 \def\PackageWarningNoLine#1#2{%
109   \PackageWarning{#1}{#2\@gobble}%
110 }
111 \def\PackageInfo#1#2{%

```

```

112  \GenericInfo{%
113      (#1) \cspaces\cspaces\cspaces
114  }{%
115      Package #1 Info: #2%
116  }%
117 }
118 </2ekernel | autoload>

119 <autoload>\def\ClassError{\@autoerr\ClassError}
120 <*2ekernel | def>
121 \gdef\ClassError#1#2#3{%
122     \GenericError{%
123         (#1) \space\cspaces\cspaces\cspaces
124     }{%
125         Class #1 Error: #2%
126     }{%
127         See the #1 class documentation for explanation.%%
128     }{#3}%
129 }
130 </2ekernel | def>

131 <*2ekernel | autoload>
132 \def\ClassWarning#1#2{%
133     \GenericWarning{%
134         (#1) \space\cspaces\cspaces\cspaces
135     }{%
136         Class #1 Warning: #2%
137     }%
138 }
139 \def\ClassWarningNoLine#1#2{%
140     \ClassWarning{#1}{#2@gobble}%
141 }
142 \def\ClassInfo#1#2{%
143     \GenericInfo{%
144         (#1) \space\space\cspaces\cspaces\cspaces
145     }{%
146         Class #1 Info: #2%
147     }%
148 }
149 </2ekernel | autoload>

```

\@latex@error Errors and other info, for use in the L<sup>A</sup>T<sub>E</sub>X core.

```

\@latex@warning 150 <autoload>\def\@latex@error{\@autoerr\@latex@error}
\@latex@warning@no@line 151 <*2ekernel | def>
    \@latex@info 152 \gdef\@latex@error#1#2{%
\@latex@info@no@line 153     \GenericError{%
154         \space\space\space\cspaces\cspaces\cspaces
155     }{%
156         LaTeX Error: #1%
157     }{%
158         See the LaTeX manual or LaTeX Companion for explanation.%%
159     }{#2}%
160 }
161 </2ekernel | def>

162 <*2ekernel | autoload>
163 \def\@latex@warning#1{%
164     \GenericWarning{%
165         \space\space\space\cspaces\cspaces\cspaces
166     }{%
167         LaTeX Warning: #1%
168     }%
169 }

```

```

170 \def\@latex@warning@no@line#1{%
171   \@latex@warning{#1@gobble}}
172 \def\@latex@info#1{%
173   \GenericInfo{%
174     \@spaces\@spaces\@spaces
175   }{%
176     LaTeX Info: #1%
177   }%
178 }
179 \def\@latex@info@no@line#1{%
180   \@latex@info{#1@gobble}}
\@font@warning and \@font@info are defined later since they have to be
redefined by the tracefn package.

\def\@font@warning#1{%
  \GenericWarning{%
    {#1}\@spaces\@spaces}%
  {Font Warning: #1}%
}
\def\@font@info#1{%
  \GenericInfo{%
    {#1}\@space\@spaces
  }{%
    Font Info: #1%
  }%
}
\c@errorcontextlines \errorcontextlines as a LATEX counter, so that it may be manipulated with
\setcounter (once it is defined :-)
181 \let\c@errorcontextlines\errorcontextlines
182 \c@errorcontextlines=-1

```

`\on@line` The message ‘on input line *n*’, if possible.

```

183 \ifnum\inputlineno=\m@ne
184   \let\on@line\empty
185 \else
186   \def\on@line{ on input line \the\inputlineno}
187 \fi

```

`\@warning` Older L<sup>A</sup>T<sub>E</sub>X messages. For the moment, these \let to the new message commands.  
`\@warning` They may be changed later, once only obsolete packages and classes contain them.  
`\@latexerr`

```

188 \let\@warning\@latex@warning
189 \let\@warning\@latex@warning@no@line
190 </2ekernel | autoload>
191 \global\let\@latexerr\@latex@error

```

`\@spaces` Four spaces.

```

192 <*2ekernel | autoload>
193 \def\@spaces{\space\space\space\space}
194 </2ekernel | autoload>

```

## 14.2 Specific errors

`\@eha` The more common error help messages.  
`\@ehb` 195 <\*2ekernel | def>  
`\@ehc` 196 \gdef\@eha{%
`\@ehd` 197 Your command was ignored.\MessageBreak
198 Type \space I <command> <return> \space to replace it %

```

199   with another command, \MessageBreak
200   or \space <return> \space to continue without it.}
201 \gdef\@ehb{%
202   You've lost some text. \space \@ehc}
203 \gdef\@ehc{%
204   Try typing \space <return> %
205   \space to proceed. \MessageBreak
206   If that doesn't work, type \space X <return> \space to quit.}
207 \gdef\@ehd{%
208   You're in trouble here. \space\@ehc}
209 
```

As `\latex@error` triggers the autoload, these definitions should not be needed in the autoload format, but just to be safe...

```

210 <autoload>
211 \let\@eha\@empty\let\@ehb\@empty\let\@ehc\@empty\let\@ehd\@empty
212 
```

Here are most of the error message-generating commands of L<sup>A</sup>T<sub>E</sub>X.

**\@autoerr** Make this autoload command robust, as it may be read in at unpredictable times.

```

213 <autoload>\def\@autoerr{\protect\@autoload{err}\protect}
```

**\@notdefinable** Error message generated in `\@ifdefinable` from calls to one of the commands `\newcommand`, `\newlength` or `\newtheorem` specifying an already-defined command name or one that begins `\end`....

```

214 \gdef\@notdefinable{%
215 (!autoload) \@latex@error{%
216 (!autoload) Command \@backslashchar reserved@a\space
217 (!autoload) already defined.\MessageBreak
218 (!autoload) Or name \@backslashchar @qend... illegal,
219 (!autoload) see p.192 of the manual}\@eha}
220 
```

**\@nolnerr** Generated by `\newline` and `\\"` when called in vertical mode.

```

221 \gdef\@nolnerr{%
222 (!autoload) \@latex@error{There's no line here to end}\@eha}
223 
```

**\@nocnterr** Generated by `\setcounter`, `\addtocounter` or `\newcounter` if applied to an undefined counter `(cnt)`.

**\@nocnterr** Obsolete error message generated in L<sup>A</sup>T<sub>E</sub>X2.09 by `\setcounter`, `\addtocounter` or `\newcounter` for undefined counter. DO NOT use for L<sup>A</sup>T<sub>E</sub>X 2<sub>&</sub> it MIGHT vanish! Use `\@nocnterr{(cnt)}` instead.

```

224 \gdef\@nocnterr#1{%
225 (!autoload) \@latex@error{No counter '#1' defined}\@eha}
226 
```

`(autoload) \@autoerr\@nocnterr}`

`227 \gdef\@nocnterr{\@nocnterr?}`

**\@ctrerr** Called when trying to print the value of a counter numbered by letters that's greater than 26.

```

228 \gdef\@ctrerr{%
229 (!autoload) \@latex@error{Counter too large}\@ehb}
230 
```

`(autoload) \@autoerr\@ctrerr}`

**\@nodocument** Error produced if paragraphs are typeset in the preamble.

```

231 (!def)\gdef\@nodocument{%
232 (!def) \@latex@error{Missing \protect\begin{document}}\@ehd}
```

\@badend	Called by \end that doesn't match its \begin. RmS 1992/08/24: added code to \@badend to display position of non-matching \begin. FMi 1993/01/14: missing space added.
	233 \gdef\@badend#1{% 234 (!autoload) \@latex@error{\protect\begin{\@currenvir}\@currenvline 235 (!autoload) \space ended by \protect\end{#1}}\@eha} 236 (autoload) \@autoerr\@badend}
\@badmath	Called by \[, \], \( or \) when used in wrong mode.
	237 \gdef\@badmath{% 238 (!autoload) \@latex@error{Bad math environment delimiter}\@eha} 239 (autoload) \@autoerr\@badmath}
\@toodeep	Called by a list environment nested more than six levels deep, or an enumerate or itemize nested more than four levels.
	240 \gdef\@toodeep{% 241 (!autoload) \@latex@error{Too deeply nested}\@ehd} 242 (autoload) \@autoerr\@toodeep}
\@badpoptabs	Called by \endtabbing when not enough \poptabs have occurred, or by \poptabs when too many have occurred.
	243 \gdef\@badpoptabs{% 244 (!autoload) \@latex@error{\protect\pushtabs\space and \protect\poptabs 245 (!autoload) \space don't match}\@ehd} 246 (autoload) \@autoerr\@badpoptabs}
\@badtab	Called by \>, \+ , \- or \< when stepping to an undefined tab.
	247 \gdef\@badtab{% 248 (!autoload) \@latex@error{Undefined tab position}\@ehd} 249 (autoload) \@autoerr\@badtab}
\@preamerr	This error is special: it appears in places where we normally have to \protect expansions. However, to prevent a protection of the error message itself (which would result in the message getting printed not issued on the terminal) we need to locally reset \protect to \relax.
	250 \gdef\@preamerr#1{% 251 \begingroup 252 \let\protect\relax 253 (*!autoload) 254 \@latex@error{\ifcase #1 Illegal character\or 255 Missing @-exp\or Missing p-arg\fi\space 256 in array arg}\@ehd 257 (/!autoload) 258 (autoload) \@autoerr\@preamerr{#1}% 259 \endgroup}
\@badlinearg	Occurs in \line and \vector command when a bad slope argument is encountered.
	260 \gdef\@badlinearg{% 261 (!autoload) \@latex@error{% 262 (!autoload) Bad \protect\line\space or \protect\vector 263 (!autoload) \space argument}\@ehb} 264 (autoload) \@autoerr\@badlinearg}
\@parmoderr	Occurs in a float environment or a \marginpar when encountered in inner vertical mode.
	265 \gdef\@parmoderr{% 266 (!autoload) \@latex@error{Not in outer par mode}\@ehb} 267 (autoload) \@autoerr\@parmoderr}

\@fltovf	Occurs in float environment or \marginpar when there are no more free boxes for storing floats.
	268 \gdef\@fltovf{% 269 < autoload> \@latex@error{Too many unprocessed floats}\@ehb} 270 < autoload> \@autoerr\@fltovf}
\@latexbug	Occurs in output routine. This is bad news.
	271 \gdef\@latexbug{% 272 < autoload> \@latex@error{This may be a LaTeX bug}{Call for help}} 273 < autoload> \@autoerr\@latexbug}
\@badcrerr	This error was removed and replaced by \nolnerr.
	274 \% \def\@badcrerr {\@latex@error{Bad use of \protect\\}\@ehc}
\@noitemerr	\addvspace or \addpenalty was called when not in vmode. Probably caused by a missing \item.
	275 \gdef\@noitemerr{% 276 < autoload> \@latex@error{Something's wrong--perhaps a missing % 277 < autoload> \protect\item}\@ehc} 278 < autoload> \@autoerr\@noitemerr}
\@notprerr	A command that can be used only in the preamble appears after the command \begin{document}.
	279 \gdef\@notprerr{% 280 < autoload> \@latex@error{Can be used only in preamble}\@eha} 281 < autoload> \@autoerr\@notprerr}
\@inmatherr	Issued by commands that don't work correctly within math (like \item). There is no real error recovery happening, e.g., the user might get additional errors afterwards.
	282 \gdef\@inmatherr#1{% 283 \relax 284 \ifmmode 285 < autoload> \@latex@error{Command \protect#1 invalid in math mode}\@ehc} 286 < autoload> \@autoerr\@inmatherr#1% 287 \fi}
\@invalidchar	An error for use with invalid characters. This is commented out, since we decided to use chatcode 15 instead.
	288 \% \def\@invalidchar{\@latex@error{Invalid character in input}\@ehc}

As well as the above error commands some error messages are directly coded to save space. The Messages alrerady present in L<sup>A</sup>T<sub>E</sub>X2.09 included:

Environment --- undefined

Issued by \begin for undefined environment.

tab overflow

Occurs in \= when maximum number of tabs exceeded.

\< in mid line

Occurs in \< when it appears in middle of line.

Float(s) lost

In output routine, caused by a float environment or \marginpar occurring in inner vertical mode.

# File h

## ltpar.dtx

### 15 Paragraphs

This section of the kernel declares the commands used to set `\par` and `\everypar` when ever their function needs to be changed for a long time.

#### 15.1 Implementation

There are two situations in which `\par` may be changed:

- Long-term changes, in which the new value is to remain in effect until the current environment is left. The environments that change `\par` in this way are the following:
  - All list environments (itemize, quote, etc.)
  - Environments that turn `\par` into a noop: tabbing, array and tabular.
- Temporary changes, in which `\par` is restored to its previous value the next time it is executed. The following are all such uses.
  - `\end` when preceded by `\@endparenv`, which is called by `\endtrivlist`
  - The mechanism for avoiding page breaks and getting the spacing right after section heads.

`\@setpar` To permit the proper interaction of these two situations, long-term changes are made by the `\@setpar{\{VAL\}}` command. It's function is:

To set `\par`. It `\def`'s `\par` and `\@par` to `\{VAL\}`.

`\@restorepar` Short-term changes are made by the usual `\def\par` commands. The original values are restored after a short-term change by the `\@restorepar` commands.

`\@par` `\@par` always is defined to be the original TeX `\par`.

`\everypar` `\everypar` is changed only for the short term. Whenever `\everypar` is set non-null, it should restore itself to null when executed.

The following commands change `\everypar` in this way:

- `\item`
- `\end` when preceded by `\@endparenv`, which is called by `\endtrivlist`
- `\minipage`

When dealing with `\par` and `\everypar` remember the following two warnings:

1. Commands that make short-term changes to `\par` and `\everypar` must take account of the possibility that the new commands and the ones that do the restoration may be executed inside a group. In particular, `\everypar` is executed inside a group whenever a new paragraph begins with a left brace. The `\everypar` command that restores its definition should be local to the current group (in case the command is inside a minipage used inside someplace where `\everypar` has been redefined). Thus, if `\everypar` is redefined to do an `\everypar{\{}` it could take several executions of `\everypar` before the restoration "holds". This usually causes no problem. However, to prevent the extra executions from doing harm, use a global switch to keep anything harmful in the new `\everypar` from being done twice.
2. Commands that change `\everypar` should remember that `\everypar` might be supposed to set the following switches false:

- `@nobreak`
- `@minipage`

they should do the setting if necessary.

```
1 <*2ekernel>
2 \message{par,}
```

`\@setpar` Initiate a long-term change to `\par`.

```
3 \def\@setpar#1{\def\par{\#1}\def\@par{\#1}}
```

The default definition of `\@par` will ensure that if `\@restorepar` defines `\par` to execute `\@par` it will redefine itself to the primitive `\@@par` after one iteration.

```
4 \def\@par{\let\par\@@par\par}
5 </2ekernel>
```

`\@restorepar` Restore from a short-term change to `\par`.

```
6 \def\@restorepar{\def\par{\@par}}
```

# File i

## ltspace.dtx

### 16 Spacing

This section deals with spacing, and line- and page-breaking.

#### 16.1 User Commands

```
\nopagebreak  [i] : i = 0,...,4.  
                  Default argument = 4. Puts a penalty into the vertical list output as follows:  
0 : penalty = 0  
1 : penalty = \@lowpenalty  
2 : penalty = \@medpenalty  
3 : penalty = \@highpenalty  
4 : penalty = 10000  
\pagebreak  [i] : same as except negatives of its penalty  
\linebreak  [i] : analog of the above  
\nolinebreak [i] : analog of the above  
\samepage   : inhibits page breaking most places by setting the following penalties to 10000:  
\interlinepenalty  
\postdisplaypenalty  
\interdisplaylinepenalty  
\beginparpenalty  
\endparpenalty  
\itempenalty  
\secpenalty  
\interfootnotelinepenalty  
\>  : initially defined to be \newline  
\>[length] : initially defined to be \vspace{length}\\newline  
Note: \\* adds a \\vadjust{\\penalty 10000}  
      OBSOLETE COMMANDS (which never made it into the manual):  
      \\obeycr : defines jCR_ == \\relax  
      \\restorecr : restores jCR_ to its usual meaning.
```

#### 16.2 Chris' comments

There are several aspects of the handling of space in horizontal mode that are inconsistent or do not work well in some cases. These are largely concerned with ignoring the effect of space tokens that would otherwise typeset an inter-word space.

Negating the effect of such space tokens is achieved by two mechanisms:

- `\unskip` is used to remove the glue just added by a space that has already had its effect; it is sometimes invoked after an `\ifdim` test on `\lastskip` (see below);
- `\ignorespaces` is used to ignore space-tokens yet to come.

The test done on `\lastskip` is sometimes for equality with zero and sometimes for being positive. Recall also that the test is only on the natural length of the glue and that no glue cannot be distinguished from glue whose natural length is zero: to summarise, a pretty awful test. It is not clear why these tests are not all the same; I think that they should all be for equality. One place where `\unskip` is often used is just before a `\par` (which itself internally does an `\unskip`) and one bit of code (in `\@item`) even has two `\unskips` before a `\par`. These uses may be fossil code but if they are necessary, maybe `\@killglue` would be even safer.

Such removal of glue by `\unskip` may sometimes have the wrong result, removing not the glue from a space-token but other explicit glue; this is sometimes not what is intended.

A common way to prevent such removal is to add an `\hskip\z@` after the glue that should not be removed. This protects that glue against one `\unskip` with no test but not against more than one. It does work for ‘tested `\unskip`s’. This is used by `\hspace*` but not by `\hspace`; this is inconsistent as the star is supposed to prevent removal only at the beginning of a line, not at the end, or in a tabular, etc.

If this reason for removing glue were the only consideration then a tested-`\unskip` and protection by `\hskip\z@` would suffice but would need to be consistently implemented.

However, the class of invisibles, commands and environments tries to be even cleverer: one of these tries to leave only one inter-word space whenever there is one before it and one after it; and it does this quite well.

But problems can arise when there is not a space-token on both sides of it; in particular, when an invisible appears at the beginning or end of a piece of text the method still leaves one space token whereas usually in these cases it should leave none.

Also, the current rules do not work well when more than one such command appears consecutively, separated by space-tokens; it leaves glue between every other invisible.

There is also a question about what these commands should do when they occur next to spaces that do not come from space tokens but, for example, from `\hspace`. Should they still produce ‘just one space’? If so, which one? It is good to note that the manual is sufficiently cautious about invisibles that we are not obliged to make anything work.

Another interesting side-road to explore is whether the space-tokens either side of an `\hspace{...}` should be ignored.

One alternative to the current algorithm that is often suggested is that all glue around the invisible should be consolidated into a space after it (usually without stating how much glue should be put there). The command `\nolinebreak` is implemented this way (and `\linebreak` should also be). This does not work correctly for the following common case:

```
... some text
\index{some-word}
some-word and more text.
```

This is optimal coding since it is normal to index a word that gets split across a page-break on its starting page. This would, on the other hand, fix another common (and documented) failure of the current system: when the invisible is the last thing in a paragraph the space before it is not removed and, worse, it is also hidden from the paragraph-ending mechanism so that an ‘empty’ line can be created at the end of the paragraph.

Another deficiency (I think) of the current system is that the following is treated as having the `\index` command between the paragraphs, which is probably not what the author intended (since there is no empty line after it).

```
\index{beginnings}
Beginnings of paragraphs ...
```

I know of no algorithm that will handle satisfactorily even all the most common cases; note that it could be that the best algorithm may be different for different invisibles since, for example, the common uses and expected behaviour of `\index`, `\marginpar`, `\linebreak`, `\pagebreak` and `\vspace` are somewhat different. [For example, is `\vspace` ever used in the middle of a paragraph?]

One method that can (and is) used to make invisible commands produce no space when used at the beginning of text is to put in some glue that is nearly enough the same as no glue or glue of zero length in all respects except for the precise test for not being exactly equal to zero; examples of such glue are `\hskip 1sp` and, possibly better but more complex, `\hskip -1sp \hskip 1sp`. However, this only works when it is known that user-supplied text is about to start.

Some similar concerns apply to the handling of space and penalties in vertical mode; there is an extra hurdle here as `\unskip` does not work on the main vertical list. The complexity of the tests done by `\addvspace` have never been explained.

The implementation of space hacks etc for vertical mode is another major area that needs further attention; my earlier experiments did not produce much improvement over the current unsatisfactory situation.

One particular problem is what happens when the following very natural coding is used (part of the problem here is that this looks like an hmode problem, but it is not):

```
... end of text.

\begin{enumerate}
  \item \label{item:xxx} Item text.
\end{enumerate}
```

### 16.3 Some immediate actions

- Fix bug in `\linebreak`.
- Fix bug in `\*\*`.
- Reimplement `\\", etc`, removing extra `\vadjusts` and getting better error trapping (this seems to involve a lot more tokens).
- Investigate whether `\\", etc` need to be errors in vmode; I think that they could be noops (maybe with a warning).
- Make all(?) `\unskips` include test for zero skip (rather than other tests or no test).
- Consider replacing `\hskip 1sp` by something better (here called an ‘infinitesimal’ skip).
- Look at all `\hskip\z@` (or similar) to see if they should be changed to an ‘infinitesimal’ skip.
- Resolve the inconsistency between `\hskip` and `\hskip*`.
- Remove unnecessary `\unskips`.
- Investigate and rationalise the ‘newline’ code.
- Find better algorithms for all sorts of things or, easier(?), fix `TEX` itself.

### 16.4 The code

```
1 <*2ekernel>
2 \message{spacing,}

\pagebreak
\nopagebreak 3 \def\pagebreak{\testopt{\no@pgbk-}4}
4 \def\nopagebreak{\testopt{\no@pgbk4}}
```

```

\@no@pgbk
5 \def\@no@pgbk #1[#2]{%
6   \ifvmode
7     \penalty #1\@getpen{#2}%
8   \else
9     \@bsphack
10    \vadjust{\penalty #1\@getpen{#2}}%
11    \@esphack
12  \fi}

\linebreak
\nolinebreak 13 \def\linebreak{\@testopt{\@no@lnbk-}4}
14 \def\nolinebreak{\@testopt{\@no@lnbk4}{}

\@no@lnbk
15 \def\@no@lnbk #1[#2]{%
16   \ifvmode
17     \nolnerr
18   \else
19     \tempskipa\lastskip
20     \unskip
21     \penalty #1\@getpen{#2}%
22     \ifdim\tempskipa>\z@
23       \hskip\tempskipa
24       \ignorespaces
25     \fi
26   \fi}

\samepage
27 \def\samepage{\interlinepenalty\@M
28   \postdisplaypenalty\@M
29   \interdisplaylinepenalty\@M
30   \beginparpenalty\@M
31   \endparpenalty\@M
32   \itempenalty\@M
33   \secpenalty\@M
34   \interfootnotelinepenalty\@M}

\\ The purpose of the new code is to fix a few bugs; however, it also attempts to
optimize the following, in order of priority:
1. efficient execution of plain \\
2. efficient execution of \\[...];
3. memory use;
4. name-space use.

The changes should make no difference to the typeset output. It appears to be safe
to use \reserved@e and \reserved@f here (other reserved macros are somewhat
disastrous).

These changes made \newline even less robust than it had been, so now it is
explicitly robust, like \\.

\@normalcr The internal definition of the ‘normal’ definition of \\.
35 \DeclareRobustCommand\\{%
36   \let \reserved@e \relax
37   \let \reserved@f \relax
38   \@ifstar{\let \reserved@e \vadjust \let \reserved@f \nobreak
39             \xnewline}%
40             \xnewline}
41 \expandafter\let\expandafter\@normalcr
42   \csname\expandafter\string\\ \endcsname

```

<code>\newline</code>	A simple form of the ‘normal’ definition of <code>\`\\`</code> .
	43 <code>\DeclareRobustCommand{\newline}{\@normalcr\relax}</code>
<code>\@xnewline</code>	
	44 <code>\def{\@xnewline}{\ifnextchar[%]{\@newline}{\@gnewline\relax}}</code>
<code>\@newline</code>	
	47 <code>\def{\@newline}[#1]{\let \reserved@e \vadjust{\@gnewline{\vskip #1}}}</code>
<code>\@gnewline</code>	The <code>\nobreak</code> added to prevent null lines when <code>\`\\`</code> ends an overfull line. Change made 24 May 89 as suggested by Frank Mittelbach and Rainer Schöpf
	49 <code>\def{\@gnewline}[#1]{\ifvmode{\@nolnerr}{\else{\unskip \reserved@e {\reserved@f#1}\nobreak \hfil \break}}\fi}</code>
<code>\@getpen</code>	
	55 <code>\def{\@getpen}[#1]{\ifcase #1 \z@ \or \@lowpenalty \or \@medpenalty \or \@highpenalty \else \OM\fi}</code>
<code>\if@nobreak</code>	Switch used to avoid page breaks caused by <code>\label</code> after a section heading, etc. It should be <b>GLOBALLY</b> set true after the <code>\nobreak</code> and <b>globally</b> set false by the next invocation of <code>\everypar</code> . Commands that reset <code>\everypar</code> should globally set it false if appropriate.
	58 <code>\def{\@nobreakfalse}{\global\let\if@nobreak\iffalse}</code> 59 <code>\def{\@breaktrue}{\global\let\if@nobreak\iftrue}</code> 60 <code>\@nobreakfalse</code>
<code>\@savsk</code>	Registers used to save the space factor and last skip.
<code>\@savsf</code>	61 <code>\newdimen{\@savsk}</code> 62 <code>\newcount{\@savsf}</code>
<code>\@bsphack</code>	<code>\@bsphack</code> and <code>\@esphack</code> used by macros such as <code>\index</code> and <code>\begin{@float} ... \end{@float}</code> that want to be invisible — i.e., not leave any extra space when used in the middle of text. Such a macro should begin with <code>\@bsphack</code> and end with <code>\@esphack</code> . The macro in question should not create any text, nor change the mode. Before giving the current definition we give an extended definition that is currently not used (because it doesn’t work as advertised:-) These are generalised hacks which attempt to do sensible things when ‘invisible commands’ appear in vmode too. They need to cope with space in both hmode (plus spacefactor) and vmode, and also cope with breaks etc. In vmode this means ensuring that any following <code>\addvspace</code> , etc sees the correct glue in <code>\lastskip</code> . In fact, these improved versions should be used for other cases of ‘whatsits, thingies etc’ which should be invisible. They are only for commands, not environments (see notes on <code>\@Esphack</code> ). BTW, anyone know why the standard hacks are surrounded by <code>\ifmmode\else</code> rather than simply <code>\ifhmode</code> ? And are there any cases where saving the spacefactor is essential? I have some extensions where it is, but it does not appear to be so in the standard uses.
	<code>\def{\@bsphack}{%</code>

```

\relax \ifvmode
  \@savsk \lastskip
  \ifdim \lastskip=\z@
  \else
    \vskip -\lastskip
  \fi
\else
  \ifhmode
    \@savsk \lastskip
    \@savesf \spacefactor
  \fi
\fi
}

```

I think that, in vmode, it is the safest to put in a `\nobreak` immediately after such things since writes, inserts etc followed by glue give valid breakpoints and, in general, it is possible to create breaks but impossible to destroy them.

```

\def \@esphack{%
\relax \ifvmode
  \nobreak
  \ifdim \@savsk=\z@
  \else
    \vskip\@savsk
  \fi
\else
  \ifhmode
    \spacefactor \@savesf
    \ifdim \@savsk>\z@
      \ignorespaces
    \fi
  \fi
\fi
}

```

For the moment we are going to ignore the vertical versions until they are correct.

```

63 \def\@bsphack{%
64   \relax
65   \ifhmode
66     \@savsk\lastskip
67     \@savesf\spacefactor
68   \fi}

\@esphack Companion to \@bsphack.

69 \def\@esphack{%
70   \relax
71   \ifhmode
72     \spacefactor\@savesf
73     \ifdim\@savsk>\z@
74       \ignorespaces
75     \fi
76   \fi}

```

`\@Eshack` A variant of `\@esphack` that sets the `@ignore` switch to true (as `\@esphack` used to do previously). This is currently used only for floats and similar environments.

```

77 \def\@Eshack{%
78   \relax
79   \ifhmode
80     \spacefactor\@savesf
81     \ifdim\@savsk>\z@
82       \@ignoretrue

```

```

83      \ignorespaces
84      \fi
85  \fi}

```

\@vbsphack Another variant which is useful for invisible things which should not live in vmode (this is how some people feel about marginals).

If it occurs in vmode then it enters hmode and ensures that \@savsk is nonzero so that the \ignorespaces is put in later. It is not used at present.

```

\def \@vbsphack{ %
  \relax \ifvmode
    \leavevmode
    \@savsk 1sp
    \@savesf \spacefactor
  \else
    \ifhmode
      \@savsk \lastskip
      \@savesf \spacefactor
    \fi
  \fi
}

```

## 16.5 Vertical spacing

LATEX supports the plain TeX commands \smallskip, \medskip and \bigskip. However, it redefines them using \vspace instead of \vskip.

Extra vertical space is added by the command \addvspace{\*skip*}, which adds a vertical skip of *skip* to the document. The sequence \addvspace{\*s1*} \addvspace{\*s2*} is equivalent to \addvspace{\*maximum of s1, s2*}.

\addvspace should be used only in vertical mode, and gives an error if it's not. The \addvspace command does *not* add vertical space if @minipage is true. The minipage environment uses this to inhibit the addition of extra vertical space at the beginning.

Penalties are put into the vertical list with the \addpenalty{\*penalty*} command. It works properly when \addpenalty and \addvspace commands are mixed.

The @nobreak switch is set true used when in vertical mode and no page break should occur. (Right now, it is used only by the section heading commands to inhibit page breaking after a heading.)

```

\addvspace{SKIP} ==
BEGIN
  if vmode
    then if @minipage
      else if \lastskip =0
        then \vskip SKIP
      else if \lastskip < SKIP
        then \vskip -\lastskip
          \vskip SKIP
        else if SKIP < 0 and \lastskip >= 0
          then \vskip -\lastskip
            \vskip \lastskip + SKIP
        fi      fi      fi      fi
    else useful error message (CAR).
  fi
END

```

\@xaddvskip Internal macro for \vspace handling the case that space has previously been added.

```
86 \def\@xaddvskip{%
```

```

87  \ifdim\lastskip<\@tempskipb
88    \vskip-\lastskip
89    \vskip\@tempskipb
90  \else
91    \ifdim\@tempskipb<\z@
92      \ifdim\lastskip<\z@
93        \else
94          \advance\@tempskipb\lastskip
95          \vskip-\lastskip
96          \vskip \@tempskipb
97        \fi
98      \fi
99    \fi}

```

**\addvspace** Add vertical space taking into account space already added, as described above.

```

100 \def\addvspace#1{%
101   \ifvmode
102     \if@minipage\else
103       \ifdim \lastskip =\z@
104         \vskip #1\relax
105       \else
106         \@tempskipb#1\relax
107         \@xaddvskip
108       \fi
109     \fi
110   \else
111     \noitemerr
112   \fi}

```

**\addpenalty**

```

113 \def\addpenalty#1{%
114   \ifvmode
115   \if@minipage
116   \else
117     \if@nobreak
118     \else
119       \ifdim\lastskip=\z@
120         \penalty#1\relax
121       \else
122         \@tempskipb\lastskip
123         \vskip -\lastskip
124         \penalty#1%
125         \vskip\@tempskipb
126       \fi
127     \fi
128   \fi
129   \else
130     \noitemerr
131   \fi}

```

**\vspace** The new code for these commands depends on the following facts:

- \@vspace** **\@vspacer**
- The value of prevdepth is changed only when a box or rule is created and added to a vertical list;
  - The value of prevdepth is used only when a box is created and added to a vertical list;
  - The value of prevdepth is always local to the building of one vertical list.

```

132 \DeclareRobustCommand\vspace{\@ifstar\@vspacer\@vspace}
133 \def\@vspace #1{%
134   \ifvmode

```

```

135      \vskip #1
136      \vskip\z@skip
137  \else
138      \@bsphack
139      \vadjust{\@restorepar
140          \vskip #1
141          \vskip\z@skip
142      }%
143      \@esphack
144  \fi}

145 \def\@vspacer#1{%
146   \ifvmode
147     \dimen@\prevdepth
148     \hrule \height\z@
149     \nobreak
150     \vskip #1
151     \vskip\z@skip
152     \prevdepth\dimen@
153  \else
154     \@bsphack
155     \vadjust{\@restorepar
156         \hrule \height\z@
157         \nobreak
158         \vskip #1
159         \vskip\z@skip}%
160     \@esphack
161  \fi}

\smallskip
\medskip 162 \def\smallskip{\vspace\smallskipamount}
\bigskip 163 \def\medskip{\vspace\medskipamount}
164 \def\bigskip{\vspace\bigskipamount}

\smallskipamount
\medskipamount 165 \newskip\smallskipamount \smallskipamount=3pt plus 1pt minus 1pt
\bigskipamount 166 \newskip\medskipamount \medskipamount =6pt plus 2pt minus 2pt
167 \newskip\bigskipamount \bigskipamount =12pt plus 4pt minus 4pt

```

## 16.6 Horizontal space (and breaks)

`\nobreakdashes` This idea is borrowed from the `amsmath` package but here we define a robust command.

This command is a low-level command designed for use only before hyphens or dashes (such as `-`, `--`, or `---`).

It could probably be better implemented: it may need its own private token register and temporary command.

Setting the hyphen in a box and then unboxing it means that the normal penalty will not be added after it—and if the penalty is not there a break will not be taken (unless an explicit penalty or glue follows, thus the final `\nobreak`).

Note that even if it is not followed by a `'-`, it still leaves vmode and sets the spacefactor; so use it carefully!

```

168 \DeclareRobustCommand{\nobreakdashes}{%
169   \leavevmode
170   \toks@{}%
171   \def\reserved@a##1{\toks@\expandafter{\the\toks@-}%
172           \futurelet\@let@token \reserved@b}%
173   \def\reserved@b {\ifx\@let@token -%
174           \expandafter\reserved@a
175       \else
176           \setbox\z@\hbox{\the\toks@\nobreak}%

```

```

177          \unhbox\z@%
178          \spacefactor\sfcodes`-
179          \fi}%
180 \futurelet\@let@token \reserved@b
181 }

\nobreakspace \xobeysp This is a robust command that produces a horizontal space at which, in paragraph-mode, a line-break is not possible. We then define an active ~ to expand to it since this is the documented behaviour of ~. One reason for introducing this is that some 8-bit input encodings have a slot for such a space and we do not want to use active characters as the LATEX internal commands.
The braces in the definition of ~ are needed to ensure that a following space is preserved when reading to/from internal files.
We need to keep \xobeysp as it is widely used; so here it is let to the non-robust command \nobreakspace .
182 \DeclareRobustCommand{\nobreakspace}{%
183   \leavevmode\nobreak\ }
184 \catcode `~=13
185 \def~{\nobreakspace{}}
186 \expandafter\let\expandafter\@xobeysp\csname nobreakspace \endcsname

\, Used in paragraph mode produces a \thinspace. It has the ordinary definition in math mode. Useful for quotes inside quotes, as in ‘‘\,‘Foo’, he said.’’
187 \DeclareRobustCommand{\,}{%
188   \relax\ifmmode\mskip\thinmuskip\else\thinspace\fi
189 }

\@ Placed before a '.', makes it a sentence-ending period. Does the right thing for other punctuation marks as well. Does this by setting spacefactor to 1000.
190 \def\@{\spacefactor\@m}

\hskip
191 \DeclareRobustCommand\hskip{\@ifstar\hskip\@hskip\@hskip}

\@hskip
192 \def\@hskip#1{\hskip #1\relax}

\@hskip\@hskip extra \hskip Opt added 1985/17/12 to guard against a following \unskip \relax added 13 Oct 88 for usual TEX lossage replaced both changes by \hskip\z@skip 27 Nov 91
193 \def\@hskip#1{\vrule\@width\z@\nobreak
194           \hskip #1\hskip \z@skip}

\fill
195 \newskip\fill
196 \fill = 0pt plus 1fill

\stretch
197 \def\stretch#1{\z@ \@plus #1fill\relax}

\thinspace
\negthinspace 198 \def\thinspace{\kern .16667em }
\enspace 199 \def\negthinspace{\kern-.16667em }
200 \def\enspace{\kern.5em }

\enskip
\quad 201 \def\enskip{\hskip.5em\relax}
\quad 202 \def\quad{\hskip1em\relax}
203 \def\quad{\hskip2em\relax}

```

**\obeycr** The following definitions will probably get deleted or moved to compatibility mode  
**\restorecr** soon.

```
204 {\catcode`^^M=13 \gdef\obeycr{\catcode`^^M13 \def^^M{\relax}%
205     \@gobblecr}%
206 {\catcode`^^M=13 \gdef\@gobblecr{\ifnextchar
207     \@gobble\ignorespaces}%
208 \gdef\restorecr{\catcode`^^M5 }}

209 </2ekernel>
```

# File j

## ltlogos.dtx

### 17 Logos

Various logos are defined here.

- \TeX The \TeX logo, adjusted so that a full stop after the logo counts as ending a sentence.

```
1 {*2ekernel}
2 \def\TeX{T\kern-.1667em\lower.5ex\hbox{E}\kern-.125emX\@}
```

- \LaTeX The \LaTeX logo.

```
3 \DeclareRobustCommand{\LaTeX}{L\kern-.36em%
4   {\sbox{z@ T}%
5    \vbox to\ht{z@}{\hbox{\check@mathfonts
6           \fontsize\sf@size{z@%
7           \math@fontsfalse\selectfont
8           A}}%
9           \vss}%
10      }%
11      \kern-.15em%
12      \TeX}
```

- \LaTeXe The \LaTeX<sub>2ε</sub> logo as proposed by A-W designers.

```
13 \DeclareRobustCommand{\LaTeXe}{\mbox{\m@th
14   \if b\expandafter\@car\f@series\@nil\boldmath\fi
15   \LaTeX\kern.15em2_{\textstyle\varepsilon}}
16 
```

# File k

## ltfiles.dtx

### 18 File Handling

The following user commands are defined in this part:

\document	(ie \begin{document})
	Reads in the .AUX files and \catcode's @ to 12.
\nofiles	Suppresses all file output by setting \c@filesw false.
\includeonly	{(NAME1, ... ,NAMEn)}
	Causes only parts NAME1, ... ,NAMEn to be read by their \include commands.
	Works by setting partsw true and setting \c@partlist to NAME1, ... ,NAMEn.
\include	{(NAME)}
	Does an \input NAME unless \c@partsw is true and NAME is not in \c@partlist.
	If \c@filesw is true, then it directs .AUX output to NAME.AUX, including a checkpoint at the end.
\input	{(NAME)}
	The same as TeX's \input, except it allows optional braces around the file name.
	In L <sup>A</sup> T <sub>E</sub> X 2 <sub><math>\epsilon</math></sub> , it also avoids the primitive 'missing file' error, if the file can not be found.
\IfFileExists	{(NAME)}{(then)}{(else)}
	If the file exists on the system, execute <i>then</i> otherwise execute <i>else</i> .
\InputIfFileExists	{(NAME)}{(then)}{(else)}
	If the file exists on the system, execute <i>then</i> and input <i>NAME</i> otherwise execute <i>else</i> .

1 <\*2ekernel | autoload>  
2 \message{files,}

#### VARIABLES, SWITCHES AND INTERNAL COMMANDS:

\c@mainaux	: Output file number for main .AUX file.
\c@partaux	: Output file number for current part's .AUX file.
\c@auxout	: Either \c@mainout or \c@partout, depending on which .AUX file output goes to.
\c@input{foo}	: If file foo exists, then \input's it, otherwise types a warning message.
@filesw	: Switch – set false if no .AUX, .TOC, .IDX etc files are to be written
@partsw	: Set true by a \includeonly command.
\c@partlist	: Set to the argument of the \includeonly command.
\cp@FOO	: The checkpoint for \include'd file FOO.TEX, written by \c@writeckpt at the end of file FOO.AUX

```
\includeonly{FILELIST} ==
BEGIN
  \c@partsw := T
  \c@partlist := FILELIST
END

\include{FILE} ==
BEGIN
  \clearpage
  if \c@filesw = T
```

```

        then \immediate\write\@mainaux{\string\@input{FILE.AUX}}
fi
if \@partsw = T
then \@tempswa := F
    \reserved@b == FILE
    for \reserved@a := \@partlist
        do if eval(\reserved@a) = eval(\reserved@b)
            then \@tempswa := T           fi
        od
    fi

if \@tempswa = T
then \@auxout := \@partaux
    if \@files w = T
        then \immediate\openout\@partaux{FILE.AUX}
            \immediate\write\@partaux{\relax}
        fi
    \@input{FILE.TEX}
    \clearpage
    \@writeckpt{FILE}
    if @files w then \closeout\@partaux fi
    \@auxout := \@mainaux
else \cp@FILE
fi
END

\@writeckpt{FILE} ==
BEGIN
if \@files w = T
    \immediate\write on file \@partaux:
        \@setckpt{FILE}{% }
for \reserved@a := \cl@ckpt
    do \immediate\write on file \@partaux:
        \global\string\setcounter

{eval(\reserved@a)}{eval(\c@eval(\reserved@a))}
    od
    \immediate\write on file \@partaux: %
fi
END

\@setckpt{FILE}{LIST} ==
BEGIN
G \cp@FILE := LIST
END

INITIALIZATION
\@tempswa := T

\@inputcheck Allocate read stream for testing and output stream.
\@unused 3 \newread\@inputcheck
          4 \newwrite\@unused

\@mainaux
\@partaux 5 \newwrite\@mainaux
          6 \newwrite\@partaux

```

```

\if@filesw
\if@partsw 7 \newif\if@filesw \o@fileswtrue
8 \newif\if@partsw \o@partswfalse

\o@clubpenalty This stores the current normal (non-infinite) value of \clubpenalty; it should
therefore be reset whenever the normal value is changed (as in the bibliography
in the standard styles).
9 \newcount\o@clubpenalty
10 \o@clubpenalty \clubpenalty

\document Cancel the \begingroup from \begin
11 \def\document{\endgroup
If some options on \documentclass haven't been used by any package we will now
give a warning since this is most certainly a misspelling.
12 \ifx\o@unusedoptionlist\empty\else
13   \o@latex@warning@no@line{Unused global option(s):`^`J%
14   \o@spaces[\o@unusedoptionlist]}%
15 \fi
16 \o@colht\textheight
17 \o@colroom\textheight \vsize\textheight
18 \columnwidth\textwidth
19 \o@clubpenalty\clubpenalty
20 \if@twocolumn
21   \advance\columnwidth -\columnsep
22   \divide\columnwidth\tw@ \hsize\columnwidth \o@firstcolumntrue
23 \fi
24 \hsize\columnwidth \linewidth\hsize
25 \begingroup\floatplacement\o@dblfloatplacement
26   \makeatletter\let\o@writefile\o@gobbletwo

27   \global \let \o@multiplelabels \relax
28   \o@input{\jobname.aux}%
29 \endgroup
30 \if@filesw
31   \immediate\openout\o@mainaux\jobname.aux
32   \immediate\write\o@mainaux{\relax}%
33 \fi

```

Dateline 1991/03/26: FMi added \process@table to support NFSS; This will also work with old lfonts if no other style defines \process@table. The following line forces the initialization of the math fonts.

```

34 \process@table
35 \let\glb@currsize\empty %% Force math initialization.

36 \normalsize
37 \everypar{}%

```

So that punctuation in headings is not disturbed by verbatim or other local changes to the space factor codes, save the document default here. This will be locally reset by the output routine. For special cases a class may want to define \normalsfcodes directly, in case that definition will be used. (This is an old bug, problem existed in LATEX2.0x and plain TeX.)

```

38 \ifx\normalsfcodes\empty
39   \ifnum\sfcode`.=\o@m
40     \let\normalsfcodes\frenchspacing
41   \else
42     \let\normalsfcodes\nonfrenchspacing
43   \fi
44 \fi

```

Way back in 1991 (08/26) FMi & RmS set the `\@noskipsec` switch to true in the preamble and to false here. This was done to trap lists and related text in the preamble but it does not catch everything; hence Change 1.1g was introduced.

```
45  \@noskipsecfalse
46  \let \@refundefined \relax
```

Just before disabling the preamble commands we execute the begin document hook which contains any code contributed by `\AtBeginDocument`. Also disable the gathering of the file list, if no `\listfiles` has been issued. `\AtBeginDocument` is redefined at this point so that and such commands that get into the hook do not chase their tail...

```
47  \let\AtBeginDocument\@firstofone
48  \@begindocumenthook
```

Most of the following assignments will be done globally in case the user adds something like `\begin{multicols}` to the document hook, i.e. starts are group in `\begin{document}`.

Since a value of exactly 0pt for `\topskip` causes `\twocolumn[]` to misbehave, we add this check, hoping that it will not cause any problems elsewhere.

```
49  \ifdim\topskip<1sp\global\topskip 1sp\relax\fi
50  \global\@maxdepth\maxdepth
51  \global\let\@begindocumenthook\@undefined
52  \ifx\@listfiles\@undefined
53    \global\let\@filelist\relax
54    \global\let\@addtofilelist\@gobble
55  \fi
```

At the very end we disable all preamble commands. This has to happen after the begin document hooks was executed so that this hook can still use such commands.

```
56  \gdef\do##1{\global\let ##1\@notprerr}%
57  \@preamblecmds
```

The next line saves tokens and also allows `\@nодокумент` to be used directly to trap preamble errors.

```
58  \global\let \@nодокумент \relax
```

The next line is a pure safety measure in case a do list is ever expanded at the wrong place. In addition it will save a few tokens to get rid of the above definition.

```
59  \global\let\do\noexpand
```

Use of `\AtBeginDocument` hook might mean that we are already in horizontal mode, so ignore the space after `\begin{document}`.

```
60  \ignorespaces}
61  \@onlypreamble\document
```

`\normalsfcodes` The setting of `\@empty` is just a flag. This command may be defined in a class or package file. If it is still `\@empty` at `\begin{document}` it will be defined to be `\frenchspacing` or `\nonfrenchspacing`, depending on which of those appears to be in effect at that point.

```
62 \let\normalsfcodes\@empty
```

`\nofiles` Set `\@fileswfalse` which suppresses the places where L<sup>A</sup>T<sub>E</sub>X makes `\immediate` writes. The `\makeindex` and `\maketoc` are disabled. `\protected@write` is redefined not to write to the file specified, but rather to write a blank line to the log file. This ensures that a `\whatsit` node is still created, and so spacing is not affected by the `\nofiles` command; to ensure this more generally, the `\if@nobreak` test is needed.

```
63 \def\nofiles{%
64   \@fileswfalse
65   \typeout{No auxiliary output files.^~J}%
}
```

```

66 \long\def\protected@write##1##2##3%
67   {\write\m@ne{}\if@nobreak\ifvmode\nobreak\fi\fi}%
68 \let\makeindex\relax
69 \let\maketitle\relax
70 \onlypreamble\nofiles

\protected@write This takes three arguments: an output stream, some initialization code, and some text to write. It then writes this, with appropriate handling of \protect and \thepage.
71 \long\def \protected@write#1#2#3{%
72   \begingroup
73   \let\thepage\relax
74   #2%
75   \let\protect\@unexpandable@protect
76   \edef\reserved@a{\write#1{#3}}%
77   \reserved@a
78   \endgroup
79   \if@nobreak\ifvmode\nobreak\fi\fi
80 }

81 \let\@auxout=\@mainaux

\includeonly
82 \def\includeonly#1{%
83   \partswtrue
84   \edef\@partlist{\zap@space#1 \emptyset}%
85 \onlypreamble\includeonly

\include In the definition of \include, \def\reserved@b changed to \edef\reserved@b to be consistent with the \edef in \includeonly. (Suggested by Rainer Schöpf & Frank Mittelbach. Change made 20 Jul 88.)
     Changed definition of \include to allow space at end of file name — otherwise, typing \include{foo } would cause LATEX to overwrite foo.tex. Change made 24 May 89, suggested by Rainer Schöpf and Frank Mittelbach
     Made \include check for being used inside an \include'd file, as this will not work and cause surprising results.
86 \def\include#1{\relax
87   \ifnum\@auxout=\@partaux
88     \@latex@error{\string\include\space cannot be nested}\@eha
89   \else \@include#1 \fi}

\@include
90 \def\@include#1 {%
91   \clearpage
92   \if@filesw
93     \immediate\write\@mainaux{\string\@input{#1.aux}}%
94   \fi
95   \tempswattrue
96   \if@partsw
97     \tempswafalse
98     \edef\reserved@b{#1}%
99     \for\reserved@a:=\@partlist\do
100       {\ifx\reserved@a\reserved@b\tempswattrue\fi}%
101   \fi
102   \tempswa
103   \let\@auxout\@partaux
104   \if@filesw
105     \immediate\openout\@partaux #1.aux
106     \immediate\write\@partaux{\relax}%
107   \fi
108   \input{#1.tex}%

```

```

109      \clearpage
110      \@writeckpt{\#1}%
111      \if@filesw
112          \immediate\closeout\@partaux
113      \fi
114      \else
115          \deadcycles{z@}
116          \@nameuse{cp@\#1}%
117      \fi
118      \let\@auxout\@mainaux

\@writeckpt
119 \def\@writeckpt#1{%
120   \if@filesw
121     \immediate\write\@partaux{\string\@setckpt{\#1}\@charlb}%
122     {\let\@elt\@wckptelt \cl@ckpt}%
123     \immediate\write\@partaux{\@charrb}%
124   \fi}

\@wckptelt
125 \def\@wckptelt#1{%
126   \immediate\write\@partaux{%
127     \string\setcounter{\#1}{\the\@nameuse{c@\#1}}}}
\@setckpt RmS 93/08/31: introduced \@setckpt
128 \def\@setckpt#1{\global\@namedef{cp@\#1}{}}

\@charlb The following defines \@charlb and \@charrb to be { and }, respectively with
\@charrb \catcode 11.
129 {\catcode`[=1 \catcode`]=2
130 \catcode`{=11 \catcode`}=11
131 \gdef\@charlb[{}]
132 \gdef\@charrb[]]
133 ]% }brace matching

```

## 18.1 Safe Input Macros

```

\IfFileExists
134 \long\def \IfFileExists#1#2#3{%
135   \openin\@inputcheck#1 %
136   \ifeof\@inputcheck
137     \ifx\input@path\@undefined
138       \def\reserved@a{#3}%
139     \else
140       \def\reserved@a{\@iffileonpath{\#1}{\#2}{\#3}}%
141     \fi
142   \else
143     \closein\@inputcheck
144     \edef\@filef@und{\#1}%
145     \def\reserved@a{\#2}%
146   \fi
147   \reserved@a}

\@iffileonpath If the file is not found by \openin, and \input@path is defined, look in all the
directories specified in \input@path.
148 \long\def\@iffileonpath#1{%
149   \let\reserved@a\@secondoftwo
150   \expandafter\@tfor\expandafter\reserved@a\expandafter
```

```

151           : \expandafter=\input@path\do{%
152   \openin\@inputcheck\reserved@b#1 %
153   \ifeof\@inputcheck\else
154     \edef\@filef@und{\reserved@b#1 }%
155     \let\reserved@a\@firstoftwo%
156     \closein\@inputcheck
157     \@break@tfor
158   \fi}%
159 \reserved@a}

\InputIfFileExists Now define \InputIfFileExists to input #1 if it seems to exist. Immediately prior to the input, #2 is executed. If the file #1 does not exist, execute '#3'.
160 \long\def \InputIfFileExists#1#2{%
161   \IfFileExists{#1}%
162   {#2\@addtolist{#1}\@input \@filef@und}%
163 }

\input Input a file: if the argument is given in braces use safe input macros, otherwise use TeX's primitive \input command (which is called \@@input in LATEX).
163 \def\input{\@ifnextchar\bgroup\@input\@input}

\@input Define \@input (i.e., \input) in terms of \InputIfFileExists.
164 \def\@input#1{%
165   \InputIfFileExists{#1}{}%
166   {\filename@parse{#1}%
167     \edef\reserved@a{\noexpand\@missingfileerror
168       {\filename@area\filename@base}%
169       {\ifx\filename@ext\relax tex\else\filename@ext\fi}}%
170   \reserved@a}%
171 }

\@input@ Define \@input in terms of \IfFileExists. So this is a 'safe input' command, but the files input are not listed by \listfiles.
We don't want .aux, .toc files etc be listed by \listfiles. However, something like .bb1 probably should be listed and thus should be implemented not by \@input.
171 \def\@input#1{%
172   \IfFileExists{#1}{\@input\@filef@und}{\typeout{No file #1.}}}

\@input@ Version of \@input that does add the file to \@filelist.
173 \def\@input@#1{\InputIfFileExists{#1}{}{\typeout{No file #1.}}}

\@missingfileerror This 'error' command avoids TeX's primitive missing file loop.
Missing file error. Prompt for a new filename, offering a default extension.
174 (autoload)\def\@missingfileerror{\autoerr\@missingfileerror}
175 </2ekernel | autoload>
176 <*2ekernel | autoerr>
177 \gdef\@missingfileerror#1#2{%
178   \typeout{^J! LaTeX Error: File '#1.#2' not found.^J^J}%
179   Type X to quit or <RETURN> to proceed,^J%
180   or enter new name. (Default extension: #2)^J}%
181   \message{Enter file name: }%
182   {\endlinechar\m@ne
183     \global\read\m@ne to\gtempa}%
184   \ifx\gtempa\empty
185   \else
186     \def\reserved@a{x}\ifx\reserved@a\@gtempa\batchmode\@end\fi
187     \def\reserved@a{X}\ifx\reserved@a\@gtempa\batchmode\@end\fi
188     \filename@parse\@gtempa
189     \edef\filename@ext{%
190       \ifx\filename@ext\relax#2\else\filename@ext\fi}%
191     \edef\reserved@a{%
192       \noexpand\InputIfFileExists

```

```

193      {\filename@area\filename@base.\filename@ext}%
194      {}%
195      {\noexpand\@missingfileerror
196       {\filename@area\filename@base}{\filename@ext}}}}%
197      \reserved@a
198      \fi}
199 {/2ekernel | autoerr}
200 {*2ekernel | autoload}

\@obsoletefile For compatibility with LATEX 2.09 document styles, we distribute files called article.sty, book.sty, report.sty, slides.sty and letter.sty. These use the command \@obsoletefile, which produces a warning message.

201 \def\@obsoletefile#1#2{%
202   \@latex@warning@no@line{inputting '#1' instead of obsolete '#2'}}%
203 \onlypreamble\@obsoletefile

```

## 18.2 Listing files

\@filelist A list of files input so far. The initial value of \gobble eats the comma before the first file name.

```

204 \let\@filelist\gobble

\@addtofilelist Add to the list of files input so far. This ‘real’ definition is only used for ‘cfg’ files during initex. An initial definition of \gobble has already been set.
```

```

205 \% \def\@addtofilelist#1{\xdef\@filelist{\@filelist,#1}}
```

\listfiles A preamble command to cause \end{document} to list files input from the main file.

```

206 \def\listfiles{%
207   \let\listfiles\relax
208   \def\@listfiles##1##2##3##4##5##6##7##8##9\@@{%
209     \def\reserved@d{\\"}%
210     \otfor\reserved@c:=##1##2##3##4##5##6##7##8\do{%
211       \ifx\reserved@c\reserved@d
212         \edef\filename@area{\filename@area}%
213       \fi}%
214     \def\@ofilelist{%
215       \typeout{^J *File List*}%
216       \for\currname:=\@filelist\do{%
217         \filename@parse\currname
218         \edef\reserved@a{%
219           \filename@base.%%
220           \ifx\filename@ext\relax tex\else\filename@ext\fi}%
221         \expandafter\let\expandafter\reserved@b
222           \csname ver@\reserved@a\endcsname
223         \expandafter\expandafter\expandafter\@listfiles\expandafter
224           \filename@area\filename@base\\\\\\\\\\\\\\\\\\\\\\\\\\@@
225         \typeout{%
226           \filename@area\reserved@a
227           \ifx\reserved@b\relax\else\@spaces\reserved@b\fi}%
228         \typeout{ *****^J}}}
229 \onlypreamble\listfiles

```

The \@filelist will be de-activated if \listfiles does not appear in the preamble. \begin{document} contains code equivalent to the following:

```

\AtBeginDocument{%
  \ifx\@listfiles\@undefined
    \let\@filelist\relax
    \let\@addtofilelist\@gobble
  \fi}

```

```

229 \onlypreamble\listfiles

```

```
\@dofilelist
230 \let\@dofilelist\relax
231 </2ekernel | autoload>
```

# File 1

## ltoutenc.dtx

### 19 Font encodings

This section of the kernel contains commands for declaring encoding-specific commands, such as accents. It also contains the code for some of the encoding files, including `omlenc.def`, `omsenc.def`, `t1enc.def` and `ot1enc.def` files, which define the OLM, OMS, T1 and OT1 encodings, and the `fontenc` package for selecting encodings.

The `fontenc` package has options for encodings, of which the last option is the default encoding. For example, to use the OT2, OT3 and T1 encodings, with T1 as the default, you say:

```
\usepackage[OT2,OT3,T1]{fontenc}
```

The standard kernel set-up loads font encoding files and selects an encoding as follows.

```
\input{omlenc.def}
\input{t1enc.def}
\input{ot1enc.def}
\input{omsenc.def}
\fontencoding{OT1}
```

Note that the files in the standard `inputenc` package depend on this behaviour of the kernel.

The syntax for declaring encoding-specific commands is:

```
\DeclareTextCommand{\command}{\encoding}{\number}{\default}{\commands}
```

This command is like `\newcommand`, except that it defines a command which is specific to one encoding. The resulting command is always robust, even if its definition is fragile. For example, the definition of `\l` in the OT1 encoding is:

```
\DeclareTextCommand{\l}{OT1}{\@xxxii 1}
```

`\DeclareTextCommand` takes the same optional arguments as `\newcommand`.

```
\ProvideTextCommand{\command}{\encoding}{\number}{\default}{\commands}
```

This acts like `\DeclareTextCommand`, but does nothing if the command is already defined.

```
\DeclareTextSymbol{\command}{\encoding}{\slot}
```

This command defines a text symbol, with a particular slot in that encoding. The commands:

```
\DeclareTextSymbol{\ss}{OT1}{25}
\DeclareTextCommand{\ss}{OT1}{\char25 }
```

have the same effect, but the `\DeclareTextSymbol` is faster.

```
\DeclareTextAccent{\command}{\encoding}{\slot}
```

This command declares a text accent. The commands:

```
\DeclareTextAccent{\"}{OT1}{127}
\DeclareTextCommand{\"}{OT1}{\add@accent {127}}
```

have the same effect.

```
\DeclareTextComposite{\(command\)}
  {\(encoding\)}{\(argument\)}{\(slot\)}
```

This command declares a composite letter, for example in the T1 encoding \'{a} is slot 225, which is declared by:

```
\DeclareTextComposite{\'}{T1}{a}{225}
```

The *command* will normally have been declared with `\DeclareTextAccent`, or as a one-argument `\DeclareTextCommand`.

`\DeclareTextComposite` is the most common example of using the more general declaration `\DeclareTextCompositeCommand`, which can define a composite to be an arbitrary piece of text.

```
\DeclareTextCompositeCommand{\(command\)}
  {\(encoding\)}{\(argument\)}{\(text\)}
```

For example, in the OT1 encoding Å has a hand-crafted definition this is declared as follows

```
\DeclareTextCompositeCommand{\r}{OT1}{A}
  {\leavevmode\setbox\z@ hbox{!}\dimen@ht\z@\advance\dimen@-1ex%
   \rlap{\raise.67\dimen@hbox{\char23}}A}
```

The *command* will normally have been declared with `\DeclareTextAccent`, or as a one-argument `\DeclareTextCommand`.

The commands defined using the above declarations can be used in two ways. Normally they are used by just calling the command in the appropriate encoding, for example `\ss`. However, sometimes you may wish to use a command in an encoding where it is not defined. If the command has no arguments, then you can use it in another encoding by calling `\UseTextSymbol`:

```
\UseTextSymbol{\(encoding\)}{\(command\)}
```

For example, `\UseTextSymbol{OT1}{\ss}` has the same effect as:

```
{\fontencoding{OT1}\selectfont\ss}
```

If the command has one argument then you can use it in another encoding by calling `\UseTextAccent`:

```
\UseTextAccent{\(encoding\)}{\(command\)}{\(text\)}
```

For example, if the current encoding is OT2 then `\UseTextAccent{OT1}{\'{a}}` has the same effect as:

```
{\fontencoding{OT1}\selectfont\'{\fontencoding{OT2}\selectfont a}}
```

You can also declare a default definition for a text command, which will be used if the current encoding has no appropriate definition. Such use will also set the definition for this command in the current encoding to equal this default definition; this makes subsequent uses of the command much faster.

```
\DeclareTextCommandDefault{\(command\)}{\(definition\)}
```

For example, the default definition of the command `\textonequarter` (which produces the fraction  $\frac{1}{4}$ ) could be built using math mode:

```
\DeclareTextCommandDefault{\textonequarter}{\ensuremath {\frac{1}{4}}}
```

There is a matching `\Provide` command which will not override an existing default definition:

```
\ProvideTextCommandDefault{\(command\)}{\(definition\)}
```

The most common use for these commands is to use symbols from other encodings, so there are some optimizations provided:

```
\DeclareTextSymbolDefault{\(command)\}{encoding}
\DeclareTextAccentDefault{\(command)\}{encoding}
```

are short for:

```
\DeclareTextCommandDefault{\(command)\}
  {\UseTextSymbol{encoding}{(command)}}
\DeclareTextCommandDefault[1]{(command)}
  {\UseTextAccent{encoding}{(command)}{\#1}}
```

For example, to make OT1 the default encoding for \ss and \' you say:

```
\DeclareTextSymbolDefault{\ss}{OT1}
\DeclareTextAccentDefault{\'}{OT1}
```

Note that you can use these commands on any zero- or one-argument commands declared with \DeclareText\* or \ProvideText\*, not just those defined using \DeclareTextSymbol or \DeclareTextAccent.

## 19.1 Removing encoding-specific commands

In some cases encoding definitions are given to provide some limited support since nothing better is available, for example, the definition for \textdollar in OT1 is a hack since \$ and £ actually share the same slot in this encoding. Thus if such a glyph becomes available in a different encoding (e.g., TS1) one would like to get rid of the flacky one and make the default definition point to the new encoding. In such a case defining

```
\DeclareTextSymbol{\textdollar}{TS1}{36}
\DeclareTextSymbolDefault{\textdollar}{TS1}
```

is not enough since if typesetting in OT1 L<sup>A</sup>T<sub>E</sub>X will still find the encoding specific definition for OT1 and therefore ignore the new default. Therefore to ensure that in this case the TS1 version is used we have to remove the OT1 declaration:

```
\UndeclareTextCommand{\textdollar}{OT1}
```

Since the \$ sign is a proper glyph in the T1 encoding there is no point removing its definition and forcing L<sup>A</sup>T<sub>E</sub>X to pick up the TS1 version if typesetting in this encoding. However, assume you want to use the variant dollar sign, i.e., \$ for your dollars. In that case you have to get rid of the T1 declaration as well, e.g., the following would do that for you:

```
\UndeclareTextCommand{\textdollar}{OT1}
\UndeclareTextCommand{\textdollar}{T1}
\DeclareTextCommandDefault{\textdollar}
  {\UseTextSymbol{TS1}\textdollaroldstyle}
```

## 19.2 The order of declarations

If an encoding-specific command is defined for more than one encoding, then it will execute fastest in the encoding in which it was defined last since its top-level definition will be set up to execute in that encoding without any overhead.

For this reason the file `fonttext.ltx` currently first loads the definitions for the T1 encoding and then those for the OT1 encoding so that typesetting in OT1 is optimized since that is (still) the default. However, when T1 is explicitly requested (via \usepackage[T1]{fontenc}) the top-level definitions are automatically changed to favour T1 since its declarations are reloaded in the process.

For the same reason default declarations should never come last since they are implemented as a special encoding themselves (with the name ?). Specifying them last would simply mean to make those encoding-specific commands equally inefficient in all encodings. Therefore the `textcomp` package, for example, first sets up all defaults to point to TS1 and then declares the commands in the TS1 encoding.

### 19.3 Docstrip modules

This `.dtx` file is used to generate several related files containing font encoding definitions. The mutually exclusive docstrip options are listed here.

T1	generates <code>t1enc.def</code> for the Cork encoding.
TS1	generates <code>ts1enc.def</code> for the Text Companion encoding.
TS1sty	generates <code>textcomp.sty</code> , package that sets up use of the Text Companion encoding.
OT1	generates <code>ot1enc.def</code> for Knuth's CM encoding.
OMS	generates <code>omsenc.def</code> for Knuth's math symbol encoding.
OML	generates <code>omlenc.def</code> for Knuth's math letters encoding.
OT4	generates <code>ot4enc.def</code> for the Polish extension to the OT1 encoding, created by B. Jackowski and M. Ryćko for use with the Polish version of Computer Modern and Computer Concrete.
package	generates <code>fontenc.sty</code> for selecting encodings.
2ekernel	for the kernel commands.
autoload	for the 'autoload' kernel commands.
autoerr	for the autoerr.sty error message autoload file.

## 19.4 Definitions for the kernel

#### 19.4.1 Declaration commands

This section contains definitions for commands such as accents which depend on the current encoding. These commands will usually be kept in .def files, for example `ot1enc.def` contains the definitions for the OT1 encoding.

```
1 <*2ekernel | autoload>
2 \message{font encodings,}
```

Far too many macros in one block here!

```
\DeclareTextCommand  
\ProvideTextCommand  
\DeclareTextSymbol  
  \@dec@text@cmd  
\chardef@text@cmd  
  \@changed@cmd  
  \@changed@cx  
extSymbolUnavailable
```

If you say:

```
\DeclareTextCommand{\foo}{T1}...
```

then `\foo` is defined to be `\T1-cmd \foo \T1\foo`, where `\T1\foo` is *one* control sequence, not two! We then call `\newcommand` to define `\T1\foo`.

```

3 \def\DeclareTextCommand{%
4   \@dec@text@cmd\newcommand}%
5 \def\ProvideTextCommand{%
6   \@dec@text@cmd\providecommand}%
7 \def\@dec@text@cmd#1#2#3{%
8   \expandafter\def\expandafter{%
9     \expandafter\%{%
10       \csname#3-cmd\expandafter{%
11         \expandafter\%{%
12           \csname#3\string#2\endcsname}%
13     }\%{%
14     \let\@ifdefinable\@rc@ifdefinable{%
15       \expandafter\#1\csname#3\string#2\endcsname}%

```

This command was introduced to fix a major bug in `\@dec@text@cmd` without changing that command itself. This was thought to be necessary because it is defined in more than one package. (Perhaps the more serious bug is to put complex low-level commands like this in packages?)

The problem it solves is that whereas both `\newcommand` and `\providecommand` (used just above) both handle the resetting of `\@ifdefinable` (following its disabling in `\@dec@text@cmd`), the primitive `\chardef` neither needs the disabling, nor does the resetting.

```
16 \def\chardef@text@cmd{\%
```

```

17  \let\@ifdefinable\@@ifdefinable
18  \chardef
19  }
20 \def\DeclareTextSymbol#1#2#3{%
21   \dec@text@cmd\chardef@text@cmd#1{#2}#3\relax
22 }

```

The declarations are only available before `\begin{document}`.

```

23 \onlypreamble\DeclareTextCommand
24 \onlypreamble\DeclareTextSymbol

```

The sneaky bit in all this is what `\T1-cmd \foo \T1\foo` does. There are five possibilities, depending on the current values of `\protect`, `\cf@encoding` and `\ifmmode`:

- If `\protect` is `\@typeset@protect` and `\cf@encoding` is `T1`, then we execute `\T1\foo`. This should be the normal behaviour, and is optimized for speed.
- If `\protect` is `\@typeset@protect`, `\cf@encoding` is (say) `OT1`, and `\OT1\foo` is defined, then we execute `\OT1\foo`.
- If `\protect` is `\@typeset@protect`, `\cf@encoding` is (say) `OT1`, we're in text mode, and `\OT1\foo` is undefined, then we define `\OT1\foo` to be the default value of `\foo`, and execute `\OT1\foo`.
- If `\protect` is `\@typeset@protect`, `\cf@encoding` is (say) `OT1`, we're in math mode, and `\OT1\foo` is undefined, then we execute the default value of `\foo`. (This is necessary so that things like `$X_\copyright$` work properly.)
- If `\protect` is not `\@typeset@protect` then we execute `\noexpand\foo`. For example, if we are writing to a file, then this results in `\foo` being written. If we are in a `\mark`, then `\foo` will be put in the mark—since `\foo` is robust, it will then survive all the things which may happen to it whilst it's a `\mark`.

So after all that, we will either execute the appropriate definition of `\foo` for the current encoding, or we will execute `\noexpand\foo`.

The default value of `\foo` is `\?\foo` if it is defined, and an error message otherwise.

When the encoding is changed from `T1` to `OT1`, `\T1-cmd` is defined to be `\@changed@cmd` and `\OT1-cmd` is defined to be `\@current@cmd`. This means that the test for what the current encoding is can be performed quickly.

```

25 \def\@current@cmd#1{%
26   \ifx\protect\@typeset@protect
27     \cinmathwarn#1%
28   \else
29     \noexpand#1\expandafter\gobble
30   \fi}
31 \def\@changed@cmd#1#2{%
32   \ifx\protect\@typeset@protect
33     \cinmathwarn#1%
34     \expandafter\ifx\csname\cf@encoding\string#1\endcsname\relax
35       \expandafter\ifx\csname ?\string#1\endcsname\relax
36         \expandafter\def\csname ?\string#1\endcsname{%
37           \TextSymbolUnavailable#1%
38         }%
39       \fi
40     \global\expandafter\let
41       \csname\cf@encoding\string#1\expandafter\endcsname
42       \csname ?\string#1\endcsname
43   \fi
44   \csname\cf@encoding\string#1%

```

```

45           \expandafter\endcsname
46 \else
47   \noexpand#1%
48 \fi}

49 </2ekernel | autoload>
50 (*2ekernel | autoerr)
51 \gdef\TextSymbolUnavailable#1{%
52   \@latex@error{%
53     Command \protect#1 unavailable in encoding \cf@encoding}%
54 } \@eha}
55 </2ekernel | autoerr>
56 {autoload}\gdef\TextSymbolUnavailable{\@autoerr\TextSymbolUnavailable}
57 (*2ekernel | autoload)

```

The command `\@inmathwarn` produces a warning message if we are currently in math mode. Note that since this command is used inside text commands, it can't call `\relax` before the `\ifmmode`. This means that it is possible for the warning to fail to be issued at the beginning of a row of an `halign` whose template enters math mode. This is probably a bad feature, but there's not much that can be done about it, since adding a `\relax` would break ligatures and kerning between text symbols.

A more efficient solution would be to make `\@inmathwarn` and `\@inmatherr` equal to `\@empty` and `\relax` by default, and to have `\everymath` reset them to their usual definitions. This is left for future investigation (for example it may break some third party code).

```

58 \def\@inmathwarn#1{%
59   \ifmmode
60     \@latex@warning{Command \protect#1 invalid in math mode}%
61   \fi}

```

`\DeclareTextCommandDefault` These define commands with encoding ?.

`\ProvideTextCommandDefault` Note that `\DeclareTextCommandDefault` can only be used in the preamble, but that the `\Provide` version is allowed in inputenc .def files, so is allowed anywhere.

```

62 \def\DeclareTextCommandDefault#1{%
63   \DeclareTextCommand#1?}

64 \def\ProvideTextCommandDefault#1{%
65   \ProvideTextCommand#1?}

66 \@onlypreamble\DeclareTextCommandDefault
67 %\@onlypreamble\ProvideTextCommandDefault

```

They require `\?-cmd` to be initialized as `\@changed@cmd`.

```
68 \expandafter\let\csname?-cmd\endcsname\@changed@cmd
```

`\DeclareTextAccent` This is just a disguise for defining a `TEX \accent` command.

```

69 \def\DeclareTextAccent#1#2#3{%
70   \DeclareTextCommand#1{#2}{\add@accent{#3}}}

71 \@onlypreamble\DeclareTextAccent

```

`\add@accent` To save space this code is shared between all text accents that are set using the `\accent` primitive. The argument is pre-set in a box so that any font loading that is needed is already done within the box. This is needed because font-loading involves grouping and that would prevent the accent mechanism from working so that the accent would not be positioned over the argument. Declarations that change the font should be allowed (only low-level ones are at present) inside the argument of an accent command, but not size changes, as they involve `\setbox` operations which also inhibit the mechanism of the `\accent` primitive.

Note that the whole process is within a group. For a detailed discussion of this reimplementation and its deficiencies, see pr/3160.

```
72 \def\add@accent#1#2{\hmode@bgroup
```

Turn off the group in `\UseTextSymbol` in case this is used inside the argument of `\add@accent`.

```
73   \let\hmode@start@before@group\@firstofone
74   \setbox\@tempboxa\hbox{\#2%
```

When presetting the argument in a box we record its `\spacefactor` for later use after the accent got typeset. This way something like `\`A` gets the spacefactor of `A` (i.e., 999) rather than the default value of 1000.

```
75   \global\mathchardef\accent@spacefactor\spacefactor}%
76   \accent#1 #2\egroup\spacefactor\accent@spacefactor}
```

Default definition for `\accent@spacefactor` prevents a horrible death of the above macro inside an unprotected `\edef`.

```
77 \let\accent@spacefactor\relax
```

```
\hmode@bgroup
```

```
78 \def\hmode@bgroup{\leavevmode\bgroup}
```

`\DeclareTextCompositeCommand`

```
\DeclareTextComposite
  @text@composite
  @text@composite@x
  @strip@args
```

Another amusing game to play with `\expandafter`, `\csname`, and `\string`. When you say `\DeclareTextCompositeCommand{\foo}{T1}{a}{bar}`, we look to see if the expansion of `\T1\foo` begins with `\@text@composite`, and if it doesn't, we redefine `\T1\foo` to be:

```
#1 -> \@text@composite \T1\foo #1\@empty \@text@composite {...}
```

where `...` is the previous definition of `\T1\foo`. Finally, we define `\T1\foo-a` to expand to `bar`.

```
79 \def\DeclareTextCompositeCommand#1#2#3#4{%
80   \expandafter\let\expandafter\reserved@a\csname#2\string#1\endcsname
81   \expandafter\expandafter\expandafter\ifx
82   \expandafter\@car\reserved@a\relax\relax\@nil \@text@composite \else
83     \edef\reserved@b##1{%
84       \def\expandafter\noexpand
85         \csname#2\string#1\endcsname####1{%
86           \noexpand\@text@composite
87             \expandafter\noexpand\csname#2\string#1\endcsname
88               ####1\noexpand\@empty\noexpand\@text@composite
89               {##1}}%
90     \expandafter\reserved@b\expandafter{\reserved@a{##1}}%
91   \fi
92   \expandafter\def\csname\expandafter\string\csname
93     #2\endcsname\string#1-\string#3\endcsname{#4}}
94 \onlypreamble\DeclareTextCompositeCommand
```

This all works because:

```
\@text@composite \T1\foo A\@empty \@text@composite {...}
```

expands to `\T1\foo-A` if `\T1\foo-A` has been defined, and `...` otherwise.

Note that `\@text@composite` grabs the first token of the argument and puts just that in the `csname`. This is so that `\'{\textit{e}}` will work—it checks whether `\T1\'-\textit{e}` is defined (which presumably it isn't) and so expands to `\{accent 1 \textit{e}\}`.

This trick won't always work, for example `\'{\itshape e}` will expand to (with spaces added for clarity):

```
\csname \string \T1\' - \string {\itshape e} \empty \endcsname
```

which will die pretty horribly. Unfortunately there's not much can be done about this if we're going to use `\csname` lookups as a fast way of accessing composites.

This has an unfortunate 'misfeature' though, which is that in the T1 encoding, `\'{aa}` produces á. This is not the expected behaviour, and should perhaps be fixed if the fix doesn't affect performance too badly.

Finally, it's worth noting that the `\@empty` is used in `\@text@composite` so that accents will work even when the argument is empty. If you say `\'{}{}` then this looks up `\\"T1\'-\@empty`, which ought to be `\relax`, and so all is well. If we didn't include the `\@empty`, then `\'{}{}` would expand to:

```
\csname \string \T1\` - \string \endcsname
```

so the `\endcsname` would be `\string`'ed and the whole of the rest of the document would be put inside the `\csname`. This would not be good.

```
95 \def\@text@composite#1#2#3\@text@composite{%
96   \expandafter\@text@composite@x
97   \csname\string#1-\string#2\endcsname}
```

Originally the `\@text@composite@x` macro had two arguments and if #1 was not `\relax` it was executed, otherwise #2 was executed. All this happened within the `\ifx` code so that neither #1 nor #2 could have picked up any additional arguments from the input stream. This has now been changed using the typical `\@firstoftwo / \@secondoftwo` coding. This way the final expansion will happen without any `\else` or `\fi` intervening in the case that we need to get a further token from the input stream.

```
98 \def\@text@composite@x#1{%
99   \ifx#1\relax
100     \expandafter\@secondoftwo
101   \else
102     \expandafter\@firstoftwo
103   \fi
104   #1}
```

The command `\DeclareTextComposite` uses `\DeclareTextCompositeCommand` to declare a command which expands out to a single glyph.

```
105 \catcode\z@=11\relax
106 \def\DeclareTextComposite#1#2#3#4{%
107   \def\reserved@a{\DeclareTextCompositeCommand#1{#2}{#3}}%
108   \bgroup
109   \lccode\z@#4%
110   \lowercase{%
111   \egroup
112   \reserved@a ^~@}}}
113 \catcode\z@=15\relax
114 \onlypreamble\DeclareTextComposite
```

`\UseTextAccent`      These fragile commands access glyphs from different encodings. They use grotty low-level calls to the font selection scheme for speed, and in order to make sure that `\UseTextSymbol` doesn't do anything which you're not allowed to do between an `\accent` and its glyph.

For a detailed discussion of this reimplementation and its deficiencies, see pr/3160.

```
115 \def\UseTextAccent#1#2#3{%
116   \hmode@start@before@group
117   {%
```

Turn off the group in `\UseTextSymbol` in case this is used inside the arguments of `\UseTextAccent`.

```
118   \let\hmode@start@before@group\@firstofone
119   \let\@curr@enc\cf@encoding
120   \only@text@encoding{#1}%
121 }
```

```

121      #2{\@use@text@encoding\@curr@enc#3}%
122  }

123 \def\UseTextSymbol#1#2{%
124     \hmode@start@before@group
125     {%
126         \def\@wrong@font@char{\MessageBreak
127             for \noexpand\symbol`#2'}%
128         \@use@text@encoding{#1}%
129         #2%
130     }%
131 }

132 \def\@use@text@encoding#1{%
133     \edef\f@encoding{#1}%
134     \xdef\font@name{%
135         \csname\curr@fontshape/\f@size\endcsname}%
136     \pickup@font
137     \font@name
138     \@@enc@update}

```

**\hmode@start@before@group** The `\hmode@start@before@group` starts hmode and should be immediately followed by an explicit `{...}`. Its purpose is to ensure that hmode is started before this group is opened. Inside `\add@accent` and `\UseTextAccent` it is redefined to remove this group so that it doesn't conflict with the `\accent` primitive.

For a detailed discussion see pr/3160.

```
139 \let\hmode@start@before@group\leavevmode
```

**\DeclareTextSymbolDefault** Some syntactic sugar. Again, these should probably be optimized for speed.

```

\DeclareTextAccentDefault 140 \def\DeclareTextSymbolDefault#1#2{%
141     \DeclareTextCommandDefault#1{\UseTextSymbol{#2}{#1}}%
142 \def\DeclareTextAccentDefault#1#2{%
143     \DeclareTextCommandDefault#1{\UseTextAccent{#2}{#1}}%
144 \onlypreamble\DeclareTextSymbolDefault
145 \onlypreamble\DeclareTextAccentDefault

```

**\UndeclareTextCommand** This command safely removes and encoding specific declaration for a given encoding. It is helpful if one intends to use the default definition always and therefore wants to get rid of a declaration for some specific encoding.

```
146 \def\UndeclareTextCommand#1#2{%
```

If there is no declaration for the current encoding do nothing. (This makes a hash table entry but without eTeX we can't do anything about that).

```
147 \expandafter\ifx\csname#2\string#1\endcsname\relax
148 \else
```

Else: throw away that declaration.

```
149     \global\expandafter\let\csname#2\string#1\endcsname
150         \undefined
```

But this is unfortunately not enough, we have to take a look at the top-level definition of the encoding specific command which for a command `\foo` would look similar to `\T1-cmd \foo \T1\foo` (three tokens).

Of course, instead of `T1` one could see a different encoding name; which one depends the encoding for which `\foo` was declared last.

Now assume we have just removed the declaration for `\foo` in `T1` and the top-level of `\foo` expands to the above. Then we better change that pretty fast otherwise we do get an “undefined csname error” when we try to typeset `\foo` within `T1` instead of getting the default definition for `\foo`. And what is the best way to change that top-level definition? Well, the only “encoding” we know for sure will still be around is the default encoding denoted by `?`.

Thus in case the last token of the top-level expansion is now undefined we change the declaration to look like `\?-cmd \foo \?\foo` which is done by the following (readable?) code:

```

151      \expandafter\expandafter\expandafter
152      \ifx\expandafter\@thirdofthree#1\@undefined
153          \expandafter\gdef\expandafter#1\expandafter
154              {\csname ?-cmd\expandafter\endcsname\expandafter
155                  #1\csname?\string#1\endcsname}%
156      \fi
157  \fi
158 }

159 \onlypreamble\UndeclareTextCommand

```

#### 19.4.2 Hyphenation

```

\patterns We redefine \patterns and \hyphenation to allow the use of commands declared
\@@patterns with \DeclareText* to be used inside them.

\hyphenation 160 \% \let\@@patterns\patterns
\@@hyphenation 161 \% \let\@@hyphenation\hyphenation
162 \% \def\patterns{%
163 \%   \bgroup
164 \%     \let\protect\@empty
165 \%     \let\@typeset\@protect\@empty
166 \%     \let\@changed@x\@changed@x@mouth
167 \%   \afterassignment\egroup
168 \%   \@@patterns
169 \%}
170 \% \def\hyphenation{%
171 \%   \bgroup
172 \%     \let\protect\@empty
173 \%     \let\@typeset\@protect\@empty
174 \%     \let\@changed@x\@changed@x@mouth
175 \%   \afterassignment\egroup
176 \%   \@@hyphenation
177 \%}

```

#### 19.4.3 Miscellania

- \a The \a command is used to access the accent commands even when they have been redefined (for example by the `tabbing` environment). Its internal name is `\@tabacckludge`.

The `\string` within the `\csname` guards against something like ' being active at the point of use.

```

178 \def\@tabacckludge#1{\expandafter\@changed@cmd
179                               \csname\string#1\endcsname\relax}
180 \let\@tabacckludge

```

#### 19.4.4 Default encodings

We define the default encodings for most commands to be either OT1, OML or OMS. These defaults are in the kernel and therefore fonts with these encodings must be available unless these defaults are redefined elsewhere. Recall that the standard kernel loads the encoding files for these encodings, and also that for the T1 encoding.

The naming conventions in the kernel are not what we would use if we were starting from scratch... Those defined by DEK (like `\ae` and `\ss`) or by the TeX Users Group Technical Working Group on multi-lingual typesetting (like `\th` and `\ng`) have short names. Those which were added to the kernel in 1993 and early 1994 are named after their Adobe glyph names (like `\guillemotleft` and

`\quotedblbase`). Unfortunately, this naming scheme won't work for all glyphs, since some names (like `\space`) are already used, and some (like `\endash`) are very likely to be defined by users. So we're now using the naming scheme of `\text` followed by the Adobe name, (like `\textendash` and `\textsterling`). Except that some glyphs don't have Adobe names, so we're using the names used by fontinst for those (like `\textcompwordmark`). Sigh.

Some accents from OT1:

```
181 \DeclareTextAccentDefault{\"}{OT1}
182 \DeclareTextAccentDefault{'}{OT1}
183 \DeclareTextAccentDefault{.}{OT1}
184 \DeclareTextAccentDefault{=}{OT1}
185 \DeclareTextAccentDefault{\H}{OT1}
186 \DeclareTextAccentDefault{\^}{OT1}
187 \DeclareTextAccentDefault{\`}{OT1}
188 \DeclareTextAccentDefault{\b}{OT1}
189 \DeclareTextAccentDefault{\c}{OT1}
190 \DeclareTextAccentDefault{\d}{OT1}
191 \DeclareTextAccentDefault{\r}{OT1}
192 \DeclareTextAccentDefault{\u}{OT1}
193 \DeclareTextAccentDefault{\v}{OT1}
194 \DeclareTextAccentDefault{\~}{OT1}
```

Some symbols from OT1:

```
195 %\DeclareTextSymbolDefault{\AA}{OT1}
196 \DeclareTextSymbolDefault{\AE}{OT1}
197 \DeclareTextSymbolDefault{\L}{OT1}
198 \DeclareTextSymbolDefault{\OE}{OT1}
199 \DeclareTextSymbolDefault{\O}{OT1}
200 %\DeclareTextSymbolDefault{\aa}{OT1}
201 \DeclareTextSymbolDefault{\ae}{OT1}
202 \DeclareTextSymbolDefault{\i}{OT1}
203 \DeclareTextSymbolDefault{\j}{OT1}

204 \DeclareTextSymbolDefault{\ij}{OT1}
205 \DeclareTextSymbolDefault{\IJ}{OT1}

206 \DeclareTextSymbolDefault{\l}{OT1}
207 \DeclareTextSymbolDefault{\oe}{OT1}
208 \DeclareTextSymbolDefault{\o}{OT1}
209 \DeclareTextSymbolDefault{\ss}{OT1}
210 \DeclareTextSymbolDefault{\textdollar}{OT1}
211 \DeclareTextSymbolDefault{\textemdash}{OT1}
212 \DeclareTextSymbolDefault{\textendash}{OT1}
213 \DeclareTextSymbolDefault{\textexcldown}{OT1}
214 %\DeclareTextSymbolDefault{\texthypenchar}{OT1}
215 %\DeclareTextSymbolDefault{\texthypen}{OT1}
216 \DeclareTextSymbolDefault{\textquestiondown}{OT1}
217 \DeclareTextSymbolDefault{\textquotedblleft}{OT1}
218 \DeclareTextSymbolDefault{\textquotedblright}{OT1}
219 \DeclareTextSymbolDefault{\textquotel}{OT1}
220 \DeclareTextSymbolDefault{\textquoter}{OT1}
221 \DeclareTextSymbolDefault{\textsterling}{OT1}
```

Some symbols from OMS:

```
222 \DeclareTextSymbolDefault{\textasteriskcentered}{OMS}
223 \DeclareTextSymbolDefault{\textbackslash}{OMS}
224 \DeclareTextSymbolDefault{\textbar}{OMS}
225 \DeclareTextSymbolDefault{\textbardbl}{OMS}
226 \DeclareTextSymbolDefault{\textbraceleft}{OMS}
227 \DeclareTextSymbolDefault{\textbraceright}{OMS}
228 \DeclareTextSymbolDefault{\textbullet}{OMS}
229 \DeclareTextSymbolDefault{\textdaggerdbl}{OMS}
230 \DeclareTextSymbolDefault{\textdagger}{OMS}
```

```

231 \DeclareTextSymbolDefault{\textparagraph}{OMS}
232 \DeclareTextSymbolDefault{\textperiodcentered}{OMS}
233 \DeclareTextSymbolDefault{\textsection}{OMS}
234 \DeclareTextAccentDefault{\textcircled}{OMS}

    Some symbols from OML:

235 \DeclareTextSymbolDefault{\textless}{OML}
236 \DeclareTextSymbolDefault{\textgreater}{OML}
237 \DeclareTextAccentDefault{\t}{OML}

    Some defaults we can fake.

    The interface for defining \copyright changed, it used to use \expandafter
    to add braces at the appropriate points.

238 \DeclareTextCommandDefault{\textcopyright}{\textcircled{c}}
239 % \expandafter\def\expandafter
240 %           \copyright\expandafter{\expandafter{\copyright}{}}

241 \DeclareTextCommandDefault{\textasciicircum}{\^{}}
242 \DeclareTextCommandDefault{\textasciitilde}{\~{}}
243 \DeclareTextCommandDefault{\textcompwordmark}{\leavevmode\kern\z@}
244 \DeclareTextCommandDefault{\textunderscore}{%
245   \leavevmode \kern.06em\vbox{\hrule\@width.3em}{}}

246 \DeclareTextCommandDefault{\textvisiblespace}{%
247   \mbox{\kern.06em\hrule\@height.3ex}%
248   \vbox{\hrule\@width.3em}%
249   \hbox{\hrule\@height.3ex}{}}

    Using \fontdimen3 in the next definition is some sort of a kludge (since it
    is the interword stretch) but it makes the ellipsis come out right in mono-spaced
    fonts too (since there it is zero).

250 \DeclareTextCommandDefault{\textellipsis}{%
251   .\kern\fontdimen3\font
252   .\kern\fontdimen3\font
253   .\kern\fontdimen3\font}

254 %\DeclareTextCommandDefault{\textregistered}{\textcircled{\scshape r}}
255 \DeclareTextCommandDefault{\textregistered}{\textcircled{%
256   \check@mathfonts\fontsize\sf@size\z@\math@fontsfalse\selectfont R}}
257 \DeclareTextCommandDefault{\texttrademark}{\textsuperscript{TM}}
258 \DeclareTextCommandDefault{\SS}{\SS}

259 \DeclareTextCommandDefault{\textordfeminine}{\textsuperscript{a}}
260 \DeclareTextCommandDefault{\textordmasculine}{\textsuperscript{o}}

```

#### 19.4.5 Math material

Some commands can be used in both text and math mode:

```

261 \DeclareRobustCommand{\$}{\ifmmode\mathdollar\else\textdollar\fi}
262 \DeclareRobustCommand{\{}{\ifmmode\lbrace\else\textbraceleft\fi}
263 \DeclareRobustCommand{\}}{\ifmmode\rbrace\else\textbraceright\fi}
264 \DeclareRobustCommand{\P}{\ifmmode\mathparagraph\else\textparagraph\fi}
265 \DeclareRobustCommand{\$}{\ifmmode\mathsection\else\textsection\fi}
266 \DeclareRobustCommand{\dag}{\ifmmode\textdagger\else\textdaggerdbl\fi}
267 \DeclareRobustCommand{\ddag}{\ifmmode\textdaggerdbl\else\textdaggerdbl\fi}

```

For historical reasons \copyright needs {} around the definition in maths.

```

268 \DeclareRobustCommand{\_}{%
269   \ifmmode\nfss@text{\textunderscore}\else\textunderscore\fi}
270 \DeclareRobustCommand{\copyright}{%
271   \ifmmode{\nfss@text{\textcopyright}}\else\textcopyright\fi}
272 \DeclareRobustCommand{\pounds}{%
273   \ifmmode\mathsterling\else\textsterling\fi}
274 \DeclareRobustCommand{\dots}{%
275   \ifmmode\mathellipsis\else\textellipsis\fi}

```

```

276 \let\ldots\dots
277 </2ekernel | autoload>

```

## 19.5 Definitions for the OT1 encoding

The definitions for the ‘TEX text’ (OT1) encoding.

Declare the encoding.

```

278 (*OT1)
279 \DeclareFontEncoding{OT1}{}{}

```

Declare the accents.

```

280 \DeclareTextAccent{"}{OT1}{127}
281 \DeclareTextAccent{'}{OT1}{19}
282 \DeclareTextAccent{.}{OT1}{95}
283 \DeclareTextAccent{=}{OT1}{22}
284 \DeclareTextAccent{^}{OT1}{94}
285 \DeclareTextAccent{`}{OT1}{18}
286 \DeclareTextAccent{~}{OT1}{126}
287 \DeclareTextAccent{H}{OT1}{125}
288 \DeclareTextAccent{u}{OT1}{21}
289 \DeclareTextAccent{v}{OT1}{20}
290 \DeclareTextAccent{r}{OT1}{23}

```

Some accents have to be built by hand: Note that `\o@align` and `\o@lign` must be inside a group. In these definitions we no longer use the helper function `\sh@ft` from plain.tex since that now has two incompatible definitions.

```

291 \DeclareTextCommand{\b}{OT1}[1]
292   {\hmode@bgroup\o@lign{\relax#1\crcr\hidewidth\ltx@sh@ft{-3ex}%
293     \vbox to.2ex{\hbox{\char22}\vss}\hidewidth}\egroup}
294 \DeclareTextCommand{\c}{OT1}[1]
295   {\leavevmode\setbox\z@\hbox{\#1}\ifdim\ht\z@=1ex\accent24 #1%
296     \else{\o@align{\unhbox\z@\crcr\hidewidth\char24\hidewidth}}\fi}
297 \DeclareTextCommand{\d}{OT1}[1]
298   {\hmode@bgroup
299     \o@lign{\relax#1\crcr\hidewidth\ltx@sh@ft{-1ex}. \hidewidth}\egroup}

```

Declare the text symbols.

```

300 \DeclareTextSymbol{\AE}{OT1}{29}
301 \DeclareTextSymbol{\OE}{OT1}{30}
302 \DeclareTextSymbol{\O}{OT1}{31}
303 \DeclareTextSymbol{\ae}{OT1}{26}
304 \DeclareTextSymbol{\i}{OT1}{16}
305 \DeclareTextSymbol{\j}{OT1}{17}
306 \DeclareTextSymbol{\oe}{OT1}{27}
307 \DeclareTextSymbol{\o}{OT1}{28}
308 \DeclareTextSymbol{\ss}{OT1}{25}
309 \DeclareTextSymbol{\textemdash}{OT1}{124}
310 \DeclareTextSymbol{\textendash}{OT1}{123}

```

Using the ligatures helps with OT1 fonts that have `\textexclamdown` and `\textquestiondown` in unusual positions.

```

311 %\DeclareTextSymbol{\textexclamdown}{OT1}{60}
312 %\DeclareTextSymbol{\textquestiondown}{OT1}{62}
313 \DeclareTextCommand{\textexclamdown}{OT1}{!`}
314 \DeclareTextCommand{\textquestiondown}{OT1}{?`}
315 %\DeclareTextSymbol{\texthyphenchar}{OT1}{`-}
316 %\DeclareTextSymbol{\texthyphen}{OT1}{`\-}
317 \DeclareTextSymbol{\textquotedblleft}{OT1}{92}
318 \DeclareTextSymbol{\textquotedblright}{OT1}{`}
319 \DeclareTextSymbol{\textquotleft}{OT1}{``}
320 \DeclareTextSymbol{\textquotright}{OT1}{`}

```

Some symbols which are faked from others:

```
321 % \DeclareTextCommand{\aa}{OT1}
322 %   {{\accent23{a}}}
323 \DeclareTextCommand{\L}{OT1}
324   {\leavevmode\setbox\z@\hbox{L}\hb@xt@wd\z@{\hss\xxxii L}}
325 \DeclareTextCommand{\l}{OT1}
326   {\hmode@bgroup\xxxii l\egroup}
327 % \DeclareTextCommand{\AA}{OT1}
328 %   {\leavevmode\setbox\z@\hbox{h}\dimen@\ht\z@\advance\dimen@-1ex%
329 %     \rlap{\raise.67\dimen@\hbox{\char23}}A}
```

In the OT1 encoding Å has a hand-crafted definition, so we have here the first recorded explicit use of \DeclareTextCompositeCommand.

```
330 \DeclareTextCompositeCommand{\r}{OT1}{A}
331   {\leavevmode\setbox\z@\hbox{!}\dimen@\ht\z@\advance\dimen@-1ex%
332     \rlap{\raise.67\dimen@\hbox{\char23}}A}
```

The dutch language uses the letter ‘ij’. It is available in T1 encoded fonts, but not in the OT1 encoded fonts. Therefor we fake it for the OT1 encoding.

```
333 \DeclareTextCommand{\ij}{OT1}%
334   {\nobreak\hskip\z@skip i\kern-0.02em j\nobreak\hskip\z@skip}
335 \DeclareTextCommand{\IJ}{OT1}%
336   {\nobreak\hskip\z@skip I\kern-0.02em J\nobreak\hskip\z@skip}
```

In the OT1 encoding, £ and \$ share a slot.

```
337 \DeclareTextCommand{\textdollar}{OT1}{\hmode@bgroup
338   \ifdim \fontdimen\@ne\font >\z@
339     \slshape
340   \else
341     \upshape
342   \fi
343   \char`\$\egroup}
344 \DeclareTextCommand{\textsterling}{OT1}{\hmode@bgroup
345   \ifdim \fontdimen\@ne\font >\z@
346     \itshape
347   \else
348     \fontshape{ui}\selectfont
349   \fi
350   \char`\$\egroup}
```

Here we are adding some more composite commands to the OT1 encoding. This makes the use of certain accents with i compatible with their use with the T1 encoding; this enables them to become true L<sup>A</sup>T<sub>E</sub>X internal representations. However, it will make these accents work a little less fast since a check will always be made for the existence of a composite.

```
351 \DeclareTextComposite{\.}{OT1}{i}{\i}
352 \DeclareTextComposite{\.}{OT1}{\i}{\i}
353 \DeclareTextCompositeCommand{\'}{OT1}{i}{\@tabacckludge'\i}
354 \DeclareTextCompositeCommand{\'}{OT1}{i}{\@tabacckludge'\i}
355 \DeclareTextCompositeCommand{\^}{OT1}{i}{\^{\i}}
356 \DeclareTextCompositeCommand{\"}{OT1}{i}{\"{\i}}
357 
```

## 19.6 Definitions for the T1 encoding

The definitions for the ‘Extended T<sub>E</sub>X text’ (T1) encoding.

Declare the encoding.

```
358 (*T1)
359 \DeclareFontEncoding{T1}{}{}
```

Declare the accents.

```
360 \DeclareTextAccent{\'}{T1}{0}
```

```

361 \DeclareTextAccent{\'}{T1}{1}
362 \DeclareTextAccent{\^}{T1}{2}
363 \DeclareTextAccent{\~}{T1}{3}
364 \DeclareTextAccent{\"}{T1}{4}
365 \DeclareTextAccent{\H}{T1}{5}
366 \DeclareTextAccent{\r}{T1}{6}
367 \DeclareTextAccent{\v}{T1}{7}
368 \DeclareTextAccent{\u}{T1}{8}
369 \DeclareTextAccent{\=}{T1}{9}
370 \DeclareTextAccent{\.}{T1}{10}

```

Some accents have to be built by hand. Note that `\o@align` and `\o@lign` must be inside a group. In these definitions we no longer use the helper function `\sh@ft` from plain.tex since that now has two incompatible definitions.

```

371 \DeclareTextCommand{\b}{T1}[1]
372   {\hmode@bgroup\o@lignf{\relax#1\crcr\hidewidth\ltx@sh@ft{-3ex}%
373     \vbox to .2ex{\hbox{\char9}\vss}\hidewidth}\egroup}
374 \DeclareTextCommand{\c}{T1}[1]
375   {\leavevmode\setbox\z@\hbox{\#1\ifdim\ht\z@=1ex\accent11 #1%
376     \else\o@align{\unhbox\z@\crcr
377       \hidewidth\char11\hidewidth}\fi}
378 \DeclareTextCommand{\d}{T1}[1]
379   {\hmode@bgroup
380     \o@lign{\relax#1\crcr\hidewidth\ltx@sh@ft{-1ex}.\hidewidth}\egroup}
381 \DeclareTextCommand{\k}{T1}[1]
382   {\hmode@bgroup\o@align{\null#1\crcr\hidewidth\char12}\egroup}
383 \DeclareTextCommand{\textogonekcentered}{T1}[1]
384   {\hmode@bgroup\o@align{\null#1\crcr\hidewidth\char12\hidewidth}\egroup}

```

Some symbols are constructed.

Slot 24 contains a small circle intended for construction of these two glyphs.

```

385 \DeclareTextCommand{\textperthousand}{T1}
386   {\%\char 24 } % space or ‘relax as delimiter?
387 \DeclareTextCommand{\textpertenthousand}{T1}
388   {\%\char 24\char 24 } % space or ‘relax as delimiter?

```

Declare the text symbols.

```

389 %\DeclareTextSymbol{\AA}{T1}{197}
390 \DeclareTextSymbol{\AE}{T1}{198}
391 \DeclareTextSymbol{\DH}{T1}{208}
392 \DeclareTextSymbol{\DJ}{T1}{208}
393 \DeclareTextSymbol{\L}{T1}{138}
394 \DeclareTextSymbol{\NG}{T1}{141}
395 \DeclareTextSymbol{\OE}{T1}{215}
396 \DeclareTextSymbol{\O}{T1}{216}
397 \DeclareTextSymbol{\SS}{T1}{223}
398 \DeclareTextSymbol{\TH}{T1}{222}
399 %\DeclareTextSymbol{\aa}{T1}{229}
400 \DeclareTextSymbol{\ae}{T1}{230}
401 \DeclareTextSymbol{\dh}{T1}{240}
402 \DeclareTextSymbol{\dj}{T1}{158}
403 \DeclareTextSymbol{\guillemotleft}{T1}{19}
404 \DeclareTextSymbol{\guillemotright}{T1}{20}
405 \DeclareTextSymbol{\guilsinglleft}{T1}{14}
406 \DeclareTextSymbol{\guilsinglright}{T1}{15}
407 \DeclareTextSymbol{\i}{T1}{25}
408 \DeclareTextSymbol{\j}{T1}{26}
409 \DeclareTextSymbol{\ij}{T1}{188}
410 \DeclareTextSymbol{\IJ}{T1}{156}
411 \DeclareTextSymbol{\l}{T1}{170}
412 \DeclareTextSymbol{\ng}{T1}{173}
413 \DeclareTextSymbol{\oe}{T1}{247}
414 \DeclareTextSymbol{\o}{T1}{248}

```

```

415 \DeclareTextSymbol{\quotedblbase}{T1}{18}
416 \DeclareTextSymbol{\quotesinglbase}{T1}{13}
417 \DeclareTextSymbol{\ss}{T1}{255}
418 \DeclareTextSymbol{\textasciicircum}{T1}{`^}
419 \DeclareTextSymbol{\textasciitilde}{T1}{`~}
420 \DeclareTextSymbol{\textbackslash}{T1}{`\\}
421 \DeclareTextSymbol{\textbar}{T1}{`|}
422 \DeclareTextSymbol{\textbraceleft}{T1}{`{`}
423 \DeclareTextSymbol{\textbraceright}{T1}{`}`}
424 \DeclareTextSymbol{\textcompwordmark}{T1}{23}
425 \DeclareTextSymbol{\textdollar}{T1}{`\$}
426 \DeclareTextSymbol{\textemdash}{T1}{22}
427 \DeclareTextSymbol{\textendash}{T1}{21}
428 \DeclareTextSymbol{\textexclamdown}{T1}{189}
429 \DeclareTextSymbol{\textgreater}{T1}{`>}
430 %\DeclareTextSymbol{\texthphenchar}{T1}{127}
431 %\DeclareTextSymbol{\texthphen}{T1}{`-}
432 \DeclareTextSymbol{\textless}{T1}{`<}
433 \DeclareTextSymbol{\textquestiondown}{T1}{190}
434 \DeclareTextSymbol{\textquotedblleft}{T1}{16}
435 \DeclareTextSymbol{\textquotedblright}{T1}{17}
436 \DeclareTextSymbol{\textquotedbl}{T1}{`"}
437 \DeclareTextSymbol{\textquotel}{T1}{``}
438 \DeclareTextSymbol{\textquotr}{T1}{``}
439 \DeclareTextSymbol{\textsection}{T1}{159}
440 \DeclareTextSymbol{\textsterling}{T1}{191}
441 \DeclareTextSymbol{\textunderscore}{T1}{95}
442 \DeclareTextSymbol{\textvisiblespace}{T1}{32}
443 \DeclareTextSymbol{\th}{T1}{254}

```

Declare the composites.

```

444 \DeclareTextComposite{\.}{T1}{i}{`i}
445 \DeclareTextComposite{\.}{T1}{\i}{`i}
"80 = 128
446 \DeclareTextComposite{\u}{T1}{A}{128}
447 \DeclareTextComposite{\k}{T1}{A}{129}
448 \DeclareTextComposite{\'}{T1}{C}{130}
449 \DeclareTextComposite{\v}{T1}{C}{131}
450 \DeclareTextComposite{\v}{T1}{D}{132}
451 \DeclareTextComposite{\v}{T1}{E}{133}
452 \DeclareTextComposite{\k}{T1}{E}{134}
453 \DeclareTextComposite{\u}{T1}{G}{135}
"88 = 136
454 \DeclareTextComposite{\'}{T1}{L}{136}
455 \DeclareTextComposite{\v}{T1}{L}{137}
456 \DeclareTextComposite{\'}{T1}{N}{139}
457 \DeclareTextComposite{\v}{T1}{N}{140}
458 \DeclareTextComposite{\H}{T1}{O}{142}
459 \DeclareTextComposite{\'}{T1}{R}{143}
"90 = 144
460 \DeclareTextComposite{\v}{T1}{R}{144}
461 \DeclareTextComposite{\'}{T1}{S}{145}
462 \DeclareTextComposite{\v}{T1}{S}{146}
463 \DeclareTextComposite{\c}{T1}{S}{147}
464 \DeclareTextComposite{\v}{T1}{T}{148}
465 \DeclareTextComposite{\c}{T1}{T}{149}
466 \DeclareTextComposite{\H}{T1}{U}{150}
467 \DeclareTextComposite{\r}{T1}{U}{151}
"98 = 152
468 \DeclareTextComposite{\"}{T1}{Y}{152}

```

```

469 \DeclareTextComposite{\'}{T1}{Z}{153}
470 \DeclareTextComposite{\v}{T1}{Z}{154}
471 \DeclareTextComposite{\.}{T1}{Z}{155}
472 \DeclareTextComposite{\.}{T1}{I}{157}
    "A0 = 160
473 \DeclareTextComposite{\u}{T1}{a}{160}
474 \DeclareTextComposite{\k}{T1}{a}{161}
475 \DeclareTextComposite{\'}{T1}{c}{162}
476 \DeclareTextComposite{\v}{T1}{c}{163}
477 \DeclareTextComposite{\v}{T1}{d}{164}
478 \DeclareTextComposite{\v}{T1}{e}{165}
479 \DeclareTextComposite{\k}{T1}{e}{166}
480 \DeclareTextComposite{\u}{T1}{g}{167}
    "A8 = 168
481 \DeclareTextComposite{\'}{T1}{l}{168}
482 \DeclareTextComposite{\v}{T1}{l}{169}
483 \DeclareTextComposite{\'}{T1}{n}{171}
484 \DeclareTextComposite{\v}{T1}{n}{172}
485 \DeclareTextComposite{\H}{T1}{o}{174}
486 \DeclareTextComposite{\'}{T1}{r}{175}
    "B0 = 176
487 \DeclareTextComposite{\v}{T1}{r}{176}
488 \DeclareTextComposite{\'}{T1}{s}{177}
489 \DeclareTextComposite{\v}{T1}{s}{178}
490 \DeclareTextComposite{\c}{T1}{s}{179}
491 \DeclareTextComposite{\v}{T1}{t}{180}
492 \DeclareTextComposite{\c}{T1}{t}{181}
493 \DeclareTextComposite{\H}{T1}{u}{182}
494 \DeclareTextComposite{\r}{T1}{u}{183}
    "B8 = 184
495 \DeclareTextComposite{\"}{T1}{y}{184}
496 \DeclareTextComposite{\'}{T1}{z}{185}
497 \DeclareTextComposite{\v}{T1}{z}{186}
498 \DeclareTextComposite{\.}{T1}{z}{187}
    "C0 = 192
499 \DeclareTextComposite{\'}{T1}{A}{192}
500 \DeclareTextComposite{\'}{T1}{A}{193}
501 \DeclareTextComposite{\^}{T1}{A}{194}
502 \DeclareTextComposite{\^}{T1}{A}{195}
503 \DeclareTextComposite{\\"}{T1}{A}{196}
504 \DeclareTextComposite{\r}{T1}{A}{197}
505 \DeclareTextComposite{\c}{T1}{C}{199}
    "C8 = 200
506 \DeclareTextComposite{\'}{T1}{E}{200}
507 \DeclareTextComposite{\'}{T1}{E}{201}
508 \DeclareTextComposite{\^}{T1}{E}{202}
509 \DeclareTextComposite{\\"}{T1}{E}{203}
510 \DeclareTextComposite{\'}{T1}{I}{204}
511 \DeclareTextComposite{\'}{T1}{I}{205}
512 \DeclareTextComposite{\^}{T1}{I}{206}
513 \DeclareTextComposite{\\"}{T1}{I}{207}
    "D0 = 208
514 \DeclareTextComposite{\^}{T1}{N}{209}
515 \DeclareTextComposite{\'}{T1}{O}{210}
516 \DeclareTextComposite{\'}{T1}{O}{211}
517 \DeclareTextComposite{\^}{T1}{O}{212}
518 \DeclareTextComposite{\^}{T1}{O}{213}
519 \DeclareTextComposite{\\"}{T1}{O}{214}

```

```

    "D8 = 216
520 \DeclareTextComposite{\`}{T1}{U}{217}
521 \DeclareTextComposite{\'}{T1}{U}{218}
522 \DeclareTextComposite{\^}{T1}{U}{219}
523 \DeclareTextComposite{\"}{T1}{U}{220}
524 \DeclareTextComposite{\'}{T1}{Y}{221}
    "E0 = 224
525 \DeclareTextComposite{\`}{T1}{a}{224}
526 \DeclareTextComposite{\'}{T1}{a}{225}
527 \DeclareTextComposite{\^}{T1}{a}{226}
528 \DeclareTextComposite{\~}{T1}{a}{227}
529 \DeclareTextComposite{\\"}{T1}{a}{228}
530 \DeclareTextComposite{\r}{T1}{a}{229}
531 \DeclareTextComposite{\c}{T1}{c}{231}
    "E8 = 232
532 \DeclareTextComposite{\`}{T1}{e}{232}
533 \DeclareTextComposite{\'}{T1}{e}{233}
534 \DeclareTextComposite{\^}{T1}{e}{234}
535 \DeclareTextComposite{\\"}{T1}{e}{235}
536 \DeclareTextComposite{\`}{T1}{i}{236}
537 \DeclareTextComposite{\'}{T1}{\i}{236}
538 \DeclareTextComposite{\'}{T1}{i}{237}
539 \DeclareTextComposite{\'}{T1}{\i}{237}
540 \DeclareTextComposite{\^}{T1}{i}{238}
541 \DeclareTextComposite{\~}{T1}{\i}{238}
542 \DeclareTextComposite{\\"}{T1}{i}{239}
543 \DeclareTextComposite{\\"}{T1}{\i}{239}
    "F0 = 240
544 \DeclareTextComposite{\^}{T1}{n}{241}
545 \DeclareTextComposite{\`}{T1}{o}{242}
546 \DeclareTextComposite{\'}{T1}{o}{243}
547 \DeclareTextComposite{\^}{T1}{o}{244}
548 \DeclareTextComposite{\~}{T1}{o}{245}
549 \DeclareTextComposite{\\"}{T1}{o}{246}
    "F8 = 248
550 \DeclareTextComposite{\`}{T1}{u}{249}
551 \DeclareTextComposite{\'}{T1}{u}{250}
552 \DeclareTextComposite{\^}{T1}{u}{251}
553 \DeclareTextComposite{\\"}{T1}{u}{252}
554 \DeclareTextComposite{\'}{T1}{y}{253}
555 \DeclareTextCompositeCommand{\k}{T1}{o}{\textogonekcentered{o}}
556 \DeclareTextCompositeCommand{\k}{T1}{0}{\textogonekcentered{0}}
557 </T1>

```

## 19.7 Definitions for the OMS encoding

The definitions for the ‘ $\text{T}_{\text{EX}}$  math symbol’ (OMS) encoding. Even though this is meant to be a math font, it includes some of the standard  $\text{L}^{\text{A}}\text{T}_{\text{EX}}$  text symbols.

Declare the encoding.

```

558 (*OMS)
559 \DeclareFontEncoding{OMS}{}{}

```

Declare the symbols.

```

560 % \changes{v1.99}{2004/02/02}{Added \cs{textbigcircle}}
561 % Note that slot 13 has in places been named |\Orb|: please root
562 % out and destroy this impolity wherever you find it!
563 % \begin{macrocode}
564 \DeclareTextSymbol{\textasteriskcentered}{OMS}{3} % "03

```

```

565 \DeclareTextSymbol{\textbackslash}{OMS}{110} % "6E
566 \DeclareTextSymbol{\textbar}{OMS}{106} % "6A
567 \DeclareTextSymbol{\textbardbl}{OMS}{107} % "6B
568 \DeclareTextSymbol{\textbraceleft}{OMS}{102} % "66
569 \DeclareTextSymbol{\textbraceright}{OMS}{103} % "67
570 \DeclareTextSymbol{\textbullet}{OMS}{15} % "0F
571 \DeclareTextSymbol{\textdaggerdbl}{OMS}{122} % "7A
572 \DeclareTextSymbol{\textdagger}{OMS}{121} % "79
573 \DeclareTextSymbol{\textparagraph}{OMS}{123} % "7B
574 \DeclareTextSymbol{\textperiodcentered}{OMS}{1} % "01
575 \DeclareTextSymbol{\textsection}{OMS}{120} % "78
576 \DeclareTextSymbol{\textbigcircle}{OMS}{13} % "0D
577 \DeclareTextCommand{\textcircled}{OMS}[1]{\hmode@bgroup
578   \oalign{%
579     \hfil \raise .07ex\hbox {\upshape#1}\hfil \crcr
580     \char 13 % "0D
581   }%
582 \egroup}
583 

```

## 19.8 Definitions for the OML encoding

The definitions for the ‘ $\text{T}_{\text{E}}\text{X}$  math italic’ (OML) encoding. Even though this is meant to be a math font, it includes some of the standard  $\text{IAT}_{\text{E}}\text{X}$  text symbols.

Declare the encoding.

```

584 (*OML)
585 \DeclareFontEncoding{OML}{}{}

```

Declare the symbols.

```

586 \DeclareTextSymbol{\textless}{OML}{`<}
587 \DeclareTextSymbol{\textgreater}{OML}{`>}
588 \DeclareTextAccent{\t}{OML}{127} % "7F
589 

```

## 19.9 Definitions for the OT4 encoding

These definitions are for the Polish extension to the ‘ $\text{T}_{\text{E}}\text{X}$  text’ (OT1) encoding. This encoding was created by B. Jackowski and M. Ryćko for use with the Polish version of Computer Modern and Computer Concrete. In positions 0–127 it is identical to OT1 but it contains some additional characters in the upper half. The  $\text{IAT}_{\text{E}}\text{X}$  support was developed by Mariusz Olko.

The PL fonts that use it are available as follows:

Metafont sources <ftp://ftp.gust.org.pl/TeX/language/polish/pl-mf.zip>;

Font files <ftp://ftp.gust.org.pl/TeX/language/polish/pl-tfm.zip>.

Declare the encoding.

```

590 (*OT4)
591 \DeclareFontEncoding{OT4}{}{}
592 \DeclareFontSubstitution{OT4}{cmr}{m}{n}

```

Declare the accents.

```

593 \DeclareTextAccent{"}{OT4}{127}
594 \DeclareTextAccent{'}{OT4}{19}
595 \DeclareTextAccent{.}{OT4}{95}
596 \DeclareTextAccent{=}{OT4}{22}
597 \DeclareTextAccent{^}{OT4}{94}
598 \DeclareTextAccent{'}{OT4}{18}
599 \DeclareTextAccent{~}{OT4}{126}
600 \DeclareTextAccent{H}{OT4}{125}
601 \DeclareTextAccent{u}{OT4}{21}
602 \DeclareTextAccent{v}{OT4}{20}
603 \DeclareTextAccent{r}{OT4}{23}

```

The ogonek accent is available only under a e A & E. But we have to provide some definition for \k. Some other accents have to be built by hand as in OT1:

```
604 \DeclareTextCommand{\k}{OT4}[1]{%
605   \TextSymbolUnavailable{\k{#1}}#1}
```

In these definitions we no longer use the helper function \sh@ft from plain.tex since that now has two incompatible definitions.

```
606 \DeclareTextCommand{\b}{OT4}[1]%
607   {\hmode@bgroup\o@align{\relax#1\crcr\hidewidth\ltx@sh@ft{-3ex}%
608     \vbox to .2ex{\hbox{\char22}\vss}\hidewidth}\egroup}
609 \DeclareTextCommand{\c}{OT4}[1]%
610   {\leavevmode\setbox\z@\hbox{\#1}\ifdim\ht\z@=1ex\accent24 #1%
611     \else\oalign{\unhbox\z@\crcr\hidewidth\char24\hidewidth}\fi}
612 \DeclareTextCommand{\d}{OT4}[1]%
613   {\hmode@bgroup
614     \o@align{\relax#1\crcr\hidewidth\ltx@sh@ft{-1ex}.\hidewidth}\egroup}
```

Declare the text symbols.

```
615 \DeclareTextSymbol{\AE}{OT4}{29}
616 \DeclareTextSymbol{\OE}{OT4}{30}
617 \DeclareTextSymbol{\O}{OT4}{31}
618 \DeclareTextSymbol{\L}{OT4}{138}
619 \DeclareTextSymbol{\ae}{OT4}{26}
620 \DeclareTextSymbol{\guillemotleft}{OT4}{174}
621 \DeclareTextSymbol{\guillemotright}{OT4}{175}
622 \DeclareTextSymbol{\i}{OT4}{16}
623 \DeclareTextSymbol{\j}{OT4}{17}
624 \DeclareTextSymbol{\l}{OT4}{170}
625 \DeclareTextSymbol{\o}{OT4}{28}
626 \DeclareTextSymbol{\oe}{OT4}{27}
627 \DeclareTextSymbol{\quotedblbase}{OT4}{255}
628 \DeclareTextSymbol{\ss}{OT4}{25}
629 \DeclareTextSymbol{\textemdash}{OT4}{124}
630 \DeclareTextSymbol{\textendash}{OT4}{123}
631 \DeclareTextSymbol{\textexclamdown}{OT4}{60}
632 \% \DeclareTextSymbol{\texthyphenchar}{OT4}{`-}
633 \% \DeclareTextSymbol{\texthyphen}{OT4}{`-}
634 \DeclareTextSymbol{\textquestiondown}{OT4}{62}
635 \DeclareTextSymbol{\textquotedblleft}{OT4}{92}
636 \DeclareTextSymbol{\textquotedblright}{OT4}{`}
637 \DeclareTextSymbol{\textquotel}{OT4}{`}
638 \DeclareTextSymbol{\textquoter}{OT4}{`'}
```

Definition for Å as in OT1:

```
639 \DeclareTextCompositeCommand{\r}{OT4}{A}%
640   {\leavevmode\setbox\z@\hbox{!}\dimen@\ht\z@\advance\dimen@-1ex%
641     \rlap{\raise.67\dimen@\hbox{\char23}}A}
```

In the OT4 encoding, £ and \$ share a slot.

```
642 \DeclareTextCommand{\textdollar}{OT4}{\hmode@bgroup
643   \ifdim \fontdimen\@ne\font >\z@
644     \slshape
645   \else
646     \upshape
647   \fi
648   \char`\$\egroup}
649 \DeclareTextCommand{\textsterling}{OT4}{\hmode@bgroup
650   \ifdim \fontdimen\@ne\font >\z@
651     \itshape
652   \else
653     \fontshape{ui}\selectfont
654   \fi
655   \char`\$\egroup}
```

Declare the composites.

```
656 \DeclareTextComposite{\k}{OT4}{A}{129}
657 \DeclareTextComposite{\'}{OT4}{C}{130}
658 \DeclareTextComposite{\k}{OT4}{E}{134}
659 \DeclareTextComposite{\'}{OT4}{N}{139}
660 \DeclareTextComposite{\'}{OT4}{S}{145}
661 \DeclareTextComposite{\'}{OT4}{Z}{153}
662 \DeclareTextComposite{\.}{OT4}{Z}{155}
663 \DeclareTextComposite{\k}{OT4}{a}{161}
664 \DeclareTextComposite{\'}{OT4}{c}{162}
665 \DeclareTextComposite{\k}{OT4}{e}{166}
666 \DeclareTextComposite{\'}{OT4}{n}{171}
667 \DeclareTextComposite{\'}{OT4}{s}{177}
668 \DeclareTextComposite{\'}{OT4}{z}{185}
669 \DeclareTextComposite{\.}{OT4}{z}{187}
670 \DeclareTextComposite{\'}{OT4}{O}{211}
671 \DeclareTextComposite{\'}{OT4}{o}{243}
672 </OT4>
```

## 19.10 Definitions for the TS1 encoding

```
673 <*TS1>
674 \DeclareFontEncoding{TS1}{}{}
675 \DeclareFontSubstitution{TS1}{cmr}{m}{n}
```

Some accents have to be built by hand. Note that `\ooalign` and `\o@lign` must be inside a group.

```
676 \DeclareTextCommand{\capitalcedilla}{TS1}[1]
677   {\hmode@bgroup
678   \ooalign{\null#1\crcr\hidewidth\char11\hidewidth}\egroup}
679 \DeclareTextCommand{\capitalogonek}{TS1}[1]
680   {\hmode@bgroup
681   \ooalign{\null#1\crcr\hidewidth\char12\hidewidth}\egroup}
```

Accents for capital letters.

These commands can be used by the end user either directly or through definitions of the type

```
\DeclareTextCompositeCommand{\'}{T1}{X}{\capitalacute X}
```

None of the latter definitions are provided by default, since they are probably rarely used.

”00 = 0

```
682 \DeclareTextAccent{\capitalgrave}{TS1}{0}
683 \DeclareTextAccent{\capitalacute}{TS1}{1}
684 \DeclareTextAccent{\capitalcircumflex}{TS1}{2}
685 \DeclareTextAccent{\capitaltilde}{TS1}{3}
686 \DeclareTextAccent{\capitaldieresis}{TS1}{4}
687 \DeclareTextAccent{\capitalhungarumlaut}{TS1}{5}
688 \DeclareTextAccent{\capitalring}{TS1}{6}
689 \DeclareTextAccent{\capitalcaron}{TS1}{7}
```

”08 = 8

```
690 \DeclareTextAccent{\capitalbreve}{TS1}{8}
691 \DeclareTextAccent{\capitalmacron}{TS1}{9}
692 \DeclareTextAccent{\capitaldotaccent}{TS1}{10}
```

Tie accents.

The tie accent was borrowed from the `cmmi` font. The tc fonts now provide four tie accents, the first two are done in the classical way with assymetric glyphs hanging out of their boxes; the new ties are centered in their boxes like all other accents. They need a name: please tell us if you know what to call them.

” =

```

693 \DeclareTextAccent{\t}{TS1}{26}
694 \DeclareTextAccent{\capitaltie}{TS1}{27}
695 \DeclareTextAccent{\newtie}{TS1}{28}
696 \DeclareTextAccent{\capitalnewtie}{TS1}{29}

    Compund word marks.
    The text companion fonts contain two compound word marks of different
    heights, one has cap_height, the other asc_height.
697 \DeclareTextSymbol{\textcapitalcompwordmark}{TS1}{23}
698 \DeclareTextSymbol{\textascendercompwordmark}{TS1}{31}

    The text companion symbols.
699 \DeclareTextSymbol{\textquotestraightbase}{TS1}{13}
    "10 = 16
700 \DeclareTextSymbol{\textquotestraightdblbase}{TS1}{18}
701 \DeclareTextSymbol{\texttwelveudash}{TS1}{21}
702 \DeclareTextSymbol{\textthreequartersemdash}{TS1}{22}
    "18 = 24
703 \DeclareTextSymbol{\textleftarrow}{TS1}{24}
704 \DeclareTextSymbol{\textrightarrow}{TS1}{25}
    "20 = 32
705 \DeclareTextSymbol{\textblank}{TS1}{32}
706 \DeclareTextSymbol{\textdollar}{TS1}{36}
707 \DeclareTextSymbol{\textquotesingle}{TS1}{39}
    "28 = 40
708 \DeclareTextSymbol{\textasteriskcentered}{TS1}{42}

    Note that '054 is a comma and '056 is a full stop: these make numbers using
    oldstyle digits easier to input.
709 \DeclareTextSymbol{\textdblhyphen}{TS1}{45}
710 \DeclareTextSymbol{\textfractionsolidus}{TS1}{47}

    Oldstyle digits.
    "30 = 48
711 \DeclareTextSymbol{\textzerooldstyle}{TS1}{48}
712 \DeclareTextSymbol{\textoneoldstyle}{TS1}{49}
713 \DeclareTextSymbol{\texttwooldstyle}{TS1}{50}
714 \DeclareTextSymbol{\textthreeoldstyle}{TS1}{51}
715 \DeclareTextSymbol{\textfouroldstyle}{TS1}{52}
716 \DeclareTextSymbol{\textfiveoldstyle}{TS1}{53}
717 \DeclareTextSymbol{\textsixoldstyle}{TS1}{54}
718 \DeclareTextSymbol{\textsevenoldstyle}{TS1}{55}
    "38 = 56
719 \DeclareTextSymbol{\texteightoldstyle}{TS1}{56}
720 \DeclareTextSymbol{\textnineoldstyle}{TS1}{57}

    More text companion symbols.
721 \DeclareTextSymbol{\textlangle}{TS1}{60}
722 \DeclareTextSymbol{\textminus}{TS1}{61}
723 \DeclareTextSymbol{\texttriangle}{TS1}{62}
    "48 = 72
724 \DeclareTextSymbol{\textmho}{TS1}{77}

    The big circle is here to define the command \textcircled. Formerly it was
    taken from the cmsy font.
725 \DeclareTextSymbol{\textbigcircle}{TS1}{79}
726 \DeclareTextCommand{\textcircled}{TS1}[1]{\hmode@bgroup
727     \oalign{%
728         \hfil \raise .07ex\hbox {\upshape#1}\hfil \crcr
729         \char 79 % '117 = "4F
730     }%
731 \egroup}

```

More text companion symbols.

```

    "50 = 80
732 \DeclareTextSymbol{\textohm}{TS1}{87}
    "58 = 88
733 \DeclareTextSymbol{\textlbrackdbl}{TS1}{91}
734 \DeclareTextSymbol{\textrbrackdbl}{TS1}{93}
735 \DeclareTextSymbol{\textuparrow}{TS1}{94}
736 \DeclareTextSymbol{\textdownarrow}{TS1}{95}
    "60 = 96
737 \DeclareTextSymbol{\textasciigrave}{TS1}{96}
738 \DeclareTextSymbol{\textborn}{TS1}{98}
739 \DeclareTextSymbol{\textdivorced}{TS1}{99}
740 \DeclareTextSymbol{\textdied}{TS1}{100}
    "68 = 104
741 \DeclareTextSymbol{\textleaf}{TS1}{108}
742 \DeclareTextSymbol{\textmarried}{TS1}{109}
743 \DeclareTextSymbol{\textmusicalnote}{TS1}{110}
    "78 = 120
744 \DeclareTextSymbol{\texttildelow}{TS1}{126}

```

This glyph, `\textdblhyphenchar` is hanging, like the `hyphenchar` of the ec fonts.

```

745 \DeclareTextSymbol{\textdblhyphenchar}{TS1}{127}
    "80 = 128
746 \DeclareTextSymbol{\textasciibreve}{TS1}{128}
747 \DeclareTextSymbol{\textasciicaron}{TS1}{129}

```

This next glyph is *not* the same as `\textquotedbl`.

```

748 \DeclareTextSymbol{\textacutedbl}{TS1}{130}
749 \DeclareTextSymbol{\textgravedbl}{TS1}{131}
750 \DeclareTextSymbol{\textdagger}{TS1}{132}
751 \DeclareTextSymbol{\textdaggerdbl}{TS1}{133}
752 \DeclareTextSymbol{\textbardbl}{TS1}{134}
753 \DeclareTextSymbol{\textperthousand}{TS1}{135}
    "88 = 136
754 \DeclareTextSymbol{\textbullet}{TS1}{136}
755 \DeclareTextSymbol{\textcelsius}{TS1}{137}
756 \DeclareTextSymbol{\textdollaroldstyle}{TS1}{138}
757 \DeclareTextSymbol{\textcentoldstyle}{TS1}{139}
758 \DeclareTextSymbol{\textflorin}{TS1}{140}
759 \DeclareTextSymbol{\textcolonmonetary}{TS1}{141}
760 \DeclareTextSymbol{\textwon}{TS1}{142}
761 \DeclareTextSymbol{\textnaira}{TS1}{143}
    "90 = 144
762 \DeclareTextSymbol{\textguarani}{TS1}{144}
763 \DeclareTextSymbol{\textpeso}{TS1}{145}
764 \DeclareTextSymbol{\textlira}{TS1}{146}
765 \DeclareTextSymbol{\textrecipe}{TS1}{147}
766 \DeclareTextSymbol{\textinterrobang}{TS1}{148}
767 \DeclareTextSymbol{\textinterrobangdown}{TS1}{149}
768 \DeclareTextSymbol{\textdong}{TS1}{150}
769 \DeclareTextSymbol{\texttrademark}{TS1}{151}
    "98 = 152
770 \DeclareTextSymbol{\textpertenthousand}{TS1}{152}
771 \DeclareTextSymbol{\textpilcrow}{TS1}{153}
772 \DeclareTextSymbol{\textbaht}{TS1}{154}
773 \DeclareTextSymbol{\textnumero}{TS1}{155}

```

This next name may change. For the following sign we know only a german name, which is abzüglich. The meaning is something like “commercial minus”. An ASCII ersatz is ./. (dot slash dot). The temporary English name is \textdiscount.

```

774 \DeclareTextSymbol{\textdiscount}{TS1}{156}
775 \DeclareTextSymbol{\textestimated}{TS1}{157}
776 \DeclareTextSymbol{\textopenbullet}{TS1}{158}
777 \DeclareTextSymbol{\textservicemark}{TS1}{159}

    "A0 = 160
778 \DeclareTextSymbol{\textlquill}{TS1}{160}
779 \DeclareTextSymbol{\textrquill}{TS1}{161}
780 \DeclareTextSymbol{\textcent}{TS1}{162}
781 \DeclareTextSymbol{\textsterling}{TS1}{163}
782 \DeclareTextSymbol{\textcurrency}{TS1}{164}
783 \DeclareTextSymbol{\textyen}{TS1}{165}
784 \DeclareTextSymbol{\textbrokenbar}{TS1}{166}
785 \DeclareTextSymbol{\textsection}{TS1}{167}

    "A8 = 168
786 \DeclareTextSymbol{\textasciidieresis}{TS1}{168}
787 \DeclareTextSymbol{\textcopyright}{TS1}{169}
788 \DeclareTextSymbol{\textordfeminine}{TS1}{170}
789 \DeclareTextSymbol{\textcopyleft}{TS1}{171}
790 \DeclareTextSymbol{\textlnot}{TS1}{172}

    The meaning of the circled-P is “sound recording copyright”.
791 \DeclareTextSymbol{\textcircledP}{TS1}{173}
792 \DeclareTextSymbol{\textregistered}{TS1}{174}
793 \DeclareTextSymbol{\textasciimacron}{TS1}{175}

    "B0 = 176
794 \DeclareTextSymbol{\textdegree}{TS1}{176}
795 \DeclareTextSymbol{\textpm}{TS1}{177}
796 \DeclareTextSymbol{\texttwosuperior}{TS1}{178}
797 \DeclareTextSymbol{\textthreesuperior}{TS1}{179}
798 \DeclareTextSymbol{\textasciiaacute}{TS1}{180}
799 \DeclareTextSymbol{\textmu}{TS1}{181} % micro sign
800 \DeclareTextSymbol{\textparagraph}{TS1}{182}
801 \DeclareTextSymbol{\textperiodcentered}{TS1}{183}

    "B8 = 184
802 \DeclareTextSymbol{\textreferencemark}{TS1}{184}
803 \DeclareTextSymbol{\textonesuperior}{TS1}{185}
804 \DeclareTextSymbol{\textordmasculine}{TS1}{186}
805 \DeclareTextSymbol{\textsurd}{TS1}{187}
806 \DeclareTextSymbol{\textonequarter}{TS1}{188}
807 \DeclareTextSymbol{\textonehalf}{TS1}{189}
808 \DeclareTextSymbol{\textthreequarters}{TS1}{190}
809 \DeclareTextSymbol{\texteuro}{TS1}{191}

    "E0 = 208
810 \DeclareTextSymbol{\texttimes}{TS1}{214}
    "F0 = 240
811 \DeclareTextSymbol{\textdiv}{TS1}{246}
812 
```

## 20 Package files

This file now also contains some packages that provide access to the more specialised encodings.

## 20.1 The fontenc package

This package allows authors to specify which encodings they will use. For each encoding `FOO`, the package looks to see if the encoding `FOO` has already been declared. If it has not, the file `fooenc.def` is loaded. The default encoding is set to be `FOO`.

In addition the package at the moment contains extra code to extend the `\@uclclist` (list of upper/lower case pairs) for encodings that involve cyrillic characters. THIS IS A TEMPORARY SOLUTION and will not stay this way forever (or so we hope) but right now we are missing a proper interface for this and didn't wanted to rush it.

813 `(*package)`

Here we define a macro that extends the `\@uclclist` if needed and afterwards turns itself in a noop.

```
814 \def\update@uclc@with@cyrillic{%
815   \expandafter\def\expandafter\@uclclist\expandafter
816   {@\@uclclist
817   \cyra\CYRA\cyrabch\CYRABHCH\cyrabchdsc\CYRABHCHDSC\cyrabhdze
818   \CYRABHDZE\cyrabha\CYRABHHA\cyrae\CYRAE\cyrb\CYRB\cyrbyus
819   \CYRBYUS\cyc\CYRC\cyrch\CYRCH\cyrchldsc\CYRCHLDSC\cyrchrdsc
820   \CYRCHRDSC\cyrchvcrs\CYRCHVCRS\cyrd\CYRD\cyrdelta\CYRDELTA
821   \cyrdje\CYRDJE\cyrdze\CYRDZEE\cyrdzhe\CYRDZHE\cyre\CYRE\cyreps
822   \CYREPS\cyrerev\CYREREV\cyrery\CYRERY\cyrf\CYRF\cyrfita
823   \CYRFITA\cyrg\CYRG\cyrgdsc\CYRGDSC\cyrgdschcrs\CYRGDSCHCRS
824   \cyrgcrs\CYRGHCRS\cyrghk\CYRGHK\cyrgup\CYRGUP\cyrh\CYRH
825   \cyrhdesc\CYRHDSC\cyrhhcrs\CYRHHCRS\cyrhk\CYRHHK\cyhrdsn
826   \CYRHRDSN\cyri\CYRI\cylie\CYRIE\cyrii\CYRII\cyrishrt\CYRISHRT
827   \cyrishrtdesc\CYRISHRTDSC\cyrizh\CYRIZH\cyrie\CYRJE\cyrk\CYRK
828   \cyrkbeak\CYRKBEAK\cyrkdesc\CYRKDSC\cyrkcrs\CYRKHCRS\cyrkhk
829   \CYRKHK\cyrkvcrs\CYRKVCRS\cyl\CYRL\cyldesc\CYRLDSC\cylrhk
830   \CYRLHK\cylje\CYRLJE\cyrm\CYRM\cymdesc\CYRMDSC\cymhk\CYRMHK
831   \cyrn\CYRN\cyrndsc\CYRNDSC\cyrng\CYRNG\cyrnhk\CYRNHK\cyrnje
832   \CYRNJE\cyrnlhk\CYRNLHK\cyro\CYRO\cyrotld\CYROTLD\cyrp\CYRP
833   \cyrphk\CYRPHK\cyrq\CYRQ\cyrr\CYRR\cyyrdsc\CYRRDSC\cyyrhk
834   \CYRRHK\cyyrtick\CYRRTICK\crys\CYRS\crysacrs\CYRSACRS
835   \cryscha\CYRSCHWA\crysdesc\CYRSDSC\cyrsemisftsn\CYRSEMISFTSN
836   \crysftsn\CYRSFTSN\crys\CYRSH\crysdesc\CYRSHCH\crysaha\CYRSHHA
837   \cyrt\CYRT\cyrtdesc\CYRTDSC\cyrtetse\CYRTETSE\cyrtshe\CYRTSHE
838   \cyr\CYRU\cyrushrt\CYRUSHRT\cyrv\CYRV\cyrw\CYRW\cyy\CYRY
839   \cyya\CYRYA\cyyat\CYRYAT\cyyrcrs\CYRYHCRS\cyyi\CYRYI\cyyo
840   \CYRYO\cyyu\CYRYU\cyyz\CYRZ\cyyzdesc\CYRZDSC\cyyzh\CYRZH
841   \cyyzdesc\CYRZDSC}%
842   \let\update@uclc@with@cyrillic\relax
843 }
```

Here we process each option:

```
844 \DeclareOption*{%
845   \let\encodingdefault\CurrentOption
846   \edef\reserved@f{%
847     \lowercase{\def\noexpand\reserved@f{\CurrentOption enc.def}}%
848   \reserved@f
849   \InputIfFileExists\reserved@f
850   {}{\PackageError{fontenc}{%
851     {Encoding file '\reserved@f' not found.%}
852     \MessageBreak
853     You might have misspelt the name of the encoding}%
854     {Necessary code for this encoding was not
855      loaded.\MessageBreak
856      Thus calling the encoding later on will
857      produce further error messages.}%
858   \let\reserved@f\relax
```

In case the current encoding is one of a list of known cyrillic ones we extend the `\@uclclist`:

```
859  \expandafter\in@\expandafter{\CurrentOption}%
860          {T2A,T2B,T2C,X2,LCY,OT2}%
861  \ifin@
```

But only if it hasn't already been extended. This might happen if there are several calls to fontenc loading one of the above encodings. If we don't do this check the `\@uclclist` gets unnecessarily big, slowing down the processing at runtime.

```
862  \expandafter\in@\expandafter\cyra\expandafter
863          {\@uclclist}%
864  \ifin@
865  \else
866      \update@uclc@with@cyrillic
867  \fi
868 \fi
869 }  
870 \ProcessOptions*
```

```
871 \fontencoding\encodingdefault\selectfont
```

To save some space we get rid of the macro extending the `\@uclclist` (might have happened already).

```
872 \let\update@uclc@with@cyrillic\relax
```

Finally we pretend that the fontenc package wasn't read in. This allows for using it several times, e.g., in a class file and in the preamble (at the cost of not getting any version info). That kind of hackery shows that using a general purpose package just for loading an encoding is not the right kind of interface for setting up encodings — it will get replaced at some point in the future.

```
873 \global\expandafter\let\csname ver@fontenc.sty\endcsname\relax
874 \global\expandafter\let\csname opt@fontenc.sty\endcsname\relax
875 \global\let\@ifl@ter@@\@ifl@ter
876 \def\@ifl@ter#1#2#3#4#5{\global\let\@ifl@ter\@ifl@ter@@}
877 </package>
```

## 20.2 The textcomp package

This one is for the TS1 encoding which contains text symbols for use with the T1-encoded text fonts. It therefore first inputs the file `TS1enc.def` and then sets (or resets) the defaults for the symbols it contains. The result of this is that when one of these symbols is accessed and the current encoding does not provide it, the symbol will be supplied by a silent, local change to this encoding.

```
878 <*TS1sty>
```

Since many PostScript fonts only implement a subset of TS1 many commands only produce black blobs of ink. To resolve the resulting problems a number of options have been introduced and some code has been developed to distinguish sub-encodings.

The sub-encodings have a numerical id and are defined as follows for TS1:

**#5** those TS1 symbols that are also in the ISO-Adobe character set; without `textcurrency`, which is often misused for the Euro. Older Type1 fonts from the non-TEX world provide only this subset.

**#4** = #5 + `\texteuro`. Most newer fonts provide this.

**#3** = #4 + `\textomega`. Can also be described as  $TS1 \cap (ISO-Adobe \cup MacRoman)$ . (Except for the missing "currency".)

**#2** = #3 + `\textestimated` + `\textcurrency`. Can also be described as  $TS1 \cap Adobe-Western-2$ . This may be relevant for OpenType fonts, which usually show the Adobe-Western-2 character set.

**#1** = TS1 without `\textcircled` and `\t`. These two glyphs are often not implemented and if their kernel defaults are changed commands like `\copyright` unnecessarily fail.

**#0** = full TS1

And here a summary to go in the transcript file:

```
879 \PackageInfo{textcomp}{Sub-encoding information:\MessageBreak
880   \space\space 5 = only ISO-Adobe without \string\textcurrency\MessageBreak
881   \space\space 4 = 5 + \string\texteuro\MessageBreak
882   \space\space 3 = 4 + \string\textohm\MessageBreak
883   \space\space 2 = 3 + \noexpand\textestimated+ \string\textcurrency\MessageBreak
884   \space\space 1 = TS1 - \noexpand\textcircled- \string\t\MessageBreak
885   \space\space 0 = TS1 (full)\MessageBreak
886 Font families with sub-encoding setting implement\MessageBreak
887 only a restricted character set as indicated.\MessageBreak
888 Family '?' is the default used for unknown fonts.\MessageBreak
889 See the documentation for details@\gobble}
```

**\DeclareEncodingSubset** An encoding subset to which a font family belongs is declared by `\DeclareEncodingSubset` that take the major encoding as the first argument (e.g., `TS1`), the family name as the second argument (e.g., `cmr`), and the subset encoding id as a third, (e.g., `0` for `cmr`).

The default encoding subset to use when nothing is known about the current font family is named `?`.

```
890 \def\DeclareEncodingSubset#1#2#3{%
891   \@ifundefined{#1:#2}{%
892     {\PackageInfo{textcomp}{Setting #2 sub-encoding to #1/#3}}%
893     {\PackageInfo{textcomp}{Changing #2 sub-encoding to #1/#3}}%
894   \@namedef{#1:#2}{#3}%
895 }@onlypreamble\DeclareEncodingSubset
```

The options for the package are the following:

**safe** for unknown font families enables only symbols that are also in the ISO-Adobe character set; without "currency", which is often misused for the Euro. Older Type1 fonts from the non-TeX world provide only this subset.

**euro** enables the "safe" symbols plus the `\texteuro` command. Most newer fonts provide this.

**full** enables all `TS1` commands; useful only with fonts like EC or CM bright.

**almostfull** same as "full", except that `\textcircled` and `\t` are *not* redefined from their defaults to avoid that commands like `\copyright` suddenly no longer work.

**force** ignore all subset encoding definitions stored in the package itself or in the configuration file and always use the default subset as specified by one of the other options (seldom useful, only dangerous).

**\iftc@forced** Switch used to implement the **force** option

```
896 \newif\iftc@forced \tc@forcedfalse
```

This is implemented by defining the default subset:

```
897 \DeclareOption{full}{\DeclareEncodingSubset{TS1}{?}{0}}
898 \DeclareOption{almostfull}{\DeclareEncodingSubset{TS1}{?}{1}}
899 \DeclareOption{euro}{\DeclareEncodingSubset{TS1}{?}{4}}
900 \DeclareOption{safe}{\DeclareEncodingSubset{TS1}{?}{5}}
```

The default is “almostfull” which means that old documents will work except that `\textcircled` and `\t` will use the kernel defaults (with the advantage that this also works if the current font (as often the case) doesn’t implement these glyphs.

The “force” option simply sets the switch to true.

```
901 \DeclareOption{force}{\tc@forcedtrue}
```

The suggestions to user is to use the “safe” option always unless that balks in which case they could switch to “almostfull” but then better check their output manually.

```
902 \def\tc@errorwarn{\PackageError}
903 \DeclareOption{warn}{\gdef\tc@errorwarn{\PackageWarning{#1}{#2}}}
904 \ExecuteOptions{almostfull}
905 \ProcessOptions\relax
```

`\CheckEncodingSubset` The command `\CheckEncodingSubset` will check if the current font family has the right encoding subset to typeset a certain command. It takes five arguments as follows: first argument is either `\UseTextSymbol`, `\UseTextAccent` depending on whether or not the symbol is a text symbol or a text accent.

The second argument is the encoding from which this symbol should be fetched.

The third argument is either a fake accessor command or an error message. the code in that argument (if ever executed) receives two arguments: #2 and #5 of `\CheckEncodingSubset`.

Argument four is the subset encoding id to test against: if this value is higher than the subset id of the current font family then we typeset the symbol, i.e., execute `#1{#2}#5` otherwise it runs `#3#5`, e.g., to produce an error message or fake the glyph somehow.

Argument five is the symbol or accent command that is being checked.

For usage examples see definitions below.

```
906 \iftc@forced
```

If the “force” option was given we always use the default for testing against.

```
907 \def\CheckEncodingSubset#1#2#3#4#5{%
908     \ifnum #4>%
909         0\csname #2:?\endcsname
910         \relax
911     \expandafter\@firstoftwo
912     \else
913     \expandafter\@secondoftwo
914     \fi
915     {#1{#2}}{#3}%
916     #5%
917 }
```

In normal circumstances the test is a bit more complicated: first check if there exists a macro `\⟨arg2⟩:{current-family}` and if so use that value to test against, otherwise use the default to test against.

```
918 \else
919 \def\CheckEncodingSubset#1#2#3#4#5{%
920     \ifnum #4>%
921         \expandafter\ifx\csname #2:\f@family\endcsname\relax
922             0\csname #2:?\endcsname
923         \else
924             \csname #2:\f@family\endcsname
925         \fi
926     \relax
927     \expandafter\@firstoftwo
928     \else
929     \expandafter\@secondoftwo
930     \fi
931     {#1{#2}}{#3}%
932     #5%
```

```

933 }
934 \fi

tc@subst
935 \def\tc@subst#1{%
936   \tc@errorwarn{textcomp}%
937   {Symbol \string#1 not provided by\MessageBreak
938   font family \f@family\space
939   in TS1 encoding.\MessageBreak Default family used instead}\@eha
940 \bgroup\fontfamily{textcompsubstdefault}\selectfont#1\egroup
941 }

\textracompsubstdefault
942 \def\textracompsubstdefault{cmr}

\tc@error \tc@error is going to be used in arg #3 of \CheckEncodingSubset when a symbol
is not available in a certain font family. It gets pass the encoding it normally lives
in (arg one) and the name of the symbol or accent that has a problem.

943 % error commands take argument:
944 % #1 symbol to be used
945 \def\tc@error#1{%
946   \PackageError{textcomp}%
947   {Accent \string#1 not provided by\MessageBreak
948   font family \f@family\space
949   in TS1 encoding}\@eha
950 }

\tc@fake@euro \tc@fake@euro is an example of a “fake” definition to use in arg #3 of
\CheckEncodingSubset when a symbol is not available in a certain font family.
Here we produce an Euro symbol by combining a “C” with a “=”.

951 \def\tc@fake@euro#1{%
952   \leavevmode
953   \PackageInfo{textcomp}{Faking \noexpand#1 for font family
954   \f@family\MessageBreak in TS1 encoding}%
955   \valign{##\cr
956     \vfil\hbox to 0.07em{\dimen@\f@size\p@
957       \math@fontsfalse
958       \fontsize{.7\dimen@}\z@\selectfont=\hss}\vfil\cr%
959     \hbox{C}\cr}
960   }%
961 }

\tc@check@symbol These are two abbreviations that we use below to check symbols and accents in
\tc@check@accent TS1. Only there to save some space, e.g., we can then write

\DeclareTextCommandDefault{\textcurrency}{\tc@check@symbol3\textcurrency}

to ensure that \textcurrency is only typeset if the current font has a TS1 subset
id of less than 3. Otherwise \tc@error is called telling the user that for this font
family \textcurrency is not available.

962 \def\tc@check@symbol{\CheckEncodingSubset\UseTextSymbol{TS1}\tc@subst}
963 \def\tc@check@accent{\CheckEncodingSubset\UseTextAccent{TS1}\tc@error}

We start with the commands that are “safe” and which can be unconditionally
set up, first the accents...
964 \DeclareTextAccentDefault{\capitalcedilla}{TS1}
965 \DeclareTextAccentDefault{\capitalogonek}{TS1}
966 \DeclareTextAccentDefault{\capitalgrave}{TS1}
967 \DeclareTextAccentDefault{\capitalacute}{TS1}
968 \DeclareTextAccentDefault{\capitalcircumflex}{TS1}
969 \DeclareTextAccentDefault{\capitaltilde}{TS1}

```

```

970 \DeclareTextAccentDefault{\capitaldieresis}{TS1}
971 \DeclareTextAccentDefault{\capitalhungarumlaut}{TS1}
972 \DeclareTextAccentDefault{\capitalring}{TS1}
973 \DeclareTextAccentDefault{\capitalcaron}{TS1}
974 \DeclareTextAccentDefault{\capitalbreve}{TS1}
975 \DeclareTextAccentDefault{\capitalmacron}{TS1}
976 \DeclareTextAccentDefault{\capitaldotaccent}{TS1}

...and then the other glyphs.

977 \DeclareTextSymbolDefault{\textcapitalcompwordmark}{TS1}
978 \DeclareTextSymbolDefault{\textascendercompwordmark}{TS1}
979 \DeclareTextSymbolDefault{\textquotestraightbase}{TS1}
980 \DeclareTextSymbolDefault{\textquotestraightdblbase}{TS1}
981 \DeclareTextSymbolDefault{\texttwelveudash}{TS1}
982 \DeclareTextSymbolDefault{\textthreequartersemdash}{TS1}
983 \DeclareTextSymbolDefault{\textdollar}{TS1}
984 \DeclareTextSymbolDefault{\textquotesingle}{TS1}
985 \DeclareTextSymbolDefault{\textasteriskcentered}{TS1}
986 \DeclareTextSymbolDefault{\textfractionsolidus}{TS1}
987 \DeclareTextSymbolDefault{\textminus}{TS1}
988 \DeclareTextSymbolDefault{\textlbrackdbl}{TS1}
989 \DeclareTextSymbolDefault{\textrbrackdbl}{TS1}
990 \DeclareTextSymbolDefault{\textasciigrave}{TS1}
991 \DeclareTextSymbolDefault{\texttildelow}{TS1}
992 \DeclareTextSymbolDefault{\textasciibreve}{TS1}
993 \DeclareTextSymbolDefault{\textasciicaron}{TS1}
994 \DeclareTextSymbolDefault{\textgravedbl}{TS1}
995 \DeclareTextSymbolDefault{\textacutedbl}{TS1}
996 \DeclareTextSymbolDefault{\textdagger}{TS1}
997 \DeclareTextSymbolDefault{\textdaggerdbl}{TS1}
998 \DeclareTextSymbolDefault{\textbardbl}{TS1}
999 \DeclareTextSymbolDefault{\textperthousand}{TS1}
1000 \DeclareTextSymbolDefault{\textbullet}{TS1}
1001 \DeclareTextSymbolDefault{\textcelsius}{TS1}
1002 \DeclareTextSymbolDefault{\textflorin}{TS1}
1003 \DeclareTextSymbolDefault{\texttrademark}{TS1}
1004 \DeclareTextSymbolDefault{\textcent}{TS1}
1005 \DeclareTextSymbolDefault{\textsterling}{TS1}
1006 \DeclareTextSymbolDefault{\textyen}{TS1}
1007 \DeclareTextSymbolDefault{\textbrokenbar}{TS1}
1008 \DeclareTextSymbolDefault{\textsection}{TS1}
1009 \DeclareTextSymbolDefault{\textasciidieresis}{TS1}
1010 \DeclareTextSymbolDefault{\textcopyright}{TS1}
1011 \DeclareTextSymbolDefault{\textordfeminine}{TS1}
1012 \DeclareTextSymbolDefault{\textlnot}{TS1}
1013 \DeclareTextSymbolDefault{\textregistered}{TS1}
1014 \DeclareTextSymbolDefault{\textasciimacron}{TS1}
1015 \DeclareTextSymbolDefault{\textdegree}{TS1}
1016 \DeclareTextSymbolDefault{\textpm}{TS1}
1017 \DeclareTextSymbolDefault{\texttwosuperior}{TS1}
1018 \DeclareTextSymbolDefault{\textthreesuperior}{TS1}
1019 \DeclareTextSymbolDefault{\textasciiaacute}{TS1}
1020 \DeclareTextSymbolDefault{\textmu}{TS1}
1021 \DeclareTextSymbolDefault{\textparagraph}{TS1}
1022 \DeclareTextSymbolDefault{\textperiodcentered}{TS1}
1023 \DeclareTextSymbolDefault{\textonesuperior}{TS1}
1024 \DeclareTextSymbolDefault{\textordmasculine}{TS1}
1025 \DeclareTextSymbolDefault{\textonequarter}{TS1}
1026 \DeclareTextSymbolDefault{\textonehalf}{TS1}
1027 \DeclareTextSymbolDefault{\textthreequarters}{TS1}
1028 \DeclareTextSymbolDefault{\texttimes}{TS1}
1029 \DeclareTextSymbolDefault{\textdiv}{TS1}

```

The \texteuro is only available for subsets with id 4 or less. Otherwise we fake the glyph using \tc@fake@euro

```
1030 \DeclareTextCommandDefault{\texteuro}{\CheckEncodingSubset\UseTextSymbol{TS1}\tc@fake@euro5\texteuro}
```

The \textohm is only available for subsets with id 3 or less. Otherwise we produce an error.

```
1032 \DeclareTextCommandDefault{\textohm}{\tc@check@symbol4\textohm}
```

The \textestimated and \textcurrency are only provided for fonts with subset encoding with id 2 or less.

```
1033 \DeclareTextCommandDefault{\textestimated}{\tc@check@symbol3\textestimated}
1034 \DeclareTextCommandDefault{\textcurrency}{\tc@check@symbol3\textcurrency}
```

Nearly all of the remaining glyphs are provided only with fonts with id 1 or 0, i.e., are essentially complete.

```
1035 \DeclareTextCommandDefault{\capitaltie}{\tc@check@accent2\capitaltie}
1036 \DeclareTextCommandDefault{\newtie}{\tc@check@accent2\newtie}
1037 \DeclareTextCommandDefault{\capitalnewtie}{\tc@check@accent2\capitalnewtie}
1038 \DeclareTextCommandDefault{\textleftarrow}{\tc@check@symbol2\textleftarrow}
1039 \DeclareTextCommandDefault{\textrightarrow}{\tc@check@symbol2\textrightarrow}
1040 \DeclareTextCommandDefault{\textblank}{\tc@check@symbol2\textblank}
1041 \DeclareTextCommandDefault{\textdblhyphen}{\tc@check@symbol2\textdblhyphen}
1042 \DeclareTextCommandDefault{\textzerooldstyle}{\tc@check@symbol2\textzerooldstyle}
1043 \DeclareTextCommandDefault{\textoneoldstyle}{\tc@check@symbol2\textoneoldstyle}
1044 \DeclareTextCommandDefault{\texttwooldstyle}{\tc@check@symbol2\texttwooldstyle}
1045 \DeclareTextCommandDefault{\textthreeoldstyle}{\tc@check@symbol2\textthreeoldstyle}
1046 \DeclareTextCommandDefault{\textfouroldstyle}{\tc@check@symbol2\textfouroldstyle}
1047 \DeclareTextCommandDefault{\textfiveoldstyle}{\tc@check@symbol2\textfiveoldstyle}
1048 \DeclareTextCommandDefault{\textsixoldstyle}{\tc@check@symbol2\textsixoldstyle}
1049 \DeclareTextCommandDefault{\textsevenoldstyle}{\tc@check@symbol2\textsevenoldstyle}
1050 \DeclareTextCommandDefault{\texteightoldstyle}{\tc@check@symbol2\texteightoldstyle}
1051 \DeclareTextCommandDefault{\textnineoldstyle}{\tc@check@symbol2\textnineoldstyle}
1052 \DeclareTextCommandDefault{\texttangle}{\tc@check@symbol2\texttangle}
1053 \DeclareTextCommandDefault{\textrangle}{\tc@check@symbol2\textrangle}
1054 \DeclareTextCommandDefault{\textmho}{\tc@check@symbol2\textmho}
1055 \DeclareTextCommandDefault{\textbigcircle}{\tc@check@symbol2\textbigcircle}
1056 \DeclareTextCommandDefault{\textuparrow}{\tc@check@symbol2\textuparrow}
1057 \DeclareTextCommandDefault{\textdownarrow}{\tc@check@symbol2\textdownarrow}
1058 \DeclareTextCommandDefault{\textborn}{\tc@check@symbol2\textborn}
1059 \DeclareTextCommandDefault{\textdivorced}{\tc@check@symbol2\textdivorced}
1060 \DeclareTextCommandDefault{\textdied}{\tc@check@symbol2\textdied}
1061 \DeclareTextCommandDefault{\textleaf}{\tc@check@symbol2\textleaf}
1062 \DeclareTextCommandDefault{\textmarried}{\tc@check@symbol2\textmarried}
1063 \DeclareTextCommandDefault{\textmusicalnote}{\tc@check@symbol2\textmusicalnote}
1064 \DeclareTextCommandDefault{\textdblhyphenchar}{\tc@check@symbol2\textdblhyphenchar}
1065 \DeclareTextCommandDefault{\textdollaroldstyle}{\tc@check@symbol2\textdollaroldstyle}
1066 \DeclareTextCommandDefault{\textcentoldstyle}{\tc@check@symbol2\textcentoldstyle}
1067 \DeclareTextCommandDefault{\textcolonmonetary}{\tc@check@symbol2\textcolonmonetary}
1068 \DeclareTextCommandDefault{\textwon}{\tc@check@symbol2\textwon}
1069 \DeclareTextCommandDefault{\textnaira}{\tc@check@symbol2\textnaira}
1070 \DeclareTextCommandDefault{\textguarani}{\tc@check@symbol2\textguarani}
1071 \DeclareTextCommandDefault{\textpeso}{\tc@check@symbol2\textpeso}
1072 \DeclareTextCommandDefault{\textlira}{\tc@check@symbol2\textlira}
1073 \DeclareTextCommandDefault{\textrecipe}{\tc@check@symbol2\textrecipe}
1074 \DeclareTextCommandDefault{\textinterrobang}{\tc@check@symbol2\textinterrobang}
1075 \DeclareTextCommandDefault{\textinterrobangdown}{\tc@check@symbol2\textinterrobangdown}
1076 \DeclareTextCommandDefault{\textdong}{\tc@check@symbol2\textdong}
1077 \DeclareTextCommandDefault{\textpertenthousand}{\tc@check@symbol2\textpertenthousand}
1078 \DeclareTextCommandDefault{\textpilcrow}{\tc@check@symbol2\textpilcrow}
1079 \DeclareTextCommandDefault{\textbaht}{\tc@check@symbol2\textbaht}
1080 \DeclareTextCommandDefault{\textnumero}{\tc@check@symbol2\textnumero}
1081 \DeclareTextCommandDefault{\textdiscount}{\tc@check@symbol2\textdiscount}
```

```

1082 \DeclareTextCommandDefault{\textopenbullet}{\tc@check@symbol2\textopenbullet}
1083 \DeclareTextCommandDefault{\textservicemark}{\tc@check@symbol2\textservicemark}
1084 \DeclareTextCommandDefault{\textlquill}{\tc@check@symbol2\textlquill}
1085 \DeclareTextCommandDefault{\textrquill}{\tc@check@symbol2\textrquill}
1086 \DeclareTextCommandDefault{\textcopyleft}{\tc@check@symbol2\textcopyleft}
1087 \DeclareTextCommandDefault{\textcircledP}{\tc@check@symbol2\textcircledP}
1088 \DeclareTextCommandDefault{\textreferencemark}{\tc@check@symbol2\textreferencemark}
1089 \DeclareTextCommandDefault{\textsurd}{\tc@check@symbol2\textsurd}

```

The `\textcircled` and `\t` are handled specially, unless the current font has a subset id of 0 (i.e. full TS1) we pick the symbols up from the the math font encodings, i.e., the third argument to `\CheckEncodingSubset` uses `\UseTextAccent` to get them from there.

```

1090 \DeclareTextCommandDefault{\textcircled}{%
1091   \CheckEncodingSubset\UseTextAccent{TS1}{\UseTextAccent{OMS}}1\textcircled}%
1092 \DeclareTextCommandDefault{\t}{%
1093   \CheckEncodingSubset\UseTextAccent{TS1}{\UseTextAccent{OML}}1\t}%

```

Finally input the encoding-specific definitions for TS1 thus making the top-level definitions optimised for this encoding (and not for the default encoding, see section 19.2).

```
1094 \input{ts1enc.def}
```

Now having the new glyphs available we also want to make sure that they are used. For most cases this will automatically happen but for some glyphs there are inferior definitions already known to L<sup>A</sup>T<sub>E</sub>X which will prevent the usage of the TS1 versions (see section 19.1 above). So we better get rid of them:

```

1095 \UndeclareTextCommand{\textsterling}{OT1}
1096 \UndeclareTextCommand{\textdollar} {OT1}

```

Similar declarations should probably be made for other encodings like OT4 if they are in use.

```

1097 %\UndeclareTextCommand{\textsterling}{OT4}
1098 %\UndeclareTextCommand{\textdollar} {OT4}

```

From the T1 encoding there are two candidates for removal: `%o` and `%oo` since these are both constructed from `%` followed by a tiny ‘o’ rather than being a single glyph. The problem with this approach is that in PostScript fonts this small zero is usually not available resulting in `%■` rather than `%o` while the real glyph (at least for `\textperthousand`) is available in the PostScript version of TS1. So for the moment we compromise by removing the T1 declaration for `\textperthousand` but keeping the one for `\textpertenthousand`. This will have the effect that with Computer Modern fonts everything will come out (although `%o` and `%oo` are not taken from the same physical font) and with PostScript fonts `%o` will come out correctly while `%oo` will most likely look like `%■` — which is probably an improvement over just getting a single ‘■’ to indicate a completely missing glyph, which would happen if we also ‘undeclared’ `\textpertenthousand`.

```

1099 \UndeclareTextCommand{\textperthousand}{T1}
1100 %\UndeclareTextCommand{\textpertenthousand}{T1}

```

### 20.2.1 Supporting oldstyle digits

```

1101 \DeclareRobustCommand\oldstylenums[1]{%
1102   \begingroup
1103   \ifmmode
1104     \mathgroup\symletters #1%
1105   \else
1106     \CheckEncodingSubset\use@text@encoding{TS1}%
1107     {\PackageWarning{textcomp}%
1108      {Oldstyle digits unavailable for
1109       family \f@family.\MessageBreak
1110       Lining digits used instead}%
1111     \tw@{#1}%

```

```

1112   \fi
1113 \endgroup
1114 }

```

### 20.2.2 Subset encoding defaults

For many font families commonly used in the T\textrm{E}\textrm{X} world we provide the subset encoding data here. Users can add additional font families in the file `textcomp.cfg` if they own other fonts.

However, if the option “forced” was given then all subset encoding specifications are ignored, so there is no point in setting any of them up:

```
1115 \iftc@forced \else
```

Computer modern based fonts (e.g., CM, CM-Bright, Concrete):

```

1116 \DeclareEncodingSubset{TS1}{cmr}    {0}
1117 \DeclareEncodingSubset{TS1}{cmss}   {0}
1118 \DeclareEncodingSubset{TS1}{cmtt}   {0}
1119 \DeclareEncodingSubset{TS1}{cmvtt}  {0}
1120 \DeclareEncodingSubset{TS1}{cmbr}   {0}
1121 \DeclareEncodingSubset{TS1}{cmtl}   {0}
1122 \DeclareEncodingSubset{TS1}{ccr}    {0}

```

PSNFSS fonts:

```

1123 \DeclareEncodingSubset{TS1}{ptm}    {4}
1124 \DeclareEncodingSubset{TS1}{pcr}    {4}
1125 \DeclareEncodingSubset{TS1}{phv}    {4}
1126 \DeclareEncodingSubset{TS1}{ppl}    {3}
1127 \DeclareEncodingSubset{TS1}{pag}    {4}
1128 \DeclareEncodingSubset{TS1}{pbk}    {4}
1129 \DeclareEncodingSubset{TS1}{pnc}    {4}
1130 \DeclareEncodingSubset{TS1}{pzc}    {4}
1131 \DeclareEncodingSubset{TS1}{bch}    {4}
1132 \DeclareEncodingSubset{TS1}{put}    {5}

```

Other CTAN fonts (probably not complete):

```

1133 \DeclareEncodingSubset{TS1}{uag}    {5}
1134 \DeclareEncodingSubset{TS1}{ugq}    {5}
1135 \DeclareEncodingSubset{TS1}{ul8}    {4}
1136 \DeclareEncodingSubset{TS1}{ul9}    {4} % (LuxiSans, one day)
1137 \DeclareEncodingSubset{TS1}{augie}  {5}
1138 \DeclareEncodingSubset{TS1}{dayrom} {3}
1139 \DeclareEncodingSubset{TS1}{dayroms} {3}
1140 \DeclareEncodingSubset{TS1}{pxr}    {0}
1141 \DeclareEncodingSubset{TS1}{pxss}   {0}
1142 \DeclareEncodingSubset{TS1}{pxtt}   {0}
1143 \DeclareEncodingSubset{TS1}{txr}    {0}
1144 \DeclareEncodingSubset{TS1}{txss}   {0}
1145 \DeclareEncodingSubset{TS1}{txtt}   {0}

```

Fourier-GUTenberg:

```

1146 \DeclareEncodingSubset{TS1}{futs}   {4}
1147 \DeclareEncodingSubset{TS1}{futx}   {4}
1148 \DeclareEncodingSubset{TS1}{futj}   {4}

```

Y&Y’s Lucida Bright

```

1149 \DeclareEncodingSubset{TS1}{hlh}   {3}
1150 \DeclareEncodingSubset{TS1}{hls}   {3}
1151 \DeclareEncodingSubset{TS1}{hlst}  {3}

```

The remaining settings for Lucida are conservative: the following fonts contain the `\textohm` character but not the `\texteuro`, i.e., belong to neither subset 4 nor subset 3. If you want to use the `\textohm` with these fonts copy these definition to `textcomp.cfg` and change the subset to 3. However in that case make sure that you do not use the `\texteuro`.

```
1152 \DeclareEncodingSubset{TS1}{hlct}  {5}
```

```
1153 \DeclareEncodingSubset{TS1}{hlx}      {5}
1154 \DeclareEncodingSubset{TS1}{hlce}       {5}
1155 \DeclareEncodingSubset{TS1}{hlcn}       {5}
1156 \DeclareEncodingSubset{TS1}{hlcw}       {5}
1157 \DeclareEncodingSubset{TS1}{hlcf}       {5}
```

Other commercial families...

```
1158 \DeclareEncodingSubset{TS1}{pplx}      {3}
1159 \DeclareEncodingSubset{TS1}{pplj}       {3}
1160 \DeclareEncodingSubset{TS1}{ptmx}       {4}
1161 \DeclareEncodingSubset{TS1}{ptmj}       {4}
```

If the file `textcomp.cfg` exists it will be loaded at this point. This allows to define further subset encodings for font families not covered by default.

```
1162 \InputIfFileExists{textcomp.cfg}
1163   {\PackageInfo{textcomp}{Local configuration file used}}{}
1164 \fi
1165 </TS1sty>
```

# File m

## ltcounts.dtx

### 21 Counters and Lengths

Commands for defining and using counters. This file defines:

```
\newcounter      To define a new counter.  
\setcounter    To set the value of counters.  
\addtocounter Increase the counter #1 by the number #2.  
\stepcounter   Increase a counter by one.  
\refstepcounter Increase a counter by one, also setting the value used by \label.  
    \value       For accessing the value of the counter as a TeX number (as opposed to  
    \the<counter> which expands to the printed representation of <counter>)  
    \arabic{<counter>}: 1, 2, 3, ...  
    \roman{<counter>}: i, ii, iii, ...  
    \Roman{<counter>}: I, II, III, ...  
    \alph{<counter>}: a, b, c, ...  
    \Alpha{<counter>}: A, B, C, ...  
    \fnsymbol{<counter>}: *, †, ‡, ...  
1 (*2ekernel)
```

#### 21.1 Environment Counter Macros

An environment foo has an associated counter defined by the following control sequences:

\c@foo	Contains the counter's numerical value. It is defined by \newcount\foocounter.
\thefoo	Macro that expands to the printed value of \foocounter. For example, if sections are numbered within chapters, and section headings look like Section II-3. The Nature of Counters then \thesection might be defined by: \def\thesection {\@Roman{\c@chapter}-\@arabic{\c@section}}
\p@foo	Macro that expands to a printed 'reference prefix' of counter foo. Any \ref to a value created by counter foo will produce the expansion of \p@foo\thefoo when the \label command is executed. See file ltxref.dtx for an extension of this mech- anism.
\cl@foo	List of counters to be reset when foo stepped. Has format \@elt{counterA}\@elt{counterB}\@elt{counterC}.

#### NOTE:

\thefoo and \p@foo must be defined in such a way that \edef\bar{\thefoo} or  
\edef\bar{\p@foo} defines \bar so that it will evaluate to the counter value at  
the time of the \edef, even after \foocounter and any other counters have been  
changed. This will happen if you use the standard commands \arabic, \Roman,  
etc.

The following commands are used to define and modify counters.

\refstepcounter{<foo>}

Same as \stepcounter, but it also defines \currentreference so that a subsequent  
\label{<bar>} command causes \ref{<bar>} to generate the current value  
of counter <foo>.

\@definecounter{<foo>}

Initializes counter {<foo>} (with empty reset list), defines \p@foo and \thefoo to  
be null. Also adds <foo> to \cl@ckpt – the reset list of a dummy counter @ckpt  
used for taking checkpoints for the \include system.

```

    \c@addtoreset{\⟨foo⟩}{\⟨bar⟩} : Adds counter ⟨foo⟩ to the list of counters
    \c@l@bar to be reset when counter ⟨bar⟩ is stepped.

\setcounter \setcounter{\⟨foo⟩}{\⟨val⟩} : Globally sets \foocounter equal to ⟨val⟩.
  2 \def\setcounter#1#2{%
  3   \@ifundefined{c@#1}{%
  4     {\@nocounterr{#1}}{%
  5       {\global\csname c@#1\endcsname#2\relax}}}

\addtocounter \addtocounter{\⟨foo⟩}{\⟨val⟩} Globally increments \foocounter by ⟨val⟩.
  6 \def\addtocounter#1#2{%
  7   \@ifundefined{c@#1}{%
  8     {\@nocounterr{#1}}{%
  9       {\global\advance\csname c@#1\endcsname #2\relax}}}

\newcounter \newcounter{\⟨newctr⟩}[\⟨oldctr⟩] Defines ⟨newctr⟩ to be a counter, which is
reset when counter ⟨oldctr⟩ is stepped. If ⟨newctr⟩ already defined produces
‘c@newctr already defined’ error.
10 \def\newcounter#1{%
11   \expandafter\@ifdefinable \csname c@#1\endcsname
12   {\@definecounter{#1}}%
13   \@ifnextchar[{\@newctr{#1}}{}}

\value \value{\⟨ctr⟩} produces the value of counter ⟨ctr⟩, for use with a \setcounter or
\addtocounter command.
14 \def\value#1{\csname c@#1\endcsname}

\@newctr
15 \def\@newctr#1[#2]{%
16   \@ifundefined{c@#2}{\@nocounterr{#2}}{\c@addtoreset{#1}{#2}}}

\stepcounter \stepcounterfoo Globally increments counter \c@FOO and resets all subsidiary
counters.
17 \def\stepcounter#1{%
18   \addtocounter{#1}\@ne
19   \begingroup
20   \let\@elt\@stpelt
21   \csname cl@#1\endcsname
22   \endgroup}

\@stpelt
23 \def\@stpelt#1{\global\csname c@#1\endcsname \z@}

\cl@ckpt
24 \def\cl@ckpt{\@elt{page}}


\@definecounter
25 \def\@definecounter#1{\expandafter\newcount\csname c@#1\endcsname
26   \setcounter{#1}\z@
27   \global\expandafter\let\csname cl@#1\endcsname\empty
28   \c@addtoreset{#1}{\@ckpt}%
29   \global\expandafter\let\csname p@#1\endcsname\empty
30   \expandafter
31   \gdef\csname the#1\expandafter\endcsname\expandafter
32     {\expandafter\@arabic\csname c@#1\endcsname} }

\c@addtoreset
33 \def\c@addtoreset#1#2{\expandafter\@cons\csname cl@#2\endcsname {{#1}}}

```

Numbering commands for definitions of `\theCOUNTER` and `\list` arguments.  
All commands can now be used in text and math mode.

<code>\arabic</code>	Representation of <code>&lt;counter&gt;</code> as arabic numerals. Changed 29 Apr 86 to make it print the obvious thing it COUNTER not positive. 44 <code>\def\arabic#1{\expandafter\@arabic\csname c@#1\endcsname}</code>
<code>\roman</code>	Representation of <code>&lt;counter&gt;</code> as lower-case Roman numerals. 45 <code>\def\roman#1{\expandafter\@roman\csname c@#1\endcsname}</code>
<code>\Roman</code>	Representation of <code>&lt;counter&gt;</code> as upper-case Roman numerals. 46 <code>\def\Roman#1{\expandafter\@Roman\csname c@#1\endcsname}</code>
<code>\alph</code>	Representation of <code>&lt;counter&gt;</code> as a lower-case letter: 1 = a, 2 = b, etc. 47 <code>\def\alph#1{\expandafter\@alph\csname c@#1\endcsname}</code>
<code>\Alph</code>	Representation of <code>&lt;counter&gt;</code> as an upper-case letter: 1 = A, 2 = B, etc. 48 <code>\def\Alph#1{\expandafter\@Alph\csname c@#1\endcsname}</code>
<code>\fnsymbol</code>	Representation of <code>&lt;COUNTER&gt;</code> as a footnote symbol: 1 = *, 2 = †, etc. 49 <code>\def\fnsymbol#1{\expandafter\@fnsymbol\csname c@#1\endcsname}</code>
<code>\@arabic</code>	<code>\@arabic\FOOcounter</code> Representation of <code>\FOOcounter</code> as arabic numerals. 50 <code>\def\@arabic#1{\number #1} %% changed 29 Apr 86</code>
<code>\@roman</code>	<code>\@roman\FOOcounter</code> Representation of <code>\FOOcounter</code> as lower-case Roman numerals. 51 <code>\def\@roman#1{\romannumeral #1}</code>
<code>\@Roman</code>	<code>\@Roman\FOOcounter</code> Representation of <code>\FOOcounter</code> as upper-case Roman numerals. 52 <code>\def\@Roman#1{\expandafter\@slowromancap\romannumeral #1@}</code>
<code>\@slowromancap</code>	Fully expandable macro to change a roman number to uppercase. 53 <code>\def\@slowromancap#1{\ifx @#1% then terminate 54       \else 55        \if i#1I\else\if v#1V\else\if x#1X\else\if l#1L\else\if 56        c#1C\else\if d#1D\else \if m#1M\else\if f\fi\fi\fi\fi\fi\fi 57       \expandafter\@slowromancap 58       \fi 59     }</code>
<code>\@alph</code>	<code>\@alph\FOOcounter</code> Representation of <code>\FOOcounter</code> as a lower-case letter: 1 = a, 2 = b, etc. 60 <code>\def\@alph#1{%</code> 61 <code>\ifcase#1\or a\or b\or c\or d\or e\or f\or g\or h\or i\or j\or 62    k\or l\or m\or n\or o\or p\or q\or r\or s\or t\or u\or v\or w\or x\or 63    y\or z\else\@ctrerr\fi}</code>
<code>\@Alph</code>	<code>\@Alph\FOOcounter</code> Representation of <code>\FOOcounter</code> as an upper-case letter: 1 = A, 2 = B, etc. 64 <code>\def\@Alph#1{%</code> 65 <code>\ifcase#1\or A\or B\or C\or D\or E\or F\or G\or H\or I\or J\or 66    K\or L\or M\or N\or O\or P\or Q\or R\or S\or T\or U\or V\or W\or X\or 67    Y\or Z\else\@ctrerr\fi}</code>
<code>\@fnsymbol</code>	Typesetting old fashioned footnote symbols. This can be done both in text or math mode now. 68 <code>\def\@fnsymbol#1{\ensuremath{\ifcase#1\or *\or \dagger\or \ddagger\or 69    \mathsection\or \mathparagraph\or \ \or **\or \dagger\dagger 70    \or \ddagger\ddagger \else\@ctrerr\fi}}</code> 71 <code>&lt;/2ekernel&gt;</code>

# File n

## ltlength.dtx

### 22 Lengths

\newlength Declare #1 to be a new length command.  
\setlength Set the length command, #1, to the value #2.  
\addtolength Increase the value of the length command, #1, by the value #2.  
\settowidth Set the length, #1 to the width of a box containing #2.  
\settoheight Set the length, #1 to the height of a box containing #2.  
\settodepth Set the length, #1 to the depth of a box containing #2.

1 (\*2ekernel)  
2 \message{lengths,}

\newlength  
3 \def\newlength#1{\@ifdefinable#1{\newskip#1}}

\setlength  
4 \def\setlength#1#2{\#1#2\relax}

\addtolength \relax added 24 Mar 86  
5 \def\addtolength#1#2{\advance#1 #2\relax}

\settoheight The obvious analogs of \settowidth.  
\settodepth  
\settowidth  
\@settodim Clear the memory afterwards (which might be a lot).  
6 \def\@settodim#1#2#3{\setbox\@tempboxa\hbox{{#3}}#2#1\@tempboxa  
7 \setbox\@tempboxa\box\voidb@x  
8 \def\settoheight{\@settodim\ht}  
9 \def\settodepth {\@settodim\dp}  
10 \def\settowidth {\@settodim\wd}

\@settopoint This macro takes the contents of the skip register that is supplied as its argument and removes the fractional part to make it a whole number of points. This can be used in class files to avoid values like 345.466666pt when calculating a dimension.

11 \def\@settopoint#1{\divide#1\p@\multiply#1\p@}  
12 (/2ekernel)

## File o

# ltfssbas.dtx

This file contains the main implementation of the ‘low level’ font selection commands. See other parts of the L<sup>A</sup>T<sub>E</sub>X distribution, or *The L<sup>A</sup>T<sub>E</sub>X Companion* for higher level documentation of the L<sup>A</sup>T<sub>E</sub>X ‘New’ Font Selection Scheme.

**Warning:** The macro documentation is still basically the documentation from the first NFSS release and therefore in some cases probably not completely accurate.

## 23 Autoloading parts of NFSS

This code is set up in a way that some parts of it can be kept separate and will only be loaded if needed.

If we are producing an autoload version of L<sup>A</sup>T<sub>E</sub>X 2<sub>E</sub> then all those parts with def1 or def2 docstrip guards will be placed into the autoloadable files **autofss1.sty** and **autofss2.sty**.

The ‘2ekernel’ code ensures that a \usepackage{autofss1} is essentially ignored if a ‘full’ format is being used that has picture mode already in the format.

Note the **autofss2** loading is currently disabled.

```
1 <2ekernel>\expandafter\let\csname ver@autofss1.sty\endcsname\fmtversion
```

The autoload file **autofss2** is a specialty because it contains code which will be completely local, ie loaded every time again.

## 24 Preliminary macros

We define a number of macros that will be used later.

\@nomath \@nomath is used by most macros that will have no effect in math mode. It issues a warning message.

```
2 <*2ekernel | autoload>
3 \def\@nomath#1{\relax\ifmmode
4   \@font@warning{Command \noexpand#1 invalid in math mode}\fi}
5 </2ekernel | autoload>
```

\no@alphabet@error The macro \no@alphabet@error is called whenever the user requests a math *alphabet* that is not available in the current *version*. In math mode an error message is produced otherwise the command keeps silent. The argument is the name of the control sequence that identifies the math *alphabet*. The \relax at the beginning is necessary to prevent T<sub>E</sub>X from scanning too far in certain situations.

```
6 <*2ekernel | def1>
7 \gdef\no@alphabet@error#1{\relax\ifmmode
8   \@latex@error{Math\space alphabet\space identifier\space
9     \noexpand#1 is\space undefined\space in\space math\space
10    version\space '\math@version'}%
11   {Your\space requested\space math\space alphabet\space
12     is\space undefined\space in\space the\space current\space
13     math\space version.^JCheck\space the\space spelling\space
14     or\space use\space the\space \noexpand\SetMathAlphabet\space
15     command.}%
16   \fi}
17 </2ekernel | def1>
18 <*autoload>
19 \gdef\no@alphabet@error{\relax\ifmmode
```

```

20      \expandafter\try@sizes\expandafter\no@alphabet@error \fi}
21 
```

\new@mathgroup  
\\mathgroup We also give a new name to \newfam and \fam to avoid verbal confusion (see the introduction).<sup>2</sup>

```

22 (*2ekernel | autoload)
23 \def\new@mathgroup{\alloc@8\mathgroup\chardef\sixt@@n}
24 \let\mathgroup\fam
25 \let\newfam\new@mathgroup
26 \onlypreamble\new@mathgroup

```

## 25 Macros for setting up the tables

\DeclareFontShape The macro \DeclareFontShape takes 6 arguments:

```

27 \def\DeclareFontShape{\begingroup
First we restore the catcodes of all characters used in the syntax.
28   \nfss@catcodes
We use \expandafter \endgroup to restore catcode in case something goes wrong
with the argument parsing (suggested by Tim Van Zandt)

```

\DeclareFontShape

```

29   \expandafter\endgroup
30   \DeclareFontShape@%
31 \def\DeclareFontShape@#1#2#3#4#5#6{%
32   \expandafter\ifx\csname #1+#2\endcsname\relax
33     @latex@error{Font family '#1+#2' unknown}\@eha
34   \else
35     \expandafter
36       \xdef\csname#1/#2/#3/#4\endcsname{\expandafter\noexpand
37                                     \csname #5\endcsname}%
38   \def\reserved@a{#6}%
39   \global
40   \expandafter\let\csname#5\expandafter\endcsname
41     \ifx\reserved@a\empty
42       \empty
43     \else
44       \reserved@a
45     \fi
46   \fi
47 }

```

\DeclareFixedFont Define a direct font switch that avoids all overhead.

```

48 \def\DeclareFixedFont#1#2#3#4#5#6{%
49   \begingroup
50   \math@fontsfalse
51   \everymath@size{}%
52   \fontsize{#6}\z@
53   \usefont{#2}{#3}{#4}{#5}%
54   \global\expandafter\let\expandafter#1\the\font
55   \endgroup
56 }
57 
```

\do@subst@correction

```

58 (*2ekernel | autoload)
59 \def\do@subst@correction{%
60   \xdef\subst@correction{%

```

---

<sup>2</sup>For the same reason it seems advisable to \let\fam and \newfam equal to \relax, but this is commented out to retain compatibility to existing style files.

```

61      \font@name
62      \global\expandafter\font
63          \csname \curr@fontshape/\f@size\endcsname
64          \noexpand\fontname\font
65      \relax}%

```

Calling `\subst@correction` after the current group means calling it after we have loaded the substitution font which is done inside a group.

```

66      \aftergroup\subst@correction
67 }

```

### `\DeclareFontFamily`

```

68 \def\DeclareFontFamily#1#2#3{%

```

If we want fast checking for the encoding scheme we can just check for `\T@..` being defined.

```

69 % \tempswafalse
70 % \def\reserved@b{#1}%
71 % \def\cdp@elt##1##2##3##4{\def\reserved@c{##1}%
72 %     \ifx\reserved@b\reserved@c \tempswatrue\fi}%
73 % \cdp@list
74 % \if@tempswa
75 \ifeundefined{T@#1}%
76     {%
77     @latex@error{Encoding scheme '#1' unknown}\@eha
78     }%
79     {%

```

Now we have to define the macro `\(#1)+(#2)` to contain #3. But since most of the time #3 will be empty we use `\let` in a tricky way rather than a simple `\def` since this will save internal memory. We store the argument #3 in a temporary macro `\reserved@a`.

```

80 \def\reserved@a{#3}%

```

We compare `\reserved@a` with `\@empty`. If these two are the same we `\let` the ‘extra’ macro equal to `\@empty` which is not the same as doing a `\let` to `\reserved@a` — the latter would blow one extra memory location rather than reusing the one from `\@empty`.

```

81 \global
82 \expandafter\let\csname #1+#2\expandafter\endcsname
83     \ifx \reserved@a\@empty
84         \@empty
85     \else \reserved@a
86     \fi
87     }%
88 }

```

`\cdp@list` We initialize the code page list to be empty.

```

89 \let\cdp@list\@empty
90 \onlypreamble\cdp@list

```

### `\cdp@elt`

```

91 \let\cdp@elt\relax
92 \onlypreamble\cdp@elt

```

### `\DeclareFontEncoding`

```

93 \def\DeclareFontEncoding{%

```

First we start with ignoring all blanks and newlines since every surplus space in the second or third argument will come out in a weird place in the document.

```

94 \begingroup
95 \nfss@catcodes
96 \expandafter\endgroup

```

```

97      \DeclareFontEncoding@}
98 \onlypreamble\DeclareFontEncoding

99 \def\DeclareFontEncoding#1#2#3{%
100   \expandafter
101   \ifx\csname T@#1\endcsname\relax
102     \def\cdp@elt{\noexpand\cdp@elt}%
103     \xdef\cdp@list{\cdp@list\cdp@elt{#1}%
104       {\default@family}{\default@series}%
105       {\default@shape}}%

```

To support encoding dependent commands (like accents) we initialise the command  $\langle encoding \rangle$ -cmd to be  $\@changed@cmd$ . (See `ltoutenc.dtx` for details.)

```

106   \expandafter\let\csname#1-cmd\endcsname\@changed@cmd
107   \else
108     \@font@info{Redeclaring font encoding #1}%
109   \fi
110   \global\@namedef{T@#1}{#2}%
111   \global\@namedef{M@#1}{\default@M#3}%

```

Keep a record of the last encoding being declared:

```

112   \xdef\LastDeclaredEncoding{#1}%
113 }
114 \onlypreamble\DeclareFontEncoding@

```

`\LastDeclaredEncoding` The last encoding being declared by `\DeclareFontEncoding`.

```
115 \def\LastDeclaredEncoding{}
```

#### `\DeclareFontSubstitution`

```

116 \def\DeclareFontSubstitution#1#2#3#4{%
117   \expandafter
118   \ifx\csname T@#1\endcsname\relax
119     \@latex@error{Encoding scheme '#1' unknown}\@eha
120   \else
121     \begingroup

```

We loop through the `\cdp@list` and rebuild it anew in `\toks@` thereby replacing the defaults for the encoding in question with the new defaults. It is important to store the encoding to test against expanded in `\reserved@a` since it might just be `\LastDeclaredEncoding` that is passed as #1.

```

122   \edef\reserved@a{#1}%
123   \toks@{%
124     \def\cdp@elt##1##2##3##4{%
125       \def\reserved@b{##1}%
126       \ifx\reserved@a\reserved@b

```

Here we use the new defaults but we use ##1 (i.e., the encoding name already stored previously) since we know that it is expanded.

```

127     \addto@hook\toks@{\cdp@elt{##1}{##2}{##3}{##4}}%
128   \else

```

If `\reserved@a` and `\reserved@b` differ then we simply copy from the old list to the new.

```

129     \addto@hook\toks@{\cdp@elt{##1}{##2}{##3}{##4}}%
130   \fi}%
131   \cdp@list
132   \xdef\cdp@list{\the\toks@}%
133 \endgroup
134 \global
135 \@namedef{D@#1}{%
136   \def\default@family{##1}%
137   \def\default@series{##2}%

```

```

138           \def\default@shape{#4}%
139           }%
140     \fi
141   }
142 \onlypreamble\DeclareFontSubstitution

\DeclareFontEncodingDefaults
143 \def\DeclareFontEncodingDefaults#1#2{%
144   \ifx\relax#1\else
145     \ifx\default@T\empty\else
146       \@font@info{Overwriting encoding scheme text defaults}%
147     \fi
148     \gdef\default@T{#1}%
149   \fi
150   \ifx\relax#2\else
151     \ifx\default@M\empty\else
152       \@font@info{Overwriting encoding scheme math defaults}%
153     \fi
154     \gdef\default@M{#2}%
155   \fi
156 }
157 \onlypreamble\DeclareFontEncodingDefaults

\default@T
\default@M 158 \let\default@T\empty
159 \let\default@M\empty

\DeclarePreloadSizes
160 \def\DeclarePreloadSizes#1#2#3#4#5{%
161   \ifundefined{T@#1}%
162     {\@latex@error{Encoding scheme '#1' unknown}\@eha}%
163   }%
164   \begingroup
165     \def\reserved@f##1, {%
We define a macro \reserved@f3 that grabs the next size and loads the corresponding font. This is done by delimiting \reserved@f's only argument by the token , (comma).
166     \if>##1%
167       \let\reserved@f\relax
168     \else
169       \xdef\font@name{\csname#1/#2/#3/#4/#\endcsname}%
170       \pickup@font
The end of the list will be detected when there are no more elements, i.e. when \reserved@f's argument is empty. The trick used here is explained in Appendix D of the TeXbook: if the argument is empty the \if will select the first clause and \let \reserved@f equal to \relax. (We use the > character here since it cannot appear in font file names.)
171     \else
172       \let\reserved@f\relax
173     \fi
174   \endgroup
Otherwise, we define \font@name appropriately and call \pickup@font to do the work. Note that the requested \curr@fontshape combination must have been defined, or you will get an error. The definition of \font@name is carried out globally to be consistent with the rest of the code in this file.
175   \font@name=\curr@fontshape
176   \pickup@font
Now we forget the name of the font just loaded. More precisely, we set the corresponding control sequence to \relax. This means that later on, when the font is first used, the macro \define@newfont is called again to execute the ‘extra’ macro for this font.

```

---

<sup>3</sup>We cannot use `\tempa` since it is needed in `\pickup@font`.

```

171           \global\expandafter\let\font@name\relax
172       \fi
Finally we call \reserved@f again to process the next size. If \reserved@f was
\let equal to \relax this will end the macro.
173       \reserved@f}%
We finish with reinserting the list of sizes after the \reserved@f macro and ap-
pending an empty element so that the end of the list is recognized properly.
174       \reserved@f#5,%
175   \endgroup
176 }%
177 }%
178 @onlypreamble\DeclarePreloadSizes

\ifmath@fonts We need a switch to decide if we have to switch math fonts. For this purpose
we provide \ifmath@fonts that can be set to true or false by the \S@... macros
depending on if math fonts are provided for this size or not. The default is of
course to switch all fonts.
179 \newif\ifmath@fonts \math@fontstrue

\DeclareMathSizes \DeclareMathSizes takes the text size, math text size, math script size, and math
\DeclareMathSizes* scriptscript size as arguments and defines the right \S@... macro.
180 \def\DeclareMathSizes{%
181   \@ifstar{\@DeclareMathSizes\math@fontsfalse}{%
182     {\@DeclareMathSizes{}{}}%
183 }%
184 @onlypreamble\DeclareMathSizes

\@DeclareMathSizes
184 \def\@DeclareMathSizes#1#2#3#4#5{%
185   \defaultunits\dimen@#2pt\relax\@nnil
186   \if$#3$%
187     \expandafter \let
188     \csname S@\strip@pt\dimen@\endcsname
189     \math@fontsfalse
190   \else
191     \expandafter \gdef
192     \csname S@\strip@pt\dimen@\endcsname
193     {\gdef\tf@size{#3}\gdef\sf@size{#4}%
194      \gdef\ssf@size{#5}%
195      #1%
196    }%
197   \fi}
198 }%
198 @onlypreamble\@DeclareMathSizes

```

## 26 Selecting a new font

### 26.1 Macros for the user

```

\fontencoding As we said in the introduction a font is described by four parameters. We first
\f@encoding define macros to specify the wanted family, series, or shape. These are simply
recorded in internal macros \f@family, \f@series, and \f@shape, resp. We use
\edef's so that the arguments can also be macros.
199 \DeclareRobustCommand\fontencoding[1]{%
200   \expandafter\ifx\csname T@#1\endcsname\relax
201     \@latex@error{Encoding scheme '#1' unknown}\@eha
202   \else
203     \edef\f@encoding{#1}%
204     \ifx\cf@encoding\f@encoding

```

If the new encoding is the same as the old encoding we have nothing to do. However, in case we had a sequence of several encoding changes without a `\selectfont` inbetween we can save processing by making sure that `\enc@update` is `\relax`.

```
205      \let\enc@update\relax
206      \else
```

If current and new encoding differ we define the macro `\enc@update` to contain all updates necessary at `\selectfont` time.

```
207      \let\enc@update\@@enc@update
208      \fi
209      \fi
210 }
```

`\@@enc@update`

```
211 \def\@@enc@update{%
```

When `\@@enc@update` is executed `\f@encoding` holds the encoding name for the new encoding and `\cf@encoding` the name of the last active encoding.

We start by setting the init command for encoding dependent macros to `\@changed@cmd`.

```
212      \expandafter
213      \let
214      \csname\cf@encoding -cmd\endcsname
215      \@changed@cmd
```

Then we turn the one for the new encoding to `\@current@cmd` (see `ltoutenc.dtx` for further explanations).

```
216      \expandafter
217      \let
218      \csname\f@encoding-cmd\endcsname
219      \@current@cmd
```

We execute the default settings `\default@T`, followed by the one for the new encoding.

```
220      \default@T
221      \csname T@\f@encoding\endcsname
```

Finally we change the default substitution values, disable `\enc@update` and make `\f@encoding` officially the current encoding.

```
222      \csname D@\f@encoding\endcsname
223      \let\enc@update\relax
224      \let\cf@encoding\f@encoding
225 }
```

`\enc@update` The default action in `\selectfont` is to do nothing.

```
226 \let\enc@update\relax
```

`\fontfamily`

```
\f@family 227 \DeclareRobustCommand\fontfamily[1]{\edef\f@family{\#1}}
\fontseries 228 \DeclareRobustCommand\fontseries[1]{\edef\f@series{\#1}}
\f@series 229 \DeclareRobustCommand\fontshape [1]{\edef\f@shape{\#1}}
```

`\fontshape` Some handy abbreviation if you want to get some particular font in the current size. If also the size should change one has to issue a `\fontsize` command first.

```
230 \def\usefont#1#2#3#4{\fontencoding{\#1}\fontfamily{\#2}%
231           \fontseries{\#3}\fontshape{\#4}\selectfont
232           \ignorespaces}
```

`\linespread` The command `\linespread` changes the current `\baselinestretch` by calling `\set@fontsize`. The values for `\f@size` and `\f@baselineskip` will be left unchanged.

```
233 \DeclareRobustCommand\linespread[1]
234   {\set@fontsize{\#1}\f@size\f@baselineskip}
```

- \fontsize** We also define a macro that allows to specify a size. In this case, however, we also need the value of `\baselineskip`. As the first argument to `\set@fontsize` we pass the current value of `\baselinestretch`. This will either match the internal value (in which case nothing changes, or it will be an updated value due to a user change of that macro using `\renewcommand`. If we would pass the internal `\f@linespread` such a change would be effectively overwritten by a size change.
- ```
235 \DeclareRobustCommand{\fontsize}[2]
236   {\set@fontsize\baselinestretch{#1}{#2}}
```
- \f@linespread** This macro holds the current internal value for `\baselinestretch`.
- ```
237 \let\f@family\empty
238 \let\f@series\empty
239 \let\f@shape\empty
240 \let\f@size\empty
241 \let\f@baselineskip\empty
242 \let\f@linespread\empty
```
- \cf@encoding**
- ```
243 \let\f@encoding\empty
244 \let\cf@encoding\empty
```
- \@defaultunits** The function `\@defaultunits` when wrapped around a dimen or skip assignment supplies default units. Usage:
- ```
\@defaultunits\dimen@=#1pt\relax\@nnil
```
- Note: the `\relax` is \*important\*. Other units can be substituted for the 'pt' if desired.
- We use `\remove@to@nnil` as an auxiliary macros for `\@defaultunits`. It just has to gobble the supplied default unit 'pt' or whatever, if it wasn't used in the assignment.
- ```
245 \def\@defaultunits{\afterassignment\remove@to@nnil}
```
- \strip@pt** This macro strips the characters pt produced by using `\the` on a dimen register.
- \rem@pt**
- ```
246 \begingroup
247   \catcode`P=12
248   \catcode`T=12
249   \lowercase{
250     \def\x{\def\rem@pt##1.##2PT{##1\ifnum##2>\z@\##2\fi}}
251   \expandafter\endgroup\x
252 \def\strip@pt{\expandafter\rem@pt\the}
```
- \mathversion** `\mathversion` takes the math *version* name as argument, defines `\math@version` appropriately and switches to the font selected forcing a call to `\glb@settings` if the *version* is known to the system.
- ```
253 \DeclareRobustCommand{\mathversion}[1]
254   {\@nomath\mathversion
255    \expandafter\ifx\csname mv@\#1\endcsname\relax
256      \@latex@error{Math version '#1' is not defined}\@eha\else
257        \edef\math@version{\#1}\%
```
- We need to force a math font setup both now and at the point where we return to the previous math version. Forcing a math font setup can simply be done by setting `\glb@currsize` to an invalid value since this will trigger the setup when the formula starts.
- ```
258           \gdef\glb@currsize{}%
```
- When the scope of the current `\mathversion` ends we need to restore the old setup. However this time we need to force it directly at least if we are inside math, otherwise we could wait. Another way to enhance this code here is todo the setting only if the version really has changed after all. This might be interesting in case of `amstext` and `boldsymbol`.

```

259           \aftergroup\glb@settings
260           \fi}

```

If TeX would support a hook just before the end of a formula (opposite of `\everymath` so to speak) the implementation of the algorithm would be much simpler because in that case we would set up the correct math fonts at this point without having to worry about incorrect settings due to nesting. The same would be true if in L<sup>A</sup>T<sub>E</sub>X the use of \$ (as the primitive TeX command) would be impossible and instead only a higher-level interface would be available. Note that this does not mean that a \$ couldn't be the short-hand for starting and stopping that higher-level interface, it only means that the direct TeX function must be hidden.

Anyway, since we don't have this and won't have it in L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  we need to implement it in a somewhat slower way.

We test for the current math font setup on entry of a formula, i.e., on the hooks `\everymath` and `\everydisplay`. But since these hooks may contain user data we provide ourselves with an internal version of these hooks which stays frozen.

```

\frozen@everymath New internal names for \everymath and \everydisplay.
\frozen@everydisplay 261 \let\frozen@everymath\everymath
                      262 \let\frozen@everydisplay\everydisplay

\everymath Now we provide now user hooks that will be called in the frozen internals.
\everydisplay 263 \newtoks\everymath
                  264 \newtoks\everydisplay

\frozen@everymath Now we define the behaviour of the frozen hooks: first check the math setup then
call the user hook.
265 \frozen@everymath = {\check@mathfonts
266                         \the\everymath}

\frozen@everydisplay Ditto for the display hook.
267 \frozen@everydisplay = {\check@mathfonts
268                         \the\everydisplay}

\curr@math@size This holds locally the current math size.
269 \let\curr@math@size\empty

```

## 26.2 Macros for loading fonts

```

\pickup@font The macro \pickup@font which is used in \selectfont is very simple: if the font
name is undefined (i.e. not known yet) it calls \define@newfont to load it.
270 \def\pickup@font{%
271     \expandafter\ifx\font@name\relax
272         \define@newfont
273     \fi}

\split@name \pickup@font assumes that \font@name is set but it is sometimes called when
\f@family, \f@series, \f@shape, or \f@size may have the wrong settings (see,
e.g., the definition of \getanddefine@fonts). Therefore we need a macro to ex-
tract font family, series, shape, and size from the font name. To this end we
define \split@name which takes the font name as a list of characters of \catcode
12 (without the backslash at the beginning) delimited by the special control se-
quence \@nil. This is not very complicated: we first ensure that / has the right
\catcode
274 {\catcode`\/=12

```

and define `\split@name` so that it will define our private `\f@encoding`, `\f@family`, `\f@series`, `\f@shape`, and `\f@size` macros.

```
275 \gdef\split@name#1/#2/#3/#4/#5\@nil{\def\f@encoding{#1}%
276                                     \def\f@family{#2}%
277                                     \def\f@series{#3}%
278                                     \def\f@shape{#4}%
279                                     \def\f@size{#5}}}
```

`\curr@fontshape` Abbreviation which may get removed again for speed.

```
280 \def\curr@fontshape{\f@encoding/\f@family/\f@series/\f@shape}
281 </2ekernel | autoload>
```

`\define@newfont` Now we can tackle the problem of defining a new font.

```
282 <*2ekernel | def2 | autoload>
283 \def\define@newfont{%
```

We have already mentioned that the token list that `\split@name` will get as argument must not start with a backslash. To reach this goal we will set the `\escapechar` to  $-1$  so that the `\string` primitive will not generate an escape character. To keep this change local we open a group. We use `\begingroup` for this purpose since `\define@newfont` might be called in math mode, and an empty `\bgroup...egroup` would add an empty Ord atom to the math list and thus affect the spacing.

Also locally redefine `\typeout` so that ‘No file ...fd’ Warnings become Font Info message just sent to the log file.

```
284 \begingroup
285   \let\typeout\f@info
286   \escapechar\m@ne
```

Then we extract *encoding scheme, family, series, shape, and size* from the font name. Note the four `\expandafter`’s so that `\font@name` is expanded first, then `\string`, and finally `\split@name`.

```
287   \expandafter\expandafter\expandafter
288     \split@name\expandafter\string\font@name\@nil
```

If the `\curr@fontshape` combination is not available, (i.e. undefined) we call the macro `\wrong@fontshape` to take care of this case. Otherwise `\extract@font` will load the external font for us.

```
289 %   \expandafter\ifx
290 %     \csname\curr@fontshape\endcsname \relax
291     \try@load@fontshape % try always
292 %   \fi
293   \expandafter\ifx
294     \csname\curr@fontshape\endcsname \relax
295   \wrong@fontshape\else
```

To allow substitution we call the `curr@fontshape` macro which usually will expand to `\relax` but may hold code for substitution (see `\subst@fontshape` definition).

```
296 %   \csname\curr@fontshape\endcsname
297   \extract@font\fi
```

We are nearly finished and must only restore the `\escapechar` by closing the group.

```
298 \endgroup}
299 </2ekernel | def2 | autoload>
```

As `autofss2.sty` only makes local definitions it is re-loaded for each font, to save some string memory in the kernel, and to speed up the loading of some packages which may load fonts. The code is actually pre-loaded into the kernel and removed at `\begin{document}`. The `\ifx` test below ensures that if `\usepackage{autofss2}` appears in the preamble, then the code is not removed at this time. Can not use `\AtBeginDocument` here as it is not defined yet! Listing all the commands like this is not ideal as any changes to the `autofss2.sty` need

to be reflected here, but this seems the most memory efficient mechanism as it avoids the use of an extra csname to store the list.

This is currently disabled, so the ‘autofss2’ code remains in the kernel, and `autofss2.sty` is not generated in the current public release.

```

300 <*autoloadxxx>
301 \expandafter\def\expandafter\@begindocumenthook\expandafter{%
302   \expandafter\ifx\csname ver@autofss2.sty\endcsname\relax
303   \gdef\define@newfont{%
304     \begingroup
305       \makeatletter\nfss@catcodes
306       \catcode`\#6\relax
307       \@@input autofss2.sty\relax\define@newfont
308     \endgroup}%
309   \begingroup
310     \def\do##1{\global\let##1\@undefined}%
311     \do\extract@sizefn
312     \do\try@simple@size
313     \do\set@simple@size@args
314     \do\extract@rangefontinfo
315     \do\is@range
316     \do\check@range
317     \do\check@single
318     \do\set@size@funct@args
319     \do\set@size@funct@args@
320     \do\try@size@range
321     \do\empty@sfcnt
322     \do\gen@sfcnt
323     \do\genb@sfcnt
324     \do\sub@sfcnt
325     \do\subf@sfcnt
326     \do\fixed@sfcnt
327   \endgroup
328   \fi}
329 </autoloadxxx>

330 <*2ekernel | autoload>
331 \def\try@load@fontshape{%
332   \expandafter
333   \ifx\csname \f@encoding+\f@family\endcsname\relax
334     \@font@info{Try loading font information for
335                 \f@encoding+\f@family}%

```

We redefine this combination to be `\empty` which means that next time we don’t try again unnecessary in case we don’t find a `.fd` file. If the file contains a `\DeclareFontFamily` command than this setting will be overwritten.

```

336   \global\expandafter\let
337     \csname\f@encoding+\f@family\endcsname\empty

```

Set the catcodes used in the syntax, but do it only once (this will be restored at the end of the font loading group).

```

338   \nfss@catcodes
339   \let\nfss@catcodes\relax

```

For increased portability make the external filename monocase, but look for the (old style) mixed case filename if the first attempt fails.

On any monocase system this means that the file is looked for twice which takes up time and string space, but at least for this release Check for both names to give people time to re-install their private fd files with lowercase names.

```

340   \edef\reserved@a{%
341     \lowercase{%
342       \noexpand\InputIfFileExists{\f@encoding\f@family.fd}}{%
343       \reserved@a\relax
344       {\@input{\f@encoding\f@family.fd}}{%

```

```
345     \fi}
```

\nfss@catcodes This macro should contain the standard \catcode assignments to all characters which are used in the commands found in an .fd file and which might have special \catcodes in the middle of a document. If necessary, this list can be extended in a package file using a suitable number of \expandafter, i.e.,

```
\expandafter\def\expandafter\nfss@catcodes  
    \expandafter{\nfss@catcodes <additional settings>}
```

Note, that this macro might get executed several times since it is also called by \DeclareFontShape, thus it probably should not be misused as a general purpose hook.

```
346 \def\nfss@catcodes{%
```

We start by making @ a letter and ignoring all blanks and newlines.

```
347     \makeatletter  
348     \catcode`\@ 9%  
349     \catcode`^I9%  
350     \catcode`^M9%
```

Then we set up \, {, }, # and % in case an .fd file is loaded during a verbatim environment.

```
351     \catcode`\\z@  
352     \catcode`{\@ne  
353     \catcode`}\tw@  
354     \catcode`\#6%  
355     \catcode`\^7%  
356     \catcode`\%14%
```

The we make sure that the important syntax parts have the right \catcode.

```
357     \@makeother\<%  
358     \@makeother\>%  
359     \@makeother\*%  
360     \@makeother\.%  
361     \@makeother\-%  
362     \@makeother\/%  
363     \@makeother\[%  
364     \@makeother\]%
```

```
365     \@makeother\'%  
366     \@makeother\'%  
367     \@makeother\%"  
368 }
```

\DeclareErrorFont Declare the last resort shape! We assume that in this fontshape there is a 10pt font but it doesn't really matter. We only loose one macro name if the assumption is false. But at least the font should be there!

```
369 \def\DeclareErrorFont#1#2#3#4#5{  
370     \xdef\error@fontshape{  
371         \noexpand\expandafter\noexpand\split@name\noexpand\string  
372         \expandafter\noexpand\csname#1/#2/#3/#4/#5\endcsname  
373         \noexpand\@nil} }%
```

Initialize all those internal variables which may or may not have values in the first seconds of NFSS' bootstrapping process. Later on such values will be updated when an encoding is selected, etc.

We definitely don't want to set \f@encoding; we can set all the others since if they are left "blank" any selection would grab "error default values" as well. However, this probably should go also.

```
374 \%     \gdef\f@encoding{#1}%  
375     \gdef\default@family{#2}%  
376     \gdef\default@series{#3}%  
377     \gdef\default@shape{#4} %
```

```

378      \global\let\f@family\default@family
379      \global\let\f@series\default@series
380      \global\let\f@shape\default@shape
381      \gdef\f@size{\#5}%
382      \gdef\f@baselineskip{#5pt}%
383 }
384 \onlypreamble\DeclareErrorFont

```

`\wrong@fontshape` Before we come to the macro `\extract@font` we have to take care of unknown `\curr@fontshape` combinations. The general strategy is to issue a warning and to try a default *shape*, then a default *series*, and finally a default *family*. If this last one also fails TeX will go into an infinite loop. But if the defaults are set incorrectly one deserves nothing else!

```

385 \def\wrong@fontshape{%
386   \csname D@\f@encoding\endcsname % install defaults if in math

```

We remember the wanted `\curr@fontshape` combination which we will need in a moment.

```

387   \edef\reserved@a{\csname\curr@fontshape\endcsname}%
388   \ifx\last@fontshape\reserved@a
389     \errmessage{Corrupted NFSS tables}%
390     \error@fontshape
391   \else

```

Then we warn the user about the mess and set the shape to its default.

```

392     \let\f@shape\default@shape

```

If the combination is not known, try the default *series*.

```

393   \expandafter\ifx\csname\curr@fontshape\endcsname\relax
394     \let\f@series\default@series

```

If this is still undefined, try the default *family*. Otherwise give up. We never try to change the encoding scheme!

```

395   \expandafter
396   \ifx\csname\curr@fontshape\endcsname\relax
397     \let\f@family\default@family
398   \fi \fi
399 \fi

```

At this point a valid `\curr@fontshape` combination must have been found. We inform the user about this fact.

The `\expandafter\string` here stops TeX adding the space that it usually puts after command names in messages. The similar construction with `\@undefined` just produces ‘undefined’, but saves a few tokens.

`\@wrong@font@char` is locally redefined in `\UseTextSymbol` from its normal (empty) definition, to report the symbol generating the font switch.

```

400   \@font@warning{Font shape ‘\expandafter\string\reserved@a’
401     \expandafter\@gobble\string\@undefined\MessageBreak
402       using ‘\curr@fontshape’ instead\@wrong@font@char}%
403   \global\let\last@fontshape\reserved@a

```

We change `\@defaultsubs` to produce a warning at the end of the document.

The macro `\@defaultsubs` is initially `\relax` but gets changed here if some default font substitution happens. It is then executed in `\enddocument`.

```

404   \gdef\@defaultsubs{%
405     \@font@warning{Some font shapes were not available, defaults
406       substituted.\@gobbletwo}}%

```

If we substitute a `\curr@fontshape` combination by the default one we don’t want the warning to be printed out whenever this (unknown) combination is used. Therefore we globally `\let` the macro corresponding to the wanted combination equal to its substitution. This requires the use of four `\expandafter`s since `\csname... \endcsname` has to be expanded before `\reserved@a` (i.e. the requested combination), and this must happen before the `\let` is executed.

```

407      \global\expandafter\expandafter\expandafter\let
408          \expandafter\reserved@a
409          \csname\curr@fontshape\endcsname

```

Now we can redefine `\font@name` accordingly. This *must* be done globally since it might occur in the group opened by `\define@newfont`. If we would this definition were local the closing `\endgroup` there would restore the old meaning of `\font@name` and then switch to the wrong font at the end of `\selectfont` although the correct font was loaded.

```

410      \xdef\font@name{%
411          \csname\curr@fontshape/\f@size\endcsname}%

```

The last thing this macro does is to call `\pickup@font` again to load the font if it is not defined yet. At this point this code will loop endlessly if the defaults are not well defined.

```
412      \pickup@font}
```

`\@wrong@font@char` Normally empty but redefined in `\UseTextSymbol` so that the Font shape undefined message can refer to the symbol causing the problem.

```
413 \let\@wrong@font@char\empty
```

`\@@defaultsubs` See above.

```
\@defaultsubs 414 \let\@defaultsubs\relax
```

`\strip@prefix` In `\extract@font` we will need a way to recover the replacement text of a macro. This is done by the primitive `\meaning` together with the macro `\strip@prefix` (for the details see appendix D of the T<sub>E</sub>Xbook, p. 382).

```
415 \def\strip@prefix#1>{}
```

## 27 Assigning math fonts to *versions*

`\install@mathalphabet` This is just another name for `\gdef` but we can redefine it if necessary later on.

```
416 \let\install@mathalphabet\gdef
```

`\math@fonts`

```
417 \let\math@fonts\empty
```

`\select@group` `\select@group` has four arguments: the new *(math alphabet identifier)* (a control sequence), the *(math group number)*, the extra macro for math mode and the `\curr@fontshape` definition macro name. We first check if we are in math mode.

```
418 \% \def\select@group#1#2#3{\relax\ifmmode
```

We do these things locally using `\begingroup` instead of `\bgroup` to avoid the appearance of an empty Ord atom on the math list.

```
419 \% \begingroup
```

We set the math fonts for the *family* in question by calling `\getanddefine@fonts` in the correct environment.

```
420 \% \escapechar\m@ne
```

```
421 \% \getanddefine@fonts{\csname c@mv@\math@version\endcsname}#3%
```

We globally select the math fonts...

```
422 \% \globaldefs\one \math@fonts
```

... and close the group to restore `\globaldefs` and `\escapechar`.

```
423 \% \endgroup
```

As long as no *size* or *version* change occurs the  $\langle\mathit{math alphabet identifier}\rangle$  should simply switch to the installed *math group* instead of calling `\select@group` unnecessarily. So we globally redefine the first argument (the new  $\langle\mathit{math alphabet identifier}\rangle$ ) to expand into a `\mathgroup` switch and then select this *alphabet*. Note that this redefinition will be overwritten by the next call to a *version* macro.

The original code for the end of `\select@group` was

```
\gdef#1{\#3\mathgroup #2}#1\fi}
```

i.e. first redefining the  $\langle\mathit{math alphabet identifier}\rangle$  and then calling the new definition to switch to the wanted  $\langle\mathit{math group}\rangle$ . Now we define the  $\langle\mathit{math alphabet identifier}\rangle$  as a call to the `\use@mathgroup` command.

```
424 % \xdef#1{\noexpand\use@mathgroup\noexpand#2%
425 %           {\number\csname c@mv@\math@version\endcsname}}%
```

But this is not sufficient, as we learned the hard way. The problem here is that the loading of the fonts that comprise the alphabet identifier #1, as well as the necessary math font assignments is deferred until it is used. This is OK so far, but if the fonts are switched within the current formula (which may happen if a sub-formula is a box that contains a math version switch) the font assignments for #1 are not restored unless #1 is used again. This is disastrous since TeX sees the wrong fonts at the end of the math formula, when it converts the math list into a horizontal list.

This is taken into account as follows: When a math alphabet identifier is used for the first time in a certain version it modifies the corresponding macro `\mv@version` so that it calls `\getanddefine@fonts` directly in future as well. We use the macro `\extract@alph@from@version` to do this. It takes the math alphabet identifier #1 and the math version macro as arguments.

```
426 % \expandafter\extract@alph@from@version
427 %   \csname mv@\math@version\expandafter\endcsname
428 %   \expandafter{\number\csname c@mv@\math@version\endcsname}%
429 %   #1%
430 % \stepcounter{mv@\math@version}%
```

Finally, it is not possible to simply call the new definition since we have an argument (the third argument of `\use@mathgroup` or more exactly the argument of `\math@egroup` if the `margid` option is in force) which would swallow our closing `\fi`. So we use the `\expandafter` technique to remove the `\fi` before the `\use@mathgroup` is expanded.

```
431 %\expandafter #1\fi}
```

`\extract@alph@from@version` We proceed to the definition of the macro `\extract@alph@from@version`. As stated above, it takes a math alphabet identifier and a math version macro (e.g. `\mv@normal`) as its arguments.

```
432 \def\extract@alph@from@version#1#2#3{%
```

To extract and replace the definition of math alphabet identifier #3 in macro #1 we have to recall how this definition looks like: Somewhere in the replacement text of #1 there is the sequence

```
\install@mathalphabet<math alphabet identifier> #3{%
  Definitions for }#3}
```

Hence, the first thing we do is to extract the tokens preceding this definitions, the definition itself, and the tokens following it. To this end we define one auxiliary macro `\reserved@a`.

```
433 \def\reserved@a##1\install@mathalphabet#3##2##3@nil{%
```

When `\reserved@a` is expanded, it will have the tokens preceding the definition in question in its first argument (`##1`), the following tokens in its third argument (`##3`), and the replacement text for the math alphabet identifier #3 in its second argument. (`##2`). This is then recorded for later use in a temporary macro `\reserved@b`.

```
434 \def\reserved@b{##2}%
```

Additionally, we define a macro `\reserved@c` to reconstruct the definitions for the math version in question from the tokens that will remain unchanged (#<sup>1</sup> and #<sup>3</sup>) and the yet to build new definitions for the math alphabet identifier #3.

```
435           \def\reserved@c###1{\gdef#1{##1###1##3}}}%
```

Then we execute our auxiliary macro.

```
436   \expandafter\reserved@a#1\@nil
```

OK, so now we have to build the new definition for #3. To do so, we first extract the interesting parts out of the old one. The old definition looks like:

```
\select@group<math alphabet identifier>
  <math group number><math extra part>
  <curr@fontshape definition>
```

So we define a new temporary macro `\reserved@a` that extracts these parts.

```
437   \def\reserved@a\select@group#3###1##2\@nil{%
```

This macro can now directly rebuild the math version definition by calling `\reserved@c`:

```
438   \reserved@c{%
439     \getanddefine@fonts{#2}##2%
440     \install@mathalphabet#3{%
441       \relax\ifmmode \else \non@alpherr#3\fi
442       \use@mathgroup#1{#2}}}%
```

In addition it defines the alphabet the way it should be used from now on.

```
443   \gdef#3{\relax\ifmmode \else \non@alpherr#3\fi
444     \use@mathgroup##1{#2}}}%
```

Finally, we only have to call this macro `\reserved@a` on the old definitions recorded in `\reserved@b`:

```
445   \expandafter\reserved@a\reserved@b\@nil
446 }
```

`\math@bgroup` Here are the default definitions for `\math@bgroup` and `\math@egroup`. We use `\bgroup` instead of `\begingroup` to avoid ‘leaking out’ of style changes. This has the side effect of always producing mathord atoms.

```
447 \let\math@bgroup\bgroup
448 \def\math@egroup#1{#1\egroup}
449 </2ekernel | autoload>
```

`\calculate@math@sizes` Here is the default definition for `\calculate@math@sizes` a more elaborate interface is under testing in `mthscale.sty`.

```
450 <2ekernel | def1>
451 \gdef\calculate@math@sizes{%
452   \font@info{Calculating space math\space sizes\space for\space
453   size\space <\f@size>}%
454   \dimen@\f@size \p@
455   \tempdima \defaultscriptratio \dimen@
456   \dimen@ \defaultscriptscriptratio \dimen@
457   \expandafter\xdef\csname S@\f@size\endcsname{%
458     \gdef\noexpand\math@fontstrue{\f@size}%
459     \gdef\noexpand\math@fontfalse{\strip@pt\tempdima}%
460     \gdef\noexpand\math@fontsmall{\strip@pt\dimen@}%
461     \noexpand\math@fonttrue}}%
462 </2ekernel | def1>
463 <autoload>
464 \def\calculate@math@sizes{\try@sizes\calculate@math@sizes}
465 </autoload>
```

`\defaultscriptratio` The default ratio for math sizes is:

`\defaultscriptratio` 1 to `\defaultscriptratio` to `\defaultscriptscriptratio`. By default this is 1 to .7 to .5.

```

466 <*2ekernel | autoload>
467 \def\defaultscriptratio{.7}
468 \def\defaultscriptscriptratio{.5}

\noaccents@ If we don't have a definition for \noaccents@ we provide a dummy.
469 \ifx\noaccents@\undefined
470   \let\noaccents@\empty
471 \fi

\showhyphens The \showhyphens command must be redefined since the version in plain.tex
uses \tenrm. We have also made some further adjustments for its use in LATEX.
472 </2ekernel | autoload>
473 <*2ekernel | autoerr>
474 \gdef\showhyphens#1{%
475   \setbox0\vbox{%
476     \color@begingroup
477     \everypar{}%
478     \parfillskip\z@skip\hsize\maxdimen
479     \normalfont
480     \pretolerance\m@ne\tolerance\m@ne\hbadness\z@\showboxdepth\z@ \ #1%
481     \color@endgroup}}
482 </2ekernel | autoerr>
483 {autoload}\def\showhyphens{\@autoerr\showhyphens}
484 <*2ekernel | autoload>

\addto@hook We need a macro to add tokens to a hook.
485 \long\def\addto@hook#1#2{\expandafter{\the#1#2} }

\@vpt
486 \def\@vpt{5}

\@vipt
487 \def\@vipt{6}

\@viiipt
488 \def\@viiipt{7}

\@viiiipt
489 \def\@viiiipt{8}

\@ixipt
490 \def\@ixipt{9}

\@xipt
491 \def\@xipt{10}

\@xiipt
492 \def\@xiipt{10.95}

\@xiiipt
493 \def\@xiiipt{12}

\@xivipt
494 \def\@xivipt{14.4}

\@xviipt
495 \def\@xviipt{17.28}

\@xxipt
496 \def\@xxipt{20.74}

```

```
\@xxvpt
497 \def\@xxvpt{24.88}
498 ⟨/2ekernel | autoload⟩
```

# File p

## ltfsstrc.dtx

### 28 Introduction

This package contains the code for tracing font loading and font changes. It basically overlays some of the low-level functions of NFSS with additional code used for tracing.

The package accepts the following options:

**errorshow** Write all information about font changes etc. only to the transcript file unless an error happens. This means that information about font substitution will not be shown on the terminal.

**warningshow** Show all NFSS warnings on the terminal. This setting corresponds to the default behaviour of NFSS if the **tracefnt** package is *not* loaded!

**infoshow** Show all NFSS warning and all NFSS info messages (that are normally only written to the transcript file) also on the terminal. This is the default if the **tracefnt** package is loaded.

**debugshow** In addition to **infoshow** show also changing of math fonts as far as possible (this option can produce a large amount of output).

**loading** Show the name of external fonts when they are loaded. This option shows only “newly” loaded fonts not those already preloaded in the format or the class file before the **tracefnt** package became active.

**pausing** Turn all font warnings into errors so that L<sup>A</sup>T<sub>E</sub>X will stop.

### 29 A driver for this document

The next bit of code contains the documentation driver file for T<sub>E</sub>X, i.e., the file that will produce the documentation you are currently reading. It will be extracted from this file by the DOCSTRIP program.

When this file is processed directly by L<sup>A</sup>T<sub>E</sub>X this will produce the documentation as well.

```
1 (*driver)
2 \documentclass{ltxdoc}
3
4
5 %\OnlyDescription % comment out for implementation details
6
7 \begin{document}
8   \DocInput{ltfsstrc.dtx}
9 \end{document}
10 /driver)
```

### 30 The Implementation

**Warning:** Read the macro documentation with a grain of salt. It is still basically the documentation from the first NFSS release and therefore in some cases probably not completely accurate.

If we are making a package file it is a good idea to test whether we are running under 2e. This code is actually placed at the very beginning of this file for easier maintenance, thus commented out here.

```

11 <*package>
12 %\NeedsTeXFormat{LaTeX2e}
13 %\ProvidesPackage{tracefnt}[??/??/?? v?.??
14 %                                         Standard LaTeX package (font tracing)]
15 </package>

The debug module makes use of commands contained in a special package file
named trace.sty.4
16 <+debug> \input trace.sty

```

## 31 Handling Options

\tracingfonts Here is the definition of the integer register for the font trace. As a default in a package file we use 1 to give error messages if fonts are substituted. If this code is used for debugging or tracing reasons in the format file (i.e. in `fam.dtx`) we use 0 as the default. But if no font trace is used we build a definition that will produce a warning message.

```

17 <2ekernel | autoload>
18 \def\tracingfonts{%
19   \Qfont@warning{Command \noexpand\tracingfonts
20     not provided.\MessageBreak
21     Use the ‘tracefnt’ package.\MessageBreak Command found:}%
22   \count@}
23 </2ekernel | autoload>

```

The `\count@` in the line above will remove the number after `\tracingfonts`. Note that this definition will be overwritten by the next line if one of these modules are included.

```

24 <*package, trace, debug>
25 \newcount\tracingfonts
26 \tracingfonts=0
27 </package, trace, debug>

```

The option `errorshow` turns off all warnings so that only real errors are shown. `warningshow` corresponds to the NFSS default (when `tracefnt` is not loaded). `infoshow` is the default for this package here; and `debugshow`, `loading`, and `pausing` extend the amount of information even further.

```

28 <*package>
29 \DeclareOption{errorshow}{%
30   \def\@font@info#1{%
31     \GenericInfo{(Font)}{\spaces\spaces\space\space\space}%
32     {LaTeX Font Info: \space\space\space#1}%
33   \def\@font@warning#1{%
34     \GenericInfo{(Font)}{\spaces\spaces\space\space\space}%
35     {LaTeX Font Warning: #1}%
36   }
37 \DeclareOption{warningshow}{%
38   \def\@font@info#1{%
39     \GenericInfo{(Font)}{\spaces\spaces\space\space\space}%
40     {LaTeX Font Info: \space\space\space#1}%
41   \def\@font@warning#1{%
42     \GenericWarning{(Font)}{\spaces\spaces\space\space\space}%
43     {LaTeX Font Warning: #1}%
44   }
45 \DeclareOption{infoshow}{%
46   \def\@font@info#1{%
47     \GenericWarning{(Font)}{\spaces\spaces\space\space\space}%
48     {LaTeX Font Info: \space\space\space#1}%

```

---

<sup>4</sup>This package is not in distribution at the moment (and probably doesn't work any longer). Think of this part of the code as being historical artefacts.

```

49 \def\@font@warning#1{%
50     \GenericWarning{(Font)\@spaces\@spaces\@spaces\space\space}{%
51         {LaTeX Font Warning: #1}}%
52 }
53 \DeclareOption{loading}{%
54     \tracingfonts\tw@%
55 }
56 \DeclareOption{debugshow}{%
57     \ExecuteOptions{infoshow}%
58     \tracingfonts\thr@@%
59 }
60 \DeclareOption{pausing}{%
61     \def\@font@warning#1{%
62         \GenericError{%
63             {(Font)\@spaces\@spaces\@spaces\space\space}{%
64                 {LaTeX Font Warning: #1}}%
65             {See the LaTeX Companion for details.}%
66             {I'll stop for every LaTeX Font Warning because}%
67             {you requested\MessageBreak the 'pausing' option}%
68             {to the tracefnt package.}}%
69     }

```

We make `infoshow` the default, which in turn defines `\font@warning` and `\font@info`.

```

70 \ExecuteOptions{infoshow}%
71 \ProcessOptions%
72 </package>

```

We also need a default definition inside the kernel:

```

73 <*2ekernel | autoload>
74 \def\@font@info#1{%
75     \GenericInfo{(Font)\@spaces\@spaces\@spaces\space\space}{%
76         {LaTeX Font Info: \space\space\space\#1}}%
77 \def\@font@warning#1{%
78     \GenericWarning{(Font)\@spaces\@spaces\@spaces\space\space}{%
79         {LaTeX Font Warning: #1}}%
80 </2ekernel | autoload>

```

## 32 Macros common to `fam.tex` and `tracefnt.sty`

In the first versions of `tracefnt.dtx` some macros of `fam.dtx`<sup>5</sup> were redefined to included the extra tracing information. Now these macros are all defined in this file (i.e. removed from `fam.dtx`) and different production versions can be obtained simply by specifying a different set of modules to include when generating `ltfss.dtx`.

### 32.1 General font loading

`\extract@font` This macro organizes the font loading. It first calls `\get@external@font` which will return in `\external@font` the name of the external font file (the `.tfm`) as it was determined by the NFSS tables.

```

81 <*2ekernel | package | autoload>
82 \def\extract@font{%
83     \get@external@font

```

Then the external font is loaded and assigned to the font identifier stored inside `\font@name` (for this reason we need `\expandafter`).

```

84     \global\expandafter\font\font@name\external@font\relax

```

---

<sup>5</sup>This file is currently not distributed in documented form. Its code is part of `ltfss.dtx`.

When tracing we typeout the internal and external font name.

```
85 {*trace}
86     \ifnum \tracingfonts >\@ne
87     \@font@info{External font '\external@font'
88             loaded as\MessageBreak \font@name}\fi
89 
```

Finally we call the corresponding “loading action” macros to finish things. First the font is locally selected to allow the use of `\font` inside the loading action macros.

```
90     \font@name \relax
```

The next two lines execute the “loading actions” for the family and then for the individual font shape.

```
91     \csname \f@encoding+\f@family\endcsname
92     \csname\curr@fontshape\endcsname
93     \relax
94 }
95 
```

```
/2ekernel | package | autoload>
```

The `\relax` at the end needs to be explained. This is inserted to prevent `TEX` from scanning too far when it is executing the replacement text of the loading code macros.

`\get@external@font` This function tries to find an external font name. It will place the name into the macro `\external@font`. If no font is found it will return the one that was defined via `\DeclareErrorFont`.

```
96 
```

```
*2ekernel | autoload>
97 \def\get@external@font{%
```

We don’t know the external font name at the beginning.

```
98     \let\external@font\@empty
99     \edef\font@info{\expandafter\expandafter\expandafter\string
100         \csname \curr@fontshape \endcsname}%
101     \try@size@range
```

If this failed, we’ll try to substitute another size of the same font. This is done by the `\try@size@substitution` macro. It “knows about” `\do@extract@font`, `\font@name`, `\f@size`, and so on.

```
102     \ifx\external@font\@empty
103         \try@size@substitution
104         \ifx\external@font\@empty
105             @latex@error{Font \expandafter \string\font@name\space
106                 not found}\@eha
107             \error@fontshape
108             \get@external@font
109         \fi\fi
110     }
111 
```

```
/2ekernel | autoload>
```

`\selectfont` The macro `\selectfont` is called whenever a font change must take place.

```
112 
```

```
*2ekernel | package | autoload>
113 \DeclareRobustCommand\selectfont
```

```
{%
```

When `debug` is specified we actually want something like ‘undebug’. The font selection is now stable so that using `\tracingall` on some other macros will show us a lot of unwanted information about font loading. Therefore we disable tracing during font loading as long as `\tracingfonts` is less than 4.

```
115 (+debug) \pushtracing
116 (+debug) \ifnum\tracingfonts<4 \tracingoff
117 (+debug) \else \tracingon\p@selectfont \fi
```

If `\baselinestretch` was redefined by the user it will not longer match its internal counterpart `\f@linespread`. If so we call `\set@fontsize` to prepare `\size@update`.

```
118     \ifx\f@linespread\baselinestretch \else
119         \set@fontsize\baselinestretch\f@size\f@baselineskip \fi
```

Then we generate the internal name of the font by concatenating *family*, *series*, *shape*, and current *size*, with slashes as delimiters between them. This is much more readable than standard L<sup>A</sup>T<sub>E</sub>X's `\twbf`, etc. We define `\font@name` globally, as always. The reason for this is explained later on.

```
120     \xdef\font@name{%
121         \csname\curr@fontshape/\f@size\endcsname}%
```

We call the macro `\pickup@font` which will load the font if necessary.

```
122     \pickup@font
```

Then we select the font.

```
123     \font@name
```

If `\tracingfonts` is greater than 2 we also show the font switch. We do this before `\glb@settings` is called since this macro might redefine `\font@name`.

```
124 <*trace>
125     \ifnum \tracingfonts>\tw@
126         \font@info{Switching to \font@name}\fi
127 </trace>
```

Finally we call `\size@update`. This macro is normally empty but will contain actions (like setting the `\baselineskip`) that have to be carried out when the font size, the base `\baselineskip` or the `\baselinestretch` have changed.

```
128     \size@update
```

A similar function is called to handle anything related to encoding updates. This one is changed from `\relax` by `\fontencoding`.

```
129     \enc@update
```

Just before ending this macro we have to pop the tracing stack if it was pushed before.

```
130 <+debug> \poptracing
131 }
```

`\set@fontsize` The macro `\set@fontsize` does the actual work. First it assigns new values to `\f@size`, `\f@baselineskip` and `\f@linespread`.

```
132 \def\set@fontsize#1#2#3{%
133     \edef\f@size{\strip@pt\tempdimb}%
134     \edef\f@skipa{\strip@pt\tempskipa}%
135     \edef\f@skipb{\the\tempskipa}%
136     \edef\f@linespread{\#1}%
137 }
```

For backward compatibility and for later testing within `\selectfont` the internal value of `\f@linespread` is passed back to `\baselinestretch`.

```
138     \let\baselinestretch\f@linespread
```

Additional processing will happen within `\selectfont`. For this reason the macro `\size@update` (which will be called in `\selectfont`) will be defined to be:

```
139     \def\size@update{%
```

First calculate the new `\baselineskip` and also store it in `normalbaselineskip`

```
140     \baselineskip\f@baselineskip\relax
141     \baselineskip\f@linespread\baselineskip
142     \normalbaselineskip\baselineskip
```

then to set up a new `\strutbox`

```
143     \setbox\strutbox\hbox{%
144         \vrule\@height.7\baselineskip
145             \vrule\@depth.3\baselineskip
146             \vrule\@width\z@}%
```

We end with a bit of tracing information.

```
147 <*trace>
148     \ifnum \tracingfonts>\tw@
149         \ifx\f@linespread\empty
150             \let\reserved@a\empty
151         \else
152             \def\reserved@a{\f@linespread x}%
153         \fi
154         \@font@info{Changing size to \f@size/\reserved@a
155                         \f@baselineskip}%
156         \aftergroup\type@restoreinfo \fi
157 </trace>
```

When all this is processed `\size@update` redefines itself to `\relax` so that in later calls of `\selectfont` no extra code will be executed.

```
158     \let\size@update\relax}%
159 }
```

Instead of defining this macro internally we might speed things up by placing the code into a separate macro and use `\let!`

`\size@update` Normally this macro does nothing; it will be redefined by `\set@fontsize` to initiate an update.

```
160 \let\size@update\relax
```

`\type@restoreinfo` This macro produces some info when a font size and/or baseline change will get restored.

```
161 <*trace>
162     \def\type@restoreinfo{%
163         \ifx\f@linespread\empty
164             \let\reserved@a\empty
165         \else
166             \def\reserved@a{\f@linespread x}%
167         \fi
168         \@font@info{Restoring size to
169                         \f@size/\reserved@a\f@baselineskip}%
170 </trace>
```

`\glb@settings` The macro `\glb@settings` globally selects all math fonts for the current size if necessary.

```
171 \def\glb@settings{%
```

When `\glb@settings` gains control a size change was requested and all previous font assignments need to be replaced. Therefore the old values of the fonts are no longer needed. For every *math group* the new assignments are appended to `\math@fonts`. But this happens only if the `math@fonts` switch is set to true. However, we always set up the correct math sizes for script and scriptscript fonts since they may be needed even if we don't set up the whole math machinery.

Here we set the math size, script size and scriptscript size. If the `S@...` macro is not defined we have to first calculate the three sizes.

```
172     \expandafter\ifx\csname S@\f@size\endcsname\relax
173         \calculate@math@sizes
174     \fi
```

The effect of this is that `\calculate@math@sizes` may or may not define the `S@...` macro. In the first case the next time the same size is requested this macro is used, otherwise `\calculate@math@sizes` is called again. This also sets the `math@fonts` switch. If it is true we must switch the math fonts.

```
175     \csname S@\f@size\endcsname
176     \ifmath@fonts
177 <*trace>
178     \ifnum \tracingfonts>\tw@
```

```

179      \c@font@info{Setting up math fonts for
180          \f@size/\f@baselineskip}\fi
181 
```

Inside a group we execute the macro for the current math *version*. This sets `\math@fonts` to a list of `\textfont...` assignments. `\getanddefine@fonts` (which may be called at this point) needs the `\escapechar` parameter to be set to `-1`.

```

182      \begingroup
183          \escapechar\m@ne
184          \csname mv@\math@version \endcsname

```

Then we set `\globaldefs` to 1 so that all following changes are done globally. The math font assignments recorded in `\math@fonts` are executed and `\glb@currsize` is set equal to `\f@size`. This signals that the fonts for math in this size are set up.

```

185      \globaldefs\@ne
186      \math@fonts
187      \let \glb@currsize \f@size
188 
```

Finally we execute any code that is supposed to happen whenever the math font setup changes. This register will be executed in local mode which means that everything that is supposed to have any effect should be done globally inside. We can't execute it within `\globaldefs\@ne` as we don't know what ends up inside this register, e.g., it might contain calculations which use some local registers to calculate the final (global) value.

```
189      \the\every@math@size
```

Otherwise we announce that the math fonts are not set up for this size.

```

190 <*trace>
191     \else
192         \ifnum \tracingfonts>\tw@
193             \c@font@info{No math setup for
194                 \f@size/\f@baselineskip}\fi
195 
```

```
196     \fi
197 }
198 
```

`\baselinestretch` In `\selectfont` we used `\baselinestretch` as a factor when assigning a value to `\baselineskip`. We use 1 as a default (i.e. no stretch).

```

199 <*2ekernel | autoload>
200 \def\baselinestretch{1}

```

`\every@math@size` We must still define the hook `\every@math@size` we used in `\glb@settings`. We initialize it to nothing. It is important to remember that everything that goes into this hook should to global updates, local changes will have weird effects.

```

201 \newtoks\every@math@size
202 \every@math@size={}
203 
```

## 32.2 Math fonts setup

### 32.2.1 Outline of algorithm for math font sizes

TEX uses the the math fonts that are current when the end of a formula is reached. If we don't want to keep font setups local to every formula (which would result in an enormous overhead, we have to be careful not to end up with the wrong setup in case formulas are nested, e.g., we need to be able to handle

```
$ a=b+c \mbox{ \small for all $b$ and $c \in Z$} $
```

Here the inner formulae  $b$  and  $c \in Z$  are typeset in  $\small$  but we have to return to  $\normalsize$  before we reach the closing \$ of the outer formula.

This is handled in the following way:

1. At any point in the document the global variable  $\gbl@currsize$  contains the point size for which the math fonts currently are set up.
2. Whenever we start a formula we compare its value with the local variable  $\f@size$  that describes the current text font size.
3. If both are the same we assume that we can use the current math font setup without adjustment.
4. If they differ we call  $\gbl@settings$  which changes the math font setup and updates  $\gbl@currsize$ .
  - (a) If we are recursively inside another formula ( $\if@inmath$ ) we ensure that  $\gbl@settings$  is executed again in the outer formula, so that the old setup is automatically restored.
  - (b) Otherwise, we set the switch  $@inmath$  locally to **true** so that all nested formulae will be able to detect that they are nested in some outer formula.

The above algorithm has the following features:

- For sizes which are not containing any formula no math setup is done. Compared to the original algorithm of NFSS this results in the following savings:
  - No unnecessary loading of math fonts for sizes that are not used to typeset any math formulae (explicit or implicit ones).
  - No time overhead due to unnecessary changes of the math font setup on entrance and exit of the text font size.
- Math font setup changes for top-level formulae will survive (there is no restoration after the formula) thus any following formula in the same size will be directly typesettable. Compared to original implementation in NFSS2 the new algorithm has the overhead of one test per formula to see if the current math setup is valid (in the original algorithm the setup was always valid, thus no test was necessary).
- In nested formulae the math font setup is restored in the outer formula by a series of  $\aftergroup$  commands and checks. Compared to the original algorithm this involves additional checks ( $2 \times \langle \text{non-math levels} \rangle$  per inner formula).

### 32.2.2 Code for math font size setting

`\check@mathfonts` In the `\check@mathfonts` macros we implement the steps 2 to 4 except that instead of a switch the macro `\init@restore@glb@settings` is used.

```

204 (*2ekernel | package | autoload)
205 \def\check@mathfonts{%
206   \ifx \gbl@currsize \f@size
207     (*trace)
208       \ifnum \tracingfonts>\thr@@
209         \@font@info{*** MATH: no change \f@size\space
210           curr/global (\curr@math@size/\gbl@currsize)}\fi
211   (*trace)
212   \else
213   (*trace)
214     \ifnum \tracingfonts>\thr@@
215       \@font@info{*** MATH: setting up \f@size\space
216         curr/global (\curr@math@size/\gbl@currsize)}\fi

```

```

217 </trace>
218     \glb@settings
219     \init@restore@glb@settings
220   \fi
221 \let\curr@math@size\f@size
222 \def\init@restore@glb@settings{\aftergroup\restglb@settings}%
223 }

```

`\init@restore@glb@settings` This macros does by default nothing but get redefined inside `\check@mathfonts` to initiate fontsize restoring in nested formulas.

```

224 <-trace> \let\init@restore@glb@settings\relax
225 (*trace)
226 \def\init@restore@glb@settings{%
227     \ifnum \tracingfonts>\thr@@
228         \@font@info{*** MATH: no resetting (not in
229             nested math)}\fi
230 }
231 </trace>

```

`\restglb@settings` This macro will be executed the first time after the current formula.

```

232 \def\restglb@settings{%
233 (*trace)
234     \ifnum \tracingfonts>\thr@@
235         \@font@info{*** MATH: restoring}\fi
236 </trace>
237     \begingroup
238         \let\f@size\curr@math@size
239         \ifx\glb@currsize\f@size
240 (*trace)
241     \ifnum \tracingfonts>\thr@@
242         \@font@info{*** MATH: ... already okay (\f@size)}\fi
243 </trace>
244     \else
245 (*trace)
246     \ifnum \tracingfonts>\thr@@
247         \@font@info{*** MATH: ... to \f@size}\fi
248 </trace>
249     \glb@settings
250   \fi
251   \endgroup
252 }

```

### 32.2.3 Other code for math

`\use@mathgroup` The `\use@mathgroup` macro should be used in user macros to select a math group. Depending on whether or not the `margid` option is in force it has two or three arguments. For this reason it should be called as the last macro.

First we test if we are inside math mode since we don't want to apply a useless definition.

```

253 \def\use@mathgroup#1#2{\relax\ifmmode
254 (*trace)
255   \ifnum \tracingfonts>\tw@
256     \count@#2\relax
257     \@font@info{Using \noexpand\mathgroup
258             (\the\count@) #2}\fi
259 </trace>

```

If so we first call the '=' macro (i.e. argument three) to set up special things for the selected math group. Then we call `\mathgroup` to select the group given by argument two and finally we place `#1` (i.e. the argument of the *<math alphabet identifier>*) at the end. This part of the code is surrounded by two commands which

behave like `\begingroup` and `\endgroup` if we want  $\langle\mathit{math alphabet identifier}\rangle$ s but will expand into `\empty` if we want simply switches to a new math group. Since argument number 2 may be a digit instead of a control sequence we add a `\relax`. Otherwise something like `\mit{1}` would switch to math group 11 (and back) instead of printing an oldstyle 1.

```
260     \math@bgroup
261         \expandafter\ifx\csname M@\f@encoding\endcsname#1\else
262             #1\fi
263             \mathgroup#2\relax
```

Before we reinsert the swallowed token (arg. three) into the input stream, in the case that the  $\langle\mathit{math alphabet identifier}\rangle$  isn't called in math mode, we remove the `\fi` with the `\expandafter` trick. This is necessary if the token is actually an macro with arguments. In such a case the `\fi` will be misinterpreted as the first argument which would be disastrous.

```
264     \expandafter\math@egroup\fi}%
```

The surrounding macros equal `\begingroup` and `\endgroup`. But using internal names makes it possible to overwrite their meaning in certain cases. This is for example used in *AMS-T<sub>E</sub>X* macros for placing accents.

`\math@egroup` If the `margid` option is in force (which can be tested by looking at the definition of `\math@bgroup` we change the `\math@egroup` command a bit to display the current  $\langle\mathit{math group number}\rangle$  after it closes the scope of  $\langle\mathit{math alphabet}\rangle$  with `\endgroup`.

```
265 <*trace>
266   \ifx\math@bgroup\bgroup
267     \def\math@egroup#1{\#1\egroup
268       \ifnum\tracingfonts>\tw@
269         \font@info{Restoring \noexpand\mathgroup
270           (\ifnum\mathgroup=\m@ne default\else \the\mathgroup\ \fi)%
271         }\fi}
272   \fi
273 </trace>
```

`\getanddefine@fonts` `\getanddefine@fonts` has two arguments: the  $\langle\mathit{math group number}\rangle$  and the *family/series/shape* name as a control sequence.

```
274 \def\getanddefine@fonts#1#2{%
```

First we turn of tracing when `\tracingfonts` is less than 4.

```
275 <+debug> \pushtracing
276 <+debug> \ifnum\tracingfonts<4 \tracingoff
277 <+debug> \else \tracingon\getanddefine@fonts \fi

278 <*trace>
279   \ifnum\tracingfonts>\tw@
280   \count@#1\relax
281     \font@info{\noexpand\mathgroup (\the\count@) #1 :=\MessageBreak
282               \string#2 \tf@size/\sf@size/\ssf@size}\fi
283 </trace>
```

We append the current `\tf@size` to #2 to obtain the font name.<sup>6</sup> Again, `font@name` is defined globally, for the reasons explained in the description of `\wrong@fontshape`.

```
284 \xdef\font@name{\csname \string#2/\tf@size\endcsname}%
```

Then we call `\pickup@font` to load it if necessary. We remember the internal name as `\textfont@name`.

```
285 \pickup@font \let\textfont@name\font@name
```

---

<sup>6</sup>One might ask why this expansion does not generate a macro name that starts with an additional `\` character. The solution is that `\escapechar` is set to `-1` before `\getanddefine@fonts` is called.

```

Same game for \scriptfont and \scriptscriptfont:
286 \xdef\font@name{\csname \string#2\sf@size\endcsname}%
287 \pickup@font \let\scriptfont@name\font@name
288 \xdef\font@name{\csname \string#2\ssf@size\endcsname}%
289 \pickup@font

```

Then we append the new \textfont... assignments to the \math@fonts.

```

290 \edef\math@fonts{\math@fonts
291         \textfont#1\textfont@name
292         \scriptfont#1\scriptfont@name
293         \scriptscriptfont#1\font@name}%

```

Just before ending this macro we have to pop the tracing stack if it was pushed before.

```

294 <+debug> \poptracing
295 }
296 </2ekernel | package | autoload>

```

### 33 Scaled font extraction

**\ifnot@nil** We begin with a simple auxiliary macro. It checks whether its argument is the token \@nil. If so, it expands to \gobble which discards the following argument, otherwise it expands to \firstofone which reproduces its argument.

```

297 <*2ekernel | autoload>
298 \def\ifnot@nil#1{\def\reserved@a{#1}%
299 \ifx\reserved@a\@nil \expandafter\@gobble
300 \else \expandafter\@firstofone\fi}

```

**\remove@to@nnil** Three other auxiliary macros will be needed in the following: \remove@to@nnil gobbles up everything up to, and including, the next \@nnil token, and \remove@angles and \remove@star do the same for the character > and \*, respectively, instead of \@nnil.

```

301 \def\remove@to@nnil#1\@nnil{}
302 \def\remove@angles#1>{\set@simple@size@args}
303 \def\remove@star#1*{#1}
304 </2ekernel | autoload>

```

**\extract@sizefn** This macro takes a size specification and parses it into size function and the optional and mandatory arguments.

```

305 <*2ekernel | def2 | autoload>
306 \def\extract@sizefn#1#2\@nil{%
307 \if>#2>\set@size@funct@args#1\@nil
308     \let\sizefn@info\empty
309 \else\expandafter\set@size@funct@args\remove@star#2\@nil
310     \def\sizefn@info{#1}\fi
311 }

```

**\try@simple@size** This function tries to extract the given size (specified by \f@size) for the requested font shape. The font information must already be present in \font@info. The central macro that does the real work is \extract@fontinfo. We will first give a simple example how this macro works, and describe it in full generality later.

Assume that the requested parameters are: *encoding scheme* ‘OT1’, *family* ‘cm’, *series* ‘sansserif’, *shape* ‘normal’, and *size* ‘12’. The correspondign font definitions have already been extracted from the macro \OT1/cm/sansserif/normal and stored in \font@info. (Otherwise \extract@fontinfo doesn’t get called.) This information consists of a token list made of characters of category code 12 of the form

```
<10*>cmss10<12*>cmss12<17*>cmss17
```

For reasonable packages one usually needs more sizes but this is sufficient to get the flavour. We will define a macro `\extract@fontinfo` to find the external font name ('cmss12') for us:

```
\def\extract@fontinfo#1<12*#2>#3<#4\@nnil{%
  \set@simple@size@args#3<#4\@nnil
  \execute@size@function{#2}}
```

so that when it gets called via

```
\extract@fontinfo<10*>cmss10<12*>cmss12<17*>cmss17\@nnil
```

#1 will contain all characters before `<12*>`, #2 will be empty, #3 will be exactly `cmss12`, and #3 will be `17>cmss17`. The expansion is therefore

```
\set@simple@size@args cmss12<17*>cmss17\@nnil
\execute@size@function{}
```

This means: the default (empty) size function will be executed, with its optional argument argument set to empty and its mandatory argument set to `cmss12` by `\set@simple@size@args`. As we discussed earlier, the effect of the default size function is to load the given external font (`cmss12`) at the specified size (12)—which is exactly what was intended.

But this is only part of the whole story. It may be that the size requested does not occur in the token list `\font@info`. And the simple definition of `\extract@fontinfo` we gave above does not allow to specify give more than one size specification in front of the external font name.

Let's address these two problems separately. The first one is solved with the following trick: We define `\extract@fontinfo` as follows:

```
\def\extract@fontinfo#1<12*#2>#3<#4\@nnil{%
  \ifnot@nil{#3}%
  {\set@simple@size@args#3<#4\@nnil
   \execute@size@function{#2}%
  }}}
```

How does this work? We call `\extract@fontinfo` via

```
\expandafter\extract@fontinfo\font@info<12*>\@nil<\@nnil
```

i.e. by appending `<12*>\@nil<\@nnil`. If the size ('12' in this case) appears in `\font@info` everything works as explained above, the only difference being that argument #4 of `\extract@fontinfo` additionally gets the tokens `<12*>\@nil<\@nnil`. However, if the size is not found everything up to the final `<12*>` is in argument #1, #3 gets `\@nil`, and #2 and #4 are empty. The macro `\ifnot@nil` will discard the calls to `\set@simple@size@args` and `\execute@size@function`, and hence `\font@info` will continue to be equal to `\@empty`. This means that no simple size specification matching the requested size could be found.

The second problem (more than one simple size specification for one external font name) will be addressed in `\set@simple@size@args` below.

The macros are hidden inside other control sequences so that we have to build `\extract@fontinfo` in several steps.

So here's the actual definition of `\extract@font` in `\try@simple@size`.

```
312 % % this could be replaced by \try@size@range making the subst slower!
313 \def\try@simple@size{%
```

`\reserved@a` is made an abbreviation for the head of the definition of the macro `\extract@fontinfo`.

```
314     \def\reserved@a{\def\extract@fontinfo####1}{%
```

Now we can define `\extract@fontinfo`. Here we handle a small but convenient variation: in case of the default (empty) size function it is allowed to omit the \* character.

```

315      \expandafter\reserved@a\expandafter<\f@size>##2##3\@nnil{%
316          \ifnot@nil{##2}%
317              {\set@simple@size@args##2##3\@nnil
318                  \execute@size@function\sizefn@info
319              }%

```

Now we call `\extract@fontinfo`. Note the `<\@nil` tokens at the end.

```

320      \expandafter\expandafter
321          \expandafter\extract@fontinfo\expandafter\font@info
322          \expandafter<\f@size>\@nil<\@nnil
323 }

```

`\set@simple@size@args` As promised above, the macro `\set@simple@size@args` will handle the case of several size specifications in a row. If another size specification follows, the very first token of its argument list is the character `<`. By starting the definition as follows,

```
324 \def\set@simple@size@args#1<%
```

parameter `#1` is empty in this case, and contains the size function's arguments otherwise. We distinguish these two cases (Note that the character `<` cannot appear in `#1`) by calling `\remove@angles` for empty `#1` and `\extract@sizefn` otherwise. In the latter case we have to take care of the remaining character tokens and discard them. This is done by `\remove@to@nnil`. Note also the use of Kabelschacht's method.

```

325      \if<#1<%
326          \expandafter\remove@angles
327      \else
328          \extract@sizefn#1*\@nil
329          \expandafter\remove@to@nnil
330      \fi}

```

Now, we are through with the case of a simple size, except for calling the size function. This will be handled later, as it is the same mechanism for all types of size specification. We will now proceed to macros for extraction of size range specification.

`\extract@rangefontinfo` `\extract@rangefontinfo` goes through a font shape definition in the input until it recognizes the tokens `<\@nil->`. It looks for font ranges with font size functions. Its operation is rather simple: it discards everything up to the next size specification and passes this on to `\is@range` for inspection. The specification (parameter `#2` is inserted again, in case it is needed later).

```

331 \def\extract@rangefontinfo#1<#2>{%
332     \is@range#2->\@nil#2>}

```

`\is@range` `\is@range` is again a sort of dispatcher macro: if the size specification it is looking at is not a range specification it discards it and calls `\extract@rangefontinfo` to continue the search. Otherwise it calls `\check@range` to check the requested size against the specified range.

From the way `\is@range` is called inside `\extract@rangefontinfo` we see that `#2` is the character `>` if the size specification found is a simple one (as it does not contain a `-` character). This is checked easily enough and `\extract@rangefontinfo` called again. Note that the extra tokens inserted after the `\@nil` in the call to `\is@range` appear at the beginning of the first argument to `\extract@rangefontinfo` and are hence ignored.

```

333 \def\is@range#1-#2\@nil{%
334     \if>#2\expandafter\check@singl\else
335         \expandafter\check@range\f1}

```

`\check@range` `\check@range` takes lower bound as parameter `#1`, upper bound as `#2`, size function as `#3` and the size function's arguments as `#4`. If `#3` is the special token `\@nil` `\font@info` is exhausted and we can stop searching.

```

336 \def\check@range#1-#2>#3<#4\@nnil{%
337   \ifnot@nil{#3}{%

```

If #3 wasn't `\@nil` we have a range. We start by assuming that we have to recurse. Note that we have to reinsert an `<` as it was already removed by scanning.

```

338   \def\reserved@f{\extract@rangefontinfo<#4\@nnil}%

```

We have to make sure that both boundaries are present, if not we have to set them. Here we check the upper bound. If `\upper@bound` is zero after the assignment we set it to `\maxdimen` (upper open range). We need to use a `(dimen)` register for the scan since we may have a decimal number as the boundary.

```

339   \upper@bound0#2\p@
340   \ifdim\upper@bound=\z@\ \upper@bound\maxdimen\fi

```

Now we check the upper boundary against `\f@size`. If it is larger or equal than `\f@size` this range is no good and we have to recurse.

```

341   \ifdim \f@size \p@<\upper@bound

```

Otherwise we have to check the lower bound. This time it is not necessary to scan the boundary value into a register because if it is empty we get zero as desired. We could even omit the 0 which would result in 1pt as default lower boundary. If `\f@size` is smaller than the boundary we have to recurse.

```

342   \lower@bound0#1\p@
343   \ifdim \f@size \p@<\lower@bound
344   \else

```

If both tests are passed we can try executing the size function.

```

345   \set@simple@size@args#3<#4\@nnil
346   \execute@size@function\sizefn@info

```

If the function was successful it should have left an external font name in `\external@font`. We use this to see if we can stop scanning. Otherwise we recurse.

```

347   \ifx\external@font\@empty
348   \else
349     \let\reserved@f\@empty
350   \fi
351   \fi
352   \fi
353   \reserved@f}
354 </2ekernel | def2 | autoload>

```

`\lower@bound` We use two dimen registers `\lower@bound` and `\upper@bound` to store the lower and upper endpoints of the range we found.

```

355 <2ekernel | autoload>
356 \newdimen\lower@bound
357 \newdimen\upper@bound
358 </2ekernel | autoload>

```

`\check@singl` `\check@singl` takes the size as parameter #1, size function as #2 and the size function's arguments as #3. We can assume that there is always something in the pipeline since the very last entry is a faked range (see above).

```

359 <2ekernel | def2 | autoload>
360 \def\check@singl#1>#2<#3\@nnil{%

```

We start by assuming that we have to recurse. Note that we have to reinsert an `<` as it was already removed by scanning.

```

361   \def\reserved@f{\extract@rangefontinfo<#3\@nnil}%

```

Now we check the the size against `\f@size`. If it is not equal `\f@size` it is no good and we have to recurse.

```

362   \ifdim \f@size \p@=#1\p@

```

Otherwise if this test is passed we can try executing the size function.

```
363      \set@simple@size@args#2<#3\@nnil
364      \execute@size@function\sizefn@info
```

If the function was successful it should have left an external font name in `\external@font`. We use this to see if we can stop scanning. Otherwise we recurse.

```
365      \ifx\external@font\@empty
366      \else
367          \let\reserved@f\@empty
368      \fi
369      \fi
370      \reserved@f}
```

`\set@size@funct@args` This macro sets the optional and mandatory arguments for a size function. If the optional argument is not present it is set to the empty token list. The mandatory argument is delimited by the token `\@nil`.

```
371 \def\set@size@funct@args{\@ifnextchar[%%
372   \set@size@funct@args@{\set@size@funct@args@[]}}
373 \def\set@size@funct@args@[#1]#2\@nil{%
374   \def\mandatory@arg{#2}%
375   \def\optional@arg{#1}%
376 }/2ekernel | def2 | autoload)
```

`\DeclareSizeFunction` This function defines a new size function hiding the internal from the designer. The body of the size function may use `\optional@arg` and `\mandatory@arg` denoting the optional and mandatory argument that may follow the size specification `<...>`.

```
377 /*2ekernel | autoload)
378 \def\DeclareSizeFunction#1#2{\@namedef{s@fct@#1}{#2}}
379 \@onlypreamble\DeclareSizeFunction
380 }/2ekernel | autoload)
```

`\execute@size@function` This macro is very simple. The only point worth noting is that calling an undefined size function will do nothing (actually execute a `\relax`).

```
381 /*2ekernel | package | autoload)
382 \def\execute@size@function#1{%
383   %% could be added to autoload as well
384   %trace
385   %@ifundefined{s@fct@#1}%
386   %{\errmessage{Undefined font size function #1}%
387   %\s@fct@%
388   %\csname s@fct@#1\endcsname}%
389   %/trace
390   %-trace
391   %\csname s@fct@#1\endcsname
392   %
393 }/2ekernel | package | autoload)
```

`\try@size@range` This macro tries to find a suitable range for requested size (specified by `\f@size`) in `\font@info`. All the relevant action is done in `\extract@rangefontinfo`. All that needs to be done is to stuff in the token list in `\font@info` so that `\extract@rangefontinfo` can inspect it. Note the `<-*\@nil><` token at the end to stop scanning.

```
392 /*2ekernel | def2 | autoload)
393 \def\try@size@range{%
394   %expandafter\extract@rangefontinfo\font@info <-*\@nil<\@nnil
395 }/2ekernel | def2 | autoload)
```

`\try@size@substitution` This is the last thing that can be tried. If the desired `\f@size` is found neither among the simple size specifications nor in one of the ranges the whole list of size specifications is searched for a nearby simple size.

```
397 <*2ekernel | def1>
398 \gdef\try@size@substitution{%
```

First we do some initializations. `\@tempdimb` will hold the difference between the wanted size and the best solution found so far, so we initialise it with `\maxdimen`. The macro `\best@size` will hold the best size found, nothing found is indicated by the empty value.

```
399  \@tempdimb \maxdimen
400  \let \best@size \empty
```

Now we loop over the specification

```
401  \expandafter \try@simples \font@info <\number\@M>\@nil<\@nnil
402 }
403 </2ekernel | def1>
404 <autoload>
405 \def\try@size@substitution{\try@simples\try@size@substitution}
406 </autoload>
```

`\font@submax` The macro `\font@submax` records the maximal deviation from the desired size encountered so far. Its value is used in a warning message at `\end{coument}`. The macro `\fontsubfuzz` contains the amount that will not cause terminal warnings (warnings still go into the transcript file).

```
407 <*2ekernel | autoload>
408 \def\font@submax{0pt}
409 \def\fontsubfuzz{.4pt}
410 </2ekernel | autoload>
411 <+package>\def\fontsubfuzz{0pt}
```

`\try@simples` `\try@simples` goes through a font shape definition in the input until it recognizes the tokens `<*>\@nil`. It looks for simple sizes to determine the two closest sizes. It is assumed that simple sizes are in increasing order.

```
412 <*2ekernel | def1>
413 \gdef\try@simples#1<#2>{%
414  \tryif@simple#2->\tryif@simple}
415 </2ekernel | def1>
416 <autoload>
417 \def\try@simples{\@autoload{fss1}}
418 </autoload>
```

`\tryis@simple` `\tryis@simple` is similar to `\is@range`. If it sees a simple size, it checks it against the value of `\f@size` and sets `\lower@font@size` or `\higher@font@size`. In the latter case, it stops the iteration. By adding `<\number\@M>` at the end of the line we always have an end point. This is a hack which probably should be corrected.

First it checks whether it is finished already, then whether the size specification in question is a simple one.

```
419 <*2ekernel | def1>
420 \gdef\tryif@simple#1-#2\tryif@simple{%
```

Most common case for `\reserved@f` first:

```
421  \let \reserved@f \try@simples
422  \if>#2%
```

If so, it compares it to the value of `\f@size`. This is done using a dimen register since there may be fractional numbers.

```
423  \dimen@ #1\p@
424  \ifdim \dimen@<\@M\p@
```

If `\dimen@` is `\@M\p@` we have reached the end of the fontspec (hopefully) otherwise we compare the value with `\f@size` and compute in `\@tempdimc` the absolute value of the difference between the two values.

```

425      \ifdim \f@size\p@<\dimen@
426          \tempdimc \dimen@
427          \advance\tempdimc -\f@size\p@
428      \else
429          \tempdimc \f@size\p@
430          \advance\tempdimc -\dimen@
431      \fi

```

The result is then compared with the smallest difference we have encountered, if the new value (in `\tempdimc` is smaller) we have found a size which is a better approximation so we make it the `\best@size` and adjust `\tempdimb`.

```

432      \ifdim \tempdimc<\tempdimb
433          \tempdimb \tempdimc
434          \def \best@size{\#1}%
435      \fi

```

When we have reached the end of the fontspec we substitute the best size found (if any). We code this inline to save macro space; in the past this was done by a macro called `\subst@size`.

```
436      \else
```

`\subst@size` This macro substitutes the size recorded in `\best@size` for the unavailable size `\f@size`. `\font@submax` records the maximum difference between desired size and selected size in the whole run.

```

437 % \% \subst@size           %% coded inline
438 % \% \def\subst@size{%
439   \ifx \external@font\empty
440     \ifx \best@size\empty
441     \else
442       \ifdim \tempdimb>\font@submax \relax
443         \xdef \font@submax {\the\tempdimb}%
444       \fi
445     \let \f@user@size \f@size
446     \let \f@size \best@size
447     \ifdim \tempdimb>\fontsubfuzz\relax
448       \font@warning{Font\space shape\space
449                     '\curr@fontshape'\space in\space size\space
450                     <\f@user@size>\space not\space available\MessageBreak
451                     size\space <\f@size>\space substituted}%
452     \fi
453     \try@simple@size
454     \do@subst@correction
455   \fi
456 \fi
457 \% %

```

This brings us back into the main part of `\tryif@simple`. Finally we get rid of any rubbish left over on the input stack.

```

458   \let \reserved@f \remove@to@nnil
459   \fi
460 \fi

```

If it's a range iterate also.

```

461 \reserved@f}
462 ⟨/2ekernel | def1⟩

```

### 33.1 Sizefunctions

In the following we define some useful size functions.

`\s@fct@` This is the default size function. Mandatory argument is an external font name, optional argument a scale factor. The font is scaled to `\f@size` if no optional argument is present, and to `\f@size` multiplied by the optional argument otherwise.

```

463 <*2ekernel | autoload>
464 \DeclareSizeFunction{}{\empty@sfcnt\@font@warning}
465 \DeclareSizeFunction{s}{\empty@sfcnt\@font@info}
466 </2ekernel | autoload>
467 <*2ekernel | def2 | autoload>
468 \def\empty@sfcnt#1{%
469     \tempdimb \f@size\p@
470     \ifx\optional@arg\empty
471     \else
472         \tempdimb \optional@arg\@tempdimb
473         #1{Font\space shape\space '\curr@fontshape'\space
474             will\space be\MessageBreak
475             scaled\space to\space size\space \the\@tempdimb}%
476     \fi
477     \edef\external@font{\mandatory@arg\space at\the\@tempdimb}}
478 </2ekernel | def2 | autoload>
```

`\s@fct@gen` `\s@fct@sgen` This size function generates the external name from the mandatory argument and the requested user size, and thus can be used for external names where the size is encoded in the font name. The optional argument a scale factor. The font is scaled to `\f@size` if no optional argument is present, and to `\f@size` multiplied by the optional argument otherwise.

```

479 <*2ekernel | autoload>
480 \DeclareSizeFunction{gen}{\gen@sfcnt\@font@warning}
481 \DeclareSizeFunction{sgen}{\gen@sfcnt\@font@info}
482 </2ekernel | autoload>
483 <*2ekernel | def2 | autoload>
484 \def\gen@sfcnt{%
485     \edef\mandatory@arg{\mandatory@arg\f@size}%
486     \empty@sfcnt}
487 </2ekernel | def2 | autoload>
```

`\s@fct@genb` `\s@fct@sgenb` This size function is similar to `gen`, but for fonts where the size is encoded in the font name in centipoins, as in the DC fonts version 1.2. The font is scaled to `\f@size` if no optional argument is present, and to `\f@size` multiplied by the optional argument otherwise.

```

488 <*2ekernel | autoload>
489 \DeclareSizeFunction{genb}{\genb@sfcnt\@font@warning}
490 \DeclareSizeFunction{sgenb}{\genb@sfcnt\@font@info}
491 </2ekernel | autoload>
492 <*2ekernel | def2 | autoload>
493 \def\genb@sfcnt{%
494     \edef\mandatory@arg{\mandatory@arg\expandafter\genb@x\f@size..\@C}%
495     \empty@sfcnt}
496 </2ekernel | def2 | autoload>
```

`\genb@x` `\genb@y` The auxiliary macros `\genb@x` and `\genb@y` are used to convert the `\f@size` into centipoins.

```

497 <*2ekernel | def2 | autoload>
498 \def\genb@x#1.#2.#3\@C{\two@digits{#1}\genb@y#200\@C}
499 \def\genb@y#1#2#3\@C{#1#2}
500 </2ekernel | def2 | autoload>
```

`\s@fct@sub` This size function handles font substitution. The mandatory argument is a family/series/shape combination, the optional argument (if present) is ignored. The

font encoding scheme cannot be changed. Therefore, the first thing we do is to prepend the encoding scheme.

```

501 <*2ekernel | autoload>
502 \DeclareSizeFunction{sub}{\sub@sfcnt@\font@warning}
503 \DeclareSizeFunction{ssub}{\sub@sfcnt@\font@info}
504 </2ekernel | autoload>
505 <*2ekernel | def2 | autoload>
506 \def\sub@sfcnt#1{%
507     \edef\mandatory@arg{\f@encoding/\mandatory@arg}%

```

Next action is split the arg into its individual components and allow for a late font shape load.

```

508     \begingroup
509         \expandafter\split@name\mandatory@arg/\@nil
510         \try@load@fontshape
511     \endgroup

```

Then we record the current `\f@size` since it may get clobbered.

```
512     \let\f@user@size\f@size
```

Then we check whether this new combination is defined and give an error message if not. In this case we also switch to `\error@fontshape`.

```

513     \expandafter
514     \ifx\csname\mandatory@arg\endcsname\relax
515         \errmessage{No\space declaration\space for\space
516             shape\space \mandatory@arg}%
517         \error@fontshape
518     \else

```

Otherwise we warn the user about the substitution taking place.

```

519     #1{Font\space shape\space '\curr@fontshape'\space in\space
520         size\space <\f@size>\space not\space available\MessageBreak
521         Font\space shape\space '\mandatory@arg'\space tried\space
522         instead}%
523     \expandafter\split@name\mandatory@arg/\@nil
524 \fi

```

Then we restart the font specification scan by calling `\get@external@font`.

```

525     \edef\f@size{\f@user@size}%
526     \get@external@font

```

Finally `\do@subst@correction` is called to get the font name right.

```

527     \do@subst@correction
528 }
529 </2ekernel | def2 | autoload>

```

`\s@fct@subf` The `subf` size function allows substitution of another font. The mandatory argument is the external name of the font to be substituted, the optional argument a size scaling factor like in the default size function. The main difference to the default size function is the warning message.

```

530 <*2ekernel | autoload>
531 \DeclareSizeFunction{subf}{\subf@sfcnt@\font@warning}
532 \DeclareSizeFunction{ssubf}{\subf@sfcnt@\font@info}
533 </2ekernel | autoload>
534 <*2ekernel | def2 | autoload>
535 \def\subf@sfcnt#1{%
536     #1{Font\space shape\space '\curr@fontshape'\space in\space
537         size\space \f@size\space not\space available\MessageBreak
538         external\space font\space '\mandatory@arg'\space used}%
539     \empty@sfcnt#1%
540 }
541 </2ekernel | def2 | autoload>

```

\s@fct@fixed The **fixed** size function is for using a font at a different size than requested. A warning message is printed, and the external font to be used is taken from the mandatory argument. If an optional argument is present it is used as the ‘at’ size for the font. Otherwise the font is loaded at its design size.

```
542 <*2ekernel | autoload>
543 \DeclareSizeFunction{fixed}{\fixed@sfcnt\@font@warning}
544 \DeclareSizeFunction{sfixed}{\fixed@sfcnt\@font@info}
545 </2ekernel | autoload>
546 <*2ekernel | def2 | autoload>
547 \def\fixed@sfcnt#1{%
548   \ifx\optional@arg\@empty
549     \let\external@font\mandatory@arg
550   \else
551     \edef\external@font{\mandatory@arg\space at\optional@arg pt}%
552   \fi
553   #1{External\space font\space '\external@font'\space loaded\space
554       for\space size\MessageBreak
555       <\f@size>}%
556 }
557 </2ekernel | def2 | autoload>
```

## File q

# ltfsscmp.dtx

This file contains the implementation of commands giving compatibility with the original ‘NFSS1’ release of the Font Selection Scheme.

**Warning:** The macro documentation is still basically the documentation from the first NFSS release and therefore in some cases probably not completely accurate.

## 34 Compatibility code for NFSS release 1

There have been a couple of commands which became obsolete with NFSS2. In the past they have been still part of the kernel code to make it possible to process old packages using those commands but since they take up valuable space we decided to remove them and instead auto-load their definitions if they are actually encountered in some file.

Thus the following code doesn’t really belong to this file but I put it here for the moment until finally a documented version of `ltfss.dtx` is available.

[ auto-loading not activated ]

```
\new@fontshape  
\subst@fontshape  
  \extra@def  
  \default@mextra  
\define@mathalphabet  
\define@mathgroup
```

These macros are the interfaces in NFSS1 which shouldn’t be used any longer. We all define them to call the macro `\scan@fontshape` which is an internal macro that loads the real definitions and then to execute themselves again. Once this auto-loading has happened they have the definition shown below and thus execute their real code directly.

```
1 (*autoload)  
2 \def\new@fontshape{\scan@fontshape\new@fontshape}  
3 \def\subst@fontshape{\scan@fontshape\subst@fontshape}  
4 \def\extra@def{\scan@fontshape\extra@def}  
5 \def\default@mextra{\scan@fontshape\default@mextra}  
6 \def\define@mathalphabet{\scan@fontshape\define@mathalphabet}  
7 \def\define@mathgroup{\scan@fontshape\define@mathgroup}
```

`\scan@fontshape`

Here is the kernel definition for `\scan@fontshape` which loads the actual definitions from the file `nfsscmp.def`.

```
8 \def\scan@fontshape{\input{nfsscmp.def}}
```

The following definitions are now placed into the auto-load file.

Since we don’t know when this file will be read in we need to provide ourselves with standard `\catcode` settings. This is done by placing all definitions in a group and calling `\nfss@catcodes`. But this macro will also disable spaces which isn’t very appropriate for the following code because it contains a lot of helper messages. Therefore we change this back.

```
9 \begingroup  
10 \nfss@catcodes  
11 \catcode`\\ =10\relax  
12 
```

```
13 (*compat)
```

`\new@fontshape`

The interface is now `\DeclareFontShape`.

```
14 \gdef\new@fontshape#1#2#3#4{  
15   \warn@rel@i\new@fontshape\DeclareFontShape  
16   \expandafter\scan@fontshape\@gobble#4<\@nil><<%  
17   \DeclareFontShape U{#1}{#2}{#3}\reserved@f}  
18 \onlypreamble\new@fontshape
```

\warn@rel@i The warning message used above.

```
19 \gdef\warn@rel@i#1#2{%
20   \font@warning{*** NFSS release 1 command
21     \noexpand#1found\MessageBreak
22   *** Update by using release 2 command
23     \string#2.\MessageBreak
24   *** Recovery is probably possible}%
25 }
26 \onlypreamble\warn@rel@i
```

\scan@fontshape This will scan the old font shape definition syntax.

```
27 \gdef\scan@fontshape{%
28   \let\reserved@f\empty
29   \let\reserved@e\empty % holds last info
30   \scan@fontshape
31 }
32 \onlypreamble\scan@fontshape
```

\scan@@fontshape

```
33 \gdef\scan@@fontshape#1>#2#3<%
34   \ifx\@nil#1%
35     \edef\reserved@f{\reserved@f\reserved@e}%
36   \else
37     \def\reserved@b{#1}% nick names
38     \def\reserved@c{#3}%
39     \in@{ at}{#3}%
40     \ifin@
41       \in@{pt}{#3}%
42       \ifin@ not a proof but a good chance
43     \ifin@
```

We grab also everything after pt and discard it if people have forgotten to place a percent sign there.

```
43   \def\reserved@a##1 at##2pt##3\@nil{%
44     \def\reserved@b{##2}%
45     \def\reserved@c{##1}%
46   }%
47   \reserved@a#3\@nil
48   \fi
49 \fi
50 \ifnum 0<0#2
51   \edef\reserved@d{\subf*\reserved@c}%
52   \ifcase #2\or
53   \or
54   \else
55     \errmessage{*** What's this? NFSS release 0? ***}%
56   \fi
57 \else
58   \edef\reserved@d{\reserved@c}%
59 \fi
60 \ifx\reserved@d\reserved@e
61   \edef\reserved@f{\reserved@f<\reserved@b>}%
62 \else
63   \edef\reserved@f{\reserved@f\reserved@e<\reserved@b>}%add old info
64   \let\reserved@e\reserved@d
65 \fi
66   \expandafter\scan@@fontshape
67 \fi
68 }
69 \onlypreamble\scan@@fontshape
```

\subst@fontshape This is now also handled by the extend syntax of \DeclareFontShape.

```
70 \gdef\subst@fontshape#1#2#3#4#5#6{%
```

```

71      \warn@rel@i\subst@fontshape\DeclareFontShape
72      \DeclareFontShape{U}{#1}{#2}{#3}{<->sub#4/#5/#6}{}
73 \onlypreamble\subst@fontshape

\extra@def This was replaced by \DeclareFontFamily.
74 \gdef\extra@def#1#2#3{%
75     \warn@rel@i\extra@def\DeclareFontFamily
76     \DeclareFontFamily{U}{#1}{}
77 }
78 \onlypreamble\extra@def

\default@mextra The new name is \DeclareFontEncodingDefaults but in this case we don't feel
comfortable with this either.
79 \gdef\default@mextra{%
80   \warn@rel@i\default@mextra\DeclareFontEncodingDefaults
We pick up the argument to \default@mextra implicitly as the second argument
of \DeclareFontEncodingDefaults.
81   \DeclareFontEncodingDefaults\relax
82 }
83 \onlypreamble\default@mextra

\preload@sizes The new interface is \DeclarePreloadSizes.
84 \gdef\preload@sizes{%
85   \warn@rel@i\preload@sizes\DeclarePreloadSizes
86   \DeclarePreloadSizes U%
87 }
88 \onlypreamble\preload@sizes

\err@rel@i This macro is used in cases where emulation with NFSS2 features is not really
possible.
89 \gdef\err@rel@i#1#2{%
90   \Q@latex@error{*** NFSS release 1 command \noexpand#1found%
91   ^~J*** Recovery not possible. Use \string#2}%
92   {The new release of NFSS doesn't support the
93   \noexpand#1command^~Jany longer.
94   Please upgrade your file to the syntax of NFSS
95   release 2^~Jusing the \noexpand#2command.}%
Let's die.
96 \batchmode\input.\relax
97 }
98 \onlypreamble\err@rel@i

\newmathalphabet \newmathalphabet is the old form.

\newmathalphabet@@ 99 \gdef\newmathalphabet{%
\newmathalphabet@@@ 100 \ifno@font@opt
101   \Q@latex@error{*** NFSS release 1 command
102   \noexpand\newmathalphabet found%
103   ^~J \space*** Automatic recovery not possible.%
104   ^~J \space*** TYPE H for Help%
105   }%
106   {Please look at the file usrguide.tex for hints on
107   how to resolve this problem.}%
108 \else
109   \warn@rel@i\newmathalphabet\DeclareMathAlphabet
110 \fi
111 \Q@ifstar\newmathalphabet@@@
112   \newmathalphabet@@@
113 \gdef\newmathalphabet@@@{\DeclareMathAlphabet#1{U}{\{}{\}}{\{}{\}}
114 \gdef\newmathalphabet@@@#1#2#3#4{%
115   \DeclareMathAlphabet{#1}{U}{#2}{#3}{#4}}

```

```

116 \@onlypreamble\newmathalphabet
117 \@onlypreamble\newmathalphabet@@
118 \@onlypreamble\newmathalphabet@@@

\if@no@font@opt
\@no@font@optfalse 119 \global\let\if@no@font@opt\iftrue
120 \gdef\@no@font@optfalse{\let\if@no@font@opt\iffalse}

\define@mathalphabet This is a case where dying is best.
121 \gdef\define@mathalphabet{%
122     \err@rel@i\define@mathalphabet\DeclareMathAlphabet
123 }
124 \@onlypreamble\define@mathalphabet

\define@mathgroup And here is another one
125 \gdef\define@mathgroup{%
126     \err@rel@i\define@mathgroup\DeclareSymbolFont
127 }
128 \@onlypreamble\define@mathgroup
129 </compat>

\addtoversion \addtoversion is the old form.
130 \def\addtoversion#1#2{%
131   \warn@rel@i\addtoversion\SetMathAlphabet
132   \SetMathAlphabet#2{#1}{U}}
133 \@onlypreamble\addtoversion

That finishes the definitions for the old interfaces — but first we better finish
the group.
134 <*autoload>
135 \endgroup
136 </autoload>
```

## File r

# ltfssdcl.dtx

This file contains the main implementation of the font selection scheme commands. See other parts of the L<sup>A</sup>T<sub>E</sub>X distribution, or *The L<sup>A</sup>T<sub>E</sub>X Companion* for higher level documentation of these commands.

**Warning:** The macro documentation is still basically the documentation from the first NFSS release and therefore in some cases probably not completely accurate.

## 35 Interface Commands

\in@ \in is a utility macro with two arguments. It determines whether its first argument occurs in its second (after expanding it) and sets the switch \if@in accordingly.

```
1 <*2ekernel | autoload>
2 \def\in@#1#2{%
3   \def\in@@##1##2##3\in@{%
4     \ifx\in@##2\in@false\else\in@true\fi}%
5   \in@@#2#1\in@\in@}
6 \newif\ifin@
```

Before the \begin{document} command several *<math versions>* and *<math alphabet identifiers>* may be declared. In principle, there should be exactly one family/series/shape combination be declared for each version/alphabet pair. But we want to allow for defaults as well for automagical filling of holes.

While building the tables for math alphabet identifiers and math versions we keep several lists:

- the list of all math versions, \version@list, each entry prefixed by the control sequence \version@elt, i.e. this list has the following form

$$\text{\version@elt}\langle\text{version}_1\rangle\text{\version@elt}\langle\text{version}_2\rangle\dots\text{\version@elt}\langle\text{version}_n\rangle$$

- the list of all math alphabet identifiers. Here every entry has the form:

$$\text{\group@elt}\langle\text{math group number}\rangle\{\{\langle\text{default family}\rangle\}\{\langle\text{default series}\rangle\}\{\langle\text{default shape}\rangle\}\}.$$

- Each defined math alphabet identifier holds a list containing information about the *versions* for which it is defined. This list has a more complicated structure: it looks as follows:

$$\text{\set@alpha}\langle\text{the alphabet identifier itself}\rangle
\text{\reserved@c}\langle\text{math version}\rangle\langle\text{font info}\rangle
\dots
\text{\@nil}$$

where *<font info>* is either \reserved@e (if the combination is not defined yet) or

$$\{\{\langle\text{family}\rangle\}\{\langle\text{series}\rangle\}\{\langle\text{shape}\rangle\}\}$$

\version@list We initialize the version list to be empty.

```
7 \let\version@list=\@empty
8 \onlypreamble\version@list
```

```

\version@elt
  9 \let\version@elt\relax
10 \@onlypreamble\version@elt

\new@mathversion The macro \new@mathversion is called with the version control sequence as its
                  argument.
11 %\def\new@mathversion#1{%
The first thing this macro does is to check if the version identifier is already present
in \version@list. We enclose \version@list in braces since it might be empty
(if no version is defined yet). But this means that we need a suitable number of
\expandafter primitives.
12 % \expandafter\in@\expandafter#1\expandafter{\version@list}%
13 % \ifin@%
If so it prints an error message. The \next macro is used to get rid of the four
characters \mv@ that would otherwise appear at the begin of the version name in
the error message.
14 %   \@latex@error{Math version
15 %                 '\expandafter\@gobblefour\string#1'
16 %                 already defined}\@eha
Otherwise we have a new version, and we can proceed with entering it into the
tables. We add it to \version@list. This is very easy: we define \version@elt
(which is the delimiter in \version@list) to protect itself and the following token
from being expanded and simply redefine \version@list.
17 % \else
18 %   \global\expandafter\newcount\csname c@\expandafter
19 %                   '@gobble\string#1\endcsname
20 %   \global\csname c@\expandafter
21 %                   '@gobble\string#1\endcsname\@ne
22 %   \def\version@elt{\noexpand\version@elt\noexpand}%
23 %   \edef\version@list{\version@list\version@elt#1}%
Then we prepare to enter the new version into all math alphabet identifier lists.
Remember that these lists use \reserved@c as delimiter, and that there appears
the control sequence \reserved@e that must not be expanded. Therefore we take
suitable precautions.
24 %   \def\reserved@c{\noexpand\reserved@c\noexpand}%
25 %   \let\reserved@e\relax
We will now go through the \alpha@list to process every math alphabet
identifier in turn. Since this list has \group@elt as a delimiter we define this
control sequence. It has three arguments as every entry consists of three items (as
explained above).
26 %   \def\group@elt##1##2##3{%
The first of these arguments is the math alphabet identifier. We redefine it
by appending the information about the new version at the end of the list
contained in it. However, there is one subtlety: the definitions for \reserved@c and
\reserved@e made above prevent the main part of the list from being expanded.
But we still have to take care of the header and the trailer. To do this we remove
the trailer by means of the macro \remove@nil which also protect the header from
being expanded. Its definition is given below. Now we can prepare to add the new
version.
27 %   \edef##1{\expandafter\remove@nil##1%
28 %             \reserved@c
29 %             #1%
30 %             \reserved@e
31 %             \noexpand\@nil}}%
Finally we call \alpha@list which will now execute the macro \group@elt once
for every defined math alphabet identifier. And that's all for now.

```

```

32 %      \alpha@list
33 %  \fi}

\alpha@list As we explained above every entry in \alpha@list has the form
\alpha@elt
<alphabet identifier><internal group number><default font assignments>...
We initialize it to \empty.
34 \let\alpha@list\empty
35 \onlypreamble\alpha@list

\alpha@elt
36 \let\alpha@elt\relax
37 \onlypreamble\alpha@elt

\newgroup Start the group (fam) allocation at 0. (Doesn't belong here.)
38 \count18=-1

\stepcounter

\select@group We surround \select@group with braces so that functions using it can be used
directly after _ or ^. However, if we use oldstyle syntax where the math alphabet
doesn't have arguments (ie if \math@bgroup is not \bgroup) we need to get rid of
the extra group.
39 \def\select@group#1#2#3#4{%
40   \ifx\math@bgroup\bgroup\else\relax\expandafter\@firstofone\fi
41   {%
42     \ifmmode
43       \ifnum\csname c@mv@\math@version\endcsname<\sixt@@n
44         \begingroup
45           \escapechar`m@ne
46           \getanddefine@fonts{\csname c@mv@\math@version\endcsname}#3%
47           \globaldefs\@ne \math@fonts
48         \endgroup
49         \init@restore@version
50         \xdef#1{\noexpand\use@mathgroup\noexpand#2%
51           {\number\csname c@mv@\math@version\endcsname}}%
52         \global\advance\csname c@mv@\math@version\endcsname\@ne
53     \else
54       \let#1\relax
55       \@latex@error{Too many math alphabets used in
56                     version \math@version}%
57       \eha
58     \fi
59   \else \expandafter\non@alpherr\fi
60   #1{#4}%
61 }%
62 }
63 \onlypreamble\restore@mathversion

\init@restore@version
64 \def\init@restore@version{%
65   \global\let\init@restore@version\relax
66   \xdef\restore@mathversion
67   {\expandafter\noexpand\csname mv@\math@version\endcsname
68    \global\csname c@mv@\math@version\endcsname
69    \number\csname c@mv@\math@version\endcsname\relax}%
70   \aftergroup\dorestore@version
71 }
72 \onlypreamble\init@restore@version

```

```

\non@alpherr
73 </2ekernel | autoload>
74 <*2ekernel | autoerr>
75 \gdef\non@alpherr#1{\@latex@error{%
The command here will have a space at the end of its name, so we make sure not
to insert an extra one.
76     \string#1allowed only in math mode}\@ehd}
77 </2ekernel | autoerr>
78 {autoload}\def\non@alpherr{\@autoerr\non@alpherr}
79 <*2ekernel | autoload>

\dorestore@version
80 \def\dorestore@version
81 { \ifmmode
82     \aftergroup\dorestore@version
83   \else
84     \gdef\init@restore@version{%
85         \global\let\init@restore@version\relax
86         \xdef\restore@mathversion
87             {\expandafter\noexpand\csname mv@\math@version\endcsname
88             \global\csname c@mv@\math@version\endcsname
89             \number\csname c@mv@\math@version\endcsname\relax}%
90     \aftergroup\dorestore@version
91   }%
92   \begingroup
93     \let\getanddefine@fonts\gobbletwo
94     \restore@mathversion
95   \endgroup
96   \fi}%
97 \onlypreamble\dorestore@version

\document@select@group We surround \select@group with braces so that functions using it can be used
directly after _ or ^.
98 \def\document@select@group#1#2#3#4{%
99   \ifx\math@bgroup\bgroup\else\relax\expandafter\@firstofone\fi
100  }%
101 \ifmmode
102   \ifnum\csname c@mv@\math@version\endcsname<\sixt@n
103     \begingroup
104       \escapechar\m@ne
105       \getanddefine@fonts{\csname c@mv@\math@version\endcsname}#3%
106       \globaldefs\@ne \math@fonts
107     \endgroup
108     \expandafter\extract@alph@from@version
109       \csname mv@\math@version\expandafter\endcsname
110       \expandafter{\number\csname
111           c@mv@\math@version\endcsname}%
112       #1%
113       \global\advance\csname c@mv@\math@version\endcsname\@ne
114   \else
115     \let#1\relax
116     \@latex@error{Too many math alphabets used
117                   in version \math@version}%
118     \eha
119   \fi
120   \else \expandafter\non@alpherr\fi
121   #1{#4}%
122 }%
123 }

\process@table

```

```

124 \def\process@table{%
125     \def\cdp@elt##1##2##3##4{%
126         \font@info{Checking defaults for
127             ##1##2##3##4}%
128         \expandafter
129         \ifx\csname##1##2##3##4\endcsname\relax

```

Grouping is important for two reasons, first `\cdp@elt` will get redefined if `\Declare...` functions are executed within the external .fd file and secondly `\try@load@fontshape` changes a lot of catcodes without surrounding itself with a group.

```

130         \begingroup
131         \def\f@encoding{##1}\def\f@family{##2}%
132         \try@load@fontshape
133         \endgroup
134     \fi
135     \expandafter
136     \ifx\csname##1##2##3##4\endcsname\relax
137         \@latex@error{This NFSS system isn't set up properly}%
138             {For encoding scheme ##1 the defaults
139                 ##2##3##4 do not form a valid font shape}%
140     \else
141         \font@info{... okay}%
142     \fi}%
143 \cdp@list

```

Now we make sure that `\error@fontshape` is okay.

```

144 \begingroup
145     \escapechar\m@ne
146     \error@fontshape
147     \expandafter\ifx\csname \curr@fontshape\endcsname\relax
148         \begingroup
149             \try@load@fontshape
150         \endgroup
151     \fi
152     \expandafter\ifx\csname \curr@fontshape\endcsname\relax
153         \@latex@error{This NFSS system isn't set up properly}%
154             {The system maintainer forgot to specify a suitable
155                 substitution
156                 font shape using the \noexpand\DeclareErrorFont
157                 command}%
158     \fi
159 \endgroup

```

Set `\select@group` to its meaning used within the document body.

```
160 \let\select@group\document@select@group
```

Install the default font attributes they are currently pointing to error font shape.  
Don't use `\reset@font` since that would trigger `\selectfont`.

```

161     \fontencoding{\encodingdefault}%
162     \fontfamily{\familydefault}%
163     \fontseries{\seriesdefault}%
164     \fontshape{\shapedefault}%

```

kill all macros not longer needed. we need to add many more!!!!!!

```
165 \everyjob{}%
```

```
166 }
```

```
167 \onlypreamble\process@table
```

```
168 %\onlypreamble\set@mathradical
```

```
\DeclareMathVersion
```

```

169 \def\DeclareMathVersion#1{%
170     \expandafter\new@mathversion\csname mv@#1\endcsname}%
171 \onlypreamble\DeclareMathVersion

```

```

\new@mathversion

172 \def\new@mathversion#1{%
173   \expandafter\in@\expandafter#1\expandafter{\version@list}%
174   \ifin@
175     \font@info{Redeclaring math version
176       '\expandafter\gobblefour\string#1'}%
177   \else
178     \global\expandafter\newcount\csname c@\expandafter
179                               \gobble\string#1\endcsname
180     \def\version@elt{\noexpand\version@elt\noexpand}%
181     \edef\version@list{\version@list\version@elt#1}%
182   \fi

```

\toks@ is used to gather all tokens for the math version. \count@ will be used to count the math groups we add to this version.

```

183   \toks@{}%
184   \count@\z@

```

Now we loop over \group@list to add all math groups defined so far to the version and at the same time to count them.

```

185 \def\group@elt##1##2{%
186   \advance\count@\@ne
187   \addto@hook\toks@{\getanddefine@fonts##1##2}%
188 }%
189 \group@list

```

We set the counter for this math version to the number of math groups found in \group@list.

```

190 \global\csname c@\expandafter\gobble\string#1\endcsname\count@

```

Now we loop over \alpha@list to add all math alphabets known so far. We have to distinguish the case that an alphabet by default should produce an error in new versions.

```

191 \def\alpha@elt##1##2##3{%
192   \ifx##2\no@alphabet@error
193     \toks@\expandafter{\the\toks@\install@mathalphabet##1%
194     {\no@alphabet@error##1}}%
195   \else
196     \toks@\expandafter{\the\toks@\install@mathalphabet##1%
197     {\select@group##1##2##3}}%
198   \fi
199 }%
200 \alpha@list

```

Finally we define the math version to expand to the contents of \toks@.

```

201 \xdef#1{\the\toks@}%
202 }
203 \onlypreamble\new@mathversion

```

\DeclareSymbolFont

```

204 \def\DeclareSymbolFont#1#2#3#4#5{%
205   \tempswafalse
206   \edef\reserved@b{#2}%
207   \def\cdp@elt##1##2##3##4{\def\reserved@c{##1}%
208     \ifx\reserved@b\reserved@c \tempswatrue\fi}%
209   \cdp@list
210   \if@tempswa
211     \@ifundefined{sym#1}{%
212       \expandafter\new@mathgroup\csname sym#1\endcsname
213       \expandafter\new@symbolfont\csname sym#1\endcsname
214       {##2}{##3}{##4}{##5}}%
215   }%
216   \font@info{Redeclaring symbol font '#1'}%

```

```

Update the group list.

217      \def\group@elt##1##2{%
218          \noexpand\group@elt\noexpand##1%
219          \expandafter\ifx\csname sym#1\endcsname##1%
220              \expandafter\noexpand\csname#2/#3/#4/#5\endcsname
221          \else
222              \noexpand##2%
223          \fi}%
224      \xdef\group@list{\group@list}%

Update the version list.

225      \def\version@elt##1{%
226          \expandafter
227          \SetSymbolFont@\expandafter##1\csname#2/#3/#4/#5\expandafter
228              \endcsname \csname sym#1\endcsname
229          }%
230          \version@list
231      }%
232      \else
233          \@latex@error{Encoding scheme '#2' unknown}\@eha
234      \fi
235  }
236 \onlypreamble\DeclareSymbolFont

\group@list
237 \let\group@list\empty
238 \onlypreamble\group@list

\group@elt
239 \let\group@elt\relax
240 \onlypreamble\group@elt

\new@symbolfont
241 \def\new@symbolfont#1#2#3#4#5{%
242     \toks@\expandafter{\group@list}%
243     \edef\group@list{\the\toks@\noexpand\group@elt\noexpand##1%
244         \expandafter\noexpand\csname#2/#3/#4/#5\endcsname}%
245     \def\version@elt##1{\toks@\expandafter{##1}%
246         \edef##1{\the\toks@\noexpand\getanddefine@fonts
247             ##1\expandafter\noexpand\csname#2/#3/#4/#5\endcsname}%
248         \global\advance\csname c@\expandafter
249             \gobble\string##1\endcsname\@ne
250         }%
251     \version@list
252 }
253 \onlypreamble\new@symbolfont

\SetSymbolFont
254 \def\SetSymbolFont#1#2#3#4#5#6{%
255     \tempswafalse
256     \edef\reserved@b{#3}%
257     \def\cdp@elt##1##2##3##4{\def\reserved@c{##1}%
258         \ifx\reserved@b\reserved@c \tempswatrue\fi}%
259     \cdp@list
260     \if@tempswa
261         \expandafter\SetSymbolFont@
262             \csname mv@#2\expandafter\endcsname\csname#3/#4/#5/#6\expandafter
263                 \endcsname \csname sym#1\endcsname
264     \else
265         \@latex@error{Encoding scheme '#3' unknown}\@eha
266     \fi
267 }
268 \onlypreamble\SetSymbolFont

```

```

\SetSymbolFont@

269 \def\SetSymbolFont@#1#2#3{%
270   \expandafter\in@\expandafter#1\expandafter{\version@list}%
271   \ifin@
272     \expandafter\in@\expandafter#3\expandafter{\group@list}%
273   \ifin@
274     \begingroup
275       \expandafter\get@cdp\string#2@nil\reserved@a
276       \toks@{}%
277       \def\install@mathalphabet##1##2{%
278         \addto@hook\toks@{\install@mathalphabet##1{##2}}%
279       }%
280       \def\getanddefine@fonts##1##2{%
281         \ifnum##1=#3%
282           \addto@hook\toks@{\getanddefine@fonts##3#2}%
283           \expandafter\get@cdp\string##2@nil\reserved@b
284           \ifx\reserved@a\reserved@b\else
285             \font@info{Encoding '\reserved@b' has changed
286               to '\reserved@a' for symbol font\MessageBreak
287               '\expandafter@gobblefour\string#3' in the
288               math version '\expandafter
289               \gobblefour\string#1'}%
290           \fi
291           \font@info{%
292             Overwriting symbol font
293             '\expandafter@gobblefour\string#3' in
294             version '\expandafter
295             \gobblefour\string#1'\MessageBreak
296             @spaces \expandafter@gobble\string##2 -->
297             \expandafter@gobble\string##2}%
298           \else
299             \addto@hook\toks@{\getanddefine@fonts##1##2}%
300           \fi}%
301         #1%
302         \xdef#1{\the\toks@}%
303       \endgroup
304     \else
305       \latex@error{Symbol font '\expandafter@gobblefour\string#3'
306                     not defined}\@eha
307     \fi
308   \else
309     \latex@error{Math version '\expandafter@gobblefour\string#1'
310                   is not
311                   defined}{You probably misspelled the name of the math
312                   version.^^JOr you have to specify an additional package.}%
313   \fi
314 }
315 \onlypreamble\SetSymbolFont@

\get@cdp

316 \def\get@cdp#1#2/#3@nil#4{\def#4{#2}}
317 \onlypreamble\get@cdp

\DeclareMathAlphabet

318 \def\DeclareMathAlphabet#1#2#3#4#5{%
319   \tempswafalse
320   \edef\reserved@b{#2}%
321   \def\cdp@elt##1##2##3##4{\def\reserved@c{##1}%
322     \ifx\reserved@b\reserved@c \tempswatrue\fi}%
323   \cdp@list
324   \if@tempswa
325     \expandafter\ifx

```

```

326  \csname\expandafter\@gobble\string#1\endcsname
327  \relax
328  \new@mathalphabet#1{#2}{#3}{#4}{#5}%
329  \else
    Check if it is already a math alphabet.
330  \edef\reserved@a{\noexpand\in@\{\string\select@group\}%
331  {\expandafter\meaning\csname \expandafter
332  \@gobble\string#1\space\endcsname}\}%
333  \reserved@a
334  \ifin@%
335  \font@info{Redeclaring math alphabet \string#1}%
336  \def\version@elt##1{%
337  \expandafter\SetMathAlphabet@\expandafter
338  ##1\csname#2/#3/#4/#5\expandafter\endcsname
339  \csname M@#2\expandafter\endcsname
340  \csname \expandafter\@gobble\string#1\space\endcsname\}%
341  \version@list
342  \else
    Check if it is a math alphabet defined via \DeclareSymbolFontAlphabet.
343  \edef\reserved@a{\noexpand\in@\{\string\use@mathgroup\}%
344  {\expandafter\meaning\csname \expandafter
345  \@gobble\string#1\space\endcsname}\}%
346  \reserved@a
347  \ifin@%
    In that case overwriting is simple since there is nothing inserted in the math
    version macros.
348  \font@info{Redeclaring math alphabet \string#1}%
349  \new@mathalphabet#1{#2}{#3}{#4}{#5}%
    Otherwise panic.
350  \else
351  \@latex@error{Command '\string#1' already defined}\@eha
352  \fi
353  \fi
354  \fi
355  \else
356  \@latex@error{Encoding scheme '#2' unknown}\@eha
357  \fi
358  }
359 \onlypreamble\DeclareMathAlphabet

\new@mathalphabet
360 \def\new@mathalphabet#1#2#3#4#5{%
361  \toks@\expandafter{\alpha@list}%
362  \edef#1{\expandafter\noexpand\csname \expandafter
363  \@gobble\string#1\space\endcsname
364  \if/#5/%
365  \noexpand\no@alphabet@error
366  \noexpand\no@alphabet@error
367  \else
368  \expandafter\noexpand\csname M@#2\endcsname
369  \expandafter\noexpand\csname#2/#3/#4/#5\endcsname
370  \fi
371  }%
372  \toks2\expandafter{#1}%
373  \edef\alpha@list{\the\toks@\noexpand\alpha@elt\the\toks2}%
374  \def\version@elt##1{\toks@\expandafter{##1}%
375  \edef##1{\the\toks@\install@mathalphabet
376  \expandafter\noexpand
377  \csname \expandafter\@gobble

```

```

378                               \string#1\space\endcsname
379                               {\if/#5%
380                                 \noexpand\no@alphabet@error
381                                 \noexpand#1%
382                               \else
383                                 \noexpand\select@group\the\toks2
384                                 \fi}%
385                               }%
386 \version@list
387 \expandafter\edef\csname \expandafter\@gobble
388                               \string#1\space\endcsname{\if/#5%
389                                 \noexpand\no@alphabet@error
390                                 \noexpand#1%
391                               \else
392                                 \noexpand\select@group\the\toks2
393                                 \fi}%
394 \edef#1{\noexpand\protect
395           \expandafter\noexpand\csname \expandafter
396           \@gobble\string#1\space\endcsname}%
397 }
398 \onlypreamble\new@mathalphabet

\SetMathAlphabet
399 \def\SetMathAlphabet#1#2#3#4#5#6{%
400   \tempswafalse
401   \edef\reserved@b{#3}%
402   \def\cdp@elt##1##2##3##4{\def\reserved@c{##1}%
403     \ifx\reserved@b\reserved@c \tempswatrue\fi}%
404   \cdp@list
405   \if@tempswa
406     \expandafter\SetMathAlphabet@
407     \csname mv@#2\expandafter\endcsname\csname#3/#4/#5/#6\expandafter
408     \endcsname \csname M@#3\expandafter\endcsname
409     \csname \expandafter\@gobble\string#1\space\endcsname#1%
410   \else
411     \@latex@error{Encoding scheme '#3' unknown}\eha
412   \fi
413 }
414 \onlypreamble\SetMathAlphabet

\SetMathAlphabet@
415 \def\SetMathAlphabet@#1#2#3#4#5{%
416   \expandafter\in@\expandafter#1\expandafter{\version@list}%
417   \ifin@
418     \expandafter\in@\expandafter#4\expandafter{\alpha@list}%
419     \ifin@
420       \begingroup
421         \toks@{ }%
422         \def\getanddefine@fonts##1##2{%
423           \addto@hook\toks@{\getanddefine@fonts##1##2}%
424         }%
425         \def\reserved@c##1##2##3##4{%
426           \expandafter\@gobble\string##4}%
427         \def\install@mathalphabet##1##2{%
428           \ifx##1#4%
429             \addto@hook\toks@{%
430               \install@mathalphabet#4{\select@group#4#3#2}}%
431             \font@info{Overwriting math alphabet
432               '\string#5' in version '\expandafter
433               \@gobblefour\string#1'\MessageBreak
434               \spaces \reserved@c#2 -->
435               \expandafter\@gobble\string#2}%

```

```

436      \else
437          \addto@hook\toks@{\install@mathalphabet##1{##2}}%
438      \fi
439  }%
440  #1%
441  \xdef#1{\the\toks@}%
442  \endgroup
443 \else

```

If the math alphabet was defined via `\DeclareSymbolFontAlphabet` we have remove its external definition and add it as a normal math alphabet to every version before trying to change it in one version.

```

444  \edef\reserved@a{%
445      \noexpand\in@{\string\use@mathgroup}{\meaning#4}%
446  \reserved@a
447  \ifin@
448      \def\reserved@b##1\use@mathgroup##2##3{%
449          \def\reserved@b{##3}\def\reserved@c{##2}}%
450      \expandafter\reserved@b#4%
451      \begingroup
452          \def\install@mathalphabet##1##2{%
453              \addto@hook\toks@{\install@mathalphabet##1{##2}}%
454          }%
455          \def\getanddefine@fonts##1##2{%
456              \addto@hook\toks@{\getanddefine@fonts##1##2}%
457              \ifnum##1=\reserved@b
458                  \expandafter
459                  \addto@hook\expandafter\toks@
460                  \expandafter{\expandafter\install@mathalphabet
461                  \expandafter#4\expandafter
462                      \expandafter\select@group\expandafter
463                      #4\reserved@c##2}}%
464      \fi
465      }%
466      \def\version@elt##1{%
467          \toks@{}%
468          ##1%
469          \xdef##1{\the\toks@}%
470      }%
471      \version@list
472  \endgroup

```

Put it into the `\alpha@list` with default ‘error’

```

473      \expandafter\gdef\expandafter\alpha@list\expandafter
474          {\alpha@list
475              \alpha@elt #4\no@alphabet@error \no@alphabet@error}%
476      \gdef#4{\no@alphabet@error #5}% fake things :-

```

Then call the internal setting routine again:

```

477      \SetMathAlphabet@{#1}{#2}{#3}{#4}{#5}
478      \else
479          \@latex@error{Command ‘\string#5’ not defined as a
480                      math alphabet}%
481          {Use \noexpand\DeclareMathAlphabet to define it.}%
482      \fi
483      \fi
484  \else
485      \@latex@error{Math version ‘\expandafter\@gobblefour\string#1’
486                      is not
487                      defined}{You probably mispelled the name of the math
488                      version.^^JOr you have to specify an additional package.}%
489  \fi
490 }
491 \onlypreamble\SetMathAlphabet@{%

```

\DeclareMathAlphabet could do with more checks like allowing single number in #4 lowercase in #4 etc

```
492 \def\DeclareMathAccent#1#2#3#4{%
493   \expandafter\in@\csname sym#3\expandafter\endcsname
494   \expandafter{\group@list}%
495 \ifin@
496   \begingroup
497     \count\z@=#4\relax
498     \count\tw@\count\z@
499     \divide\count\z@\sixt@@n
500     \count@\count\z@
501     \multiply\count@\sixt@@n
502     \advance\count\tw@-\count@
503     \if\relax\noexpand#1% is command?
504       \edef\reserved@a{\noexpand\in@\{\"string\mathaccent}{\meaning#1}}%
505       \reserved@a
506     \ifin@
507       \expandafter\set@mathaccent
508         \csname sym#3\endcsname#1#2%
509         {\hexnumber@\{\\count\z@}\hexnumber@\{\\count\tw@}}%
510         \font@info{Redeclaring math accent \"string#1}%
511     \else
512       \expandafter\ifx
513         \csname\expandafter\@gobble\string#1\endcsname
514       \relax
515         \expandafter\set@mathaccent
516           \csname sym#3\endcsname#1#2%
517           {\hexnumber@\{\\count\z@}\hexnumber@\{\\count\tw@}}%
518       \else
519         @latex@error{Command '\string#1' already defined}\@eha
520       \fi
521     \fi
522   \else
523     @latex@error{Not a command name: '\noexpand#1'}\@eha
524   \fi
525   \endgroup
526 \else
527   @latex@error{Symbol font '#3' is not defined}\@eha
528 \fi
529 }
530 @onlypreamble\DeclareMathAccent

\set@mathaccent
531 \def\set@mathaccent#1#2#3#4{%
532   \xdef#2{\mathaccent"\mathchar@type#3\hexnumber@#1#4\relax}}
533 @onlypreamble\set@mathaccent
```

\DeclareMathSymbol

```
534 \def\DeclareMathSymbol#1#2#3#4{%
535   \expandafter\in@\csname sym#3\expandafter\endcsname
536   \expandafter{\group@list}%
537 \ifin@
538   \begingroup
539     \count\z@=#4\relax
540     \count\tw@\count\z@
541     \divide\count\z@\sixt@@n
542     \count@\count\z@
543     \multiply\count@\sixt@@n
544     \advance\count\tw@-\count@
545     \if\relax\noexpand#1% is command?
546       \edef\reserved@a{\noexpand\in@\{\"string\mathchar}{\meaning#1}}%
547       \reserved@a
548     \ifin@
```

```

549      \expandafter\set@mathsymbol
550          \csname sym#3\endcsname#1#2%
551          {\hexnumber@\{\count\z@\}\hexnumber@\{\count\tw@\}}%
552          \font@info{Redeclaring math symbol \string#1}%
553      \else
554          \expandafter\ifx
555              \csname\expandafter\@gobble\string#1\endcsname
556              \relax
557              \expandafter\set@mathsymbol
558                  \csname sym#3\endcsname#1#2%
559                  {\hexnumber@\{\count\z@\}\hexnumber@\{\count\tw@\}}%
560          \else
561              \@latex@error{Command '\string#1' already defined}\@eha
562          \fi
563      \fi
564      \else
565          \expandafter\set@mathchar
566              \csname sym#3\endcsname#1#2
567              {\hexnumber@\{\count\z@\}\hexnumber@\{\count\tw@\}}%
568          \fi
569      \endgroup
570  \else
571      \@latex@error{Symbol font '#3' is not defined}\@eha
572  \fi
573 }
574 \onlypreamble\DeclareMathSymbol

\set@mathchar
575 \def\set@mathchar#1#2#3#4{%
576   \global\mathcode`#2=\mathchar@type#3\hexnumber@#1#4\relax}
577 \onlypreamble\set@mathchar

\set@mathsymbol
578 \def\set@mathsymbol#1#2#3#4{%
579   \global\mathchardef#2"\mathchar@type#3\hexnumber@#1#4\relax}
580 \onlypreamble\set@mathsymbol

581 %\def\mathsymbol#1#2#3{%
582 %  \tempcnta=#3\relax
583 %  \tempcntb\tempcnta
584 %  \divide\tempcnta\sixt@@n
585 %  \count@\tempcnta
586 %  \multiply\count@\sixt@@n
587 %  \advance\tempcntb-\count@
588 %  \mathchar"\mathchar@type#1\hexnumber@#2%
589 %  \hexnumber@\tempcnta\hexnumber@\tempcntb\relax}
590 %
591 %\def\DeclareMathAlphabetCharacter#1#2#3{%
592 %  \DeclareMathSymbol{#1}{#2}{#3}{#4}}
593 %
594 %
595 %
596 %
597 %
598 %
599 %
600 \onlypreamble\DeclareMathDelimiter

```

\@xxDeclareMathDelimiter This macro checks if the second arg is a “math type” such as \mathopen. The undocumented original code didn’t use math types when the delimiter was a single letter. For this reason the coding is a bit strange as it tries to support the undocumented syntax for compatibility reasons.

```
601 \def\@xxDeclareMathDelimiter#1#2#3#4{%
```

7 is the default value returned in the case that \mathchar@type is passed something unexpected, like a math symbol font name. We locally move \mathalpha out of the way so if you use that the right branch is taken. This will still fail if an explicit number 7 is used!

```
602   \begingroup
603     \let\mathalpha\mathord
604     \ifnum7=\mathchar@type{#2}%
605       \endgroup
```

If this branch is taken we have old syntax (5 arguments).

```
606   \expandafter\@firstofone
607   \else
```

If this branch is taken \mathchar@type is different from 7 so we assume new syntax. In this case we also use the arguments to set up the letter as a math symbol for the case where it is not used as a delimiter.

```
608   \endgroup
609   \DeclareMathSymbol#1{#2}{#3}{#4}%
```

Then we arrange that \@xDeclareMathDelimiter only gets #1, #3, #4 ... as it does not expect a math type as argument.

```
610   \expandafter\@firstoftwo
611   \fi
612   {\@xDeclareMathDelimiter#1}{#2}{#3}{#4}}
613 \onlypreamble\@xxDeclareMathDelimiter
```

\@DeclareMathDelimiter

```
614 \def\@DeclareMathDelimiter#1#2#3#4#5#6{%
615   \expandafter\in@\csname sym#3\expandafter\endcsname
616   \expandafter{\group@list}%
617 \ifin@
618   \expandafter\in@\csname sym#5\expandafter\endcsname
619   \expandafter{\group@list}%
620 \ifin@
621   \begingroup
622     \count\z@=#4\relax
623     \count\tw@\count\z@
624     \divide\count\z@\sixt@@n
625     \count@\count\z@
626     \multiply\count@\sixt@@n
627     \advance\count\tw@-\count@
628     \edef\reserved@c{\hexnumber@{\count\z@}\hexnumber@{\count\tw@}}%
629   %
630     \count\z@=#6\relax
631     \count\tw@\count\z@
632     \divide\count\z@\sixt@@n
633     \count@\count\z@
634     \multiply\count@\sixt@@n
635     \advance\count\tw@-\count@
636     \edef\reserved@d{\hexnumber@{\count\z@}\hexnumber@{\count\tw@}}%
637   %
638     \edef\reserved@a{\noexpand\in@\string\delimiter}{\meaning#1}%
639     \reserved@a
640 \ifin@
641   \expandafter\set@mathdelimiter
642     \csname sym#3\expandafter\endcsname
643     \csname sym#5\endcsname#1#2%
```

```

644             \reserved@c\reserved@d
645             \@font@info{Redeclaring math delimiter \string#1}%
646         \else
647             \expandafter\ifx
648             \csname\expandafter\@gobble\string#1\endcsname
649             \relax
650             \expandafter\set@mathdelimiter
651             \csname sym#3\expandafter\endcsname
652             \csname sym#5\endcsname#1#2%
653             \reserved@c\reserved@d
654         \else
655             \@latex@error{Command ‘\string#1’ already defined}\@eha
656         \fi
657     \fi
658     \endgroup
659   \else
660     \@latex@error{Symbol font ‘#5’ is not defined}\@eha
661   \fi
662 \else
663   \@latex@error{Symbol font ‘#3’ is not defined}\@eha
664 \fi
665 }
666 \onlypreamble\@DeclareMathDelimiter

```

\@xDeclareMathDelimiter

```

667 \def\@xDeclareMathDelimiter#1#2#3#4#5{%
668   \expandafter\in@\csname sym#2\expandafter\endcsname
669   \expandafter{\group@list}%
670 \ifin@
671   \expandafter\in@\csname sym#4\expandafter\endcsname
672   \expandafter{\group@list}%
673 \ifin@
674   \begingroup
675     \count\z@=#3\relax
676     \count\tw@\count\z@
677     \divide\count\z@\sixt@@n
678     \count@\count\z@
679     \multiply\count@\sixt@@n
680     \advance\count\tw@-\count@
681     \edef\reserved@c{\hexnumber@{\count\z@}\hexnumber@{\count\tw@}}%
682 %
683     \count\z@=#5\relax
684     \count\tw@\count\z@
685     \divide\count\z@\sixt@@n
686     \count@\count\z@
687     \multiply\count@\sixt@@n
688     \advance\count\tw@-\count@
689     \edef\reserved@d{\hexnumber@{\count\z@}\hexnumber@{\count\tw@}}%
690     \expandafter\set@mathdelimiter
691       \csname sym#2\expandafter\endcsname\csname sym#4\endcsname#1%
692       \reserved@c\reserved@d
693   \endgroup
694 \else
695   \@latex@error{Symbol font ‘#4’ is not defined}\@eha
696 \fi
697 \else
698   \@latex@error{Symbol font ‘#2’ is not defined}\@eha
699 \fi
700 }
701 \onlypreamble\@xDeclareMathDelimiter

```

\set@mathdelimiter

We have to end the definition of a math delimiter like `\lfloor` with a space and not with `\relax` as we did before, because otherwise constructs involving

```

\abovewithdelims will prematurely end (pr/1329)
702 \def\set@mathdelimiter#1#2#3#4#5#6{%
703   \xdef#3{\delimiter"\mathchar@type#4\hexnumber@#1#5%
704                                     \hexnumber@#2#6 }%
705 \onlypreamble\set@mathdelimiter

\set@@mathdelimiter
706 \def\set@@mathdelimiter#1#2#3#4#5{%
707   \global\delcode`#3="\hexnumber@#1#4\hexnumber@#2#5\relax%
708 \onlypreamble\set@@mathdelimiter

\DeclareMathRadical
709 \def\DeclareMathRadical#1#2#3#4#5{%
Below is a crude fix to make this macro work if #1 is undefined or \relax. Should
be improved!
710 \expandafter\ifx
711   \csname\expandafter\@gobble\string#1\endcsname
712   \relax
713   \let#1\radical
714 \fi
715 \edef\reserved@a{\noexpand\in@\{\string\radical\}\{\meaning#1\}}%
716 \reserved@a
717 \ifin@
718   \expandafter\in@\csname sym#2\expandafter\endcsname
719   \expandafter{\group@list}%
720 \ifin@
721   \expandafter\in@\csname sym#4\expandafter\endcsname
722   \expandafter{\group@list}%
723 \ifin@
724   \begingroup
725     \count\z@=#3\relax
726     \count\tw@\count\z@
727     \divide\count\z@\sixt@on
728     \count@\count\z@
729     \multiply\count@\sixt@on
730     \advance\count\tw@-\count@
731     \edef\reserved@c{%
732       \hexnumber@\{\count\z@\}\hexnumber@\{\count\tw@\}}%
733     \count\z@=#5\relax
734     \count\tw@\count\z@
735     \divide\count\z@\sixt@on
736     \count@\count\z@
737     \multiply\count@\sixt@on
738     \advance\count\tw@-\count@
739     \edef\reserved@d{%
740       \hexnumber@\{\count\z@\}\hexnumber@\{\count\tw@\}}%
Coded inline instead of using \set@mathradical
741 %           \expandafter\set@mathradical
742 %             \csname sym#2\expandafter\endcsname
743 %               \csname sym#4\endcsname#1%
744 %               \reserved@c\reserved@d
745   \xdef#1{\radical"\expandafter\hexnumber@
746             \csname sym#2\endcsname\reserved@c
747             \expandafter\hexnumber@
748             \csname sym#4\endcsname\reserved@d
749             \relax}%
750           \endgroup
751 \else
752   \@latex@error{Symbol font '#4' is not defined}\@eha
753 \fi

```

```

754     \else
755         \@latex@error{Symbol font '#2' is not defined}\@eha
756     \fi
757     \else
758         \@latex@error{Command '\string#1' already defined}\@eha
759     \fi
760 }
761 \onlypreamble\DeclareMathRadical

    Definition below was wrong it contained \delimiter !

\def\set@mathradical#1#2#3#4#5{%
    \xdef#3{\radical"\hexnumber@#1#4\hexnumber@#2#5\relax}%

\mathalpha just a dummy currently
762 \let\mathalpha\relax

\mathchar@type

763 \def\mathchar@type#1{%
764   \ifodd 2#11 #1\else % is this non-negative number?
765       \ifx#1\mathord 0\else
766           \ifx#1\mathop 1\else
767               \ifx#1\mathbin 2\else
768                   \ifx#1\mathrel 3\else
769                       \ifx#1\mathopen 4\else
770                           \ifx#1\mathclose 5\else
771                               \ifx#1\mathpunct 6\else
772                                   % anything else is variable ord
773                                   \fi
774                               \fi
775                           \fi
776                             \fi
777                               \fi
778                                 \fi
779                                   \fi
780   \fi}
781 \onlypreamble\mathchar@type

\DeclareSymbolFontAlphabet

782 \def\DeclareSymbolFontAlphabet#1#2{%
783   \expandafter\DeclareSymbolFontAlphabet@
784   \csname \expandafter\@gobble\string#1\space\endcsname{#2}#1}
785 \onlypreamble\DeclareSymbolFontAlphabet

\DeclareSymbolFontAlphabet@

786 \def\DeclareSymbolFontAlphabet@#1#2#3{%
    We use the switch \if@tempswa to decide if we can declare this symbol font
    alphabet.

787     \if@tempswatrue
        First check if #2 is known to be a symbol font
788     \expandafter\in@\csname sym#2\expandafter\endcsname
789         \expandafter{\group@list}%
790     \ifin@
        Check if #1 is defined as a math alphabet defined via \DeclareMathAlphabet:
791     \expandafter\in@\expandafter#1\expandafter{\alpha@list}%
792     \ifin@
        If so remove it from the \alpha@list and from all math version macros.
793     \font@info{Redeclaring math alphabet \string#3}%
794     \toks@{}\%
```

```

795      \def\alpha@elt##1##2##3{%
796          \ifx##1#1\else\addto@hook\toks@{\alpha@elt##1##2##3}\fi}%
797      \alpha@list
798      \xdef\alpha@list{\the\toks@}%

```

Now we loop over all versions and remove the math alphabet:

```

799      \def\version@elt##1{%
800          \begingroup
801              \toks@{}%
802              \def\getanddefine@fonts####1####2{%
803                  \addto@hook\toks@{\getanddefine@fonts####1####2}}%
804              \def\install@mathalphabet####1####2{%
805                  \ifx####1#1\else
806                      \addto@hook\toks@{\install@mathalphabet
807                          ####1{####2}}\fi}%
808                  ####1%
809                  \xdef##1{\the\toks@}%
810                  \endgroup
811                  }%
812      \version@list
813  \else

```

If #3 is not defined as a math alphabet check if it is defined at all:

```

814      \expandafter\ifx
815          \csname\expandafter\@gobble\string#1\space\endcsname
816          \relax

```

If it is undefined, fine otherwise check if it is a math alphabet defined via `\DeclareSymbolFontAlphabet`:

```

817      \else
818          \edef\reserved@a{%
819              \noexpand\in@{\string\use@mathgroup}{\meaning#1}}%
820          \reserved@a
821          \ifin@
822              \qfont@info{Redeclaring math alphabet \string#3}%
823          \else

```

Since the command #3 is defined to be something which is not a math alphabet we have to skip redefining it.

```

824          \qtempswafalse
825          \qlate@error{Command ‘\string#3’ already defined}\qeha
826          \fi
827          \fi
828          \fi
829      \else

```

Since the symbol font is not known we better skip defining this alphabet.

```

830          \qtempswafalse
831          \qlate@error{Unknown symbol font ‘#2’}\qeha
832      \fi
833      \if@tempswa

```

When we reach this point we are allowed to define #1 to be a symbol font math alphabet. This means that we have to set it to

```
\use@mathgroup <math-settings> \sym<name>
```

The `<math-settings>` are the one for the encoding that is used in the font shape where `\sym<name>` is pointing to. This means that we have to get it from the information stored in `\group@list`. Thus we loop through that list after defining `\group@elt` in a suitable way.

```

834      \def\group@elt##1##2{%
835          \expandafter\ifx\csname sym#2\endcsname##1%
836          \expandafter\reserved@a\string##2\@nil
837          \fi}%

```

```
838 \def\reserved@a##2##3@nil{%
839     \def\reserved@a{##2}%
840     \group@list
841     \toks@{\relax\ifmmode \else \non@alpherr#1\fi}%
842     \edef#1{\the\toks@
843         \noexpand\use@mathgroup
844         \expandafter\noexpand\csname M@\reserved@a\endcsname
845         \csname sym#2\endcsname}%
846     \def#3{\protect#1}%
847 \fi
848 }
849 \@onlypreamble\DeclareSymbolFontAlphabet@
850 </2ekernel | autoload>
```

## File s

# ltfssini.dtx

This file contains the top level L<sup>A</sup>T<sub>E</sub>X interface to the font selection scheme commands. See other parts of the L<sup>A</sup>T<sub>E</sub>X distribution, or *The L<sup>A</sup>T<sub>E</sub>X Companion* for higher level documentation of these commands.

## 36 NFSS Initialisation

Finally, there are six commands that are to be used in L<sup>A</sup>T<sub>E</sub>X and that we will therefore protect against expansion at the wrong point: \fontfamily, \fontseries, \fontshape, \fontsize, \selectfont, and \mathversion.

### 36.1 Providing math *versions*

L<sup>A</sup>T<sub>E</sub>X provides two *versions*. We call them *normal* and *bold*, respectively.

```
1 \DeclareMathVersion{normal}
2 \DeclareMathVersion{bold}
```

Now we define the standard font change commands. We don't allow the use of \rmfamily etc. in math mode.

First the changes to another *family*:

```
3 \DeclareRobustCommand\rmfamily
4     {\not@math@\alphabet\rmfamily\mathrm
5      \fontfamily\rmdefault\selectfont}
6 \DeclareRobustCommand\sffamily
7     {\not@math@\alphabet\sffamily\mathsf
8      \fontfamily\sfdefault\selectfont}
9 \DeclareRobustCommand\ttfamily
10    {\not@math@\alphabet\ttfamily\mathtt
11     \fontfamily\ttdefault\selectfont}
```

Then the commands changing the *series*:

```
12 \DeclareRobustCommand\bfseries
13     {\not@math@\alphabet\bfseries\mathbf
14      \fontseries\bfdefault\selectfont}
15 \DeclareRobustCommand\mdseries
16     {\not@math@\alphabet\mdseries\relax
17      \fontseries\mddefault\selectfont}
18 \DeclareRobustCommand\upshape
19     {\not@math@\alphabet\upshape\relax
20      \fontshape\updefault\selectfont}
```

Then the commands changing the *shape*:

```
21 \DeclareRobustCommand\slshape
22     {\not@math@\alphabet\slshape\relax
23      \fontshape\sldefault\selectfont}
24 \DeclareRobustCommand\scshape
25     {\not@math@\alphabet\scshape\relax
26      \fontshape\scdefault\selectfont}
27 \DeclareRobustCommand\itshape
28     {\not@math@\alphabet\itshape\mathit
29      \fontshape\itdefault\selectfont}
```

We also have to define the *emphasize* font change command (i.e. \em). This command will look if the current font is sloped (i.e. has a positive \fontdimen1) and will then select either \upshape or \itshape.

```
30 \DeclareRobustCommand\em
31     {\@nomath\em \ifdim \fontdimen1ne\font >\z@
32      \upshape \else \itshape \fi}
```

`\not@math@alphabet` This function generates an error message when it is called in math mode. The same function should be defined in `newfont.sty`.

```

33 \def\not@math@alphabet#1#2{%
34   \relax
35   \ifmmode
36     @late@error{Command \noexpand#1invalid in math mode}%
37     {%
38       Please
39       \ifx#2\relax
40         define a new math alphabet^{#1}%
41         if you want to use a special font in math mode%
42       \else

```

We have to a `\noexpand` below to prevent expansion of #2. In case of #1 we can omit this (due to the current definition of robust commands since they do come out right there :-).

```

43   use the math alphabet \noexpand#2instead of
44   the #1command%
45   \fi
46   .
47 }%
48 \fi}

```

Finally we provide two abbreviations to switch to the L<sup>A</sup>T<sub>E</sub>X *versions*.

```

49 \def\boldmath{\@nomath\boldmath
50   \mathversion{bold}}
51 \def\unboldmath{\@nomath\unboldmath
52   \mathversion{normal}}

```

Here we switch to the default math version by defining the internal macro `\math@version`. We dare not to call `\mathversion` at this place because this would call `\glb@settings`.

```
53 \def\math@version{normal}
```

## 36.2 Miscellaneous

`\newfont` We start by defining a few macros that are part of standard L<sup>A</sup>T<sub>E</sub>X's user interface.  
`\symbol` The use of these functions is not encouraged, but they will allow to process older documents without changes to the source.

```

54 \def\newfont#1#2{\@ifdefinable#1{\font#1=#2\relax}%
55 \def\symbol#1{\char #1\relax}

```

`\@setfontsize` This abbreviation is used by L<sup>A</sup>T<sub>E</sub>X's user level size changing commands, such as `\large`.

```
56 \def\@setfontsize#1#2#3{\@nomath#1%
```

For the benefit of people relying on keeping the name of the current font command saved in `\@currsize` we define it. To ensure that `\@setfontsize` keeps being robust we omit this assignment during times where `\protect` differs from `\@typeset@protect`.

```

57   \ifx\protect\@typeset@protect
58     \let\@currsize#1%
59   \fi
60   \fontsize{#2}{#3}\selectfont

```

For compatibility we also define `\@setsizes` the 209 command

```

61 <*compat>
62 \def\@setsizes#1#2#3#4{\@setfontsize#1{#4}{#2}}
63 </compat>

```

`\oldstylenums` This macro implements old style numerals but only works if we assume that the standard math fonts are used. Thus it needs changing in case other math encodings are used.

```
64 \def\oldstylenums#1{%
65   \begingroup
```

Provide spacing using the interword space of the current font.

```
66   \spaceskip\fontdimen\tw@\font
```

Then switch to the math italic font. We don't change the current value of `\f@series` which means that you can use bold numerals if `\bfseries` is in force. As family we use `\rmdefault` which means that this only works if there exist an OML encoded version of that font or rather a corresponding .fd file (which is the case for standard L<sup>A</sup>T<sub>E</sub>X fonts even though they only contain substitutions).

```
67   \usefont{OML}{\rmdefault}{\f@series}{it}%
68   \mathgroup\symletters #1%
69   \endgroup
70 }
```

`\hexnumber@` To set up L<sup>A</sup>T<sub>E</sub>X's special math character definitions we first provide a macro to generate hexadecimal numbers. It is a rather simple `\ifcase`.

```
71 \def\hexnumber@#1{\ifcase\number#1
72 0\or 1\or 2\or 3\or 4\or 5\or 6\or 7\or 8\or
73 9\or A\or B\or C\or D\or E\or F\fi}
```

`\nfss@text` In its simplest form `\nfss@text` is an `\mbox`. This will produce unbreakable text outside math and inside math you will get text with the same fonts as outside. The only drawback is that such item won't change sizes in subscripts. But this behavior can be easily changed. With the `amstex` style option one will get a sub style called `amstext` which will redefine the `\nfss@text` macro to produce correct text in all sizes.

We have to use `\def` instead of the shorter `\let` since `\mbox` is undefined when we reach this point.

```
74 \def\nfss@text#1{{\mbox{#1}}}
```

`\copyright` The definition of `\copyright` was changed so that it works in other type styles, and to make it robust. We leave the family untouched so that the copyright notice will come out differently if a different font family is in use. This command is commented out, since it is now defined in `ltoutenc.dtx`.

```
75 %\DeclareRobustCommand\copyright
76 %  {{\ooalign{\hfil
77 %    \raise.07ex\hbox{\mdseries\upshape c}\hfil\crcr
78 %    \mathhexbox20D}}}
```

`\normalfont` `\reset@font` The macro `\reset@font` is used in L<sup>A</sup>T<sub>E</sub>X to switch to a standard font, in order to initialize the current font in situations where typesetting is done in a new visual context (e.g. in a footnote). We define it here to allow the test for the new L<sup>A</sup>T<sub>E</sub>X version above but nevertheless are able to run all kind of mixtures.

The user interface name for `\reset@font` is `\normalfont`:

```
79 \DeclareRobustCommand\normalfont
80   {\usefont\encodingdefault
81    \familydefault
82    \seriesdefault
83    \shapedefault
84    \relax}
85 \let\reset@font\normalfont
```

We left out the special L<sup>A</sup>T<sub>E</sub>X fonts which are not automatically included in the base version of the font selection since these fonts contain only a few characters

which are also included in the AMS fonts so anybody who is using these fonts doesn't need them. But for compatibility reasons we will define these symbols.

```

86 \def\not@base#1{\@latex@error
87   {Command \noexpand#1not provided in base LaTeX2e}%
88   {Load the latexsym or the amsfonts package to
89    define this symbol}}
90 \def\mho{\not@base\mho}
91 \def\Join{\not@base\Join}
92 \def\Box{\not@base\Box}
93 \def\Diamond{\not@base\Diamond}
94 \def\leadsto{\not@base\leadsto}
95 \def\sqsubset{\not@base\sqsubset}
96 \def\sqsupset{\not@base\sqsupset}
97 \def\lhd{\not@base\lhd}
98 \def\unlhd{\not@base\unlhd}
99 \def\rhd{\not@base\rhd}
100 \def\unrhd{\not@base\unrhd}

```

We now initialize all variables set by \DeclareErrorFont. These values are not really important since they will be overwritten later on by the definition in fontdef.ltx.

However, if fontdef.cfg is corrupted then at least a hopefully suitable error font is present.

```

101 \DeclareErrorFont{OT1}{cmr}{m}{n}{10} %% don't modify this setting
102                                     %% overwrite it in fontdef.cfg
103                                     %% if necessary

```

We now load the customizable parts of NFSS.

```
104 \ifnum\inputlineno=\m@ne
```

Still using T<sub>E</sub>X2. need a configuration file to avoid setting the 8bit characters.

```

105 \InputIfFileExists{fonttext.cfg}
106   {\typeout{=====
107   ^^^J%
108   Local config file fonttext.cfg used^^J%
109   ^^^J%
110   =====}%
111   \def\@addtofilelist##1{\xdef\@filelist{\@filelist,\##1}}%
112   }
113   {\typeout{!!!!!!!!!!!!!!}%
114   !^^J%
115   ! You MUST use a fonttext.cfg file!^^J%
116   ! As you are still using TeX2!!!!^^J%
117   !^^J%
118   ! See the documentation file tex2.txt^^J%
119   !^^J%
120   !!!!!!!!!!!!!!!}%
121   \batchmode \@@end}
122 \else

```

With T<sub>E</sub>X3 can use the standard ltx file if no configuration file exists.

```

123 \InputIfFileExists{fonttext.cfg}
124   {\typeout{=====
125   ^^^J%
126   Local config file fonttext.cfg used^^J%
127   ^^^J%
128   =====}%
129   \def\@addtofilelist##1{\xdef\@filelist{\@filelist,\##1}}%
130   }
131   {\input{fonttext.ltx}}
132 \fi
133 \let\@addtofilelist\gobble

```

Ditto for math although I don't think that we will get a lot of customisation  
:-)

```
134 \InputIfFileExists{fontmath.cfg}
135     {\typeout{=====
136         ^^^J%
137         Local config file fontmath.cfg used^J%
138         ^^^J%
139         =====}%
140         \def\@addtofilelist##1{\xdef\@filelist{\@filelist,##1}}%
141     }
142     {\input{fontmath.ltx}}
143 \let\@addtofilelist\@gobble
```

Then we preload several fonts. This file might be customized *without* changing the behavior of the format (i.e. necessary font definitions will be loaded at runtime if they are not preloaded). This is done in the file `preload.ltx`.

```
144 \InputIfFileExists{preload.cfg}
145     {\typeout{=====
146         ^^^J%
147         Local config file preload.cfg used^J%
148         ^^^J%
149         =====}%
150         \def\@addtofilelist##1{\xdef\@filelist{\@filelist,##1}}%
151     }
152     {\input{preload.ltx}}
153 \let\@addtofilelist\@gobble
```

\@acci We also save the values of some accents in \@acci, \@accii and \@acciii so they  
\@accii can be restored by a `minipage` inside a `tapping` environment.

\@acciii 154 \let\@acci\` \let\@accii\` \let\@acciii\=

\cal Here were the two old *(alphabet identifiers)*.  
\mit

# File t

## fontdef.dtx

### 37 Introduction

This file is used to generate the files `fonttext.ltx` (text font declarations) and `fontmath.ltx` (math font declarations), which are used during the format generation. It contains the declaration of the standard text encodings used at the site as well as a minimal subset of font shape groups that NFSS will look at to ensure that the specified encodings are valid.

The math part contains the setup for math encodings as well as the default math symbol declarations that belong to the encoding.

It is possible to change this setup (by using other fonts, or defaults) without losing the ability to process documents written at other sites. Portability in this sense means that a document will compile without errors. It does not mean, however, that identical output will be produced. For this it is necessary that the distributed setup is used at both installations.

### 38 Customization

You are not allowed to change this source file! If you want to change the default encodings and/or the font shape groups preloaded you should create a copy of `fonttext.ltx` under the name `fonttext.cfg` and change this copy. If L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  finds a file of this name it will use it, otherwise it uses the standard file which is `fontdef.ltx`.

If you don't plan to use Computer Modern much or at all, it might (!) be a good idea to make your own `fonttext.cfg`. Look at the comments below (docstrip module 'text') to see what should go into such a file.

To change the math font setup use a copy of `fontmath.ltx` under the name `fontmath.cfg` and change this copy. However, dealing with this interface is even more a job for an expert than changing the text font setup — in short, we don't encourage either.

**Warning:** please note that we don't support customised L<sup>A</sup>T<sub>E</sub>X versions. Thus, before sending in a bug report please try your test file with a L<sup>A</sup>T<sub>E</sub>X format which is not customised and send in the log from that version (unless the problem goes away).

Please note: the following standard encodings have to be defined in all local variants of `font....cfg` to guarantee that all L<sup>A</sup>T<sub>E</sub>X installations behave in the same way.

T1	Cork T <sub>E</sub> X text encoding
OT1	old T <sub>E</sub> X text encoding
U	unknown encoding
OML	old T <sub>E</sub> X math letters encoding
OMS	old T <sub>E</sub> X math symbols encoding
OMX	old T <sub>E</sub> X math extension symbols encoding

Notice that some of these encodings are 'old' in the sense that we hope that they will be superseded soon by encoding standards defined by the T<sub>E</sub>X user community. Therefore this set of default encodings may change in the future.

The first candidate is OT1 which will soon be replaced by T1, the official T<sub>E</sub>X text encoding.

**Warning:** If you add additional encodings to this file there is no guarantee any longer that files processable at your installation will also

be processable at other installations. Thus, if you make use of such an encoding in your document, e.g. if you intend to typeset in Cyrillic (OT2 encoding), you need to specify this encoding in the preamble of your document prior to sending it to another installation. Once the encoding is specified in that place in your document, the document is processable at all L<sup>A</sup>T<sub>E</sub>X installations (provided they have suitable fonts installed).

For this reason we suggest that you define a short package file that sets up an additional encoding used at your site (rather than putting the encoding into this file) since this package can easily be shipped with your document.

## 39 The docstrip modules

The following modules are used to direct `docstrip` in generating external files:

driver	produce a documentation driver file
text	produce the file <code>fonttext.ltx</code>
math	produce the file <code>fontmath.ltx</code>
cfgtext	produce a dummy <code>fonttext.cfg</code> file
cfgmath	produce a dummy <code>fontmath.cfg</code> file

A typical `docstrip` command file would then have entries like:

```
\generateFile{fonttext.ltx}{t}{\from{fontdef.dtx}{text}}
```

## 40 A driver for this document

The next bit of code contains the documentation driver file for T<sub>E</sub>X, i.e. the file that will produce the documentation you are currently reading. It will be extracted from this file by the DOCSTRIP program.

```
1 (*driver)
2 \documentclass{ltxdoc}
3 \GetFileInfo{fontdef.dtx}
4 \begin{document}
5   \DocInput{fontdef.dtx}
6 \end{document}
7 
```

## 41 The fonttext.ltx file

The identification is done earlier on with a `\ProvidesFile` declaration.

```
8 (*text)
9 \typeout{== Don't modify this file, use a .cfg file instead ==^^J}
```

### 41.1 Encodings

This file declares the standard encodings for text and math fonts. All others should be declared in packages or in the documents directly.

For every text encoding there are normally a number of encoding specific commands, e.g. accents, special characters, etc. (The definition for such a command might have to change when the encoding is changed, because the character is in a different position, or not available at all, or the accent is produced in a different way.) This is handled by a general mechanism which is described in `ltoutenc.dtx`.

By convention, text encoding specific declarations, including the declaration `\DeclareFontEncoding`, are kept in separate file of the form `<enc>.enc.def`,

e.g. `ot1enc.def`. This allows other applications to make use of the declarations as well.

Similar to the default encoding, the loading of the encoding files for the two major text encodings shouldn't be changed. In particular, the `inputenc` package depends on this.

```
10 \input {omlenc.def}
11 \input {t1enc.def}
12 \input {ot1enc.def}      % <- should come after T1 for speed
13 \input {omsenc.def}
```

We then set the default text font encoding. This will hopefully change some day to T1. This setting should *not* be changed to produce a portable format.

```
14 \fontencoding{OT1}
```

If different encodings for text fonts are in use one could put the common setup into `\DeclareFontEncodingDefaults`. There is now a better mechanism so using this interface is discouraged!

```
15 \DeclareFontEncodingDefaults{}{}
```

Then we define the default substitution for every encoding. This release of L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  assumes that the ec fonts are available. It is possible to change this to point to some other font family (e.g., Times with the appropriate encoding if it is available) without making documents non-portable. However, in such a case documents will produce different page breaks at other sites. The substitution defaults can all be changed without losing portability as long as there are font shape definitions for the selected substitutions.

```
16 \DeclareFontSubstitution{T1}{cmr}{m}{n}
17 \DeclareFontSubstitution{OT1}{cmr}{m}{n}
```

For every encoding declaration, L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  will try to verify that the given substitution information makes sense, i.e. that it is impossible to go into an endless loop if font substitution happens. This is done at the moment the `\begin{document}` is encountered. L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  will then check that for every encoding the substitution defaults form a valid font shape group, which means that it will check if there is a `\DeclareFontShape` declaration for this combination. We will therefore load the corresponding .fd files now. If we don't do this they would be loaded at verification time (i.e. at `\begin{document}`) which would delay processing unnecessarily.

**Warning:** Please note that this means that you have to regenerate the format whenever you change any of these .fd files since L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  will not read .fd files if it already knows about the encoding/family combination.

The `\nfss@catcodes` ensures that white space is ignored in any definitions made in the fd files.

```
18 \begingroup
19 \nfss@catcodes
20 \input {t1cmr.fd}
21 \input {ot1cmr.fd}
22 \endgroup
```

We also load some other font definition files which are normally needed in a document. This is only done for processing speed and you can comment the next two lines out to save some memory. If necessary these files are then loaded when your document is processed. (Loading .fd files is a less drastic step compared to preloading fonts because the number of fonts is limited 255 at (nearly) every T<sub>E</sub>X installation, while the amount of main memory is not a limiting factor at most installations.)

```
23 \begingroup
24 \nfss@catcodes
25 \input {ot1cmss.fd}
26 \input {ot1cmtt.fd}
27 \endgroup
```

Even with all the precautions it is still possible that NFSS will run into problems, for example, when a `.fd` file contains corrupted data. To guard against such cases NFSS has a very low-level fallback font that is installed with the following line.

```
28 \DeclareErrorFont{OT1}{cmr}{m}{n}{10}
```

This means, “if everything else fails use Computer Modern Roman normal shape at 10pt in the old text encoding”. You can change the font used but the encoding should be the same as the one specified with `\fontencoding` above.

## 41.2 Defaults

To allow the use of `\rmfamily`, `\sffamily`, etc. in documents even if non-standard families are used we provide nine macros which hold the name of the corresponding families, series, and so on. This makes it easy to use other font families (like Times Roman, etc.). One simply has to redefine these defaults.

All these hooks have to be defined in this file but you can change their meaning (except for `\encodingdefault`) without making documents non-portable.

<code>\rmdefault</code>	The following three definitions set up the meaning for <code>\rmfamily</code> , <code>\sffamily</code> , and <code>\ttfamily</code> .
<code>\sfdefault</code>	29 <code>\newcommand\rmdefault{cmr}</code>
<code>\ttdefault</code>	30 <code>\newcommand\sfdefault{cmss}</code>
	31 <code>\newcommand\ttdefault{cmtt}</code>
<code>\bfdefault</code>	Series changing commands are influenced by the following hooks.
<code>\mddefault</code>	32 <code>\newcommand\bfdefault{bx}</code>
	33 <code>\newcommand\mddefault{m}</code>
<code>\itdefault</code>	Shape changing commands use the following hooks.
<code>\sldefault</code>	34 <code>\newcommand\itdefault{it}</code>
<code>\scdefault</code>	35 <code>\newcommand\sldefault{s1}</code>
<code>\updefault</code>	36 <code>\newcommand\scdefault{sc}</code>
	37 <code>\newcommand\updefault{n}</code>
<code>\encodingdefault</code>	Finally we have the hooks that describe the behaviour of the <code>\normalfont</code> command. To stay portable, the definition of <code>\encodingdefault</code> should <i>not</i> be changed and should match the setting above for <code>\fontencoding</code> . All other values can be set according to your taste.
<code>\familydefault</code>	38 <code>\newcommand\encodingdefault{OT1}</code>
<code>\seriesdefault</code>	39 <code>\newcommand\familydefault{\rmdefault}</code>
<code>\shapedefault</code>	40 <code>\newcommand\seriesdefault{\mddefault}</code>
	41 <code>\newcommand\shapedefault{\updefault}</code>

This finishes the low-level setup in `fonttext.ltx`.

```
42 </text>
```

## 42 The fontmath.ltx file

The identification is done earlier on with a `\ProvidesFile` declaration.

```
43 <math>
```

```
44 \typeout{== Don't modify this file, use a .cfg file instead ==^J}
```

### 42.1 The font encodings used

```
45 \DeclareFontEncoding{OML}{}{}
46 \DeclareFontEncoding{OMS}{}{}
47 \DeclareFontEncoding{OMX}{}{}
```

Finally a declaration for U encoding which serves for all fonts that do not fit standard encodings. For math this sets up `\noaccents@` providing for AMS-L<sup>A</sup>T<sub>E</sub>X. This macro is used therein to handle accented characters if they are not supported by the font. In other words, if fonts with U encoding are used in math, all accents (like from `\breve{e}`) are obtained from some other font that has them.

```
48 \DeclareFontEncoding{U}{}{\noaccents@}
```

The encodings for math are next:

```
49 \DeclareFontSubstitution{OML}{cmm}{m}{it}
50 \DeclareFontSubstitution{OMS}{cmsy}{m}{n}
51 \DeclareFontSubstitution{OMX}{cmex}{m}{n}
52 \DeclareFontSubstitution{U}{cmr}{m}{n}

53 \begingroup
54 \nfss@catcodes
55 \input {omlcmm.fd}
56 \input {oms cmsy.fd}
57 \input {omx cmex.fd}
58 \input {ucmr.fd}
59 \endgroup
```

#### 42.1.1 Symbolfont and Alphabet declarations

We now define the basic symbol fonts used by L<sup>A</sup>T<sub>E</sub>X. These four symbol fonts must be defined by this file.

It is possible to make the symbol fonts point to other external fonts without losing the ability to process documents written at other sites, as long as one defines the same symbol font names with the same encodings, e.g. `operators` with OT1 etc. If other encodings are used documents become non-portable. Such a change should therefore be done in a package file.

```
60 \DeclareSymbolFont{operators} {OT1}{cmr}{m}{n}
61 \DeclareSymbolFont{letters} {OML}{cmm}{m}{it}
62 \DeclareSymbolFont{symbols} {OMS}{cmsy}{m}{n}
63 \DeclareSymbolFont{largesymbols}{OMX}{cmex}{m}{n}

64 \SetSymbolFont{operators}{bold}{OT1}{cmr}{bx}{n}
65 \SetSymbolFont{letters} {bold}{OML}{cmm}{b}{it}
66 \SetSymbolFont{symbols} {bold}{OMS}{cmsy}{b}{n}
```

Below are the seven math alphabets which are defined by NFSS. Again they must be defined by this file. However, as before you can change the fonts used without losing portability, but you should be careful when changing the encoding since that may make documents come out wrong.

```
67 \DeclareSymbolFontAlphabet{\mathrm}{operators}
68 \DeclareSymbolFontAlphabet{\mathnormal}{letters}
69 \DeclareSymbolFontAlphabet{\mathcal}{symbols}
70 \DeclareMathAlphabet {\mathbf}{OT1}{cmr}{bx}{n}
71 \DeclareMathAlphabet {\mathsf}{OT1}{cmss}{m}{n}
72 \DeclareMathAlphabet {\mathit}{OT1}{cmr}{m}{it}
73 \DeclareMathAlphabet {\mathtt}{OT1}{cmtt}{m}{n}
```

Given the currently available fonts we cannot bold-en `\mathbf` and `\mathtt` but in principle one could use ‘ultra bold’ or something. The alphabets defined via `\DeclareSymbolFontAlphabet` will change automatically in a new math version if the corresponding symbol font changes.

```
74 \SetMathAlphabet{\mathsf}{bold}{OT1}{cmss}{bx}{n}
75 \SetMathAlphabet{\mathit}{bold}{OT1}{cmr}{bx}{it}
```

## 42.2 Math font sizes

The declarations below declare the text, script and scriptscript size to be used for each text font size.

All occurrences of sizes longer than a single character are replaced with the macro name that holds them, saving a number of tokens (but losing a bit of speed, so this may not stay this way).

```

76 \DeclareMathSizes{5}{5}{5}{5}
77 \DeclareMathSizes{6}{6}{5}{5}
78 \DeclareMathSizes{7}{7}{5}{5}
79 \DeclareMathSizes{8}{8}{6}{5}
80 \DeclareMathSizes{9}{9}{6}{5}
81 \DeclareMathSizes{\@xpt}{\@xpt}{7}{5}
82 \DeclareMathSizes{\@xipt}{\@xipt}{8}{6}
83 \DeclareMathSizes{\@xiipt}{\@xiipt}{8}{6}
84 \DeclareMathSizes{\@xivpt}{\@xivpt}{\@xpt}{7}
85 \DeclareMathSizes{\@xviipt}{\@xviipt}{\@xiipt}{\@xpt}
86 \DeclareMathSizes{\@xxpt}{\@xxpt}{\@xivpt}{\@xiipt}
87 \DeclareMathSizes{\@xxvpt}{\@xxvpt}{\@xxpt}{\@xviipt}
```

### 42.3 The math symbol assignments

We start by setting up math codes for most of the characters typed in directly from the keyboard. Most of them are normally already setup up in the same way by *InitEX*. However, we repeat them here to have a complete setup which can be exchanged with another if desired.

#### 42.3.1 The letters

```

88 \DeclareMathSymbol{a}{\mathalpha}{letters}{`a}
89 \DeclareMathSymbol{b}{\mathalpha}{letters}{`b}
90 \DeclareMathSymbol{c}{\mathalpha}{letters}{`c}
91 \DeclareMathSymbol{d}{\mathalpha}{letters}{`d}
92 \DeclareMathSymbol{e}{\mathalpha}{letters}{`e}
93 \DeclareMathSymbol{f}{\mathalpha}{letters}{`f}
94 \DeclareMathSymbol{g}{\mathalpha}{letters}{`g}
95 \DeclareMathSymbol{h}{\mathalpha}{letters}{`h}
96 \DeclareMathSymbol{i}{\mathalpha}{letters}{`i}
97 \DeclareMathSymbol{j}{\mathalpha}{letters}{`j}
98 \DeclareMathSymbol{k}{\mathalpha}{letters}{`k}
99 \DeclareMathSymbol{l}{\mathalpha}{letters}{`l}
100 \DeclareMathSymbol{m}{\mathalpha}{letters}{`m}
101 \DeclareMathSymbol{n}{\mathalpha}{letters}{`n}
102 \DeclareMathSymbol{o}{\mathalpha}{letters}{`o}
103 \DeclareMathSymbol{p}{\mathalpha}{letters}{`p}
104 \DeclareMathSymbol{q}{\mathalpha}{letters}{`q}
105 \DeclareMathSymbol{r}{\mathalpha}{letters}{`r}
106 \DeclareMathSymbol{s}{\mathalpha}{letters}{`s}
107 \DeclareMathSymbol{t}{\mathalpha}{letters}{`t}
108 \DeclareMathSymbol{u}{\mathalpha}{letters}{`u}
109 \DeclareMathSymbol{v}{\mathalpha}{letters}{`v}
110 \DeclareMathSymbol{w}{\mathalpha}{letters}{`w}
111 \DeclareMathSymbol{x}{\mathalpha}{letters}{`x}
112 \DeclareMathSymbol{y}{\mathalpha}{letters}{`y}
113 \DeclareMathSymbol{z}{\mathalpha}{letters}{`z}

114 \DeclareMathSymbol{A}{\mathalpha}{letters}{`A}
115 \DeclareMathSymbol{B}{\mathalpha}{letters}{`B}
116 \DeclareMathSymbol{C}{\mathalpha}{letters}{`C}
117 \DeclareMathSymbol{D}{\mathalpha}{letters}{`D}
118 \DeclareMathSymbol{E}{\mathalpha}{letters}{`E}
119 \DeclareMathSymbol{F}{\mathalpha}{letters}{`F}
120 \DeclareMathSymbol{G}{\mathalpha}{letters}{`G}
121 \DeclareMathSymbol{H}{\mathalpha}{letters}{`H}
122 \DeclareMathSymbol{I}{\mathalpha}{letters}{`I}
123 \DeclareMathSymbol{J}{\mathalpha}{letters}{`J}
```

```

124 \DeclareMathSymbol{K}{\mathalpha}{letters}{'K}
125 \DeclareMathSymbol{L}{\mathalpha}{letters}{'L}
126 \DeclareMathSymbol{M}{\mathalpha}{letters}{'M}
127 \DeclareMathSymbol{N}{\mathalpha}{letters}{'N}
128 \DeclareMathSymbol{O}{\mathalpha}{letters}{'O}
129 \DeclareMathSymbol{P}{\mathalpha}{letters}{'P}
130 \DeclareMathSymbol{Q}{\mathalpha}{letters}{'Q}
131 \DeclareMathSymbol{R}{\mathalpha}{letters}{'R}
132 \DeclareMathSymbol{S}{\mathalpha}{letters}{'S}
133 \DeclareMathSymbol{T}{\mathalpha}{letters}{'T}
134 \DeclareMathSymbol{U}{\mathalpha}{letters}{'U}
135 \DeclareMathSymbol{V}{\mathalpha}{letters}{'V}
136 \DeclareMathSymbol{W}{\mathalpha}{letters}{'W}
137 \DeclareMathSymbol{X}{\mathalpha}{letters}{'X}
138 \DeclareMathSymbol{Y}{\mathalpha}{letters}{'Y}
139 \DeclareMathSymbol{Z}{\mathalpha}{letters}{'Z}

```

### 42.3.2 The digits

```

140 \DeclareMathSymbol{0}{\mathalpha}{operators}{'0}
141 \DeclareMathSymbol{1}{\mathalpha}{operators}{'1}
142 \DeclareMathSymbol{2}{\mathalpha}{operators}{'2}
143 \DeclareMathSymbol{3}{\mathalpha}{operators}{'3}
144 \DeclareMathSymbol{4}{\mathalpha}{operators}{'4}
145 \DeclareMathSymbol{5}{\mathalpha}{operators}{'5}
146 \DeclareMathSymbol{6}{\mathalpha}{operators}{'6}
147 \DeclareMathSymbol{7}{\mathalpha}{operators}{'7}
148 \DeclareMathSymbol{8}{\mathalpha}{operators}{'8}
149 \DeclareMathSymbol{9}{\mathalpha}{operators}{'9}

```

### 42.3.3 Punctuation, brace, etc. keys

```

150 \DeclareMathSymbol{!}{\mathclose}{operators}{"21}
151 \DeclareMathSymbol{*}{\mathbin}{symbols}{"03} % \ast
152 \DeclareMathSymbol{+}{\mathbin}{operators}{"2B}
153 \DeclareMathSymbol{,}{\mathpunct}{letters}{"3B}
154 \DeclareMathSymbol{-}{\mathbin}{symbols}{"00}
155 \DeclareMathSymbol{.}{\mathord}{letters}{"3A}
156 \DeclareMathSymbol{:}{\mathrel}{operators}{"3A}
157 \DeclareMathSymbol{;}{\mathpunct}{operators}{"3B}
158 \DeclareMathSymbol{=}{\mathrel}{operators}{"3D}
159 \DeclareMathSymbol{?}{\mathclose}{operators}{"3F}

```

The following symbols are defined as delimiters below which automatically defines them as math symbols.

```

160 \% \DeclareMathSymbol{()}{\mathopen}{operators}{"28}
161 \% \DeclareMathSymbol{}{\mathclose}{operators}{"29}
162 \% \DeclareMathSymbol{/}{\mathord}{letters}{"3D}
163 \% \DeclareMathSymbol{[]}{\mathopen}{operators}{"5B}
164 \% \DeclareMathSymbol{}{\mathclose}{operators}{"5D}
165 \% \DeclareMathSymbol{|}{\mathord}{symbols}{"6A}
166 \% \DeclareMathSymbol{<}{\mathrel}{letters}{"3C}
167 \% \DeclareMathSymbol{>}{\mathrel}{letters}{"3E}

```

Should all of the following being activated by default? Probably not.

```

168 \% \DeclareMathSymbol{{\}}{\mathopen}{symbols}{"66}
169 \% \DeclareMathSymbol{'`}{\mathclose}{symbols}{"67}
170 \% \DeclareMathSymbol{'\\}{\mathord}{symbols}{"6E} % \backslash
171 \mathcode`\ = "8000 % \space
172 \mathcode`'= "8000 % ^\prime
173 \mathcode`\_ = "8000 % \

```

### 42.3.4 Delimitercodes for characters

[to be completed]

Finally, *IniTeX* sets all `\delcode` values to -1, except `\delcode`.=0`

```

174 \DeclareMathDelimiter{()}{\mathopen}{operators}{28}{largesymbols}{00}
175 \DeclareMathDelimiter{}{\mathclose}{operators}{29}{largesymbols}{01}
176 \DeclareMathDelimiter{[]}{\mathopen}{operators}{5B}{largesymbols}{02}
177 \DeclareMathDelimiter{}{\mathclose}{operators}{5D}{largesymbols}{03}

```

The next two are considered to be relations when not used in the context of a delimiter! And worse, they do even represent different glyphs when being used as delimiter and not as delimiter. This is a user level syntax inherited from plain T<sub>E</sub>X. Therefore we explicitly redefine the math symbol definitions for these symbols afterwards.

```

178 \DeclareMathDelimiter{<}{\mathopen}{symbols}{68}{largesymbols}{0A}
179 \DeclareMathDelimiter{>}{\mathclose}{symbols}{69}{largesymbols}{0B}
180 \DeclareMathSymbol{<}{\mathrel}{letters}{3C}
181 \DeclareMathSymbol{>}{\mathrel}{letters}{3E}

```

And here is another case where the non-delimiter version produces a glyph different from the delimiter version.

```

182 \DeclareMathDelimiter{/}{\mathord}{operators}{2F}{largesymbols}{0E}
183 \DeclareMathSymbol{/}{\mathord}{letters}{3D}
184 \DeclareMathDelimiter{|}{\mathord}{symbols}{6A}{largesymbols}{0C}
185 \expandafter\DeclareMathDelimiter\@backslashchar
186 \mathord{symbols}{6E}{largesymbols}{0F}

```

N.B. { and } should NOT get delcodes; otherwise parameter grouping fails!

## 42.4 Symbols accessed via control sequences

### 42.4.1 Greek letters

```

187 \DeclareMathSymbol{\alpha}{\mathord}{letters}{0B}
188 \DeclareMathSymbol{\beta}{\mathord}{letters}{0C}
189 \DeclareMathSymbol{\gamma}{\mathord}{letters}{0D}
190 \DeclareMathSymbol{\delta}{\mathord}{letters}{0E}
191 \DeclareMathSymbol{\epsilon}{\mathord}{letters}{0F}
192 \DeclareMathSymbol{\zeta}{\mathord}{letters}{10}
193 \DeclareMathSymbol{\eta}{\mathord}{letters}{11}
194 \DeclareMathSymbol{\theta}{\mathord}{letters}{12}
195 \DeclareMathSymbol{\iota}{\mathord}{letters}{13}
196 \DeclareMathSymbol{\kappa}{\mathord}{letters}{14}
197 \DeclareMathSymbol{\lambda}{\mathord}{letters}{15}
198 \DeclareMathSymbol{\mu}{\mathord}{letters}{16}
199 \DeclareMathSymbol{\nu}{\mathord}{letters}{17}
200 \DeclareMathSymbol{\xi}{\mathord}{letters}{18}
201 \DeclareMathSymbol{\pi}{\mathord}{letters}{19}
202 \DeclareMathSymbol{\rho}{\mathord}{letters}{1A}
203 \DeclareMathSymbol{\sigma}{\mathord}{letters}{1B}
204 \DeclareMathSymbol{\tau}{\mathord}{letters}{1C}
205 \DeclareMathSymbol{\upsilon}{\mathord}{letters}{1D}
206 \DeclareMathSymbol{\phi}{\mathord}{letters}{1E}
207 \DeclareMathSymbol{\chi}{\mathord}{letters}{1F}
208 \DeclareMathSymbol{\psi}{\mathord}{letters}{20}
209 \DeclareMathSymbol{\omega}{\mathord}{letters}{21}
210 \DeclareMathSymbol{\varepsilon}{\mathord}{letters}{22}
211 \DeclareMathSymbol{\vartheta}{\mathord}{letters}{23}
212 \DeclareMathSymbol{\varpi}{\mathord}{letters}{24}
213 \DeclareMathSymbol{\varrho}{\mathord}{letters}{25}
214 \DeclareMathSymbol{\varsigma}{\mathord}{letters}{26}
215 \DeclareMathSymbol{\varphi}{\mathord}{letters}{27}
216 \DeclareMathSymbol{\Gamma}{\mathalpha}{operators}{00}
217 \DeclareMathSymbol{\Delta}{\mathalpha}{operators}{01}
218 \DeclareMathSymbol{\Theta}{\mathalpha}{operators}{02}
219 \DeclareMathSymbol{\Lambda}{\mathalpha}{operators}{03}
220 \DeclareMathSymbol{\Xi}{\mathalpha}{operators}{04}

```

```

221 \DeclareMathSymbol{\Pi}{\mathalpha}{operators}{05}
222 \DeclareMathSymbol{\Sigma}{\mathalpha}{operators}{06}
223 \DeclareMathSymbol{\Upsilon}{\mathalpha}{operators}{07}
224 \DeclareMathSymbol{\Phi}{\mathalpha}{operators}{08}
225 \DeclareMathSymbol{\Psi}{\mathalpha}{operators}{09}
226 \DeclareMathSymbol{\Omega}{\mathalpha}{operators}{0A}

```

#### 42.4.2 Ordinary symbols

```

227 \DeclareMathSymbol{\aleph}{\mathord}{symbols}{40}
228 \def\hbar{{\mathchar'26\mkern-9mu h}}
229 \DeclareMathSymbol{\imath}{\mathord}{letters}{7B}
230 \DeclareMathSymbol{\jmath}{\mathord}{letters}{7C}
231 \DeclareMathSymbol{\ell}{\mathord}{letters}{60}
232 \DeclareMathSymbol{\wp}{\mathord}{letters}{7D}
233 \DeclareMathSymbol{\Re}{\mathord}{symbols}{3C}
234 \DeclareMathSymbol{\Im}{\mathord}{symbols}{3D}
235 \DeclareMathSymbol{\partial}{\mathord}{letters}{40}
236 \DeclareMathSymbol{\infty}{\mathord}{symbols}{31}
237 \DeclareMathSymbol{\prime}{\mathord}{symbols}{30}
238 \DeclareMathSymbol{\emptyset}{\mathord}{symbols}{3B}
239 \DeclareMathSymbol{\nabla}{\mathord}{symbols}{72}
240 \def\surd{{\mathchar"1270}}
241 \DeclareMathSymbol{\top}{\mathord}{symbols}{3E}
242 \DeclareMathSymbol{\bot}{\mathord}{symbols}{3F}
243 \def\angle{{\vbox{\ialign{$\m@th\scriptstyle##$\crcr
244     \not\mathrel{\mkern14mu}\crcr
245     \noalign{\nointerlineskip}
246     \mkern2.5mu\leaders\hrule\@height.34pt\hfill\mkern2.5mu\crcr}}}}
247 \DeclareMathSymbol{\triangle}{\mathord}{symbols}{34}
248 \DeclareMathSymbol{\forall}{\mathord}{symbols}{38}
249 \DeclareMathSymbol{\exists}{\mathord}{symbols}{39}
250 \DeclareMathSymbol{\neg}{\mathord}{symbols}{3A}
251 \let\lnot=\neg
252 \DeclareMathSymbol{\flat}{\mathord}{letters}{5B}
253 \DeclareMathSymbol{\natural}{\mathord}{letters}{5C}
254 \DeclareMathSymbol{\sharp}{\mathord}{letters}{5D}
255 \DeclareMathSymbol{\clubsuit}{\mathord}{symbols}{7C}
256 \DeclareMathSymbol{\diamondsuit}{\mathord}{symbols}{7D}
257 \DeclareMathSymbol{\heartsuit}{\mathord}{symbols}{7E}
258 \DeclareMathSymbol{\spadesuit}{\mathord}{symbols}{7F}

```

#### 42.4.3 Large Operators

```

259 \DeclareMathSymbol{\coprod}{\mathop}{largesymbols}{60}
260 \DeclareMathSymbol{\bigvee}{\mathop}{largesymbols}{57}
261 \DeclareMathSymbol{\bigwedge}{\mathop}{largesymbols}{56}
262 \DeclareMathSymbol{\biguplus}{\mathop}{largesymbols}{55}
263 \DeclareMathSymbol{\bigcap}{\mathop}{largesymbols}{54}
264 \DeclareMathSymbol{\bigcup}{\mathop}{largesymbols}{53}
265 \DeclareMathSymbol{\intop}{\mathop}{largesymbols}{52}
266 \def\int{\intop\nolimits}
267 \DeclareMathSymbol{\prod}{\mathop}{largesymbols}{51}
268 \DeclareMathSymbol{\sum}{\mathop}{largesymbols}{50}
269 \DeclareMathSymbol{\bigotimes}{\mathop}{largesymbols}{4E}
270 \DeclareMathSymbol{\bigoplus}{\mathop}{largesymbols}{4C}
271 \DeclareMathSymbol{\bigodot}{\mathop}{largesymbols}{4A}
272 \DeclareMathSymbol{\ointop}{\mathop}{largesymbols}{48}
273 \def\oint{\ointop\nolimits}
274 \DeclareMathSymbol{\bigsqcup}{\mathop}{largesymbols}{46}
275 \DeclareMathSymbol{\smallint}{\mathop}{symbols}{73}

```

#### 42.4.4 Binary symbols

```

276 \DeclareMathSymbol{\triangleleft}{\mathbin}{letters}{2F}

```

```

277 \DeclareMathSymbol{\triangleright}{\mathbin}{letters}{`2E}
278 \DeclareMathSymbol{\bigtriangleup}{\mathbin}{symbols}{`34}
279 \DeclareMathSymbol{\bigtriangledown}{\mathbin}{symbols}{`35}
280   \let \varbigtriangledown \bigtriangledown
281   \let \varbigtriangleup \bigtriangleup

```

These last two synonyms are needed because the `stamryd` package redefines them as Operators.

```

282 \DeclareMathSymbol{\wedge}{\mathbin}{symbols}{`5E}
283   \let\land=\wedge
284 \DeclareMathSymbol{\vee}{\mathbin}{symbols}{`5F}
285   \let\lor=\vee
286 \DeclareMathSymbol{\cap}{\mathbin}{symbols}{`5C}
287 \DeclareMathSymbol{\cup}{\mathbin}{symbols}{`5B}
288 \DeclareMathSymbol{\ddagger}{\mathbin}{symbols}{`7A}
289 \DeclareMathSymbol{\dagger}{\mathbin}{symbols}{`79}
290 \DeclareMathSymbol{\sqcap}{\mathbin}{symbols}{`75}
291 \DeclareMathSymbol{\sqcup}{\mathbin}{symbols}{`74}
292 \DeclareMathSymbol{\uplus}{\mathbin}{symbols}{`5D}
293 \DeclareMathSymbol{\amalg}{\mathbin}{symbols}{`71}
294 \DeclareMathSymbol{\diamond}{\mathbin}{symbols}{`05}
295 \DeclareMathSymbol{\bullet}{\mathbin}{symbols}{`0F}
296 \DeclareMathSymbol{\wr}{\mathbin}{symbols}{`6F}
297 \DeclareMathSymbol{\div}{\mathbin}{symbols}{`04}
298 \DeclareMathSymbol{\odot}{\mathbin}{symbols}{`0C}
299 \DeclareMathSymbol{\oslash}{\mathbin}{symbols}{`0B}
300 \DeclareMathSymbol{\otimes}{\mathbin}{symbols}{`0A}
301 \DeclareMathSymbol{\ominus}{\mathbin}{symbols}{`09}
302 \DeclareMathSymbol{\oplus}{\mathbin}{symbols}{`08}
303 \DeclareMathSymbol{\mp}{\mathbin}{symbols}{`07}
304 \DeclareMathSymbol{\pm}{\mathbin}{symbols}{`06}
305 \DeclareMathSymbol{\circ}{\mathbin}{symbols}{`0E}
306 \DeclareMathSymbol{\bigcirc}{\mathbin}{symbols}{`0D}
307 \DeclareMathSymbol{\setminus}{\mathbin}{symbols}{`6E}
308 \DeclareMathSymbol{\cdotp}{\mathbin}{symbols}{`01}
309 \DeclareMathSymbol{\ast}{\mathbin}{symbols}{`03}
310 \DeclareMathSymbol{\times}{\mathbin}{symbols}{`02}
311 \DeclareMathSymbol{\star}{\mathbin}{letters}{`3F}

```

#### 42.4.5 Relations

```

312 \DeclareMathSymbol{\propto}{\mathrel}{symbols}{`2F}
313 \DeclareMathSymbol{\sqsubseteq}{\mathrel}{symbols}{`76}
314 \DeclareMathSymbol{\sqsupseteq}{\mathrel}{symbols}{`77}
315 \DeclareMathSymbol{\parallel}{\mathrel}{symbols}{`6B}
316 \DeclareMathSymbol{\mid}{\mathrel}{symbols}{`6A}
317 \DeclareMathSymbol{\dashv}{\mathrel}{symbols}{`61}
318 \DeclareMathSymbol{\vdash}{\mathrel}{symbols}{`60}
319 \DeclareMathSymbol{\nearrow}{\mathrel}{symbols}{`25}
320 \DeclareMathSymbol{\searrow}{\mathrel}{symbols}{`26}
321 \DeclareMathSymbol{\nwarrow}{\mathrel}{symbols}{`2D}
322 \DeclareMathSymbol{\swarrow}{\mathrel}{symbols}{`2E}
323 \DeclareMathSymbol{\Leftrightarrow}{\mathrel}{symbols}{`2C}
324 \DeclareMathSymbol{\Leftarrow}{\mathrel}{symbols}{`28}
325 \DeclareMathSymbol{\Rightarrow}{\mathrel}{symbols}{`29}
326 \def\neq{\not=}\let\neq\neg
327 \DeclareMathSymbol{\leq}{\mathrel}{symbols}{`14}
328   \let\le=\leq
329 \DeclareMathSymbol{\geq}{\mathrel}{symbols}{`15}
330   \let\ge=\geq
331 \DeclareMathSymbol{\succ}{\mathrel}{symbols}{`1F}
332 \DeclareMathSymbol{\prec}{\mathrel}{symbols}{`1E}
333 \DeclareMathSymbol{\approx}{\mathrel}{symbols}{`19}
334 \DeclareMathSymbol{\succeq}{\mathrel}{symbols}{`17}

```

```

335 \DeclareMathSymbol{\preceq}{\mathrel}{symbols}{16}
336 \DeclareMathSymbol{\supset}{\mathrel}{symbols}{1B}
337 \DeclareMathSymbol{\subset}{\mathrel}{symbols}{1A}
338 \DeclareMathSymbol{\supseteq}{\mathrel}{symbols}{13}
339 \DeclareMathSymbol{\subseteq}{\mathrel}{symbols}{12}
340 \DeclareMathSymbol{\in}{\mathrel}{symbols}{32}
341 \DeclareMathSymbol{\ni}{\mathrel}{symbols}{33}
342     \let\owns=\ni
343 \DeclareMathSymbol{\gg}{\mathrel}{symbols}{1D}
344 \DeclareMathSymbol{\ll}{\mathrel}{symbols}{1C}
345 \DeclareMathSymbol{\not}{\mathrel}{symbols}{36}
346 \DeclareMathSymbol{\leftrightarrow}{\mathrel}{symbols}{24}
347 \DeclareMathSymbol{\leftarrow}{\mathrel}{symbols}{20}
348     \let\gets=\leftarrow
349 \DeclareMathSymbol{\rightarrow}{\mathrel}{symbols}{21}
350     \let\to=\rightarrow
351 \DeclareMathSymbol{\mapstochar}{\mathrel}{symbols}{37}
352     \def\mapsto{\mapstochar\rightarrow}
353 \DeclareMathSymbol{\sim}{\mathrel}{symbols}{18}
354 \DeclareMathSymbol{\simeq}{\mathrel}{symbols}{27}
355 \DeclareMathSymbol{\perp}{\mathrel}{symbols}{3F}
356 \DeclareMathSymbol{\equiv}{\mathrel}{symbols}{11}
357 \DeclareMathSymbol{\asymp}{\mathrel}{symbols}{10}
358 \DeclareMathSymbol{\smile}{\mathrel}{letters}{5E}
359 \DeclareMathSymbol{\frown}{\mathrel}{letters}{5F}
360 \DeclareMathSymbol{\leftharpoonup}{\mathrel}{letters}{28}
361 \DeclareMathSymbol{\leftharpoondown}{\mathrel}{letters}{29}
362 \DeclareMathSymbol{\rightharpoonup}{\mathrel}{letters}{2A}
363 \DeclareMathSymbol{\rightharpoondown}{\mathrel}{letters}{2B}

```

Here cometh much profligate robustification of math constructs. Warning: some of these commands may become non-robust if an AMS package is loaded.

Further potential problems: some math font packages may make unfortunate assumptions about some of these definitions that are not true of the robust versions we need.

```

364 \DeclareRobustCommand
365   \cong{\mathrel{\mathpalette\@ vereq\sim}} % congruence sign
366 \def\@ vereq#1#2{\lower.5\p@\vbox{\lineskip\maxdimen\lineskip-.5\p@
367   \ialign{$\m@th#1\hfil##\hfil$\crcr#2\crcr=\crcr}}}
368 \DeclareRobustCommand
369 \notin{\mathrel{\m@th\mathpalette\c@ncel\in}}
370 \def\c@ncel#1#2{\m@th\ooalign{$\hfil#1\mkern1mu/\hfil$\crcr$#1#2$}}
371 \DeclareRobustCommand
372 \rightleftharpoons{\mathrel{\mathpalette\rlh@{}{}{}}}
373 \def\rlh@#1{\vcenter{\m@th\hbox{\ooalign{\raise2pt
374   \hbox{$\#1\rightharpoonup$}\crcr
375   $\#1\leftharpoondown$}}}}
376 \DeclareRobustCommand
377 \doteq{\buildrel\textstyle.\over=}

```

#### 42.4.6 Arrows

```

378 \DeclareRobustCommand
379   \joinrel{\mathrel{\mkern-3mu}}
380 \DeclareRobustCommand
381   \relbar{\mathrel{\smash{-}}} % \smash, because -
382                           % has the same height as +

```

In contrast to `plain.tex` `\Relbar` got braces around the equal sign to guard against it being “math active” expanding to `\futurelet`.... This might be the case when packages are implementing shorthands for math, e.g. `=>` meaning `\Rightarrow` etc. It would actually be better not to use `=` in such definitions but instead define something like `\mathequalsign` and use this. However we can’t do this now as it would break other math layouts where characters are in different

```

places (since those wouldn't know about the need for a new command name).
383 \DeclareRobustCommand
384   \Relbar{\mathrel{=}}
385 \DeclareMathSymbol{\lhook}{\mathrel}{letters}{`2C}
386   \def\hookrightarrow{\lhook\joinrel\rightarrow}
387 \DeclareMathSymbol{\rhook}{\mathrel}{letters}{`2D}
388   \def\hookleftarrow{\leftarrow\joinrel\rhook}
389 \DeclareRobustCommand
390   \bowtie{\mathrel{\triangleright}\joinrel\mathrel{\triangleleft}}
391 \DeclareRobustCommand
392   \models{\mathrel{}{}\joinrel\Relbar}
393 \DeclareRobustCommand
394   \Longrightarrow{\Relbar\joinrel\rightarrow}

```

LaTeX Change: `\longrightarrow` and `\longleftarrow` redefined to make them robust.

```

395 \DeclareRobustCommand\longrightarrow
396   {\relbar\joinrel\rightarrow}
397 \DeclareRobustCommand\longleftarrow
398   {\leftarrow\joinrel\relbar}
399 \DeclareRobustCommand
400   \Longleftarrow{\Leftarrow\joinrel\Relbar}
401 \DeclareRobustCommand
402   \longmapsto{\mapstochar\longrightarrow}
403 \DeclareRobustCommand
404   \longleftrightarrow{\leftarrow\joinrel\rightarrow}
405 \DeclareRobustCommand
406   \Longleftrightarrow{\Leftarrow\joinrel\Rightarrow}
407 \DeclareRobustCommand
408   \iff{\;}{\Longleftrightarrow\;}

```

#### 42.4.7 Punctuation symbols

```

409 \DeclareMathSymbol{\ldotp}{\mathpunct}{letters}{`3A}
410 \DeclareMathSymbol{\cdotp}{\mathpunct}{symbols}{`01}
411 \DeclareMathSymbol{\colon}{\mathpunct}{operators}{`3A}

```

This is commented out, since `\ldots` is now defined in `ltoutenc.dtx`.

```

412 %\def\@ldots{\mathinner{\ldotp\ldotp\ldotp}}
413 %\ DeclareRobustCommand\ldots
414 %           {\relax\ifmmode\@ldots\else\mbox{$\mathinner{\ldots}$}\fi}
415 \DeclareRobustCommand
416   \cdots{\mathinner{\cdotp\cdotp\cdotp}}
417 \DeclareRobustCommand
418   \vdots{\vbox{\baselineskip4\p@\lineskiplimit\z@
419     \kern6\p@\hbox{.}\hbox{.}\hbox{.}}}
420 \DeclareRobustCommand
421   \ddots{\mathinner{\mkern1mu\raise7\p@
422     \vbox{\kern7\p@\hbox{.}\mkern2mu
423       \raise4\p@\hbox{.}\mkern2mu\raise\p@\hbox{.}\mkern1mu}}}

```

#### 42.4.8 Math accents

```

424 \DeclareMathAccent{\acute}{\mathalpha}{operators}{`13}
425 \DeclareMathAccent{\grave}{\mathalpha}{operators}{`12}
426 \DeclareMathAccent{\ddot}{\mathalpha}{operators}{`7F}
427 \DeclareMathAccent{\tilde}{\mathalpha}{operators}{`7E}
428 \DeclareMathAccent{\bar}{\mathalpha}{operators}{`16}
429 \DeclareMathAccent{\breve}{\mathalpha}{operators}{`15}
430 \DeclareMathAccent{\check}{\mathalpha}{operators}{`14}
431 \DeclareMathAccent{\hat}{\mathalpha}{operators}{`5E}
432 \DeclareMathAccent{\vec}{\mathord}{letters}{`7E}
433 \DeclareMathAccent{\dot}{\mathalpha}{operators}{`5F}
434 \DeclareMathAccent{\widetilde}{\mathord}{largesymbols}{`65}
435 \DeclareMathAccent{\widehat}{\mathord}{largesymbols}{`62}

```

For some reason plain TeX never bothered to provide a ring accent in math (although it is available in the fonts), but since we got a request for it here we go:

```

436 \DeclareMathAccent{\mathring}{\mathalpha}{operators}{17}

42.4.9 Radicals

437 \DeclareMathRadical{\sqrtsign}{symbols}{70}{largesymbols}{70}

42.4.10 Over and under something, etc

438 \def\overrightarrow#1{\vbox{\m@th\ialign{##\crcr
439     \rightarrowfill\crcr\noalign{\kern-\p@\nointerlineskip}
440     $ \hfil\displaystyle{#1}\hfil $ \crcr}}
441 \def\overleftarrow#1{\vbox{\m@th\ialign{##\crcr
442     \leftarrowfill\crcr\noalign{\kern-\p@\nointerlineskip}%
443     $ \hfil\displaystyle{#1}\hfil $ \crcr}}
444 \def\overbrace#1{\mathop{\vbox{\m@th\ialign{##\crcr\noalign{\kern3\p@}%
445     \downbracefill\crcr\noalign{\kern3\p@\nointerlineskip}%
446     $ \hfil\displaystyle{#1}\hfil $ \crcr}}\limits}
447 \def\underbrace#1{\mathop{\vtop{\m@th\ialign{##\crcr
448     $ \hfil\displaystyle{#1}\hfil $ \crcr
449     \noalign{\kern3\p@\nointerlineskip}%
450     \upbracefill\crcr\noalign{\kern3\p@}}}\limits}

    (quite a waste of tokens, IMHO — Frank)

451 \def\skew#1#2#3{${\muskip\z@#1mu\divide\muskip\z@\tw@ \mkern\muskip\z@
452     #2\{\mkern-\muskip\z@\{#3\}\mkern\muskip\z@\}\mkern-\muskip\z@\{}}}
453 \def\rightarrowfill{$\m@th\smash{\mkern-7mu\%
454     \cleaders\hbox{$\mkern-2mu\smash{\mkern-2mu}$}\hfill
455     \mkern-7mu\mathord\rightarrow$}
456 \def\leftarrowfill{$\m@th\mathord\leftarrow\mkern-7mu\%
457     \cleaders\hbox{$\mkern-2mu\smash{\mkern-2mu}$}\hfill
458     \mkern-7mu\smash{-$}

459 \DeclareMathSymbol{\braceleft}{\mathord}{largesymbols}{7A}
460 \DeclareMathSymbol{\braceright}{\mathord}{largesymbols}{7B}
461 \DeclareMathSymbol{\bracel}{\mathord}{largesymbols}{7C}
462 \DeclareMathSymbol{\bracer}{\mathord}{largesymbols}{7D}
463 \def\downbracefill{$\m@th\setbox\z@\hbox{$\braceleft$}\%
464     \braceleft\leaders\vrule\@height\ht\z@\@depth\z@\hfill\bracer
465     \bracel\leaders\vrule\@height\ht\z@\@depth\z@\hfill\braceright$\}
466 \def\upbracefill{$\m@th\setbox\z@\hbox{$\braceright$}\%
467     \bracel\leaders\vrule\@height\ht\z@\@depth\z@\hfill\bracerd
468     \braceleft\leaders\vrule\@height\ht\z@\@depth\z@\hfill\bracer$}

42.4.11 Delimiters

469 \DeclareMathDelimiter{\loustache} % top from (, bottom from )
470   {\mathopen}{largesymbols}{7A}{largesymbols}{40}
471 \DeclareMathDelimiter{\rmoustache} % top from ), bottom from (
472   {\mathclose}{largesymbols}{7B}{largesymbols}{41}
473 \DeclareMathDelimiter{\arrowvert} % arrow without arrowheads
474   {\mathord}{symbols}{6A}{largesymbols}{3C}
475 \DeclareMathDelimiter{\Arrowvert} % double arrow without arrowheads
476   {\mathord}{symbols}{6B}{largesymbols}{3D}
477 \DeclareMathDelimiter{\Vert}
478   {\mathord}{symbols}{6B}{largesymbols}{OD}
479 \let\|=Vert
480 \DeclareMathDelimiter{\vert}
481   {\mathord}{symbols}{6A}{largesymbols}{OC}
482 \DeclareMathDelimiter{\uparrow}
483   {\mathrel}{symbols}{22}{largesymbols}{78}
484 \DeclareMathDelimiter{\downarrow}
485   {\mathrel}{symbols}{23}{largesymbols}{79}
486 \DeclareMathDelimiter{\updownarrow}
487   {\mathrel}{symbols}{6C}{largesymbols}{3F}

```

```
488 \DeclareMathDelimiter{\Uparrow}{\mathrel}{symbols}{"2A}{largesymbols}{"7E}
489 \DeclareMathDelimiter{\Downarrow}{\mathrel}{symbols}{"2B}{largesymbols}{"7F}
490 \DeclareMathDelimiter{\Updownarrow}{\mathrel}{symbols}{"6D}{largesymbols}{"77}
491 \DeclareMathDelimiter{\backslash}{\mathord}{symbols}{"6E}{largesymbols}{"0F}
492 \DeclareMathDelimiter{\rangle}{\mathclose}{symbols}{"69}{largesymbols}{"0B}
493 \DeclareMathDelimiter{\langle}{\mathopen}{symbols}{"68}{largesymbols}{"0A}
494 \DeclareMathDelimiter{\rbrace}{\mathclose}{symbols}{"67}{largesymbols}{"09}
495 \DeclareMathDelimiter{\lbrace}{\mathopen}{symbols}{"66}{largesymbols}{"08}
496 \DeclareMathDelimiter{\rceil}{\mathclose}{symbols}{"65}{largesymbols}{"07}
497 \DeclareMathDelimiter{\lceil}{\mathopen}{symbols}{"64}{largesymbols}{"06}
498 \DeclareMathDelimiter{\rfloor}{\mathclose}{symbols}{"63}{largesymbols}{"05}
499 \DeclareMathDelimiter{\lfloor}{\mathopen}{symbols}{"62}{largesymbols}{"04}
```

\lgroup \rgroup \bracevert There are three plain TeX delimiters which are not fully supported by NFSS, since they partly point into a bold cmr font. Allocating a full symbol font, just to have three delimiters seems a bit too much given the limited space available. For this reason only the extensible sizes are supported. If this is not desired one can use, without losing portability, define `\mathbf` and `\mathtt` as font symbol alphabet (setting up `cmr/bx/n` and `cmtt/m/n` as symbol fonts first) and modify the delimiter declarations to point with their small variant to those symbol fonts. (This is done in `oldlfont.dtx` so look there for examples.)

```

512 \DeclareMathDelimiter{\lgroup} % extensible ( with sharper tips
513     {\mathopen}{largesymbols}{3A}{largesymbols}{3A}
514 \DeclareMathDelimiter{\rgroup} % extensible ) with sharper tips
515     {\mathclose}{largesymbols}{3B}{largesymbols}{3B}
516 \DeclareMathDelimiter{\bracevert} % the vertical bar that extends braces
517     {\mathord}{largesymbols}{3E}{largesymbols}{3E}

```

## 42.5 Math versions of text commands

The `\mathunderscore` here is really a text definition, so it has been put back into `ltoutenc.dtx` (by Chris, 30/04/97) and should be removed from here.

These symbols are the math versions of text commands such as \P, \\$, etc.

\mathparagraph These math symbols are not in plain T<sub>E</sub>X.

```
\mathsection 518 \DeclareMathSymbol{\mathparagraph}{\mathord}{symbols}{"7B}
\mathdollar 519 \DeclareMathSymbol{\mathsection}{\mathord}{symbols}{"78}
\mathsterling 520 \DeclareMathSymbol{\mathdollar}{\mathord}{operators}{"24}
\mathunderscore 521 \def\mathsterling{\mathit{\mathchar"7024}}
522 \def\mathunderscore{\kern.06em\vbox{\hrule\@width.3em}}
```

\mathellipsis This is plain T<sub>E</sub>X's \ldots.

523 \def\mathellipsis{\mathinner{\ldotp\ldotp\ldotp}}%

## 42.6 Other special functions and parameters

### 42.6.1 Biggggg

524 \def\big#1{{\hbox{\$\left#1\vbox{\kern8.5\p@{}{}}\right.\n@space\$}}}

```

525 \def\Big#1{{\hbox{$\left.#1\right.\vbox{to11.5\p@{} }\right.\n@space$}}}
526 \def\bigg#1{{\hbox{$\left.#1\right.\vbox{to14.5\p@{} }\right.\n@space$}}}
527 \def\Bigg#1{{\hbox{$\left.#1\right.\vbox{to17.5\p@{} }\right.\n@space$}}}
528 \def\n@space{\nulldelimiterspace\z@\m@th}

```

#### 42.6.2 The log-like functions

\operator@font The \operator@font determines the symbol font used for log-like functions.

```

529 \def\operator@font{\mathgroup\symoperators}

```

#### 42.6.3 Parameters

```

530 \thinmuskip=3mu
531 \medmuskip=4mu plus 2mu minus 4mu
532 \thickmuskip=5mu plus 5mu

```

This finishes the low-level setup in `fontmath.ltx`.

```

533 
```

### 43 Default cfg files

We provide default cfg files here to ensure that on installations that search large file trees we do not pick up some strange customisation files from somewhere.

```

534 (*cfgtext | cfgmath | cfgprel)
535 %%
536 %%
537 %%
538 %% Load the standard setup:
539 %%
540 <+cfgtext>\input{fonttext.ltx}
541 <+cfgmath>\input{fontmath.ltx}
542 <+cfgprel>\input{preload.ltx}
543 %%
544 %% Small changes could go here; see documentation in cffguide.tex for
545 %% allowed modifications.
546 %%
547 %% In particular it is not allowed to misuse this configuration file
548 %% to modify internal LaTeX commands!
549 %%
550 %% If you use this file as the basis for configuration please change
551 %% the \ProvidesFile lines to clearly identify your modification, e.g.,
552 %%
553 <+cfgtext>%\ProvidesFile{fonttext.cfg}[2001/06/01
554 <+cfgmath>%\ProvidesFile{fonttext.cfg}[2001/06/01
555 <+cfgprel>%\ProvidesFile{preload.cfg}[2001/06/01
556 %%           Customised local font setup]
557 %%
558 %%
559 </cfgtext | cfgmath | cfgprel>

```

# File u

## preload.dtx

### 44 Overview

This file contains a number of possible settings for preloading fonts during installation of NFSS2 (which is used by L<sup>A</sup>T<sub>E</sub>X 2<sub>E</sub>). It will be used to generate the following files:

preload.min	minimal subset of fonts necessary to run NFSS2
preload.ori	preload of CM fonts similar to the old <code>1fonts.tex</code>
preload.ltx	The standard selection of preloads
cmpreloa.xpt	preload of CM fonts for 10pt document size
cmpreloa.xip	preload of CM fonts for 11pt document size
cmpreloa.xii	preload of CM fonts for 12pt document size
dcpreloa.xpt	preload of DC fonts for 10pt size
dcpreloa.xip	preload of DC fonts for 11pt size
dcpreloa.xii	preload of DC fonts for 12pt size

These files are for installations that make use of Computer Modern fonts either old encoding (OT1) or Cork encoding (T1). The Computer Modern fonts with Cork encoding are known as DC-fonts.

Most important is `preload.ltx` which is used during format generation. You are *not* allowed to change this file.

### 45 Customization

You can customize the preloaded fonts in your L<sup>A</sup>T<sub>E</sub>X 2<sub>E</sub> system by installing a file with the name `preload.cfg`. If this file exists it will be used in place of the system file `preload.ltx`. You can, for example, copy one of the files mentioned above (that can be generated from this source) to `preload.cfg`.

Or you can define completely other preloads. In that case start from `preload.min` since that contains the fonts that have to be preloaded by \*all\* L<sup>A</sup>T<sub>E</sub>X 2<sub>E</sub> systems.

Avoid using `preload.ori`, it will load so many fonts that on most installations it is nearly impossible to load other font families afterwards. This file is only generated to show what fonts have been preloaded by L<sup>A</sup>T<sub>E</sub>X 2.09.

If you normally use other fonts than Computer Modern `preload.min` might be best.

**Warning:** If you preload fonts with encodings other than the normally supported encodings you have to declare that encoding in a `fontdef.cfg` configuration file (see the documentation in the file `fontdef.dtx`). Adding an extra encoding to the format might produce non-portable documents, thus this should be avoided if possible.

### 46 Module switches for the DOCSTRIP program

The DOCSTRIP will generate the above file from this source using the following module directives:

driver	produce a documentation driver file
preload	produce a preload... file
cm	for OT1 encoded Computer Modern
dc	for T1 encoded Computer Modern
min	produce minimal subset
xpt	produce 10pt preloads
xipt	produce 11pt preloads
xiipt	produce 12pt preloads
ori	produce preloads similar to old <code>lfonts.tex</code>
tex	produce preload.ltx

A typical DOCSTRIP command file would then have entries like:

```
\generateFile{preload.min}{t}{\from{preload.dtx}{preload,min}}
```

for generating preload files.

## 47 A driver for this document

The next bit of code contains the documentation driver file for TEX, i.e., the file that will produce the documentation you are currently reading. It will be extracted from this file by the DOCSTRIP program.

```
1 <*driver>
2 \documentclass{ltxdoc}
3 %\OnlyDescription % comment out for implementation details
4 \begin{document}
5   \DocInput{preload.dtx}
6 \end{document}
7 </driver>
```

## 48 The code

We begin by loading the math extension font (`cmex10`) and the LATEX line and circle fonts. It is necessary to do this explicitly since these are used by `lplain.tex` and `latex.tex`. Since the internal font name contains / characters and digits we construct the name via `\csname`. These are the only fonts (!) that must be loaded in this file.

All `\DeclarePreloadSizes` can be removed or others can be added, they only influence the processing speed.

```
8 \expandafter\font\csname OMX/cmex/m/n/10\endcsname=cmex10\relax
9 \font\tenln =line10 \font\tenlnw =linew10\relax
10 \font\tencirc=lcircle10 \font\tencircw=lcirclew10\relax
```

The above fonts should not be touched but anything below this point here in the preload suggestions can be modified without any problems.

```
11 <-tex>*****
12 <-tex>% Start any modification below this point **
13 <-tex>*****
14 <-tex>
15 %%
16 %% Computer Modern Roman:
17 %%-----
18 <*ori>
19 \DeclarePreloadSizes{OT1}{cmr}{m}{n}
20   {5,6,7,8,9,10,10.95,12,14.4,17.28,20.74,24.88}
21 \DeclarePreloadSizes{OT1}{cmr}{bx}{n}{9,10,10.95,12,14.4,17.28}
22 \DeclarePreloadSizes{OT1}{cmr}{m}{s1}{10,10.95,12}
23 \DeclarePreloadSizes{OT1}{cmr}{m}{it}{7,8,9,10,10.95,12}
24 </ori>
25 <+xpt & cm> \DeclarePreloadSizes{OT1}{cmr}{m}{n}{5,7,10}
```

```

26 <+xpt & dc> \DeclarePreloadSizes{T1}{cmr}{m}{n}{5,7,10}
27 <+xipt & cm> \DeclarePreloadSizes{OT1}{cmr}{m}{n}{6,8,10.95}
28 <+xipt & dc> \DeclarePreloadSizes{T1}{cmr}{m}{n}{6,8,10.95}
29 <+xiipt & cm> \DeclarePreloadSizes{OT1}{cmr}{m}{n}{6,8,12}
30 <+xiipt & dc> \DeclarePreloadSizes{T1}{cmr}{m}{n}{6,8,12}
31 %%
32 %% Computer Modern Sans:
33 %%-----
34 <+ori> \DeclarePreloadSizes{OT1}{cmss}{m}{n}{10,10.95,12}
35 %%
36 %% Computer Modern Typewriter:
37 %%-----
38 <+ori> \DeclarePreloadSizes{OT1}{cmtt}{m}{n}{9,10,10.95,12}
39 %%
40 %% Computer Modern Math:
41 %%-----
42 <*ori>
43 \DeclarePreloadSizes{OML}{cmm}{m}{it}
44 {5,6,7,8,9,10,10.95,12,14.4,17.28,20.74}
45 \DeclarePreloadSizes{OMS}{cmsy}{m}{n}
46 {5,6,7,8,9,10,10.95,12,14.4,17.28,20.74}
47 </ori>

```

The math fonts are the same for both DC and CM fonts. So far there isn't an agreed on standard.

```

48 <*xpt>
49 \DeclarePreloadSizes{OML}{cmm}{m}{it}{5,7,10}
50 \DeclarePreloadSizes{OMS}{cmsy}{m}{n}{5,7,10}
51 </xpt>
52 <*xipt>
53 \DeclarePreloadSizes{OML}{cmm}{m}{it}{6,8,10.95}
54 \DeclarePreloadSizes{OMS}{cmsy}{m}{n}{6,8,10.95}
55 </xipt>
56 <*xiipt>
57 \DeclarePreloadSizes{OML}{cmm}{m}{it}{6,8,12}
58 \DeclarePreloadSizes{OMS}{cmsy}{m}{n}{6,8,12}
59 </xiipt>
60 %%
61 %% LaTeX symbol fonts:
62 %%-----
63 <*ori>
64 \DeclarePreloadSizes{U}{lasy}{m}{n}
65 {5,6,7,8,9,10,10.95,12,14.4,17.28,20.74}
66 </ori>
67 </preload>

```

<i>Command</i>	<i>Corresponds to</i>	<i>Action</i>
<code>\textrm{...}</code>	<code>\rmfamily</code>	Typeset argument in roman family
<code>\textsf{...}</code>	<code>\sffamily</code>	Typeset argument in <code>sans serif</code> family
<code>\texttt{...}</code>	<code>\ttfamily</code>	Typeset argument in <code>typewriter</code> family
<code>\textmd{...}</code>	<code>\mdseries</code>	Typeset argument in medium series
<code>\textbf{...}</code>	<code>\bfseries</code>	Typeset argument in <b>bold</b> series
<code>\textup{...}</code>	<code>\upshape</code>	Typeset argument in normal shape
<code>\textit{...}</code>	<code>\itshape</code>	Typeset argument in <i>italic</i> shape
<code>\textsl{...}</code>	<code>\slshape</code>	Typeset argument in <i>slanted</i> shape
<code>\textsc{...}</code>	<code>\scshape</code>	Typeset argument in <i>SMALL CAPS</i> shape
<code>\emph{...}</code>	<code>\em</code>	Typeset argument <i>emphasized</i>

Table 1: Font-change commands with arguments

The font change commands provided here all start with `\text..` to emphasize that they are for use in normal text and to be easily memorable. They automatically take care of any necessary italic correction on either side of the argument.

## File v **ltfntcmd.dtx**

### Abstract

The commands defined in this file `ltfntcmd` are part of the kernel code for L<sup>A</sup>T<sub>E</sub>X 2<sub>&</sub>/NFSS2.

It is also meant to serve as documentation for package writers since it demonstrates how to define high-level font changing commands using a small number of creator functions.

## 49 Introduction

Font changes such as `\bfseries`, `\sffamily`, etc. are declarations; this means that their scope is delimited by the grouping structure, either by the next `\end` of some environment or by explicitly using a group, e.g., writing something like `\{\bfseries...` in the source. If you make the mistake of writing `\bfseries{...}` (thinking of `\bfseries` as a command with one argument) then the result is rather striking.

Font declarations are an artifact of the T<sub>E</sub>X system and for several reasons it is better to avoid them on the user level whenever possible. In L<sup>A</sup>T<sub>E</sub>X3 they will probably all be replaced by environments and by font commands taking one argument.

This file defines a creator function for such declarative font switches. This function creates commands which can be used in both math and text.

This file also defines a number of high-level commands (all starting with `\text..`) that have one argument and typeset this argument in the requested way. Thus these commands are for typesetting short pieces of text in a specific family, series or shape. These are all produced as examples of the use of a creator function which is itself also defined in this file.

Table 1 shows all these high-level commands in action. A further advantage of using these commands is that they automatically take care of any necessary italic correction on either side of their argument.

Thus, when using such commands, one does not have to worry about forgetting the italic correction when changing fonts. Only in very few situations is this

additional space wrong but, for example, most typographers recommend omitting the italic correction if a small punctuation character, like a comma, directly follows the font change. Since the amount of correction required is partly a matter of taste, you can define in what situations the italic correction should be suppressed. This is done by putting the characters that should cancel a preceding italic correction in the list `\nocorrlist`.<sup>7</sup> The default definition for this list is produced by the following.

```
\newcommand \nocorrlist {,.}
```

It is best to declare the most often used characters first, because this will make the processing slightly faster. For example,

```
\emph{When using the NFSS{} high-level commands,  
the \emph{proper} use of italic corrections is  
automatically taken care of}. Only  
\emph{sometimes} one has to help \LaTeX{} by  
adding a \verb=\nocorr= command.
```

which results in:

*When using the NFSS high-level commands, the proper use of italic corrections is automatically taken care of. Only sometimes one has to help L<sup>A</sup>T<sub>E</sub>X by adding a \nocorr command.*

In contrast, the use of the declaration forms is often more appropriate when you define your own commands or environments.

```
\newenvironment{bfitemize}{\begin{itemize}\normalfont\bfseries}{\end{itemize}}  
\begin{bfitemize}  
\item This environment produces boldface items.  
\item It is defined in terms of LATEX's  
  \texttt{itemize} environment and NFSS  
  declarations.  
\end{bfitemize}
```

This gives:

- **This environment produces boldface items.**
- **It is defined in terms of L<sup>A</sup>T<sub>E</sub>X's itemize environment and NFSS declarations.**

In addition to global customization of when to insert the italic correction, it is of course sometimes necessary to explicitly insert one with `\!/`.

It is also possible to suppress the italic correction in individual instances. For this, the command `\nocorr` is provided.

The `\nocorr` must appear as the first or last token inside the braces of the argument of the `\text...` commands, at that end of the text where you wish to suppress the italic correction.

It is worth pointing out here that inserting a `\!/` in places where it can have no function (i.e. anywhere except immediately after a slanted letter) is not an error—it will just be silently ignored. Unfortunately this is not true if the redefinition of `\!/` in `amstex.sty` is used as this version can cause space to be removed immediately before the `\!/`.

---

<sup>7</sup>Any package that changes the `\catcode` of a character inside `\nocorrlist` must then explicitly reset the list. Otherwise the changed character will no longer be recognized by the suppression algorithm.

## 50 The implementation

\DeclareTextFontCommand This is the creator function for \text... commands. It gives a warning if \foo or \fragfoo is already defined.

In math mode it simply puts the font declaration and text into a box (possibly an automatically sized one).

Otherwise it first scans the text to see where \nocorr occurs within it. This sets the \check@ic commands to do what is necessary concerning the italic correction at both ends.

The algorithm for deciding whether to put in an italic correction is not very subtle: one is added whenever the newly current font is not itself positively sloped, unless the next token is a character in the ‘nocorr’ list. At the end of the text this is done after closing the group so as to check the ‘outer font’. Note that this will often result in adding an italic correction token after a character in an unsloped font; we believe (in early 2003) that this is perhaps inefficient but not dangerous.

It also now checks for empty contents of the text command and optimises this case. Some care is also taken to check that doing dangerous things in vertical mode is avoided.

The italic correction token is added to the horizontal list before (in the list) an immediately preceding non-zero glob of glue (skip) and any non-zero penalty preceding that since, in the typical case, this puts it immediately after the last character in the preceding word.

Note that it is necessary to put in the \aftergroup\maybe@ic at the end of the group so that it comes after any other aftergroup tokens and immediately before the following tokens. It is also necessary to remove the \fi from the token list before the group ends; this is done by adding an \expandafter just before the closing brace.

```
1 (*2ekernel)
2 \def \DeclareTextFontCommand #1#2{%
3   \DeclareRobustCommand#1[1]{%
4     \ifmmode
5       \nfss@text{#2##1}%
6     \else
7       \hmode@bgroup
8       \text@command{##1}%
9       #2\check@icl ##1\check@icr
10      \expandafter
11      \egroup
12      \fi
13    }%
14 }
```

\textrm Now we define the \text*family* commands in terms of the above; \textttt does not look very nice!

\textsf

\texttt 15 \DeclareTextFontCommand{\textrm}{\rmfamily}

\textnormal 16 \DeclareTextFontCommand{\textsf}{\sffamily}

17 \DeclareTextFontCommand{\texttt}{\ttfamily}

18 \DeclareTextFontCommand{\textnormal}{\normalsize}

\textbf For the series attribute:

\textmd 19 \DeclareTextFontCommand{\textbf}{\bfseries}

20 \DeclareTextFontCommand{\textmd}{\mdseries}

\textit And for the shapes:

\textsl 21 \DeclareTextFontCommand{\textit}{\itshape}

\textsc 22 \DeclareTextFontCommand{\textsl}{\slshape}

\textup 23 \DeclareTextFontCommand{\textsc}{\scshape}

24 \DeclareTextFontCommand{\textup}{\upshape}

\emph Finally we have the \em font change declaration of L<sup>A</sup>T<sub>E</sub>X. The corresponding definition with argument is

```
25 \DeclareTextFontCommand{\emph}{\em}
```

\nocorr This is just a label, so it does nothing; it should also be unexpandable.

```
26 \let \nocorr \relax
```

\check@icl \check@icr We define these defaults in case some error causes them to be expanded at the wrong time.

```
27 \let \check@icl \@empty
28 \let \check@icr \@empty
```

\text@command \check@nocorr@ This checks for a \nocorr as the first token in its argument and also for one in any other position not protected within braces (the latter is treated as if it were at the end of the argument).

Is this the correct action in the ‘empty’ case? It is efficient but typographically it is, strictly, incorrect!

```
29 \def \text@command #1{%
30   \def \reserved@a {#1}%
31   \ifx \reserved@a \@empty
32     \let \check@icl \@empty
33     \let \check@icr \@empty
34   \else
```

\space is a reserved word in L<sup>A</sup>T<sub>E</sub>X or actually already in plain T<sub>E</sub>X. If somebody really redefines it so many things will break that I don’t see any reason to make this routine here slower than necessary.

```
35 %   \def \reserved@b { }%
36 %   \ifx \reserved@a \reserved@b
37   \ifx \reserved@a \space
38     \let \check@icl \@empty
39     \let \check@icr \@empty
40   \else
41     \check@nocorr@ #1\nocorr@nil
42   \fi
43 \fi
44 }
45 \def \check@nocorr@ #1#2\nocorr#3@nil {%
```

The two checks are initialised here to their values in the normal case.

```
46 \let \check@icl \maybe@ic
47 \def \check@icr {\ifvmode \else \aftergroup \maybe@ic \fi}%
48 \def \reserved@a {\nocorr}%
49 \def \reserved@b {#1}%
50 \def \reserved@c {#3}%
51 \ifx \reserved@a \reserved@b
52   \ifx \reserved@c \reserved@b
```

In this case there is a \nocorr at the start but not at the end, so \check@icl should be empty.

```
53   \let \check@icl \@empty
54 \else
```

Otherwise there is a \nocorr both at the start and elsewhere, so no italic corrections should be added.

```
55   \let \check@icl \@empty
56   \let \check@icr \@empty
57 \fi
58 \else
59   \ifx \reserved@c \@empty
```

In this case there is no `\nocorr` anywhere, so we need to check for an italic correction at both the beginning and the end. This has been set up as the default so no code is needed here.

```
60     \else
```

In this case there is no `\nocorr` at the start but there is one elsewhere, so no `\aftergroup` is needed.

```
61         \let \check@icr \empty
62     \fi
63 \fi
64 }
```

`\maybe@ic` These macros implement the italic correction.

`\maybe@ic@`

```
65 \def \maybe@ic {\futurelet\let@token\maybe@ic@}
66 \def \maybe@ic@ {%
```

We first check to see if the current font is positively sloped. (But do not forget the message Rainer sent about an upright font with non-zero slope! Or is this an urban myth?) It has been suggested that this should test against a small positive value, but what?

```
67 \ifdim \fontdimen\@ne\font>\z@
68 \else
69     \tempswattrue
```

It would be possible, but probably not worthwhile, to continue the forward scan beyond any closing braces.

```
70 \expandafter\@tfor\expandafter\reserved@a\expandafter:\expandafter=%
71     \nocorrlist
```

We have to hide the `\@let@token` in the macro `\t@st@ic` rather than testing it directly in the loop since it might be `\let` to a `\fi` or `\else`, which would result in chaos.

```
72 \do \t@st@ic
```

Frank thinks that the next bit it is inefficient if done after the second change. Chris thinks that most all of this is inefficient for the commonest cases: but that is the price of a cleverer algorithm. It is certainly needed to deal with the use of `\nolinebreak`.

```
73     \if@tempswa \sw@slant \fi
74 \fi
75 }
```

`\t@st@ic` The next token in the input stream is stored in `\@let@token` via a `\let`, the current token from `\nocorrlist` is stored via `\def` in `\reserved@a`. To compare them we have to fiddle around a bit.

If the only things to check were characters then this could be done via an `\if` thus their catcodes would not matter; but this will not work whilst `\futurelet` is used above.

```
76 \def \t@st@ic {%
77 \expandafter\let\expandafter\reserved@b\expandafter=\reserved@a\relax
78 \ifx\reserved@b\@let@token
```

If they are the same we record the fact and jump out of the loop.

```
79     \tempswafalse
80     \break@tfor
81 \fi
82 }
```

`\sw@slant` The definition of the mysterious `\sw@slant` command is as follows.

`\fix@penalty`

```
83 \def \sw@slant {%
```

It is surely correct to put in an italic correction when there is no skip. If the last thing on the list is actually a zero skip (including things whose dimension part is zero, such as `\hfill`), or anything other than a character, then the italic correction will have no effect.

In order to work correctly with unbreakable spaces from `\~` (and other common forms of line-breaking control) we also move back across a penalty before the glue.

```
84 \ifdim \lastskip=\z@
85   \fix@penalty
86 \else
87   \skip@ \lastskip
88   \unskip
89   \fix@penalty
90   \hskip \skip@
91 \fi
92 }
```

The above code means: “If there is a non-zero space just before the current position (`\ifdim...`) save the amount of that space (`\skip@\lastskip`), remove it (`\unskip`), then do a similar thing if there is a penalty just before the skip, and finally put the space back in.”

Since zero glue cannot be distinguished in this context from no glue, we dare not put in an `\hskip` in this case as this may produce an unwanted breakpoint. This is not satisfactory.

The penalty before the glue is handled similarly, with the same caveats concerning the zero case. Is this the first recorded use of `\unpenalty` in standard L<sup>A</sup>T<sub>E</sub>X code?

```
93 \def \fix@penalty {%
94   \ifnum \lastpenalty=\z@
95     \@@italiccorr
96   \else
97     \count@ \lastpenalty
98     \unpenalty
99     \@@italiccorr
100    \penalty \count@
101  \fi
102 }
```

`\nocorrlist` This holds the list of characters that should prevent italic correction. They should be ordered by decreasing frequency of use. If any such character is made active later on one needs to redefine the list so that the active character becomes part of it.

```
103 \def \nocorrlist {,.}
```

`\nfss@text` This command will by default behave like a L<sup>A</sup>T<sub>E</sub>X `\mbox` but may be redefined by packages such as `amstext.sty` to be a bit cleverer.

```
104 \ifx \nfss@text\undefined
105   \def \nfss@text {\leavevmode\hbox}
106 \fi
```

`\DeclareOldFontCommand` This is the function used to create declarative font-changing commands that can also be used to change alphabets in math-mode.

Usage: `\DeclareOldFontCommand \fn{\langle font-change decls\rangle} {\langle math-alphabet\rangle}`

Here `\fn` is the font-declaration command being defined, `\langle font-change decls\rangle` is the declaration it will expand to in text-mode, and `\langle math-alphabet\rangle` is the (single) math alphabet specifier which is to be used in math-mode.

It does not care whether the command being defined already exists but it does give a warning if it redefines anything.

Here are some typical examples of its use in conjunction with more basic NFSS2 font commands.

```
\DeclareOldFontCommand{\rm}{\normalfont\rmfamily}{\mathrm}
```

```

\DeclareOldFontCommand{\sf}{\normalfont\sffamily}{\mathsf}
\DeclareOldFontCommand{\tt}{\normalfont\ttfamily}{\mathtt}

107 \def \DeclareOldFontCommand #1#2#3{%
108   \ DeclareRobustCommand #1{\@fontswitch {#2}{#3}}%
109 }

\@fontswitch These two commands actually do the necessary tests and declarative font- or
\@@math@egroup alphabet-changing.

\@@math@egroup 110 \def \@fontswitch #1#2{%
111   \ifmmode
112     \let \math@bgroup \relax
113     \def \math@egroup {\let \math@bgroup \@@math@bgroup
114                           \let \math@egroup \@@math@egroup}%

```

We need to have a `\relax` in the following line in case the #2 is something like `\mathsf` grabbing the next token as an argument. For this reason the code also uses explicit arguments again (see pr/1275).

```

115   #2\relax
116 \else
117   #1%
118 \fi
119 }
120 \let \@@math@bgroup \math@bgroup
121 \let \@@math@egroup \math@egroup

```

These commands are available only in the preamble.

```

122 \onlypreamble \DeclareTextFontCommand
123 \onlypreamble \DeclareOldFontCommand

```

## 51 Initialization

`\normalsize` This is defined to produce an error.

```

124 \def\normalsize{%
125   \@latex@error {The font size command \protect\normalsize\space
126           is not defined:\MessageBreak
127           there is probably something wrong with
128           the class file}\@eha
129 }
130 </2ekernel>

```

**File w**

**ltpageno.dtx**

## 52 Page Numbering

Page numbers are produced by a page counter, used just like any other counter. The only difference is that `\c@page` contains the number of the next page to be output (the one currently being produced), rather than one minus it. Thus, it is normally initialized to 1 rather than 0. `\c@page` is defined to be `\count0`, rather than a count assigned by `\newcount`.

`\pagenumbering`

The user sets the `\pagenumbering{<foo>}` command, which sets the page counter to 1 and defines `\thepage` to be `\foo`. For example, `\pagenumbering{roman}` causes pages to be numbered i, ii, etc.

```
1 <*2ekernel>
2 \message{page nos.,}
3 \countdef\c@page=0 \c@page=1
4 \def\cl@page{}
5 \def\pagenumbering#1{%
6   \global\c@page \c@ne \gdef\thepage{\csname \#1\endcsname
7   \c@page}}
8 </2ekernel>
```

# File x

## ltxref.dtx

### 53 Cross Referencing

The user writes `\label{<foo>}` to define the following cross-references:

`\ref{<foo>}`: value of most recently incremented referencable counter. in the current environment. (Chapter, section, theorem and enumeration counters counters are referencable, footnote counters are not.)

`\pageref{<foo>}`: page number at which `\label{foo}` command appeared. where foo can be any string of characters not containing ‘\’, ‘{’ or ‘}’.

Note: The scope of the `\label` command is delimited by environments, so  
`\begin{theorem} \label{foo} ... \end{theorem} \label{bar}`  
defines `\ref{foo}` to be the theorem number and `\ref{bar}` to be the current section number.

Note: `\label` does the right thing in terms of spacing – i.e., leaving a space on both sides of it is equivalent to leaving a space on either side.

#### 53.1 Cross Referencing

```
1 (*2ekernel)
2 \message{x-ref,}
```

This is implemented as follows. A referencable counter CNT is incremented by the command `\refstepcounter{CNT}`, which sets `\@currentlabel == {CNT}{eval(\p@cnt\theCNT)}`. The command `\label{FOO}` then writes the following on file `\auxout` :  
`\newlabel{FOO}{{eval(\@currentlabel)}{eval(\thepage)}}`

```
\ref{FOO} ==
BEGIN
```

```
if \r@foo undefined
then  @refundefined := G T
??
Warning: 'reference foo on page ... undefined'
```

```
else  \@car \eval(\r@FOO)\@nil
```

```
fi
END
```

```
\pageref{foo} =
BEGIN
```

```
if \r@foo undefined
then  @refundefined := G T
??
Warning: 'reference foo on page ... undefined'
```

```
else  \@cdr \eval(\r@FOO)\@nil
```

```
fi
END
```

`\G@refundefinedtrue` This does not save on name-space (since `\G@refundefinedfalse` was never needed) but it does make the implementation of such one-way switches more consistent. The extra macro to make the change is used since this change appears several times.

**Note** despite its name, `\G@refundefinedtrue` does *not* correspond to an `\if` command, and there is no matching `...false`. It would be more natural to call the command `\G@refdefined` (as inspection of the change log will reveal) but unfortunately such a change would break any package that had defined a `\ref`-like

command that mimicked the definition of `\ref`, calling `\G@refundefinedtrue`. Inspection of the T<sub>E</sub>X archives revealed several such packages, and so this command has been named ...`true` so that the definition of `\ref` need not be changed, and the packages will work without change.

```

3 \% \newif\ifG@refundefined
4 \% \def\G@refundefinedtrue{\global\let\ifG@refundefined\iftrue}
5 \% \def\G@refundefinedfalse{\global\let\ifG@refundefined\iffalse}
6 \def\G@refundefinedtrue{%
7   \gdef\@refundefined{%
8     \@latex@warning@no@line{There were undefined references}}}
9 \let\@refundefined\relax

```

<code>\ref</code>	Referencing a <code>\label</code> . RmS 91/10/25: added a few extra <code>\reset@font</code> , as suggested by Bernd Raichle
<code>\pageref</code>	RmS 92/08/14: made <code>\ref</code> and <code>\pageref</code> robust
<code>\@setref</code>	RmS 93/09/08: Added setting of <code>refundefined</code> switch.
	<pre> 10 \def\@setref#1#2#3{% 11   \ifx#1\relax 12   \protect\G@refundefinedtrue 13   \nfss@textf{\reset@font\bfseries ??}% 14   \@latex@warning{Reference '#3' on page \thepage \space 15   undefined}% 16   \else 17   \expandafter#2#1\null 18   \fi} 19 \def\ref#1{\expandafter\@setref\csname r@#1\endcsname\@firstoftwo{#1}} 20 \def\pageref#1{\expandafter\@setref\csname r@#1\endcsname 21                               \@secondoftwo{#1}} </pre>
<code>\newlabel</code>	This command will be written to the <code>.aux</code> file to pass label information from one run to another.
<code>\@newl@bel</code>	The internal form of <code>\newlabel</code> and <code>\bibcite</code> . Note that this macro does it's work inside a group. That way the local assignments it needs to do don't clutter the save stack. This prevents large documents with many labels to run out of save stack.
	<pre> 22 \def\@newl@bel#1#2#3{% 23   \@ifundefined{#1@#2}{% 24     \relax 25     \gdef\@multiplelabels{% 26       \@latex@warning@no@line{There were multiply-defined labels}}% 27       \@latex@warning@no@line{Label '#2' multiply defined}}% 28   \global\@namedef{#1@#2}{#3}} 29 \def\newlabel{\@newl@bel r} 30 \onlypreamble\@newl@bel </pre>
<code>\if@multiplelabels</code>	This is redefined to produce a warning if at least one label is defined more than once. It is executed by the <code>\enddocument</code> command.
<code>\@multiplelabels</code>	
	<pre> 31 \let\@multiplelabels\relax </pre>
<code>\label</code>	The commands <code>\label</code> and <code>\refstepcounter</code> have been changed to allow <code>\protect</code> 'ed commands to work properly. For example,
<code>\refstepcounter</code>	<pre> \def\thechapter{\protect\foo{\arabic{chapter}}.\roman{section}}} </pre>
	will cause a <code>\label{bar}</code> command to define <code>\ref{bar}</code> to expand to something like <code>\foo{4.d}</code> . Change made 20 Jul 88.
	<pre> 32 \def\label#1{\@bsphack 33   \protected@write\@auxout{}{% 34     {\string\newlabel{#1}{\@currentlabel}{\thepage}}}}% 35   \@esphack} </pre>

```

36 \def\refstepcounter#1{\stepcounter{#1}%
37   \protected@edef@\currentlabel
38     {\csname p@#1\endcsname\csname the#1\endcsname}%
39 }

```

\@currentlabel For \label commands that come before any environment

```

40 \def@\currentlabel{%
41 </2ekernel>

```

### 53.2 An extension of counter referencing

At the moment a reference to a counter `foo` will generate the equivalent of `\p@foo\thefoo` although not quite in this form. For some applications it would be nice if one could have `\thefoo` being an argument to `\p@foo` to be able to put material before and after the number generated by `\thefoo`. This can be easily achieved with a small change to one of the kernel commands as follows:

```

\def\refstepcounter#1{\stepcounter{#1}%
  \protected@edef@\currentlabel
    {\csname p@#1\expandafter\endcsname\csname the#1\endcsname}%
}

```

The trick is to ensure that `\csname the#1\endcsname` is turned into a single token before `\p@...` is expanded further. This way, if the `\p@...` command is a macro with one argument it will receive `\the....`. With the kernel code (i.e., without the `\expandafter`) it will instead pick up `\csname` which would be disastrous.

Using `\expandafter` instead of braces delimiting the argument is better because, assuming that the `\p@...` command is not defined as a macro with one argument, the braces will stay and prohibit kerning that might otherwise happen between the glyphs generated by `\the...` and surrounding glyphs.

We have refrained from making this change in the kernel code although for existing documents it would be 100% backward compatible. The reason being that any class or package making use of this functionality would then horribly fail with older L<sup>A</sup>T<sub>E</sub>X installations.

Instead we suggest that people who are interested in using this functionality in a document class or package add the redefinition to the class file. To ensure that this redefinition is properly applied they might want to test for the original definition first, e.g.

```

\CheckCommand*\refstepcounter[1]{\stepcounter{#1}%
  \protected@edef@\currentlabel
    {\csname p@#1\endcsname\csname the#1\endcsname}%
}
\renewcommand*\refstepcounter[1]{\stepcounter{#1}%
  \protected@edef@\currentlabel
    {\csname p@#1\expandafter\endcsname\csname the#1\endcsname}%
}

```

# File y

## ltmiscen.dtx

### 54 Miscellaneous Environments

This section implements the basic environment mechanism, and also a few specific environments including `document`. The math environments and related commands, the ‘flushing’ environments, (`center`, `flushleft`, `flushright`), and `verbatim`.

```
1 <*2ekernel>
2 \message{environments,}
```

#### 54.1 Environments

`\begin{foo}` and `\end{foo}` are used to delimit environment `foo`.

`\begin{foo}` starts a group and calls `\foo` if it is defined, otherwise it does nothing.

`\end{foo}` checks to see that it matches the corresponding `\begin` and if so, it calls `\endfoo` and does an `\endgroup`. Otherwise, `\end{foo}` does nothing.

If `\end{foo}` needs to ignore blanks after it, then `\endfoo` should globally set the `@ignore` switch true with `\@ignoretrue` (this will automatically be global).

NOTE: `\@end` is defined to be the `\end` command of T<sub>E</sub>X82.

`\enddocument` is the user’s command for ending the manuscript file.

`\stop` is a panic button — to end T<sub>E</sub>X in the middle.

```
\enddocument ==
BEGIN
  \@checkend{document}    %% checks for unmatched \begin
  \clearpage
  \begingroup
    if @filesw = true
      then close file @mainaux
      if G@refundefined = true
        then LaTeX Warning: 'There are undefined references.' fi
      if @multiplelabels = true
        then LaTeX Warning:
          'One or more label(s) multiply defined.'
      else
        \@setckpt {ARG1}{ARG2} == null
        \newlabel{LABEL}{VAL} ==
          BEGIN
            \reserved@a == VAL
            if def(\reserved@a) = def(\r@LABEL)
              else @tempswa := true           fi
          END
        \bibcite{LABEL}{VAL} == null
        BEGIN
          \reserved@a == VAL
          if def(\reserved@a) = def(\g@LABEL)
            else @tempswa := true           fi
        END
        @tempswa := false
        make @ a letter
        \input \jobname.AUX
        if @tempswa = true
          then LaTeX Warning: 'Label may have changed.
                           Rerun to get cross-references right.'
        fi      fi      fi
```

```

\endgroup
finish up
END

\@writefile{EXT}{ENTRY} ==
if tf@EXT undefined
    else \write\tf@EXT{ENTRY}
fi

\@currenvir The name of the current environment. Initialized to document to so that
\end{document} works correctly.
3 \def\@currenvir{document}

\if@ignore
\@ignoretrue 4 \def\@ignorefalse{\global\let\if@ignore\iffalse}
\@ignorefalse 5 \def\@ignoretrue {\global\let\if@ignore\iftrue}
6 \@ignorefalse

\ignorespacesafterend
7 \let\ignorespacesafterend\@ignoretrue

\enddocument
8 \def\enddocument{%
The \end{document} hook is executed first. If necessary it can contain a
\clearpage to output dangling floats first. In this position it can also contain
something like \end{foo} so that the whole document effectively starts and ends
with some special environment. However, this must be used with care, eg if two
applications would use this without knowledge of each other the order of the
environments will be wrong after all. \AtEndDocument is redefined at this point so
that and such commands that get into the hook do not chase their tail...
9   \let\AtEndDocument\@firstofone
10  \enddocumenthook
11  \@checkend{document}%
12  \clearpage
13  \begingroup
14    \if@files
15      \immediate\closeout\mainaux
16      \let\@setckpt\@gobbletwo
17      \let\@newl@bel\@testdef

The previous line is equiv to setting
18      \def\newlabel{\@testdef r}%
19      \def\bibcite{\@testdef b}%
20
21      \tempswafalse
22      \makeatletter \input\jobname.aux
23
24      \dofilelist

First we check for font size substitution bigger than \fontsubfuzz. The \relax
is necessary because this is a macro not a register.
25      \ifdim \font@submax >\fontsubfuzz\relax

In case you wonder about the \gobbletwo inside the message below, this is a
horrible hack to remove the tokens \on@line. that are added by \font@warning
at the end.
26      \font@warning{Size substitutions with differences\MessageBreak
27          up to \font@submax\space have occurred.\gobbletwo}%
28      \fi

```

The macro `\@defaultsubs` is initially `\relax` but gets redefined to produce a warning if there have been some default font substitutions.

```
26     \@defaultsubs
```

The macro `\@refundefined` is initially `\relax` but gets redefined to produce a warning if there are undefined refs.

```
27     \@refundefined
```

If a label is defined more than once, `\@tempswa` will always be true and thus produce a “Label(s) may ...” warning. But since a rerun will not solve that problem (unless one uses a package like `varioref` that generates labels on the fly), we suppress this message.

```
28     \if@filesw
29         \ifx \@multiplelabels \relax
30             \if@tempswa
31                 \@latex@warning@no@line{Label(s) may have changed.
32                 Rerun to get cross-references right}%
33             \fi
34         \else
35             \@multiplelabels
36         \fi
37     \fi
38 \endgroup
39 \deadcycles\z@\@end}
```

```
\@testdef
```

```
40 \def\@testdef #1#2#3{%
41   \def\reserved@a{#3}\expandafter \ifx \csname #1#2\endcsname
42 \reserved@a \else \@tempswatru e \fi}
```

```
\@writefile
```

```
43 \long\def\@writefile#1#2{%
44   \@ifundefined{tf@#1}\relax
45   {\@temptokena{#2}%
46   \immediate\write\csname tf@#1\endcsname{\the\@temptokena}%
47   }%
48 }
```

```
\stop
```

```
49 \def\stop{\clearpage\deadcycles\z@\let\par\@par\@end}
```

```
50 \everypar{\@nodocument} %% To get an error if text appears before the
51 \nullfont               %% \begin{document}
```

`\begin`, `\end`, and `\@checkend` changed so `\end{document}` will catch an unmatched `\begin`. Changed 24 May 89 as suggested by Frank Mittelbach and Rainer Sch\"opf.

```
\begin{NAME} ==
BEGIN
  IF \NAME undefined  THEN  \reserved@a == BEGIN report error
END
  ELSE  \reserved@a ==
        (@currenvir :=L NAME) \NAME
FI
@ignore :=G F      %% Added 30 Nov 88
\begingroup
\endpe := F
@currenvir :=L NAME
\NAME
```

```

END

\end{NAME} ==
BEGIN
  \endNAME
  \checkend{NAME}
  \endgroup
  IF @endpe = T          %% @endpe set True by \endparenv
    THEN \doendpe         %% \doendpe redefines \par and
  \everypar                %% to suppress paragraph indentation in
                           %% immediately following text
    FI
    IF @ignore = T
      THEN @ignore :=G F
        \ignorespaces
    FI
  END

\checkend{NAME} ==
BEGIN
  IF \currenvir = NAME
    ELSE \badend{NAME}
  FI
END

\begin
52 \def\begin#1{%
53   \ifundefined{#1}%
54     {\def\reserved@a{\@latex@error{Environment #1 undefined}\@eha}}%
55     {\def\reserved@a{\def\currenvir{#1}%
56       \edef\currenvline{\on@line}%
57       \csname #1\endcsname}}%
58   \ignorespaces
59   \begingroup\endpefalse\reserved@a}

\end
60 \def\end#1{%
61   \csname end#1\endcsname\checkend{#1}%
62   \expandafter\endgroup\if@endpe\doendpe\fi
63   \if@ignore\ignorespaces\fi}

\checkend
64 \def\checkend#1{\def\reserved@a{#1}\ifx
65   \reserved@a\currenvir \else\badend{#1}\fi}

\currenvline We do need a default value for \currenvline on top-level since the document
environment cancels the brace group. This means that a mismatch with \begin
{document} will not produce a line number. Thus the outer default must be
\empty or we will end up with two spaces.
66 \let\currenvline\empty

```

## 54.2 Center, Flushright, Flushleft

```
67 \message{center,}
```

```
\center, \flushright and \flushleft set
  \rightskip = 0pt or \flushglue (as appropriate)
```

```

\leftskip = 0pt or \flushglue (as appropriate)
\parindent = 0pt
\parfillskip = 0pt. (except \flushleft)
\\ == \par \vskip -\parskip
\\[LENGTH] == \\ \vskip LENGTH
\\* == \par \penalty 10000 \vskip -\parskip
\\*[LEN] == \\* \vskip LENGTH

```

They invoke the trivlist environment to handle vertical spacing before and after them.

\centering, \raggedright and \raggedleft are the declaration analogs of the above.

\raggedright has a more universal effect, however. It sets  
\rightskip := flushglue. Every environment, like the list environments,  
that set \rightskip to its 'normal' value set it to \rightskip

```

{@centercr
68 \def{@centercr}{\ifhmode \unskip\else \nolnerr\fi
69     \par\ifstar{\nobreak\xcentercr}\xcentercr}

```

```

@xcentercr
70 \def@xcentercr{\addvspace{-\parskip}\ifnextchar
71     [\@icentercr\ignorespaces}

```

```

@icentercr
72 \def@icentercr[#1]{\vskip #1\ignorespaces}

```

**center** We use \relax to prevent \item scanning too far.  
73 \def\center{\trivlist \centering\item\relax}  
74 \def\endcenter{\endtrivlist}

```

@centering
75 \def\centering{%
76     \let\\@centercr
77     \rightskip\flushglue\leftskip\flushglue
78     \parindent\z@\parfillskip\z@skip}

```

```

@rightskip
79 \newskip\rightskip \rightskip \z@skip

```

**flushleft** We use \relax to prevent \item scanning too far.  
80 \def\flushleft{\trivlist \raggedright\item\relax}  
81 \def\endflushleft{\endtrivlist}

```

@raggedright
82 \def\raggedright{%
83     \let\\@centercr\rightskip\flushglue \rightskip\rightskip
84     \leftskip\z@skip
85     \parindent\z@}

```

**flushright** We use \relax to prevent \item scanning too far.  
86 \def\flushright{\trivlist \raggedleft\item\relax}  
87 \def\endflushright{\endtrivlist}

```

\raggedleft
88 \def\raggedleft{%
89   \let\\@centercr
90   \rightskip\z@skip\leftskip\@flushglue
91   \parindent\z@\parfillskip\z@skip}
92 \message{verbatim,}

```

### 54.3 Verbatim

The verbatim environment uses the fixed-width `\ttfamily` font, turns blanks into spaces, starts a new line for each carriage return (or sequence of consecutive carriage returns), and interprets *every* character literally. I.e., all special characters `\`, `{`, `$`, etc. are `\catcode`'d to 'other'.

The command `\verb` produces in-line verbatim text, where the argument is delimited by any pair of characters. E.g., `\verb #...#` takes '...' as its argument, and sets it verbatim in `\ttfamily` font.

The `*-variants` of these commands are the same, except that spaces print as the TeXbook's space character instead of as blank spaces.

```

\@vobeyspaces
93 {\catcode`\ =\active%
94 \gdef\@vobeyspaces{\catcode`\ \active\let \xobeysp{}}

\xobeysp

\@xverbatim
\@sxverbatim 95 \begingroup \catcode`|=0 \catcode`[= 1
96 \catcode`]=2 \catcode`{|=12 \catcode`\\|=12
97 \catcode`\\|=12 \gdef\@xverbatim{\end{verbatim}[\#1\end{verbatim}]
98 \gdef\@sxverbatim{\end{verbatim}[\#1\end{verbatim}]}
99 \endgroup

\@verbatim  Real start of verbatim environment We use \relax to prevent \item scanning too
far.
100 \def\@verbatim{\trivlist \item\relax
101   \if@minipage\else\vskip\parskip\fi
102   \leftskip\@totalleftmargin\rightskip\z@skip
103   \parindent\z@\parfillskip\@flushglue\parskip\z@skip

Added \@@par to clear possible \parshape definition from a surrounding list (the
verbatim guru says).
104   \@@par
105   \tempswafalse
106   \def\par{%
107     \if@tempswa

A \leavevmode added: needed if, for example, a blank verbatim line is the first
thing in a list item (wow!).
108   \leavevmode \null \@@par\penalty\interlinepenalty
109   \else
110     \tempswatrue
111     \ifhmode\@@par\penalty\interlinepenalty\fi
112   \fi}%

To allow customization we hide the font used in a separate macro.
113 \let\do\@makeother \dospecials
114 \obeylines \verb@font \noligs
115 \hyphenchar\font\m@ne

```

To avoid a breakpoint after the labels box, we remove the penalty put there by the list macros: another use of \unpenalty!

```
116 \everypar \expandafter{\the\everypar \unpenalty}%
117 }
```

\verb+atim (RmS 93/09/19) Protected against ‘missing item’ error message triggered by empty verbatim environment.

```
118 \def\verb+atim{\@verbatim \frenchspacing\@vobeyspaces \xverbatim}%
119 \def\endverbatim{\if@newlist \leavevmode\fi\endtrivlist}
```

\verb+atim@font Macro to select the font used for verbatim typesetting. It also does other work if necessary for the font used.

```
120 \def\verb+atim@font{\normalfont\ttfamily}
```

\verb+atim\*

```
121 \namedef{verbatim*}{\@verbatim\@sxverbatim}%
122 \expandafter\let\csname endverbatim*\endcsname =\endverbatim
```

\@makeother

```
123 \def\@makeother#1{\catcode`\#12\relax}
```

\verb+balance@group

```
124 \let\verb+balance@group@\empty
```

\verb+egroup

```
125 \def\verb+egroup{\global\let\verb+balance@group@\empty\egroup}
```

\verb+eol@error

```
126 \begingroup
127   \obeylines%
128   \gdef\verb+eol@error{\obeylines%
129     \def^M{\verb+egroup\@latex@error{%
130       \noexpand\verb ended by end of line}\@ehc}}%
131 \endgroup
```

\verb+ Typesetting a small piece verbatim.

```
132 \def\verb{\relax\ifmmode\hbox{\else\leavevmode\kern-.1em}\fi%
133 \bgroup
134   \verb+eol@error \let\do\@makeother \dospecials
135   \verb+atim@font\@noligs
136   \@ifstar\@sverb\@verb}
```

\@sverb Definitions of \@sverb and \verb+ changed so \verb+ foo+ does not lose leading blanks when it comes at the beginning of a line. Change made 24 May 89. Suggested by Frank Mittelbach and Rainer Schöpf.

```
137 \def\@sverb#1{%
138   \catcode`\#1\active
139   \lccode`~\#1%
140   \gdef\verb+balance@group{\verb+egroup%
141     \@latex@error{\noexpand\verb illegal in command argument}\@ehc}%
142   \aftergroup\verb+balance@group
143   \lowercase{\let~\verb+egroup}}%
```

\@verb

```
144 \def\@verb{\@vobeyspaces \frenchspacing \@sverb}
```

\verb+atim@nolig@list

```
145 \def\verb+atim@nolig@list{\do\`{\do\<\do\>}\do\,,\do\`{\do\-\}}
```

```
\do@noligs
146 \def\do@noligs#1{%
147   \catcode`#1\active
148   \begingroup
149     \lccode`\~`#1\relax
150     \lowercase{\endgroup\def~{\leavevmode\kern\z@\char`#1}}}
\@noligs To stay compatible with packages that use \@noligs we keep it.
151 \def\@noligs{\let\do\do@noligs \verbatim@nolig@list}
152 ⟨/2ekernel⟩
```

# File z

## ltmath.dtx

### 55 Math setup

This file contains a lot of the original plain T<sub>E</sub>X code, as well as the L<sub>A</sub>T<sub>E</sub>X environments for math. It still needs sorting out.

```
1 (*2ekernel)
2 \message{math definitions,}
```

#### 55.1 Math commands based on plain T<sub>E</sub>X

##### 55.1.1 The log-like functions

\log The standard operators:

```
3 \def\log{\mathop{\operator@font log}\nolimits}
4 \def\lg{\mathop{\operator@font lg}\nolimits}
5 \def\ln{\mathop{\operator@font ln}\nolimits}
6 \def\lim{\mathop{\operator@font lim}}
7 \def\limsup{\mathop{\operator@font lim\,,sup}}
8 \def\liminf{\mathop{\operator@font lim\,,inf}}
9 \def\sin{\mathop{\operator@font sin}\nolimits}
10 \def\arcsin{\mathop{\operator@font arcsin}\nolimits}
11 \def\sinh{\mathop{\operator@font sinh}\nolimits}
12 \def\cos{\mathop{\operator@font cos}\nolimits}
13 \def\arccos{\mathop{\operator@font arccos}\nolimits}
14 \def\cosh{\mathop{\operator@font cosh}\nolimits}
15 \def\tan{\mathop{\operator@font tan}\nolimits}
16 \def\arctan{\mathop{\operator@font arctan}\nolimits}
17 \def\tanh{\mathop{\operator@font tanh}\nolimits}
18 \def\cot{\mathop{\operator@font cot}\nolimits}
19 \def\coth{\mathop{\operator@font coth}\nolimits}
20 \def\sec{\mathop{\operator@font sec}\nolimits}
21 \def\csc{\mathop{\operator@font csc}\nolimits}
22 \def\max{\mathop{\operator@font max}\nolimits}
23 \def\min{\mathop{\operator@font min}\nolimits}
24 \def\sup{\mathop{\operator@font sup}\nolimits}
25 \def\inf{\mathop{\operator@font inf}\nolimits}
26 \def\arg{\mathop{\operator@font arg}\nolimits}
27 \def\ker{\mathop{\operator@font ker}\nolimits}
28 \def\dim{\mathop{\operator@font dim}\nolimits}
29 \def\hom{\mathop{\operator@font hom}\nolimits}
30 \def\det{\mathop{\operator@font det}\nolimits}
31 \def\exp{\mathop{\operator@font exp}\nolimits}
32 \def\Pr{\mathop{\operator@font Pr}\nolimits}
33 \def\gcd{\mathop{\operator@font gcd}\nolimits}
34 \def\deg{\mathop{\operator@font deg}\nolimits}
```

\bmod And some operators have to be done by hand:

```
35 \def\bmod{%
36   \nonscript\mskip-\medmuskip\mkern5mu%
37   \mathbin{\operator@font mod}\penalty900\mkern5mu%
38   \nonscript\mskip-\medmuskip}
```

\pmod

```
39 \def\pmod#1{%
40   \allowbreak\mkern18mu(\operator@font mod)\,,\,#1)}
```

### 55.1.2 Biggggg

\big Variants on \big and friends for use with delimiters:

```
41 \def\bigl{\mathopen\bigl}
42 \def\bigr{\mathrel\bigr}
43 \def\biggr{\mathclose\bigr}
44 \def\Bigl{\mathopen\Bigl}
45 \def\Bigr{\mathrel\Bigr}
46 \def\Biggr{\mathclose\Bigr}
47 \def\biggl{\mathopen\biggl}
48 \def\biggm{\mathrel\biggl}
49 \def\biggr{\mathclose\biggl}
50 \def\Biggl{\mathopen\Biggl}
51 \def\Biggm{\mathrel\Biggl}
52 \def\Biggr{\mathclose\Biggl}
```

### 55.1.3 The UNSORTED Rest

The other math commands are lifted from plain T<sub>E</sub>X.

```
\jot
53 \newdimen\jot
54 \jot=3pt

\interdisplaylinepenalty
55 \newcount\interdisplaylinepenalty
56 \interdisplaylinepenalty=100

\choose
57 \def\choose{\atopwithdelims()}

\bgroup
58 \def\bgroup{\atopwithdelims[]}

\bgroup
59 \def\bgroup{\atopwithdelims\{\}}
```

```

77 \def\vphantom{\v@true\h@false\ph@nt}
78 \def\hphantom{\v@false\h@true\ph@nt}
79 \def\phantom{\v@true\h@true\ph@nt}
80 \def\ph@nt{%
81   \ifmmode
82     \expandafter\mathpalette\expandafter\mathph@nt
83   \else
84     \expandafter\makeph@nt
85   \fi}
86 \def\makeph@nt#1{%
87   \setbox\z@\hbox{\color@begingroup#1\color@endgroup}\finph@nt}
88 \def\mathph@nt#1#2{%
89   \setbox\z@\hbox{$\m@th#1\{#2\}$}\finph@nt}
90 \def\finph@nt{%
91   \setbox\tw@\null
92   \ifv@ \ht\tw@\ht\z@ \dp\tw@\dp\z@\fi
93   \ifh@ \wd\tw@\wd\z@\fi \box\tw@}

```

\mathstrut

```

94 \def\mathstrut{\vphantom{}}

\smash
95 \def\smash{%
96   \relax % \relax, in case this comes first in \halign
97   \ifmmode
98     \expandafter\mathpalette\expandafter\mathsm@sh
99   \else
100    \expandafter\makesm@sh
101   \fi}
102 \def\makesm@sh#1{%
103   \setbox\z@\hbox{\color@begingroup#1\color@endgroup}\finsm@sh}
104 \def\mathsm@sh#1#2{%
105   \setbox\z@\hbox{$\m@th#1\{#2\}$}\finsm@sh}
106 \def\finsm@sh{\ht\z@\z@ \dp\z@\z@ \box\z@}

```

\buildrel

```

107 \def\buildrel#1\over#2{\mathrel{\mathop{\kern\z@#2}\limits^{#1}}}

\cases
108 \def\cases#1{\left.\right.,\vcenter{\normalbaselines\m@th
109   \ialign{$\hfil\quad\hfil$&\quad$\hfil\cr\cr\#1\cr\cr}}\right.}

\matrix
110 \def\matrix#1{\null,\vcenter{\normalbaselines\m@th
111   \ialign{$\hfil\#\#\hfil&\quad\hfil\#\#\hfil\cr\cr\#1\cr\cr\#1\cr\cr\#1\cr\cr\#1\cr\cr}}\right.}

\pmatrix
114 \def\pmatrix#1{\left(\begin{array}{c}#1\end{array}\right)}

\bmatrix
115 \def\bmatrix#1{\begingroup \m@th
116   \tempdima 8.75\p@
117   \setbox\z@\vbox{%
118     \def\cr{\cr\noalign{\kern2\p@\global\let\cr\endline}}%
119     \ialign{$\hfil\kern2\p@\kern\@tempdima\&\thinspace\hfil$&$\hfil\cr\cr\#1\cr\cr\#1\cr\cr\#1\cr\cr\#1\cr\cr\#1\cr\cr\#1\cr\cr}}\right.}

```

```

121      \omit\strut\hfil\crcr\noalign{\kern-\baselineskip}%
122      #1\crcr\omit\strut\cr}%%
123 \setbox@tw@ vbox{\unvcopy\z@\global\setbox@ne\lastbox}%
124 \setbox@tw@ hbox{\unhbox@\ne\unskip\global\setbox@ne\lastbox}%
125 \setbox@tw@ hbox{${\kern\wd@ne\kern-@tempdima\left(\kern-\wd@\ne
126 \global\setbox@ne\vbox{\box@\ne\kern2\p@}%
127 \vcenter{\kern-\ht@\ne\unvbox\z@\kern-\baselineskip}\,,\right)$}%
128 \null\;vbox{\kern\ht@\ne\box@}\endgroup}

\openup
129 \def\openup{\afterassignment\openup\dimen@}
130 \def\openup{\advance\lineskip\dimen@
131   \advance\baselineskip\dimen@
132   \advance\lineskiplimit\dimen@}

\displaylines
133 \newif\ifdt@p
134 \def\displ@y{\global\dt@ptrue\openup\jot\m@th
135   \everycr{\noalign{\ifdt@p \global\dt@pfalse \ifdim\prevdepth>-1000\p@
136     \vskip-\lineskiplimit \vskip\normallineskiplimit \fi
137     \else \penalty\interdisplaylinepenalty \fi}}}
138 \def\@lign{\tabskip\z@skip\everycr{}% restore inside \displ@y
139 \def\displaylines#1{\displ@y \tabskip\z@skip
140   \halign{\hb@xt@\displaywidth{$\@lign\hfil\displaystyle##\hfil$}\crcr
141     #1\crcr}}
142 \let\sp=^
143 \let\sb=_
144 %\def\,\{\mskip\thinmuskip% already defined in ltspace
145 \def\,>\{\mskip\medmuskip%
146 \def\,;\{\mskip\thickmuskip%
147 \def\,!{\mskip-\thinmuskip%
148 \def\*{\discretionary{\thinspace\the\textrm{font}2\char2}{}}{}}%
\>
\; Nickname for the medium space since \> is not available inside tabbing.
149 \let\:=\>
\active@math@prime This is the definition of the active math prime.
150 \def\active@math@prime{\bgroup\prim@s}
\prime@s
151 {\catcode`\'=\active \global\let'\active@math@prime}
152 \def\prim@s{%
153   \prime\futurelet@\let@token\pr@m@s}
154 \def\pr@m@s{%
155   \ifx'\@let@token
156     \expandafter\pr@@@s
157   \else
158     \ifx`\@let@token
159       \expandafter\expandafter\expandafter\pr@@@t
160     \else
161       \egroup
162     \fi
163   \fi}

```

```

164 \def\pr@@@s#1{\prim@s}
165 \def\pr@@@t#1#2{#2\egroup}

166 {\catcode`\_=active \gdef_{{}_-} % _ in math is
167 % either subscript or \_
168 \def\({\relax\ifmmode@\badmath\else$`fi}
169 \def\){\relax\ifmmode@ifinner$\else\@badmath`fi\else \@badmath`fi}

170 \def\[{%
171   \relax\ifmmode
172     \@badmath
173   \else
174     \ifvmode
175       \nointerlineskip
176       \makebox[.6\linewidth]{}%
177     \fi
178     $$%$$ BRACE MATCH HACK
179   \fi
180 }

181 \def\]{%
182   \relax\ifmmode
183   \ifinner
184     \@badmath
185   \else
186     $$%$$ BRACE MATCH HACK
187   \fi
188   \else
189     \@badmath
190   \fi
191   \ignorespaces
192 }

math Disguises for \(\dots\) and \[\dots\].
displaymath 193 \let\math=\(
194 \let\endmath=\)

195 \def\displaymath{[]}
196 \def\enddisplaymath{}@\ignoretrue

equation Numbered equations, using the counter \c@equation. Note: The document style
\c@equation must define \theequation etc., and do the appropriate \addtoreset. It should
also redefine \eqnnum if another format for the equation number is desired other
than the standard (...), or to move the equation numbers to the flushleft. (See
comment on the \def of \eqnnum.)
197 \def\c@equation{\refstepcounter{equation}}
198 \def\equation{$\refstepcounter{equation}}
199 \def\endequation{\eqno \hbox{\c@eqnnum} $\@ignoretrue}

\c@eqnnum Produces the equation number for equation and eqnarray environments. The
following definition is for flushright numbers; for flushleft numbers, see leqno.clo.
The equation number is set in black roman type even if an eqnarray environment
appears in an italic environment.
200 \def\c@eqnnum{\normalfont \normalcolor (\theequation)}

```

```

\stackrel A disguise for plain TEX's buildrel.
201 \def\stackrel#1#2{\mathrel{\mathop{#2}\limits^{#1}}}

\frac A disguise for plain TEX's \over.
202 \def\frac#1#2{{\begingroup\over#2}\endgroup}

\sqrt Add an optional argument to plain's \sqrt to give the nth root of an expression
\@sqrt  $\sqrt[n]{e}$ .
203 \DeclareRobustCommand\sqrt{\@ifnextchar[\@sqrt@sqrtsign}
204 \def\@sqrt[#1]{\root #1\of}

\eqnarray Here's the eqnarray environment: Default is for left-hand side of equations to be
\@eqcnt flushright. To make them flushleft, \let\@eqnse = \hfil.
\@eqpen 205 \newcount\@eqcnt
\if@eqnsw 206 \newcount\@eqpen
\@eqnse 207 \newif\if@eqnsw\@eqnswtrue
208 \newskip\@centering
209 \@centering = Opt plus 1000pt

To get a proper \@currentlabel we have to redefine it for the whole display. Note
that we can't use \refstepcounter as this results in \@currentlabel getting
restored at the wrong and thus always writing the first label to the .aux file.
210 \def\eqnarray{
211   \stepcounter{equation}%
212   \def\@currentlabel{\p@equation\theequation}%
213   \global\@eqnswtrue
214   \m@th
215   \global\@eqcnt\z@
216   \tabskip\@centering
217   \let\\@\eqncr
218   $$\everycr{}\halign to\displaywidth\bgroup
219     \hskip\@centering$\displaystyle\tabskip\z@skip##$\@eqnse
220     &\global\@eqcnt\@ne\hskip \tw@\arraycolsep \hfil$##$\hfil
221     &\global\@eqcnt\tw@\hskip \tw@\arraycolsep
222       $displaystyle##$\hfil\tabskip\@centering
223     &\global\@eqcnt\thr@@ \hb@xt@\z@\bgroup\hss##\egroup
224       \tabskip\z@skip
225     \cr
226   }
227 \def\endeqnarray{%
228   \@eqncr
229   \egroup
230   \global\advance\c@equation\m@ne
231   $$\@ignoretrue
232 }
233 \let\@eqnse=\relax

\nonumber Switches off equation numbering.
234 \def\nonumber{\global\@eqnswfalse}

\@eqncr
\@xeqncr 235 \def\@eqncr{%
\@yeqncr 236   {\ifnum0='}\fi
237   \@ifstar{%
238     \global\@eqpen\@M\@yeqncr
239   }{%
240     \global\@eqpen\interdisplaylinepenalty \@yeqncr
241   }%
242 }

```

```

243 \def\@yeqncr{\@testopt\@xeqncr{z@\skip}
244 \def\@xeqncr[#1]{%
245   \ifnum0`{\fi}%
246   \@@eqncr
247   \noalign{\penalty\@eqpen\vskip\jot\vskip #1\relax}%
248 }

\@@eqncr
249 \def\@@eqncr{\let\reserved@a\relax
250   \ifcase\@eqcnt \def\reserved@a{& &}\or \def\reserved@a{& &}\%
251   \or \def\reserved@a{&}\else
252     \let\reserved@a\empty
253     \@latex@error{Too many columns in eqnarray environment}\@ehc\fi
254   \reserved@a \if@eqnsw\@eqnnum\stepcounter{equation}\fi
255   \global\@eqnswtrue\global\@eqcnt\z@\cr}

```

**eqnarray\*** Here's the eqnarray\* environment:

```

\@seqncr 256 \let\@seqncr=\@eqncr
257 \namedef{eqnarray*}{\def\@eqncr{\nonumber\@seqncr}\eqnarray}
258 \namedef{endeqnarray*}{\nonumber\endeqnarray}

```

**\lefteqn** \lefteqn{*FORMULA*} typesets *FORMULA* in display math style flushleft in a box of width zero.

```
259 \def\lefteqn#1{\rlap{$\displaystyle #1$}}
```

**\ensuremath** In math mode, \ensuremath{text} is equivalent to text; in LR or paragraph mode, it is equivalent to \$text\$. \relax is not needed in front of the \ifmmode as \protect will be \let to \relax. This version (due to Donald Arseneau) avoids duplicating its argument in the ‘then’ and ‘else’ part of the \ifmath which is necessary in nested ‘tabular’ like environments. See amslatex/2104.

```

260 \DeclareRobustCommand{\ensuremath}{%
261   \ifmmode
262     \expandafter\@firstofone
263   \else
264     \expandafter\@ensuredmath
265   \fi}

```

**\@ensuredmath** The \relax stops \ensuremath{} starting display math.

```

266 \long\def\@ensuredmath#1{$\relax#1$}
267 
```

### 55.3 External options to the standard document classes

#### 55.3.1 Left equation numbering

**\@eqnnum** To put the equation number on the left side of an equation we have to use a little trick. The number is shifted \displaywidth to the left inside a box of (approximately) zero width. This fails when the quation is too wide, the equation number than may overprint the equation itself.

```

268 (*leqno)
269 \renewcommand\@eqnnum{\hb@xt@.01\p@{}%
270           \rlap{\normalfont\normalcolor
271           \hskip -\displaywidth(\theequation)}}
272 
```

### 55.3.2 Flush left equations

To get the displayed math environments to print the contents flush left (with an indentation) we have to redefine all of L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub> 's displayed math environments.

`\mathindent` The amount of indentation of the equations is stored in a register.

273 `(*fleqn)`

274 `\newdimen\mathindent`

The setting of `\mathindent` has to be deferred until the class file has been processed, because `\leftmargini` is still 0pt wide at the moment `fleqn.clo` is read in.

275 `\AtEndOfClass{\mathindent\leftmargini}`

\[ Begin display math;

276 `\renewcommand\[\relax`

277 `\ifmmode\@badmath`

278 `\else`

279 `\begin{trivlist} %`

280 `\begin{parpenalty}\predisplaypenalty`

281 `\end{parpenalty}\postdisplaypenalty`

282 `\item[]\leavevmode`

283 `\hb@xt@\linewidth\bgroup \$\m@th\displaystyle \$\$`

284 `\hskip\mathindent\bgroup`

285 `\fi}`

\] end display math;

286 `\renewcommand\]\relax`

287 `\ifmmode`

288 `\egroup \$\hfil\$`

289 `\egroup`

290 `\end{trivlist} %`

291 `\else \@badmath`

292 `\fi}`

`equation` The equation environment

293 `\renewenvironment{equation} %`

294 `{\begin{parpenalty}\predisplaypenalty`

295 `\end{parpenalty}\postdisplaypenalty`

296 `\refstepcounter{equation} %`

297 `\begin{trivlist} \item[]\leavevmode`

298 `\hb@xt@\linewidth\bgroup \$\m@th\$ \$`

299 `\displaystyle`

300 `\hskip\mathindent} %`

301 `\hfil\$`

302 `\displaywidth\linewidth\hbox{\eqnnum} %`

303 `\egroup`

304 `\end{trivlist}`

`eqnarray` The eqnarray environment

305 `\renewenvironment{eqnarray}{%`

306 `\stepcounter{equation} %`

307 `\def\@currentlabel{\p@equation\theequation} %`

308 `\global\@eqnswtrue\m@th`

309 `\global\@eqcnt\z@`

310 `\tabskip\mathindent`

311 `\let\\=\@eqncr`

312 `\setlength\abovedisplayskip{\topsep} %`

313 `\ifvmode`

314 `\addtolength\abovedisplayskip{\partopsep} %`

315 `\fi`

When the documentclass uses a non-zero \parskip setting the \topsep might have a negative value to compensate for that. Therefore we add \parskip to \abovedisplayskip.

```
316   \addtolength\abovedisplayskip{\parskip}%
317   \setlength\belowdisplayskip{\abovedisplayskip}%
318   \setlength\belowdisplayshortskip{\abovedisplayskip}%
319   \setlength\abovedisplayshortskip{\abovedisplayskip}%
320   $$\everycr{}\halign{#}\hfil\hbox{#}\hfil\cr
321   \bgroup
322     \hskip\@centering
323     $\displaystyle\tabskip\z@skip\@eqnsel\&%
324     \global\@eqcnt\@ne \hskip \tw@arraycolsep \hfil\@eqcnt\@ne\hfil\&%
325     \global\@eqcnt\tw@ \hskip \tw@arraycolsep
326     $\displaystyle\@eqcnt\@ne\hfil \tabskip\@centering\&%
327     \global\@eqcnt\thr@@
328     \hb@xt@\z@\bgroup\hss\egroup\tabskip\z@skip\cr}%
329   \f@eqncr
330   \egroup
331   \global\advance\c@equation\m@ne$$\$%
332   \ignorespaces
333 }
334 
```

# File A

## ltlists.dtx

### 56 List, and related environments

The generic commands for creating an indented environment – `enumerate`, `itemize`, `quote`, etc – are:

```
\list{\LABEL}{{COMMANDS}} ... \endlist
```

which can be invoked by the user as the list environment. The *LABEL* argument specifies item labeling. *COMMANDS* contains commands for changing the horizontal and vertical spacing parameters.

Each item of the environment is begun by the command `\item[ITEMLABEL]` which produces an item labeled by ITEMlabel. If the argument is missing, then the *LABEL* argument of the `\list` command is used as the item label.

The label is formed by putting `\makelabel{ITEMLABEL}` in an hbox whose width is either its natural width or else `\labelwidth`, whichever is larger. The `\list` command defines `\makelabel` to have the default definition:

```
\makelabel{ARG} == BEGIN \hfil ARG END
```

which, for a label of width less than `\labelwidth`, puts the label flushright, `\labelsep` to the left of the item's text. However, `\makelabel` can be `\let` to another command by the `\list`'s *COMMANDS* argument.

A `\usecounter{foo}` command in the second argument causes the counter *foo* to be initialized to zero, and stepped by every `\item` command without an argument. (`\label` commands within the list refer to this counter.)

When you leave a list environment, returning either to an enclosing list or normal text mode, LaTeX begins a new paragraph if and only if you leave a blank line after the `\end` command. This is accomplished by the `\@endparenv` command.

Blank lines are ignored every other reasonable place—i.e.:

- Between the `\begin{list}` and the first `\item`,
- Between the `\item` and the text of that item.
- Between the end of the last item and the `\end{list}`.

For an environment like quotation, in which items are not labeled, the entire environment is a single item. It is defined by letting `\quotation == \list{}{\...}\item\relax`. (Note the `\relax`, there in case the first character in the environment is a `']`.) The spacing parameters provide a great deal of flexibility in designing the format, including the ability to let the indentation of the first paragraph be different from that of the subsequent ones.

The trivlist environment is equivalent to a list environment whose second argument sets the following parameter values:

`\leftmargin = 0`: causes no indentation of left margin

`\labelwidth = 0`: see below for precise effect this has.

`\itemindent = 0`: with a null label, makes first paragraph have no indentation.

Succeeding paragraphs have `\parindent` indentation. To give first paragraph same indentation, set `\itemindent = \parindent` before the `\item[]`.

Every `\item` in a trivlist environment must have an argument—in many cases, this will be the null argument (`\item[]`). The trivlist environment is mainly used for paragraphing environments, like verbatim, in which there is no margin change. It provides the same vertical spacing as the list environment, and works reasonably well when it occurs immediately after an `\item` command in an enclosing list.

## 56.1 List and Trivlist

The following variables are used inside a list environment:

`\@totalleftmargin` The distance that the prevailing left margin is indented from the outermost left margin,

`\linewidth` The width of the current line. Must be initialized to `\hsize`.

`\@listdepth` A count for holding current list nesting depth.

`\makelabel` A macro with a single argument, used to generate the label from the argument (given or implied) of the `\item` command. Initialized to `\@mklab` by the `\list` command. This command must produce some stretch—i.e., an `\hfil`.

`\@inlabel` A switch that is false except between the time an `\item` is encountered and the time that TeX actually enters horizontal mode. Should be tested by commands that can be messed up by the list environment's use of `\everypar`.

`\box\@labels` When `\@inlabel = true`, it holds the labels to be put out by `\everypar`.

`\@noperitem` A switch set by `\list` when `\@inlabel = true`. Handles the case of a `\list` being the first thing in an item.

`\@noparlist` A switch set true for a list that begins an item. No `\topsep` space is added before or after `\item`'s such a list.

`\@newlist` Set true by `\list`, set false by the first text (by `\everypar`).

`\@noitemarg` Set true when executing an `\item` with no explicit argument. Used to save space. To save time, make two separate `\@item` commands.

`\@nmbrlist` Set true by `\usecounter` command, causes list to be numbered.

`\@listctr` `\def`'ed by `\usecounter` to name of counter.

`\@noskipsec` A switch set true by a sectioning command when it is creating an in-text heading with `\everypar`.

Throughout a list environment, `\hsize` is the width of the current line, measured from the outermost left margin to the outermost right margin. Environments like tabbing should use `\linewidth` instead of `\hsize`.

Here are the parameters of a list that can be set by commands in the `\list`'s COMMANDS argument. These parameters are all TeX skips or dimensions (defined by `\newskip` or `\newdimen`), so the usual TeX or L<sup>A</sup>T<sub>E</sub>X commands can be used to set them. The commands will be executed in vmode if and only if the `\list` was preceded by a `\par` (or something like an `\end{list}`), so the spacing parameters can be set according to whether the list is inside a paragraph or is its own paragraph.

## 56.2 Vertical Spacing (skips)

`\topsep`: Space between first item and preceding paragraph.

`\partopsep`: Extra space added to `\topsep` when environment starts a new paragraph (is called in vmode).

`\itemsep`: Space between successive items.

`\parsep`: Space between paragraphs within an item – the `\parskip` for this environment.

### 56.3 Penalties

\@beginparpenalty: put at the beginning of a list  
\@endparpenalty: put at end of list  
\@itempenalty: put between items.

### 56.4 Horizontal Spacing (dimens)

\leftmargin: space between left margin of enclosing environment (or of page if top level list) and left margin of this list. Must be nonnegative.  
\rightmargin: analogous.  
\listparindent: extra indentation at beginning of every paragraph of a list except the one started by the \item command. May be negative! Usually, labeled lists have \listparindent equal to zero.  
\itemindent: extra indentation added right BEFORE an item label.  
\labelwidth: nominal width of box that contains the label. If the natural width of the label  $\leq \labelwidth$ , then the label is flushed right inside a box of width \labelwidth (with an \hfil). Otherwise, a box of the natural width is employed, which causes an indentation of the text on that line.  
\labelsep: space between end of label box and text of first item.

### 56.5 Default Values

Defaults for the list environment are set as follows. First, \rightmargin, \listparindent and \itemindent are set to 0pt. Then, one of the commands \@listi, \@listii, ..., \@listvi is called, depending upon the current level of the list. The \@list ... commands should be defined by the document style. A convention that the document style should follow is to set \leftmargin to \leftmargini, ..., \leftmarginvi for the appropriate level. Items that aren't changed may be left alone, but everything that could possibly be changed must be reset.

```
\list{LABEL}{COMMANDS} ==
BEGIN
  if \@listdepth > 5
    then LaTeX error: 'Too deeply nested'
    else \@listdepth :=G \@listdepth + 1
  fi
  \rightmargin     := 0pt
  \listparindent   := 0pt
  \itemindent      := 0pt
  \eval{@list \romannumeral\the\@listdepth} %% Set default values:
  \@itemlabel      :=L LABEL
  \makelabel       == \cmklab
  @nmbrlist        :=L false
  COMMANDS

  \@trivlist           % commands common to \list and
  \trivlist

  \parskip      :=L \parsep
  \parindent    :=L \listparindent
  \linewidth    :=L \linewidth - \rightmargin - \leftmargin
  \@totalleftmargin :=L \@totalleftmargin + \leftmargin
  \parshape 1 \@totalleftmargin \linewidth
```

```

\ignorespaces                                % gobble space up to \item
END

\endlist == BEGIN \clistdepth :=G \clistdepth -1
                                         \endtrivlist
END

\@trivlist ==
BEGIN
  if @newlist = T then \noitemerr fi
    %% This command removed for some forgotten
reason.
  \topsepadd :=L \topsep
  if @noskipsec then leave vertical mode fi %% Added 11 Jun 85
  if vertical mode
    then \topsepadd :=L \topsepadd + \partopsep
    else \unskip \par                         % remove glue from end of last line
  fi
  if @inlabel = true
    then @noparitem :=L true
        @noparlist :=L true
    else @noparlist :=L false
        \topsep :=L \topsepadd
  fi
  \topsep      :=L \topsep + \parskip %% Change 4 Sep 85
  \leftskip    :=L 0pt                  % Restore paragraphing
parameters
  \rightskip     :=L \rightskip
  \parfillskip   :=L 0pt + 1fil

NOTE: \setpar called on every \list in case \par has been
temporarily munged before the \list command.
\setpar{if @newlist = false then {\@par} fi}
\newlist       :=G T
\outerparskip  :=L \parskip
END

\trivlist ==
BEGIN
  \parsep      := \parskip
  @nbrlist := F
  \trivlist
  \labelwidth := 0
  \leftmargin := 0
  \itemindent := \parindent
  \itemlabel :=L "empty"                   %% added 93/12/13
  \makelabel{LABEL} == LABEL
END

\endtrivlist ==
BEGIN
  if @inlabel = T then \indent fi
  if horizontal mode then \unskip \par fi
  if @noparlist = true
  else if \lastskip > 0
    then \tempskipa := \lastskip
        \vskip - \lastskip

```

```

                \vskip \tempskipa -\outerparskip + \parskip
        fi
        \endparenv
    fi
END

\endparenv ==
BEGIN
    \addpenalty{@endparpenalty}
    \addvspace{\topsepadd}
\endgroup %% ends the \begin command's \begingroup
\par == BEGIN
    \restorepar
    \everypar{}
    \par
END
\everypar == BEGIN remove \lastbox \everypar{} END
\begingroup %% to match the \end commands \endgroup
END

\item == BEGIN if math mode then WARNING fi
    if next char =
        then \item
        else @noitemarg := true
            \item[@itemlabel]
END

\item[LAB] ==
BEGIN
    if @noparitem = true
        then @noparitem := false
            % NOTE: then clause hardly every taken,
            % so made a macro \donoparitem
            \box@labels :=G \hbox{\hskip -\leftmargin
                \box@labels
                \hskip \leftmargin }
    if @minipage = false then
        \tempskipa := \lastskip
        \vskip -\lastskip
        \vskip \tempskipa + \outerparskip - \parskip
    fi
    else if @inlabel = true
        then \indent \par % previous item empty.
    fi
    if hmode then 2 \unskip's
        % To remove any space at end of prev.
        % paragraph that could cause a blank line.
        \par
    fi
    if @newlist = T
        then if @nobreak = T % Kludge if list follows \section
            then \addvspace{\outerparskip - \parskip}
            else \addpenalty{@beginparpenalty}
                \addvspace{\topsep}
                \addvspace{-\parskip} %% added 4 Sep 85
        fi
        else \addpenalty{@itempenalty}

```

```

                \addvspace{\itemsep}
            fi
            @inlabel :=G true
        fi

        \everypar{ @minipage :=G F
                    @newlist :=G F
                    if @inlabel = true
                        then @inlabel :=G false
                        \hskip -\parindent
                        \box\@labels
                        \penalty 0
                        %% 3 Oct 85 -- allow line break here
                        \box\@labels :=G null
                    fi
                    \everypar{} }
    @nobreak :=G false
    if @noitemarg = true
        then @noitemarg := false
        if @nmbrlist
            then \refstepcounter{@listctr}
        fi      fi
    @tempboxa :=L \hbox{\makelabel{LAB}}
    \box\@labels :=G \@labels \hskip \itemindent
                \hskip - (\labelwidth + \labelsep)
    if \wd \@tempboxa > \labelwidth
        then \box\@tempboxa
        else \hbox to \labelwidth
    {\unhbox\@tempboxa}
    fi
    \hskip\labelsep
    \ignorespaces                                %% gobble space up to text
END

\makelabel{LABEL} == ERROR      %% default to catch lonely \item

\usecounter{CTR} == BEGIN  @nmbrlist :=L true
                        \@listctr == CTR
                        \setcounter{CTR}{0}
END

DEFINE \dimen's and \count

\topskip
\partopsep 1 (*2ekernel)
\itemsep 2 \newskip\topsep
\parsep 3 \newskip\partopsep
\@topsep 4 \newskip\itemsep
\@topsepadd 5 \newskip\parsep
\outerparskip 6 \newskip\@topsep
7 \newskip\@topsepadd
8 \newskip\@outerparskip

\leftmargin
\rightmargin 9 \newdimen\leftmargin
\listparindent 10 \newdimen\rightmargin
\itemindent 11 \newdimen\listparindent
\labelwidth
\labelsep
\@totalleftmargin
```

```

12 \newdimen\itemindent
13 \newdimen\labelwidth
14 \newdimen\labelsep
15 \newdimen\linewidth
16 \newdimen\@totalleftmargin \@totalleftmargin=\z@

\leftmargini
\leftmarginii 17 \newdimen\leftmargini
\leftmarginiii 18 \newdimen\leftmarginii
\leftmarginiv 19 \newdimen\leftmarginiii
\leftmarginv 20 \newdimen\leftmarginiv
\leftmarginvi 21 \newdimen\leftmarginv
\leftmarginvii 22 \newdimen\leftmarginvi

\@listdepth
\@itempenalty 23 \newcount\@listdepth \@listdepth=0
\@beginparpenalty 24 \newcount\@itempenalty
\@endparpenalty 25 \newcount\@beginparpenalty
\@endparpenalty 26 \newcount\@endparpenalty

\@labels
27 \newbox\@labels

\if@inlabel
\@inlabelfalse 28 \newif\if@inlabel \@inlabelfalse
\@inlabeltrue
\if@newlist
\@newlistfalse 29 \newif\if@newlist \@newlistfalse
\@newlisttrue
\if@noperitem
\@noperitemfalse 30 \newif\if@noperitem \@noperitemfalse
\@noperitemtrue
\if@noperlist
\@noperlistfalse 31 \newif\if@noperlist \@noperlistfalse
\@noperlisttrue
\if@noitemarg
\@noitemargfalse 32 \newif\if@noitemarg \@noitemargfalse
\@noitemargtrue
\if@newlist
\@newlistfalse 33 \newif\if@nmbrlist \@nmbrlistfalse
\@newlisttrue
\list
34 \def\list#1#2{%
35   \ifnum \@listdepth >5\relax
36     \@toodeep
37   \else
38     \global\advance\@listdepth\@ne
39   \fi
40   \rightmargin\z@
41   \listparindent\z@
42   \itemindent\z@
43   \csname @list\romannumeral\the\@listdepth\endcsname
44   \def\@itemlabel{\#1}%
45   \let\makelabel\mklabel
46   \if@nmbrlistfalse
47     #2\relax
48   \fi
49   \parskip\parsep
50   \parindent\listparindent
51   \advance\linewidth -\rightmargin

```

```

52  \advance\linewidth -\leftmargin
53  \advance\@totalleftmargin \leftmargin
54  \parshape \one \@totalleftmargin \linewidth
55  \ignorespaces}

\par@deathcycles
56 \newcount\par@deathcycles

\@trivlist Because \par is sometimes made a no-op it is possible for a missing \item to
produce a loop that does not fill memory and so never gets trapped by TeX.
We thus need to trap this here by setting \par to count the number of times a
paragraph is called with no progress being made started.
57 \def\@trivlist{%
58   \if@noskipsec \leavevmode \fi
59   \@topsepadd \topsep
60   \ifvmode
61     \advance\@topsepadd \partopsep
62   \else
63     \unskip \par
64   \fi
65   \if@inlabel
66     \c@noparitemtrue
67     \c@noparlisttrue
68   \else
69     \if@newlist \c@noitemerr \fi
70     \c@noparlistfalse
71     \@topsep \@topsepadd
72   \fi
73   \advance\@topsep \parskip
74   \leftskip \z@skip
75   \rightskip \@rightskip
76   \parfillskip \@flushglue
77   \par@deathcycles \z@
78   \c@setpar{\if@newlist
79     \advance\par@deathcycles \one
80     \ifnum \par@deathcycles >\c@m
81       \c@noitemerr
82       {\c@par}%
83     \fi
84     \else
85       {\c@par}%
86     \fi}%
87   \global \c@newlisttrue
88   \c@outerparskip \parskip}

\trivlist
89 \def\trivlist{%
90   \parsep\parskip
91   \c@nmbrlistfalse
92   \c@trivlist
93   \labelwidth\z@
94   \leftmargin\z@
95   \itemindent\z@

We initialise \c@itemlabel so that a trivlist with an \item not having an
optional argument doesn't produce an error message.
96 \let\c@itemlabel\empty
97 \def\makelabel##1{##1}

\endlist
98 \def\endlist{%

```

```

99   \global\advance\clistdepth\m@ne
100  \endtrivlist}

```

The definition of `\trivlist` used to be in `ltspage.dtx` so that other commands could be ‘let to it’. They now use `\def`.

`\endtrivlist`

```

101 \def\endtrivlist{%
102   \if@inlabel
103     \leavevmode
104     \global \c@inlabelfalse
105   \fi
106   \if@newlist
107     \c@noitemerr
108     \global \c@newlistfalse
109   \fi
110   \ifhmode\unskip \par

```

We also check if we are in math mode and issue an error message if so (hoping that `\currenvir` resolves suitably). Otherwise the usual “perhaps a missing item” error will get triggered later which is confusing.

```

111   \else
112     \c@inmatherr{\end{\currenvir}}%
113   \fi
114   \if@nolist \else
115     \ifdim\lastskip >\z@
116       \tempskipa\lastskip \vskip -\lastskip
117       \advance\tempskipa\parskip \advance\tempskipa -\outerparskip
118       \vskip\tempskipa
119     \fi
120   \c@endparenv
121   \fi
122 }

```

`\c@endparenv` To suppress the paragraph indentation in text immediately following a paragraph-making environment, `\everypar` is changed to remove the space, and `\par` is redefined to restore `\everypar`. Instead of redefining `\par` and `\everypar`, `\c@endparenv` was changed to set the `@endpe` switch, letting `\end` redefine `\par` and `\everypar`.

This allows paragraph-making environments to work right when called by other environments. (Changed 27 Oct 86)

```

123 \def\c@endparenv{%
124   \addpenalty\c@ndparpenalty\addvspace\c@topsepadd\c@ndpetrue}
125 \def\c@ndoendpe{\c@ndpetrue
126   \def\par{\c@restorepar\everypar{}\par\c@ndoendpefalse}\everypar

```

Use `\setbox0=\lastbox` instead of `\hskip -\parindent` so that a `\noindent` becomes a no-op when used before a line immediately following a list environment (23 Oct 86).

```

127           {{\setbox\z@\lastbox}\everypar{}\c@ndoendpefalse}}

```

`\c@ifendpe`  
`\c@ndoendpe` 128 `\newif\if@cendpe`  
`\c@ndoendpe` 129 `\c@ndoendpefalse`

`\c@mklab`

```

130 \def\c@mklab#1{\hfil #1}

```

`\c@item`

```

131 \def\c@item{%
132   \c@inmatherr\c@item
133   \c@ifnextchar [\c@item{\c@noitemargtrue \c@item[\c@itemlabel]}}

```

```

\@donoparitem
134 \def\@donoparitem{%
135   \noparitemfalse
136   \global\setbox\@labels\hbox{\hskip -\leftmargin
137                               \unhbox\@labels
138                               \hskip \leftmargin}%
139   \if@minipage\else
140     \tempskipa\lastskip
141     \vskip -\lastskip
142     \advance\tempskipa\outerparskip
143     \advance\tempskipa -\parskip
144     \vskip\tempskipa
145   \fi}
146
\@item
147 \def\@item[#1]{%
148   \if@noparitem
149     \@donoparitem
150   \else
151     \if@inlabel
152       \indent \par
153     \fi
154     \ifhmode
155       \unskip\unskip \par
156     \fi
157     \if@newlist
158       \if@nobreak
159         \nbitem
160       \else
161         \addpenalty\beginparpenalty
162         \addvspace\topsep
163         \addvspace{-\parskip}%
164       \fi
165     \else
166       \addpenalty\itempenalty
167       \addvspace\itemsep
168     \fi
169     \global\@inlabeltrue
170   \fi
171   \everypar{%
172     \minipagetrue
173     \global\@inlabelfalse

```

This `\if@inlabel` check is needed in case an item starts of inside a group so that `\everypar` does not become empty outside that group. nobreakfalse, etc etc.

```

173   \if@inlabel
174     \global\@inlabelfalse

```

The paragraph indent is now removed by using `\setbox...` since this makes `\noindent` a no-op here, as it should be. Thus the following comment is redundant but is left here for the sake of future historians: this next command was changed from an `hskip` to a `kern` to avoid a break point after the parindent box: the skip could cause a line-break if a very long label occurs in `raggedright` setting.

If `\noindent` was used after `\item` want to cancel the `\itemindent` skip. This case can be detected as the indentation box will be void.

```

175   {\setbox\z@\lastbox
176     \ifvoid\z@
177       \kern-\itemindent
178     \fi}%
179   \box\@labels
180   \penalty\z@
181 \fi

```

This code is intended to prevent a page break after the first line of an item that comes immediately after a section title. It may be sensible to always forbid a page break after one line of an item? As with all such settings of \clubpenalty it is local so will have no effect if the item starts in a group.

Only resetting \nobreak when it is true is now essential since now it is sometimes set locally.

```

182   \if@nobreak
183     \nobreakfalse
184     \clubpenalty \z@M
185   \else
186     \clubpenalty \z@clubpenalty
187     \everypar{}%
188   \fi}%
189 \if@noitemarg
190   \noitemargfalse
191 \if@nmbrlist
192   \refstepcounter\@listctr
193 \fi
194 \fi

```

We use \sbox to support colour commands.

```

195 \sbox\@tempboxa{\makelabel{\#1}}%
196 \global\setbox\@labels\hbox{%
197   \unhbox\@labels
198   \hskip \itemindent
199   \hskip -\labelwidth
200   \hskip -\labelsep
201   \ifdim \wd\@tempboxa >\labelwidth
202     \box\@tempboxa
203   \else
204     \hbox to\labelwidth {\unhbox\@tempboxa}%
205   \fi
206   \hskip \labelsep}%
207 \ignorespaces}
\makelabel
208 \def\makelabel#1{%
209   \@latex@error{Lonely \string\item--perhaps a missing
210     list environment}\@ehc}
\@nbitem
211 \def\@nbitem{%
212   \tempskipa\outerparskip
213   \advance\tempskipa -\parskip
214   \addvspace\tempskipa}
\usecounter
215 \def\usecounter#1{\@nmbrlisttrue\def\@listctr{\#1}\setcounter{\#1}\z@}

```

## 56.6 Itemize and Enumerate

Enumeration is done with four counters: `enumi`, `enumii`, `enumiii` and `enumiv`, where `enumN` controls the numbering of the Nth level enumeration. The label is generated by the commands `\labelenumi` ... `\labelenumiv`, which should be defined by the document style. Note that `\p@enumN\theenumN` defines the output of a `\ref` command. A typical definition might be:

```

\def\theenumii{\alph{enumii}}
\def\p@enumii{\theenumii}
\def\labelenumii{(\theenumii)}

```

which will print the labels as ‘(a)’, ‘(b)’, … and print a `\ref` as ‘3a’.

The item numbers are moved to the right of the label box, so they are always a distance of `\labelsep` from the item.

`\@enumdepth` holds the current enumeration nesting depth.

Itemization is controlled by four commands: `\labelitemi`, `\labelitemii`, `\labelitemiii`, and `\labelitemiv`. To cause the second-level list to be bulleted, you just define `\labelitemii` to be `•`. `\@itemspacing` and `\@itemdepth` are the analogs of `\@enumspacing` and `\@enumdepth`.

```
\enumerate ==
BEGIN
if \@enumdepth > 3
  then errormessage: "Too deeply nested".
else \@enumdepth :=L \@enumdepth + 1
  \@enumctr :=L eval(enum@\romannumeral\the\@enumdepth)
  \list{\label{(\@enumctr)}}
    {\usecounter{\@enumctr}}
    \makelabel{LABEL} == \hss \llap{LABEL}
fi
END

\endenumerate == \endlist

\@enumdepth
216 \newcount\@enumdepth \@enumdepth = 0

\c@enumi
\c@enumii 217 \def\c@enumi{\def\@enumctr{enumi}}
\c@enumii 218 \def\c@enumii{\def\@enumctr{enumii}}
\c@enumiv 219 \def\c@enumiv{\def\@enumctr{enumiv}}
220 \def\c@enumiv{\def\@enumctr{enumiv}>

enumerate
221 \def\enumerate{%
222   \ifnum \@enumdepth > \thr@@@toodeep \else
223     \advance\@enumdepth\@ne
224     \edef\@enumctr{enum\romannumeral\the\@enumdepth}%
225       \expandafter
226       \list
227         \cscname label\@enumctr\endcsname
228         {\usecounter{\@enumctr}\def\makelabel##1{\hss\llap{##1}}}%
229   \fi}
230 \let\endenumerate =\endlist

\itemize ==
BEGIN
if \@itemdepth > 3
  then errormessage: 'Too deeply nested'.
else \@itemdepth :=L \@itemdepth + 1
  \@itemitem ==
eval(labelitem\romannumeral\the\@itemdepth)
  \list{\cscname{\@itemitem}}
    {\makelabel{LABEL} == \hss \llap{LABEL}}
fi
END

\enditemize == \endlist
```

```
\@itemdepth
231 \newcount\@itemdepth \@itemdepth = 0

itemize
232 \def\itemize{%
233   \ifnum \@itemdepth > \thr@@\@toodeep\else
234     \advance\@itemdepth\@ne
235     \edef\@itemitem{\labelitem\romannumeral\the\@itemdepth}%
236     \expandafter
237     \list
238       \csname\@itemitem\endcsname
239       {\def\makelabel##1{\hss\llap{##1}}}%
240   \fi}
241 \let\enditemize =\endlist
242 
```

# File B

## ltboxes.dtx

### 57 L<sup>A</sup>T<sub>E</sub>X Box commands

- \makebox \makebox[⟨wid⟩][⟨pos⟩]{⟨obj⟩}  
Puts ⟨obj⟩ in an \hbox of width ⟨wid⟩, positioned by ⟨pos⟩.  
The possible ⟨pos⟩ are:  
**s** stretched,  
**l** flushleft,  
**r** flushright,  
**c** (default) centred.  
If ⟨wid⟩ is missing, then ⟨pos⟩ is also missing and ⟨obj⟩ is put in an \hbox of its natural width.  
  \makebox(⟨x⟩,⟨y⟩)[⟨pos⟩]{⟨obj⟩}  
Puts ⟨obj⟩ in an \hbox of width  $x * \unitlength$  and height  $y * \unitlength$ . ⟨pos⟩ arguments are **s**, **l**, **r** or **c** (default) for stretched, flushleft, flushright or centred, and **t** or **b** for top, bottom – or combinations like **tr** or **rb**. Default for horizontal and vertical are centered. Note that in this picture mode version of \makebox a [b] aligns on the *bottom* of the text as documented. If you want to align on the *baseline* use \makebox( , )[b]{\raisebox{0pt}[\height]{0pt}{xyz}} or \makebox( , )[b]{\smash{xyz}}  
\mbox \mbox{⟨obj⟩} The same as \makebox{⟨obj⟩}, but is more efficient as no checking for optional arguments is done.  
\newsavebox \newsavebox{⟨cmd⟩} : If ⟨cmd⟩ is undefined, then defines it to be a T<sub>E</sub>X box register.  
  \savebox \savebox{⟨cmd⟩} ... : ⟨cmd⟩ is defined to be a T<sub>E</sub>X box register, and the '...' are any \makebox arguments. It is like \makebox, except it doesn't produce text but saves the value in \box ⟨cmd⟩.  
  \sbox \sbox{⟨cmd⟩}{⟨obj⟩} is an efficient abbreviation for \savebox{⟨cmd⟩}{⟨obj⟩}.  
\lrbox \begin{lrbox}{⟨cmd⟩}{⟨text⟩}\end{lrbox} is equivalent to \sbox{⟨cmd⟩}{⟨text⟩}  
except that any white space at the beginning and end of ⟨text⟩ is ignored.  
\framebox \framebox ... : like \makebox, except it puts a 'frame' around the box. The frame is made of lines of thickness \fboxrule, separated by space \fboxsep from the text – except for \framebox(X,Y) ... , where the thickness of the lines is as for the picture environment, and there is no separation added.  
  \fbox \fbox{⟨obj⟩} is an abbreviation for \framebox{⟨obj⟩}.  
\parbox \parbox[⟨pos⟩][⟨height⟩][⟨inner-pos⟩]{⟨width⟩}{⟨text⟩} : Makes a box with \hsize ⟨width⟩, positioned by ⟨pos⟩ as follows: c : \vcenter (placed in \$...\$ if not in math mode) b : \vbox t : \vtop default value is c. Sets \hsize := ⟨width⟩ and calls \parboxrestore, which does the following: Restores the original definitions of:  
  \par  
  \\  
  \-\  
  \'  
  \`  
  \=
- Resets the following parameters:

```

\parindent      = 0pt
\parskip       = 0pt
\linewidth     = \hsize
\@totallftmargin = 0pt
\leftskip      = 0pt
\rightskip     = 0pt
\@rightskip   = 0pt
\parfillskip   = 0pt plus 1fil
\lineskip      = \normallineskip
\baselineskip  = \normalbaselineskip
Calls \sloppy
Note: \arrayparboxrestore same as \parboxrestore but it doesn't restore \\
minipage      minipage : Similar to \parbox, except it also makes this look like a page by
setting
    \textwidth == \columnwidth == box width
    changes footnotes by redefining:
    \mpfn == mpfootnote
    \thempfn == \thempfootnote
    \footnotetext == \mpfootnotetext
        resets the following list environment parameters:
    \listdepth == \mplistdepth
where \mplistdepth is initialized to zero,
        and executes \minipagerestore to allow the document style to reset any
other parameters it desires. It sets @minipage true, and resets \everypar to set it
false. This switch keeps \addvspace from putting space at the top of a minipage.
    Change added 24 May 89: \minipage sets @minipage globally; \endminipage
resets it false.
\rule      \rule[<raised>]{<width>}{<height>} : Makes a <width> * <height> rule, raised
<raised>.
\underline \underline{<text>} : Makes an underlined hbox with <text> in it.
\raisebox  \raisebox[<distance>][<height>][<depth>]{<box>} :
Raises <box> up by <distance> length (down if <distance> negative). Makes TEX
think that the new box extends <height> above the line and <depth> below, for a
total vertical length of <height>+<depth>. Default values of <height> & <depth> =
actual height and depth of box in new position.

1 (*2ekernel)
2 \message{boxes,}

\makebox \makebox User level command just looks for optional [ or ].
3 \def\makebox{%
4   \leavevmode
5   \ifnextchar(%)
6     \makepicbox
7     {\ifnextchar[\@makebox\mbox}%
\mbox The basic horizontal box command for LATEX.
8 \long\def\mbox#1{\leavevmode\hbox{#1}%

\@makebox Look for a possible second optional argument (defaults to c).
9 \def\@makebox[#1]{%
10  \ifnextchar [ {\imakebox[#1]}{\imakebox[#1][c]}%}

\@begin@tempboxa Helper macro for supporting \height, \width etc. Grab #1 into \tempboxa and
measure it.
11 \long\def\@begin@tempboxa#1#2{%
12   \begingroup
13     \setbox\tempboxa#1{\color@begingroup#2\color@endgroup}%

```

```

14      \def\width{\wd\@tempboxa}%
15      \def\height{\ht\@tempboxa}%
16      \def\depth{\dp\@tempboxa}%
17      \let\totalheight\@ovri
18      \totalheight\height
19      \advance\totalheight\depth}

\@end@tempboxa End the group started by \begin@tempboxa, so that the scope of \height only
includes the 'length' argument to the user-command.
20 \let\@end@tempboxa\endgroup

\bm@c Set up spacing.
\bm@l 21 \def\bm@c{\hss\unhbox\@tempboxa\hss}
\bm@r 22 \def\bm@l{\unhbox\@tempboxa\hss}\let\bm@c\bm@l
\bm@s 23 \def\bm@r{\hss\unhbox\@tempboxa}\let\bm@c\bm@r
\bm@t 24 \def\bm@s{\unhbox\@tempboxa}

\bm@b Internal form of \makebox.
25 \long\def\@imakebox[#1][#2]{#3}%
26   \begin@tempboxa\hbox{#3}%
27   \setlength{\tempdima}{#1} support calc
28   \hb@xt@{\tempdima}{\csname\bm@#2\endcsname}%
29 \end@tempboxa

\@makepicbox Picture mode form of \makebox.
30 \def\@makepicbox(#1,#2){%
31   \ifnextchar[{ \@imakepicbox(#1,#2)}{\@imakepicbox(#1,#2)[]}}}

\@imakepicbox picture mode version
32 \long\def\@imakepicbox(#1,#2)[#3]{#4}%
33   \vbox to#2\unitlength
34   {\let\mb@b\vss \let\mb@l\hss\let\mb@r\hss
35     \let\mb@t\vss
36     \otfor\reserved@a :=#3\do{%
37       \if s\reserved@a
38         \let\mb@l\relax\let\mb@r\relax
39       \else
40         \expandafter\let\csname\mb@\reserved@a\endcsname\relax
41       \fi}%
42     \mb@t
43     \hb@xt@ #1\unitlength{\mb@l #4\mb@r}%
44     \mb@b

This kern ensures that a b option aligns on the bottom of the text rather than
the baseline. this is the documented behaviour in the LATEXBook. The kern is
removed in compatibility mode.
45   \kern\z@}

\set@color This macro is initialy a no-op, but the colour package will redefine it to insert a
\special.
46 \let\set@color\relax

\color@begingroup These macros are initialy a no-op, but the colour package will redefine them to be
\begin{group}, \end{group}, \begin{group}\set@color,
\hbox\begin{group}\color@begingroup, \color@endgroup\end{group}. and <set to main
document colour> respectively.
\color@endgroup
47 \let\color@begingroup\relax
48 \let\color@endgroup\relax
\color@setgroup
49 \let\color@setgroup\relax
50 \let\normalcolor\relax
\color@hbox
51 \let\color@hbox\relax
\color@vbox
52 \let\color@vbox\relax
53 \let\color@endbox\relax

```

```

\newsavebox Allocate a new ‘savebox’.
54 \def\newsavebox#1{\@ifdefinable{#1}{\newbox#1}{}}

\savebox Save #1 in a box register.
55 \def\savebox#1{%
56   \@ifnextchar(%)
57     {\@savepicbox#1{\@ifnextchar[{\@savebox#1}{\sbox#1}}}%
58 \long\def\sbox#1#2{\setbox#1\hbox{%
59   \color@setgroup#2\color@endgroup}%
60 \def\@savebox#1[#2]{%
61   \@ifnextchar [{{\@isavebox#1[#2]}{\@isavebox#1[#2][c]}}}

\@isavebox
62 \long\def\@isavebox#1[#2][#3]{%
63   \sbox#1{\@imakebox[#2][#3][#4]}}

\@savepicbox Picture mode version of \savebox.
64 \def\@savepicbox#1(#2,#3){%
65   \@ifnextchar[%]
66     {\@isavepicbox#1(#2,#3)}{\@isavepicbox#1(#2,#3)[]}}}

\@isavepicbox Picture mode version of \savebox.
67 \long\def\@isavepicbox#1(#2,#3)[#4]{%
68   \sbox#1{\@imakepicbox(#2,#3)[#4]{#5}}}

\lrbox lrbox: the new environment form of \sbox. Use \aftergroup tricks to enable a
local assignment to be made to the box, in a way that it still has an effect outside
the lrbox environment.
69 \def\lrbox#1{%
70   \edef\reserved@a{%
71     \endgroup
72     \setbox#1\hbox{%
73       \begingroup\aftergroup}%
74         \def\noexpand\@currenvir{\@currenvir}%
75         \def\noexpand\@currenvline{\on@line}{}%
76     \reserved@a
77     \endpfalse
78     \color@setgroup
79     \ignorespaces}%
80 \def\endlrbox{\unskip\color@endgroup}

\usebox unchanged
81 \def\usebox#1{\leavevmode\copy #1\relax}

\frame The following definition of \frame was written by Pavel Curtis (Extra space
removed 14 Jan 88) RmS 92/08/24: Replaced occurrence of \@halfwidth by
\@wholewidth
82 \long\def\frame#1{%
83   \leavevmode
84   \hbox{%
85     \hskip-\@wholewidth
86     \vbox{%
87       \vskip-\@wholewidth
88       \hrule \@height\@wholewidth
89     }%
90   }%
91 }
```

```

89      \hbox{%
90          \vrule\@width\@wholewidth
91          #1%
92          \vrule\@width\@wholewidth}%
93      \hrule\@height\@wholewidth
94      \vskip-\@wholewidth}%
95      \hskip-\@wholewidth}

\fboxrule user level parameters,
\fboxsep 96 \newdimen\fboxrule
97 \newdimen\fboxsep

\fbox Abbreviated framed box command.
98 \long\def\fbox#1{%
99   \leavevmode
100  \setbox\@tempboxa\hbox{%
101    \color@begingroup
102    \kern\fboxsep{#1}\kern\fboxsep
103    \color@endgroup}%
104  \frameb@x\relax}

\framebox Framed version of \makebox.
105 \def\framebox{%
106   \ifnextchar(%)
107     \framepicbox{\ifnextchar[\@framebox\fbox}{}}}

\@framebox Deal with optional arguments.
108 \def\@framebox[#1]{%
109   \ifnextchar[%]
110     {\@iframebox[#1]}%
111     {\@iframebox[#1][c]}}}

\@iframebox The handling the optional arguments. In order to set the whole box, including the frame to the specified dimension, we first determine that dimension from the natural size of the text, #3. calculated width.
112 \long\def\@iframebox[#1][#2]\#3{%
113   \leavevmode
114   \begin@tempboxa\hbox{#3}%
115   \setlength\@tempdima{#1}%
116   \setbox\@tempboxa\hb@xt@\@tempdima
117   {\kern\fboxsep\csname bm@\#2\endcsname\kern\fboxsep}%
118   \frameb@x{\kern-\fboxrule}%
119   \end@tempboxa}

\@frameb@x Common part of \framebox and \fbox. #1 is a negative kern in the \framebox case so that the vertical rules do not add to the width of the box.
120 \def\@frameb@x#1{%
121   \tempdima\fboxrule
122   \advance\tempdima\fboxsep
123   \advance\tempdima\dp\@tempboxa
124   \hbox{%
125     \lower\@tempdima\hbox{%
126       \vbox{%
127         \hrule\@height\fboxrule
128         \hbox{%
129           \vrule\@width\fboxrule
130           #1%
131           \vbox{%
132             \vskip\fboxsep
133             \box\@tempboxa
134             \vskip\fboxsep}}%}

```

```

135      #1%
136      \vrule\@width\fboxrule}%
137      \hrule\@height\fboxrule}%
138      }%
139      }%
140 }

\@framepicbox Picture mode version.

141 \def\@framepicbox(#1,#2){%
142   \@ifnextchar[{ \@framepicbox(#1,#2){\@framepicbox(#1,#2)[ ]}}}

\@ifframepicbox Picture mode version.

143 \long\def\@ifframepicbox(#1,#2)[#3]#4{%
144   \frame{\@imakepicbox(#1,#2)[#3]{#4}}}

\parbox The main vertical-box command for LATEX.

145 \def\parbox{%
146   \ifnextchar[%]
147     \@iparbox
148     {\@iiiparbox c\relax[s]}}}

\@iparbox Optional argument handling.

149 \def\@iparbox[#1]{%
150   \ifnextchar[%]
151     {\@iiparbox{#1}}%
152     {\@iiiparbox{#1}\relax[s]}}}

\@iiparbox Optional argument handling.

153 \def\@iiparbox#1[#2]{%
154   \ifnextchar[%]
155     {\@iiparbox{#1}{#2}}%
156     {\@iiparbox{#1}{#2}[#1]}}}

\@iiiparbox The internal version of \parbox.

\@parboxto 157 \let\@parboxto\@empty
158 \long\def\@iiiparbox#1#2[#3]#4#5{%
159   \leavevmode
160   \pboxswfalse
161   \setlength{\tempdima}{#4}%
162   \begin{tempboxa}\vbox{\hsize\tempdima\parboxrestore#5\@par}%
163   \ifx\relax#2\else
164     \setlength{\tempdimb}{#2}%
165     \edef\@parboxto{to\the\tempdimb}%
166   \fi
167   \if#1b\vbox
168     \else\if #1t\vtop
169       \else\ifmmode\vcenter
170         \else\pboxswtrue \$\vcenter
171       \fi\fi\fi
172     \parboxtof\let\hss\vss\let\unhbox\unvbox
173       \csname bm#3\endcsname}%
174     \if\pboxsw \m@th\fi
175   \endtempboxa}

\@arrayparboxrestore Restore various paragraph parameters.

The rational for allowing two normally global flags to be set locally here was
stated originally by Donald Arsenu and extended by Chris Rowley. It is because
these flags are only set globally to true by section commands, and these should
never appear within boxes or, indeed, in any group; and they are only ever set
globally to false when they are definitely true.

```

If anyone is unhappy with this argument then both flags should be treated as in `\set@nobreak`; otherwise this command will be redundant.

```
176 \def\@arrayparboxrestore{%
177   \let\if@nobreak\iffalse
178   \let\if@noskipsec\iffalse
179   \let\par\@@par
180   \let\-\@dischyp
Redefined accents to allow changes in font encoding
181   \let\'\@acci\let`\'@accii\let=\@acciii
182   \parindent\z@\parskip\z@skip
183   \everypar{}%
184   \linewidth\hsize
185   \totalleftmargin\z@
186   \leftskip\z@skip \rightskip\z@skip \rightskip\z@skip
187   \parfillskip\@flushglue \lineskip\normalineskip
188   \baselineskip\normalbaselineskip
189   \sloppy}
```

`\parboxrestore` Restore various paragraph parameters, and also `\``.

```
190 \def\@parboxrestore{\@arrayparboxrestore\let\\\"@normalcr}
```

`\if@minipage` Switch that is true at the start of a minipage.

```
191 \def\@minipagefalse{\global\let\if@minipage\iffalse}
192 \def\@minipagetrue {\global\let\if@minipage\iftrue}
193 \c@minipagefalse
```

`\minipage` Essentially an environment form of `\parbox`.

```
194 \def\minipage{%
195   \c@ifnextchar[%
196     \c@iminipage
197     {\c@iiminipage c\relax[s]}}}
```

`\c@iminipage` Optional argument handling.

```
198 \def\c@iminipage[#1]{%
199   \c@ifnextchar[%
200     {\c@iiminipage{#1}}%
201     {\c@iiminipage{#1}\relax[s]}}}
```

`\c@iiminipage` Optional argument handling.

```
202 \def\c@iiminipage[#1][#2]{%
203   \c@ifnextchar[%
204     {\c@iiminipage{#1}{#2}}%
205     {\c@iiminipage{#1}{#2}[#1]}}
```

`\c@iiminipage` Internal form of `minipage`.

```
206 \def\c@iiminipage#1#2[#3]{#4}%
207   \leavevmode
208   \pboxswfalse
209   \setlength\tempdima{#4}%
210   \def\c@mpargs{{#1}{#2}[#3]{#4}}%
211   \setbox\tempboxa\vbox\bgroup
212     \color@begingroup
213       \hsize\tempdima
214       \textwidth\hsize \columnwidth\hsize
215       \parboxrestore
216       \def\c@mpfn{\mpfootnote}\def\thempfn{\thempfootnote}\c@mpfootnote\z@
217       \let\c@footnotetext\mpfootnotetext
218       \let\c@listdepth\mplistdepth \c@mplistdepth\z@
219       \c@minipagerestore
220       \c@setminipage}
```

\@minipagerestore Hook so that other styles can reset other commands in a minipage.

221 \let\@minipagerestore=\relax

\endminipage

222 \def\endminipage{%

223   \par

224   \unskip

225   \ifvoid\@mpfootins\else

226     \vskip\skip\@mpfootins

227     \normalcolor

228     \footnoterule

229     \unvbox\@mpfootins

230   \fi

231   \@minipagefalse %% added 24 May 89

232   \color@endgroup

233   \egroup

234   \expandafter\@iiiparbox\@mpargs{\unvbox\@tempboxa}}

\@mplistdepth Versions of \@listdepth and \footins local to minipage.

\@mpfootins 235 \newcount\@mplistdepth

236 \newinsert\@mpfootins

\@mpfootnotetext Minipage version of \@footnotetext.

Final \strut added 27 Mar 89, on suggestion by Don Hosek

237 \long\def\@mpfootnotetext#1{%

238   \global\setbox\@mpfootins\vbox{%

239     \unvbox\@mpfootins

240     \reset@font\footnotesize

241     \hsize\columnwidth

242     \@parboxrestore

243     \protected@edef\@currentlabel

244       {\csname p@\@mpfootnote\endcsname\@thefnmark} %

245     \color@begingroup

246       \@makefntext{%

247         \rule{z@\footnotesep}{.1em}\ignorespaces#1\@finalstrut\strutbox} %

248       \color@endgroup}}

249 \newif\if@pboxsw

\rule Draw a rule of the specified size.

250 \def\rule{\@ifnextchar[\@rule{\@rule[\z@]}}

\@rule Internal form of \rule.

251 \def\@rule[#1]#2#3{%

252   \leavevmode

253   \hbox{%

254     \setlength\@tempdima{#1} %

255     \setlength\@tempdimb{#2} %

256     \setlength\@tempdimc{#3} %

257     \advance\@tempdimc\@tempdima

258     \vrule\@width\@tempdimb\@height\@tempdimc\@depth-\@tempdima)}

\@@underline Saved primitive \underline.

259 \let\@@underline\underline

\underline LATEX version works outside math.

260 \def\underline#1{%

261   \relax

262   \ifmmode\@@underline{#1} %

263   \else \\$\@@underline{\hbox{#1}}\\$ \m@th\\$ \relax \fi}

\raisebox Raise a box, and change its vertical dimensions.

```

264 \def\raisebox#1{%
265   \leavevmode
266   \@ifnextchar[{\@rsbox{#1}}{\@irsbox{#1}[]}]}
```

\@rsbox Optional argument handling.

```

267 \def\@rsbox[#2]{%
268   \@ifnextchar[{\@iirsbox{#1}[#2]}{\@irsbox{#1}[#2]}}
```

\@argsbox ...

\@irsbox Internal version of \raisebox (less than two optional args).

```

269 \long\def\@irsbox[#2][#3]{%
270   \begin{tempboxa}\hbox{#3}%
271   \setlength{\tempdima}{#1}%
272   \ifx\\#2\\\else\setlength{\tempdimb}{#2}\fi
273   \setbox\@tempboxa\hbox{\raise\@tempdima\box\@tempboxa}%
274   \ifx\\#2\\\else\ht\@tempboxa\@tempdimb\fi
275   \box\@tempboxa
276 \end{tempboxa}}
```

\@iirsbox Internal version of \raisebox (two optional args).

```

277 \long\def\@iirsbox[#2][#3][#4]{%
278   \begin{tempboxa}\hbox{#4}%
279   \setlength{\tempdima}{#1}%
280   \setlength{\tempdimb}{#2}%
281   \setlength{\dimen@}{#3}%
282   \setbox\@tempboxa\hbox{\raise\@tempdima\box\@tempboxa}%
283   \ht\@tempboxa\@tempdimb
284   \dp\@tempboxa\dimen@
285   \box\@tempboxa
286 \end{tempboxa}}
```

\@finalstrut This macro adds a special strut the *depth* of the box given as #1, and height and width 0pt. It is used for ensuring that the last line of a paragraph has the correct depth in ‘p’ columns of tables and in footnotes. In vertical mode nothing is done, as adding the strut (as done in 2.09) would start a new paragraph. It would be possible to inspect \prevdepth to check the depth of the just-completed paragraph, but we do not do that here. Actually we do even less now, skip the vmode test as it broke tabular ‘p’ columns.

The \nobreak was added (1995/10/31) to allow hyphenation of the final word of the paragraph.

```

287 \def\@finalstrut#1{%
288   \unskip\ifhmode\nobreak\fi\vrule\@width\z@\@height\z@\@depth\dp#1}
```

## 57.1 Some low-level constructs

The following commands are basically inherited from plain TeX.

\leftline These macros place text on a full line either centred or left or right adjusted.

\rightline

```

289 \def\@line{\hb@xt@{\hsize}
```

\centerline

```

290 \def\leftline#1{\@line{#1\hss}}
291 \def\rightline#1{\@line{\hss#1}}
292 \def\centerline#1{\@line{\hss#1\hss}}
```

\rlap These macros place text to the left or right of the current reference point without taking up space.

```

293 \def\rlap#1{\hb@xt@{\z@}{#1\hss}}
294 \def\llap#1{\hb@xt@{\z@}{\hss#1}}
```

295 ⟨/2ekernel⟩

# File C

## lttab.dtx

### 58 Tabbing, Tabular and Array Environments

This section deals with ‘Lining It Up in Columns’. First the `tabbing` environment is defined, and then in second part, `tabular` together with its variants, `tabular*` and `array`.

Note that the `tabular` defined here is essentially the original L<sup>A</sup>T<sub>E</sub>X 2.09 version, not the extended version described in *The L<sup>A</sup>T<sub>E</sub>X Companion*. Use the `array` package to obtain the extended version.

#### 58.1 tabbing

```
\dimen\@firsttab = distance of tab stop i from left margin  
      0 <= i <= 15 (?).
```

`\dimen\@firsttab` is initialized to `\@totalleftmargin`, so it starts at the prevailing left margin.

```
\@maxtab      = number of highest defined tab register  
                 probably = \@firsttab + 12  
\@nxttabmar = tab stop number of next line's left margin  
\@curtabmar = tab stop number of current line's left margin  
\@curtab    = number of the current tab. At start of line,  
                 it equals \@curtabmar  
\@heightab  = largest tab number currently defined.  
\@tabpush   = depth of \pushtab's  
  
\box\@curline = contents of current line, excluding left margin  
                 skip, and excluding contents of current field  
\box\@curfield = contents of current field  
  
\@rjfield     = switch: T iff the last field of the line should  
                 be right-justified at the right margin.  
  
\tabbingsep   = distance left by the \` command between the  
                 current position and the field that is  
                 “left-shifted”.
```

#### UTILITY MACROS

```
\@stopfield : closes the current field  
\@addfield  : adds the current field to the current line.  
\@contfield : continues the current field  
\@startfield : begins the next field  
\@stopline   : closes the current line and outputs it  
\@startline  : starts the next line  
\@ifatmargin : an \if that is true iff the current line.  
                 has width zero
```

```
\@startline ==  
BEGIN  
  \@curtabmar :=G \@nxttabmar  
  \@curtab :=G \@curtabmar  
  \box\@curline :=G null  
  \@startfield
```

```

\strut
END

\@stopline ==
BEGIN
  \unskip
  \@stopfield
  if @rjfield = T
    then @rjfield :=G F
      \tempdima := \totalleftmargin + \ linewidth
      \hb@xt@ \tempdima{\itemfudge
        \hskip \dimen\curtabmar
        \box\curline
        \hfil
        \box\curfield}
    else \addfield
      \hbox {\itemfudge
        \hskip \dimen\curtabmar
        \box\curline}
  fi
END

\@startfield ==
BEGIN
  \box\curfield :=G \hbox {
END

\@stopfield ==
BEGIN
  }
END

\@contfield ==
BEGIN
  \box\curfield :=G \hbox { \unhbox\currfield %%} brace
matching
END
\@addfield ==
BEGIN
  \box\curline :=G \unbox\curline * \unbox\curfield
END

\@ifatmargin ==
BEGIN
  if dim of box\curline = 0pt then
END

\tabbing ==
BEGIN
  \lineskip :=L 0pt
  \> == \rtab
  \< == \ltab
  \= == \settab
  \+ == \tabplus
  \- == \tabminus
  \` == \tabrj

```

```

\` == \@tablab
\\ == BEGIN \@stopline \@startline END
\\[DIST] == BEGIN
    \@stopline \vskip DIST \@startline\ignorespaces
END
\\* == BEGIN \@stopline \penalty 10000 \@startline END
\\*[DIST] == BEGIN \@stopline \penalty 10000 \vskip DIST
    \@startline\ignorespaces END
\@hightab := \@nxttabmar :=G \@firsttab
\@tabpush :=G 0
\dimen\@firsttab := \@totallleftmargin
@rjfield :=G F
\trivlist \item\relax
if @minipage = F then \vskip \parskip fi
\box\@tabfbox = \rlap{\indent\the\everypar}
    % note: \the\everypar sets @inlabel :=G F
\@itemfudge == BEGIN \box\@tabfbox END
\@startline
\ignorespaces
END

\@endtabbing ==
BEGIN
\@stopline
if \@tabpush > 0 then error message: "unmatched \poptabs" fi
\endtrivlist
END

\@rtab ==
BEGIN
\@stopfield
\@addfield
if \@curtab < \@hightab
    then \@curtab :=G \@curtab + 1
    else error message "Undefined Tab" fi
\tempdima := \dimen\@curtab - \dimen\@curtabmar
    - width of box \@curline
\box\@curline :=G \hbox{\unhbox\@curline + \hskip\@tempdima}
\@startfield
END

\@settab ==
BEGIN
\@stopfield
\@addfield
if \@curtab < \@maxtab
    then \@curtab :=G \@curtab+1
    else error message: "Too many tabs" fi
if \@curtab > \@hightab
    then \@hightab :=L \@curtab fi
\dimen\@curtab :=L \dimen\@curtabmar + width of \box\@curline
\@startfield
END

\@ltab ==
BEGIN
\@ifatmargin

```

```

then if \@curtabmar > \@firsttab
    then \@curtab :=G \@curtab - 1
        \@curtabmar :=G \@curtabmar - 1
        else error message "Too many untabs"      fi
    else error message "Left tab in middle of line"
fi
END

\@tabplus ==
BEGIN
if \@nxttabmar < \@hightab
    then \@nxttabmar :=G \@nxttabmar+1
    else error message "Undefined tab"
fi
END

\@tabminus ==
BEGIN
if \@nxttabmar > \@firsttab
    then \@nxttabmar :=G \@nxttabmar-1
    else error message "Too many untabs"
fi
END

\@tabrj ==
BEGIN \@stopfield
    \@addfield
    @rjfield :=G T
    \@startfield
END

\@tablab ==
BEGIN \@stopfield
    \box\@curline G:= \hbox{\box\@curline %% 'G' added 17 Jun 86
        \hskip - width of \box\@curfield
        \hskip -\tabbingsep
        \box\@curfield
        \hskip \tabbingsep }
    \@startfield
END

\pushtabs ==
BEGIN
    \@stopfield
    \@tabpush :=G \@tabpush + 1
    \begingroup
    \@contfield
END

\poptabs ==
BEGIN
    \@stopfield
    if \@tabpush > 0
        then \endgroup
            \@tabpush :=G \@tabpush - 1
        else error message: "Too many \poptabs"
    fi

```

```

    \@contfield
END

\@a The accents ` , ' , and `= that have been redefined inside a tabbing environment can be called by typing `a` , `a` , and `a=`. The macro `a is defined in ltoutenc.dtx.

The ‘2ekernel’ code ensures that a \usepackage{autotabg} is essentially ignored if a ‘full’ format is being used that has picture mode already in the format.
1 <2ekernel>\expandafter\let\csname ver@autotabg.sty\endcsname\fmtversion

\@firsttab
\@maxtab 2 (*2ekernel | autoload)
3 \newdimen\@gtempa
4 \chardef\@firsttab=\the\allocationnumber
5 \newdimen\@gtempa\newdimen\@gtempa\newdimen\@gtempa\newdimen\@gtempa
6 \newdimen\@gtempa\newdimen\@gtempa\newdimen\@gtempa\newdimen\@gtempa
7 \newdimen\@gtempa\newdimen\@gtempa\newdimen\@gtempa\newdimen\@gtempa
8 \newdimen\@gtempa
9 \chardef\@maxtab=\the\allocationnumber
10 \dimen\@firsttab=0pt

\@nxttabmar
\@curtabmar 11 \newcount\@nxttabmar
\@curtab 12 \newcount\@curtabmar
\@hightab 13 \newcount\@curtab
\@tabpush 14 \newcount\@hightab
15 \newcount\@tabpush

\@curline
\@curfield 16 \newbox\@curline
\@tabbbox 17 \newbox\@curfield
18 \newbox\@tabbbox

19 </2ekernel | autoload>
20 <*2ekernel | def>

\if@rjfield
21 \newif\if@rjfield

\@startline It is, in some sense, an error if the current margin tab setting is higher than the value of \@hightab (which is a local variable). That this is allowed is a fundamental design flaw which is not going to be corrected now.
22 \gdef\@startline{%
23     \ifnum \@nxttabmar >\@hightab
24         \@badtab
25         \global\@nxttabmar \@hightab
26     \fi
27     \global\@curtabmar \@nxttabmar
28     \global\@curtab \@curtabmar
29     \global\setbox\@curline \hbox {}%
30     \@startfield
31     \strut}

\@stopline
32 \gdef\@stopline{%
33     \unskip
34     \@stopfield
35     \if@rjfield
36         \global\@rjfieldfalse

```

```

37   \@tempdima\@totallleftmargin
38   \advance\@tempdima\linewidth
39   \hb@xt@\@tempdima{%
40     \@itemfudge\hskip\dimen\@curtabmar
41     \box\@curline
42     \hfil
43     \box\@curfield}%
44   \else
45   \addfield
46   \hbox{\@itemfudge\hskip\dimen\@curtabmar\box\@curline}%
47   \fi}

\@startfield
48 \gdef\@startfield{%
49   \global\setbox\@curfield\hbox\bgroup\color@begingroup}

\@stopfield
50 \gdef\@stopfield{%
51   \color@endgroup\egroup}

\@contfield
52 \gdef\@contfield{%
53   \global\setbox\@curfield\hbox\bgroup\color@begingroup
54   \unhbox\@curfield}

\@addfield
55 \gdef\@addfield{\global\setbox\@curline\hbox{\unhbox
56   \@curline\unhbox\@curfield}{}}

\@ifatmargin
57 \gdef\@ifatmargin{\ifdim \wd\@curline =\z@}

\@tabcr
58 \gdef\@tabcr{\@stopline \@ifstar{\penalty \OM \@xtabcr}\@xtabcr}

\@xtabcr
59 \gdef\@xtabcr{\@ifnextchar[\@itabcr{\@startline\ignorespaces}{}}

\@itabcr
60 \gdef\@itabcr[#1]{\vskip #1\@startline\ignorespaces}
61 \gdef\kill{\@stopfield\@startline\ignorespaces}

\tabbing We use \relax to prevent \item from scanning too far.
62 \gdef\tabbing{\lineskip \z@skip\let>\@rtab\let<\@ltab\let\=\@settab
63   \let\+\@tabplus\let-\@tabminus\let\`{\@tabrj\let\`\@tablab
64   \let\=\@tabcr
65   \@height\@firssttab
66   \global\@nxttabmar\@firssttab
67   \dimen\@firssttab\@totallleftmargin
68   \global\@tabpush\z@ \global\@rjfieldfalse
69   \trivlist \item\relax
70   \if@minipage\else\vskip\parskip\fi

71   \setbox\@tabfbox\hbox{%
72     \rlap{\hskip\@totallleftmargin\indent\the\everypar}}%
73   \def\@itemfudge{\box\@tabfbox}%
74   \@startline\ignorespaces}

\endtabbing
75 \gdef\endtabbing{%
76   \@stopline\ifnum\@tabpush >\z@ \badpoptabs \fi\endtrivlist}

```

```

\@rtab Omitted \global added to \@rtab 17 Jun 86
77 \gdef\@rtab{\@stopfield\@addfield\ifnum \@curtab<\@hightab
78     \global\advance\@curtab \cne \else\@badtab\fi
79     \tempdima\dimen\@curtab
80     \advance\tempdima -\dimen\@curtabmar
81     \advance\tempdima -\wd\@curline
82     \global\setbox\@curline\hbox{\unhbox\@curline\hskip\tempdima}%
83     \@startfield\ignorespaces}

\@settab
84 \gdef\@settab{\@stopfield\@addfield
85   \ifnum \@curtab <\@maxtab
86     \ifnum\@curtab =\@hightab
87       \advance\@hightab \cne
88     \fi
89     \global\advance\@curtab \cne
90   \else
91     \@latexerror{Tab overflow}\ehd
92   \fi
93   \dimen\@curtab \dimen\@curtabmar
94   \advance\dimen\@curtab \wd\@curline
95   \@startfield
96   \ignorespaces}

\@ltab
97 \gdef\@ltab{\@ifatmargin\ifnum\@curtabmar >\@firsttab
98     \global\advance\@curtab \mone \global\advance\@curtabmar\mone\else
99     \@badtab\fi\else
100    \@latexerror{\string\<\space in mid line}\ehd\fi\ignorespaces}

\@tabplus
101 \gdef\@tabplus{%
102   \ifnum\@nxttabmar<\@hightab
103     \global\advance\@nxttabmar\cne
104   \else
105     \@badtab
106   \fi
107   \ignorespaces}

\@tabminus
108 \gdef\@tabminus{%
109   \ifnum\@nxttabmar>\@firsttab
110     \global\advance\@nxttabmar\mone
111   \else
112     \@badtab
113   \fi
114   \ignorespaces}

\@tabrj
115 \gdef\@tabrj{%
116   \@stopfield\@addfield\global\@rjfieldtrue\@startfield\ignorespaces}

\@tablab \setbox\@curline made \global in \@tablab. 17 Jun 86
117 \gdef\@tablab{%
118   \@stopfield
119   \global\setbox\@curline\hbox{%
120     \box\@curline
121     \hskip-\wd\@curfield \hskip-\tabbingsep
122     \box\@curfield
123     \hskip\tabbingsep}%
124   \@startfield
125   \ignorespaces}

```

```

\pushtabs
126 \gdef\pushtabs{%
127   \@stopfield\@addfield\global\advance\@tabpush \cne \begingroup
128     \@contfield}

\poptabs It is, in some sense, an error if, after the endgroup, the current tab setting is higher
          than the new value of \chightab (which is a local variable). That this is allowed
          is a fundamental design flaw which is not going to be corrected now.
129 \gdef\poptabs{\@stopfield\@addfield
130   \ifnum \@tabpush >\z@
131     \endgroup
132     \global\advance\@tabpush \m@ne
133     \ifnum \@curtab >\chightab
134       \global \@curtab \chightab
135       \@badtab
136     \fi
137   \else
138     \@badpoptabs
139   \fi
140   \@contfield}

141 </2ekernel | def>

\tabbingsep
142 <*2ekernel | autoload>
143 \newdimen\tabbingsep
144 </2ekernel | autoload>

\tabbing
145 <*autoload>
146 \def\tabbing{\@autoload{tabg}\tabbing}
147 </autoload>

```

## 58.2 array and tabular environments

ARRAY PARAMETERS:

\arraycolsep  
   : half the width separating columns in an array environment  
 \tabcolsep  
   : half the width separating columns in a tabular environment  
 \arrayrulewidth  
   : width of rules  
 \doublerulesep  
   : space between adjacent rules in array or tabular  
 \arraystretch  
   : line spacing in array and tabular environments is done by  
     placing a strut in every row of height and depth  
     \arraystretch times the height and depth of the strut  
     produced by an ordinary \strut command.

PREAMBLE:

The PREAMBLE argument of an array or tabular environment can contain the following:

l,r,c : indicate where entry is to be placed.  
 | : for vertical rule  
 @{}{EXP} : inserts the text EXP in every column.  
        \arraycolsep or \tabcolsep spacing is suppressed.  
 \*{N}{PRE} : equivalent to writing N copies of PRE in the preamble.  
        PRE may contain \*{N'}{EXP'} expressions.

`p{LEN}` : makes entry in parbox of width LEN.

SPECIAL ARRAY COMMANDS:

`\multicolumn{N}{FORMAT}{ITEM}` : replaces the next N column

items by ITEM, formatted according to FORMAT.

FORMAT should contain at most one l,r or c.

If it contains none, then ITEM is ignored.

`\vline` : draws a vertical line the height of the current row. May appear in an array element entry.

`\hline` : draws a horizontal line between rows. Must appear either before the first entry (to appear above the first row) or right after a `\\"` command. If followed by another `\hline`, then adds a `\vskip` of `\doublerulesep`.

`\cline[i-j]` : draws horizontal lines between rows covering columns i through j, inclusive. Multiple commands may follow one another to provide lines covering several disjoint columns

`\extracolsep{WIDTH}` : for use inside an @ in the preamble. Causes a WIDTH space to be added between columns for the rest of the columns. This is in addition to the ordinary intercolumn space.

```
\array ==
BEGIN
  \@acol    == \@arrayacol
  \@classz  == \@arrayclassz
  \@classiv == \@arrayclassiv
  \\
  == \@arraycr
  \@haligno == NULL
  \@tabarray
END

\endarray{NAME} == BEGIN \crcr }} END

\tabular ==
BEGIN
  \@haligno == NULL
  \@tabular
END

\tabular*{WIDTH} ==
BEGIN
  \@haligno == to WIDTH
  \@tabular
END

\@tabular ==
BEGIN
  \leavevmode
  \hbox { $
    \@acol    == \@tabacol
    \@classz  == \@tabclassz
    \@classiv == \@tabclassiv
    \\
    == \@tabularcr
    \@tabarray
```

```

    END

\endtabular == BEGIN \crcr} } \$} END

\@tabarray == if next char = [ then \@array else \@array[c] fi

\@array[POS]{PREAMBLE} ==
BEGIN
  define \@arstrutbox to make \@arstrut produce strut of height
  and depth \arraystretch times the height and
  depth of a normal strut.
\@mkpream{PREAMBLE}
\@preamble == \halign \@halignto {\@tabskip=0pt\@arstrut
                                     eval{\@preamble}\@tabskip = 0pt\cr %%}
\@startpbox == \@@startpbox
\@endpbox == \@@endpbox
if POS = t then \vtop
  else if POS = b then \vbox
  else \vcenter
fi
fi
{
\par      ==L {} % changed 92/09/18
\sharp     ==
\protect   == \relax
\lineskip :=L 0pt
\baselineskip :=L 0pt
\@preamble
END

\@arraycr ==
BEGIN
$           %% Prevents extra space at end of row's last entry.
if next char = [
  then \@argarraycr
else $ \cr    %% Needed to balance $
END

\@argarraycr[LENGTH] ==
BEGIN
$           %% Needed to balance $ of \@arraycr
if LENGTH > 0
  then \tempdima := depth of \@arstrutbox + LENGTH
       \vrule height 0pt width 0pt depth \tempdima
       \cr
  else \cr \noalign{\vskip LENGTH}
END

\@tabularcr and \@argtabularcr same as \@arraycr and
\@argarraycr
except without the extra $'s.

148 (*2ekernel | autoload)

\extracolsep
149 \def\extracolsep#1{\@tabskip #1\relax}

```

```

\array
150 \def\array{\let\@acol\@arrayacol \let\@classz\@arrayclassz
151 \let\@classiv\@arrayclassiv
152 \let\\@\arraycr\let\@halignto\@empty\@tabarray}

\endarray
\endtabular 153 \def\endarray{\crcr\egroup\egroup}
\endtabular* 154 \def\endtabular{\crcr\egroup\egroup $}\egroup}
155 \expandafter \let \csname endtabular*\endcsname = \endtabular

\tabular
156 \def\tabular{\let\@halignto\@empty\@tabular}

\tabular* Note that the change to use \setlength slightly alters the timing of the expansion
           and use of the length in #1 but this is very unlikely to have any practical effect.
157 \namedef{tabular*}{#1}%
158 \setlength\dimen@{#1}%
159 \edef\@halignto{to\the\dimen@}\@tabular

\@tabular
160 \def\@tabular{\leavevmode \hbox \bgroup \$\let\@acol\@tabacol
161 \let\@classz\@tabclassz
162 \let\@classiv\@tabclassiv \let\\@\tabularcr\@tabarray}

\@tabarray RmS 91/11/04 added \m@th.
163 \def\@tabarray{\m@th\ifnextchar[\@array{\@array[c]}}}

RmS 1993/11/03 changed \halign to \ialign and removed superfluous
\tabskip assignment

\@array
164 \def\@array[#1]{%
165 \if #1\top \else \if#1b\vbox \else \vcenter \fi\fi
166 \bgroup

This next bit of code sets up the strut and then builds the halign and its preamble
according to the specification in the second argument.

This code has been moved inside the box. A side effect of this has been to
expose what was a buglet in the previous version: since the \carstrut below is
expanded and contains an \ifmmode then it could produce an unnecessary extra
box in every row, thus wasting ‘lots of’ main memory.

167 \setbox\@carstrutbox\hbox{%
168 \vrule \height\arraystretch\ht\strutbox
169 \depth\arraystretch \dp\strutbox
170 \width\z@}%
171 \mkpream{#2}%
172 \edef\@preamble{%
173 \ialign \noexpand\@halignto
174 \bgroup \carstrut \preamble \tabskip\z@skip \cr}%

That is the end of setting up the preamble; now we reset things before executing
the halign built-up in \preamble. The restorations could be done by introducing
an extra group, thus saving tokens.

175 \let\@startpbox\@startpbox \let\@endpbox\@endpbox
176 \let\tabularnewline\\%
177 \let\par\empty
178 \let\sharp##%
179 \set@typeset@protect
180 \lineskip\z@skip\baselineskip\z@skip

```

If the parsing of the preamble goes wrong there may be some characters left which TeX then tries to typeset, i.e., we would be in horizontal mode. That would produce an endless loop because the `\halign` expects vertical mode thus issues a `\par` but that is a no-op at this point. So we better test this case issue some error message and make a crude recovery by ending that horizontal mode with force. A better fix would be to ensure that we never pick up more than a single character token (not done).

```

181     \ifhmode \@preamerr\z@ \@@par\fi
182     \@preamble}

\@arraycr Array version of \\.
183 \def\@arraycr{%
184   ${\ifnum0='}\fi\@ifstar\@xarraycr\@xarraycr}

\@arraycr
185 \def\@xarraycr{\@ifnextchar[\@argarraycr{\ifnum0='{\fi}{}\\}}
\@argarraycr
186 \def\@argarraycr[#1]{%
187   \ifnum0='{\fi}{}\\ \ifdim #1>\z@ \@xargarraycr[#1]\else
188     \@yargarraycr[#1]\fi}

\tabularnewline Tabular version of \\.
189 \let\tabularnewline\relax

\@tabularcr
190 \def\@tabularcr{%
191   ${\ifnum0='}\fi\@ifstar\@xtabularcr\@xtabularcr}

\@xtabularcr
192 \def\@xtabularcr{\@ifnextchar[\@argtabularcr{\ifnum0='{\fi}\\}}
\@argtabularcr
193 \def\@argtabularcr[#1]{%
194   \ifnum0='{\fi}%
195   \ifdim #1>\z@
196     \unskip\@xargarraycr[#1]%
197   \else
198     \@yargarraycr[#1]%
199   \fi}

\@xargarraycr
200 \def\@xargarraycr#1{\@tempdima #1\advance\@tempdima \dp \carstrutbox
201   \vrule \height\z@ \depth\@tempdima \width\z@ \\}
\@yargarraycr
202 \def\@yargarraycr#1{\cr\noalign{\vskip #1} }

\multicolumn \multicolumn{NUMBER}{FORMAT}{ITEM} ==
BEGIN
\multispan{NUMBER}
\begin{group}
\caddamp == null
\cmkpream{FORMAT}
\csharp == ITEM
\protect == \relax
\cstartpbox == \@@cstartpbox
\cendpbox == \@@cendpbox
\carstrut

```

```
\@preamble
\endgroup
END
```

The command `\def\@addamp{}` was removed from `\multicolumn` on 6 Dec 86 because it caused embedded array environments not to work. I think that it was included originally to prevent an error message if the 2nd argument to the `\multicolumn` command had two column specifiers.

8 Feb 89 — `\hbox{}` added after `\@preamble` to correct bug that occurred if `\multicolumn` preceded `\[\D]` with  $D > 0$ , caused by `\[]` command doing an `\unskip`, which removed `\tabcolsep` glue inserted by `\multicolumn`.

This has been made long so that, for example, a p-column can contain multiple paragraphs; maybe the arguments of @-expressions should also be able to contain multiple paragraphs.

```
203 \long\def\multicolumn#1#2#3{\multispan{#1}\begingroup
204   \mkpream{#2}%
205   \def\sharp{#3}\set@typeset@protect
206   \let\startpbox\@startpbox\let\endpbox\@endpbox
207   \carstrut \preamble\hbox{}\endgroup\ignorespaces}
```

Codes for classes and character numbers of array, tabular and multicolumn arguments.

Character	Class	Number
c	0	0
l	0	1
r	0	2
	1	-
@	2	-
p	3	-
{@-exp}	4	-
{p-arg}	5	-

```
\@testpach \foo : expands \foo, which should be an array parameter
token, and sets \chclass and \chnum to its class and
number. Uses \lastchclass to distinguish 4 and 5
```

Preamble error codes

- 0: 'illegal character'
- 1: 'Missing @-exp'
- 2: 'Missing p-arg'

```
\@addamp ==
BEGIN if @firststamp = true then @firststamp := false
else & fi
END
```

```
\@mkpream TOKENLIST ==
BEGIN
  @firststamp      := T
  \lastchclass    := 6
  \@preamble      == null
  \@sharp          == \relax
  \protect         == BEGIN \noexpand\protect\noexpand END
  \@startpbox     == \relax
  \@endpbox       == \relax
  \@expast{TOKENLIST}
```

```

for \cnextchar := expand(\reserved@a)
  do \ctestpach{\cnextchar}
    case of \chclass
      0 -> \classz
      1 -> \classi
      ...
      5 -> \classv
    end case
    \lastchclass := \chclass
  od
  case of \lastchclass
    0 -> \hskip \arraycolsep           % lrc
    1 ->                                % |
    2 -> \preamerr1 % 'Missing @-exp'   % @@
    3 -> \preamerr2 % 'Missing p-arg'   % p
    4 ->                                % @-exp
    5 -> \hskip \arraycolsep           % p-exp
  end case
END

\arrayclassz ==
BEGIN
  \preamble := \preamble *
  case of \lastchclass
    0 -> \hskip \arraycolsep \addamp \hskip
\arraycolsep
    1 -> \addamp \hskip \arraycolsep
    2 -> % impossible
    3 -> % impossible
    4 -> \addamp
    5 -> \hskip \arraycolsep \addamp \hskip
\arraycolsep
    6 -> \addamp \hskip \arraycolsep
  end case
* case of \chnum
  0 -> \hfil$\relax\sharp$\hfil
  1 -> $\relax\sharp$\hfil
  2 -> \hfil$\relax\sharp$%
end case
END

\tabclassz == similar to \arrayclassz

\classi ==
BEGIN
  \preamble := \preamble *
  case of \lastchclass
    0 -> \hskip \arraycolsep \arrayrule
    1 -> \hskip \doublerulesep \arrayrule
    2 -> % impossible
    3 -> % impossible
    4 -> \arrayrule
    5 -> \hskip \arraycolsep \arrayrule
    6 -> \arrayrule
  end case
END

```

```

\@classii ==
BEGIN
  \@preamble := \@preamble *
    case of \@lastchclass
      0    ->
      1    -> \hskip .5\arrayrulewidth
      2    -> % impossible
      else ->
    end case
END

\@classiii ==
BEGIN
  \@preamble := \@preamble *
    case of \@lastchclass
      0 -> \hskip \arraycolsep \@addamp \hskip
\arraycolsep
      1 -> \@addamp \hskip \arraycolsep
      2 -> % impossible
      3 -> % impossible
      4 -> \@addamp
      5 -> \hskip \arraycolsep \@addamp \hskip
\arraycolsep
      6 -> \@addamp \hskip \arraycolsep
    end case
END

\@arrayclassiv ==
BEGIN  \@preamble := \@preamble * $ \@nextchar$ END

\@tabclassiv == same as \@arrayclassv except without the $ ... $

\@classv ==
BEGIN
  \@preamble :=
    \@preamble * \@startpbox{\@nextchar}\ignorespaces\@sharp
                                \@endpbox
END

\@expast{S}:
Sets \reserved@a := S with all instances of *{N}{STRING}
replaced by N copies of STRING, where N > 0. An *
appearing inside braces is ignored, but *-expressions
inside STRING are expanded, so nested *-expressions are
handled properly.

\@expast{S} == BEGIN  \@expast S *0x\@  END

\@expast S1 *{N}{S2} S3 \@ ==
BEGIN
  \reserved@a := S1
  \@tempcnta := N
  if \@tempcnta > 0
    then while \@tempcnta > 0 do \reserved@a := \reserved@a S2
                                     \@tempcnta := \@tempcnta - 1 od
        \reserved@b == \@expast
  else \reserved@b == \@exnoop

```

```

        fi
        \expandafter \reserved@b \reserved@a S3 \@@
END

\@xexnoop
208 \def\@xexnoop #1\@@{ }

\@expast
209 \def\@expast#1{\@xexpast #1*0x\@@}

\@xexpast
210 \def\@xexpast#1##2##3##4\@@{%
211   \edef\reserved@a{\#1}%
212   \tempcnta#2\relax
213   \ifnum\tempcnta>\z@%
214     \whilenum\tempcnta>\z@\do
215       {\edef\reserved@a{\reserved@a#3}\advance\tempcnta \m@ne}%
216     \let\reserved@b\@xexpast
217   \else
218     \let\reserved@b\@xexnoop
219   \fi
220   \expandafter\reserved@b\reserved@a #4\@@}

\if@firstamp
221 \newif\if@firstamp

\@addamp
222 \def\@addamp{%
223   \if@firstamp
224     \if@firstampfalse
225   \else
226     \edef\@preamble{\@preamble &}%
227   \fi}

\@arrayacol
\@tabacol 228 \def\@arrayacol{\edef\@preamble{\@preamble \hskip \arraycolsep}}
\@campacol 229 \def\@tabacol{\edef\@preamble{\@preamble \hskip \tabcolsep}}
\@acolampacol 230 \def\@campacol{\@addamp \@acol}
231 \def\@acolampacol{\@acol\@addamp\@acol}

\@mkpream
232 \def\@mkpream#1{\@firststamptrue\@lastchclass6
233   \let\@preamble\empty
234   \let\protect\unexpandable\protect
235   \let\sharp\relax
236   \let\startpbox\relax\let\endpbox\relax
237   \expast{\#1}%
238   \expandafter\@tfor \expandafter
239     \nextchar \expandafter:\expandafter=\reserved@a\do
240       {\@testpach\@nextchar
241       \ifcase \chclass \classz \or \classi \or \classii \or \classiii
242         \or \classiv \or \classv \fi\@lastchclass\chclass}%
243   \ifcase \lastchclass \acol
244     \or \or \preamerr \one\or \preamerr \tw@ \or \or \acol \fi}

\@arrayclassz
245 \def\@arrayclassz{\ifcase \lastchclass \acolampacol \or \campacol \or
246   \or \or \addamp \or
247   \acolampacol \or \if@firstampfalse \acol \fi
248   \edef\@preamble{\@preamble
249   \ifcase \chnum
250     \hfil$\relax\sharp$\hfil \or \$\relax\sharp$\hfil
251     \or \hfil$\relax\sharp$\fi}%

```

```
\@tabclassz RmS 91/08/14 inserted extra braces around entry for NFSS
```

```
252 \def\@tabclassz{%
253   \ifcase\@lastchclass
254     \@acolampacol
255   \or
256     \@ampacol
257   \or
258   \or
259   \or
260     \@addamp
261   \or
262     \@acolampacol
263   \or
264     \firststampfalse\@acol
265 \fi
266 \edef\@preamble{%
267   \@preamble%
268   \ifcase\@chnum
269     \hfil\ignorespaces\@sharp\unskip\hfil
270   \or
271     \hskip1sp\ignorespaces\@sharp\unskip\hfil
272   \or
273     \hfil\hskip1sp\ignorespaces\@sharp\unskip
274   \fi}{}}

\@classi
275 \def\@classi{%
276   \ifcase\@lastchclass
277     \@acol\@arrayrule
278   \or
279     \@addtopreamble{\hskip \doublerulesep}\@arrayrule
280   \or
281   \or
282   \or
283     \@arrayrule
284   \or
285     \@acol\@arrayrule
286   \or
287     \@arrayrule
288 \fi}{}}

\@classii
289 \def\@classii{%
290   \ifcase\@lastchclass
291   \or
292     \@addtopreamble{\hskip .5\arrayrulewidth}%
293 \fi}{}}

\@classiii
294 \def\@classiii{\ifcase\@lastchclass \@acolampacol \or
295   \@addamp\@acol \or
296   \or \or \@addamp \or
297   \@acolampacol \or \@ampacol \fi}{}}

\@tabclassiv
298 \def\@tabclassiv{\@addtopreamble\@nextchar}{}}

\@arrayclassiv
299 \def\@arrayclassiv{\@addtopreamble{$\@nextchar$}}{}}
```

```

\@classv
300 \def\@classv{\@addtopreamble{\@startpbox{\@nextchar}\ignorespaces
301 \@sharp\@endpbox}}
\@addtopreamble
302 \def\@addtopreamble#1{\edef\@preamble{\@preamble #1}}
\@chclass
\@lastchclass 303 \newcount\@chclass
\@chnum 304 \newcount\@lastchclass
305 \newcount\@chnum

\arraycolsep
\@tabcolsep 306 \newdimen\arraycolsep
\arrayrulewidth 307 \newdimen\@tabcolsep
\doublerulesep 308 \newdimen\arrayrulewidth
309 \newdimen\doublerulesep

\arraystretch
310 \def\arraystretch{1}      % Default value.

\@arstrutbox
\@arstrut 311 \newbox\@arstrutbox
312 \def\@arstrut{%
313   \relax\ifmmode\copy\@arstrutbox\else\unhcopy\@arstrutbox\fi}

\@arrayrule
314 \def\@arrayrule{\@addtopreamble{\hskip -.5\arrayrulewidth
315   \vrule \@width \arrayrulewidth\hskip -.5\arrayrulewidth}}
\@testpatch
316 \def\@testpatch#1{\@chclass \ifnum \@lastchclass=\tw@ 4 \else
317   \ifnum \@lastchclass=3 5 \else
318     \z@\if #1c\@chnum \z@\else
319       \if #1l\@chnum \one \else
320         \if #1r\@chnum \tw@\else
321           \@chclass \if #1|\one \else
322             \if #1@\tw@\else
323               \if #1p3 \else \z@\@preamerr 0\fi
324   \fi \fi \fi \fi \fi \fi
325 \fi}

\hline
326 \def\hline{%
327   \noalign{\ifnum0='}\fi\hrule \@height \arrayrulewidth \futurelet
328   \reserved@a\@xhline}

\@xhline
329 \def\@xhline{\ifx\reserved@a\hline
330   \vskip\doublerulesep
   Measure from the middle of the rules.
331   \vskip-\arrayrulewidth
332   \fi
333   \ifnum0='{\fi}\fi}

\vline
334 \def\vline{\vrule \@width \arrayrulewidth}

```

\cline The old L<sup>A</sup>T<sub>E</sub>X2.09 implementation of \cline used up quite a lot of memory and two precious count registers. This new (1995/09/14) implementation does not use any count registers. It is coded in a way that depends heavily on the definition of \multispan so that command has been moved here from the file `ltpplain.dtx`.

These counters are no longer declared.

```
335 \def\cline#1{\@cline#1\@nil}

336 \def\@cline#1-#2\@nil{%
337   \omit
```

Use the counter from \multispan.

```
338   \multicnt#1%
339   \advance\multispan\m@ne
340   \ifnum\multicnt=\@ne\@firstofone{\&\omit}\fi
341   \multicnt#2%
342   \advance\multicnt-#1%
343   \advance\multispan\@ne
```

The original had \unskip at this point, but how could a skip get here ???

```
344   \leaders\hrule\@height\arrayrulewidth\hfill
345   \cr
```

This is back spacing is fairly horrible, but it is what happened in the old version... An alternative would be to make \cline look ahead for a following \cline as does \hline. This would alter the spacing in existing documents so keep the old version in the kernel. Perhaps a package should do this differently.

```
346 \noalign{\vskip-\arrayrulewidth}
```

\mscount The \mscount counter is no longer declared, saving a csname and a register. It is declared in compatibility mode.

\multispan Modify \multispan slightly from its plain T<sub>E</sub>X definition to allow more efficient code sharing with \multicolumn. Also share a count register with \multiput.

```
\sp@n 347 \def\multispan{\omit\@multispan}

348 \def\@multispan#1{%
349   \multicnt#1\relax
350   \loop\ifnum\multicnt>\@ne \sp@n\repeat

351 \def\sp@n{\span\omit\advance\multicnt\m@ne}
```

\@startpbox Helper macros for ‘p’ columns.

```
\@endpbox  \@startpbox{\langle width\rangle} text \egroup is essentially \parbox{\langle width\rangle}{\langle text\rangle}
           \@endpbox is essentially \unskip \strut \par \egroup\hfil (Changed 14
           Jan 89) (changed again 1994/05/13)
```

```
352 \def\@startpbox#1{\vtop\bgroup \setlength\hsize{#1}\@arrayparboxrestore}
353 \def\@endpbox{\@finalstrut\@arstrutbox\par\egroup\hfil}
```

14 Jan 89: Def of \@endpbox changed from  
\def\@endpbox{\par\vskip\dp\@arstrutbox\egroup\hfil}  
so vertical spacing works out right if the last line of a ‘p’ entry has a descender.

```
\@@@startpbox
\@@@endpbox 354 \let\@@@startpbox=\@startpbox
355 \let\@@@endpbox=\@endpbox

356 </2ekernel | autoload>
```

# File D

## ltpictur.dtx

### 59 Picture Mode

Picture mode commands. In addition to the commands available in L<sup>A</sup>T<sub>E</sub>X2.09, This section adds the new `\qbezier` command for drawing curves.

`\qbezier` `\qbezier[(N)]((AX,AY))(BX,BY)((CX,CY))` plots a quadratic Bezier curve from  $(AX,AY)$  to  $(CX,CY)$ , with  $(BX,BY)$  as the third Bezier point, using  $N + 1$  points equally spaced parametrically. If  $N = 0$  (the default value), then a sufficient number of points are used to draw a connected curve—except that at most `\qbeziermax` + 1 points are drawn. A “point” is a square of side `\@wholewidth`.

`\bezier` In addition, to be compatible with the old `bezier` package, a variant of this command, `\bezier`, is defined, in which the first argument is not optional.

<code>\unitlength</code>	= value of dimension argument
<code>\@wholewidth</code>	= current line width
<code>\@halfwidth</code>	= half of current line width
<code>\@linefnt</code>	= font for drawing lines
<code>\@circlefnt</code>	= font for drawing circles

`\linethickness{DIM}` : Sets the width of horizontal and vertical lines in a picture to DIM. Does not change width of slanted lines or circles. Width of all lines reset by `\thinlines` and `\thicklines`

```
\picture(XSIZE,YSIZE)(XORG,YORG)
BEGIN
    \@picht := YSIZE * \unitlength
    box \@picbox :=
        \hb@xt@ XSIZE * \unitlength
        {\hspace{-XORG} * \unitlength
         \lower YORG * \unitlength
         \hbox{
            \ignorespaces      %% added 13 June 89
        }
    END
```

```
\endpicture ==
BEGIN
    } \hss }
height of \@picbox := \@picht
depth of \@picbox := 0
\mbox{\box\@picbox} %% change 26 Aug 91
END
```

```
\put(X, Y){OBJ} ==
BEGIN
    \@killglue
    \raise Y * \unitlength \hb@xt@ 0pt { \hspace{X * \unitlength}
                                                OBJ \hss
    }
    \ignorespaces
END
```

```
\multiput(X,Y)(DELX,DELY){N}{OBJ} ==
```

```

BEGIN
  \@killglue
  \@multicnt := N
  \@xdim := X * \unitlength
  \@ydim := Y * \unitlength
  while \@multicnt > 0
    do \raise \@ydim \hb@xt@ 0pt { \hskip \@xdim
      OBJ \hss }
    \@multicnt := \@multicnt - 1
    \@xdim := \@xdim + DELX * \unitlength
    \@ydim := \@ydim + DELY * \unitlength
  od
  \ignorespaces
END

\shortstack[POS]{TEXT} : Makes a \vbox containing TEXT stacked as
a one-column array, positioned l, r or c as indicated by POS.

The ‘2ekernel’ code ensures that a \usepackage{autopict} is essentially ig-
nored if a ‘full’ format is being used that has picture mode already in the format.

1 <2ekernel>\expandafter\let\csname ver@autopict.sty\endcsname\fmtversion

\@wholewidth
\@halfwidth 2 (*2ekernel | autoload)
3 \newdimen\@wholewidth
4 \newdimen\@halfwidth

\unitlength
5 \newdimen\unitlength \unitlength =1pt

\@picbox
\@picht 6 \newbox\@picbox
7 \newdimen\@picht
8 </2ekernel | autoload>

\picture #1 should be white space.

\pictur@ #1 should be a ( (eating any white space before the bracket),
9 (*2ekernel | def)
10 \long\gdef\picture#1{\pictur@#1}
11 \gdef\pictur@(#1){%
12   \@ifnextchar({\@picture(#1)}{\@picture(#1)(0,0)}}
13 </2ekernel | def>
14 (*autoload)
15 \def\pictur@{\@autoload{pict}}
16 \def\picture{\pictur@\picture}
17 </autoload>

\@picture
18 (*2ekernel | def)
19 \gdef\@picture(#1,#2)(#3,#4){%
20   \@picht#2\unitlength
21   \setbox\@picbox\hb@xt@#1\unitlength\bgroup
22   \hskip -#3\unitlength
23   \lower #4\unitlength\hbox\bgroup
24   \ignorespaces}

```

```

\endpicture
25 \gdef\endpicture{%
26   \egroup\hss\egroup
27   \ht\@picbox\@picht\dp\@picbox\z@
28   \mbox{\box\@picbox}%

In the definitions of \put and \multiput, \hskip was replaced by \kern just
in case arg #3 = "plus". (Bug detected by Don Knuth. changed 20 Jul 87).

29 \long\gdef\put(#1,#2)#3{%
30   \killglue\raise#2\unitlength
31   \hb@xt@\z@{\kern#1\unitlength #3\hss}%
32   \ignorespaces}

\multiput #3 had better be a (.
33 \gdef\multiput(#1,#2)#3{%
34   \xdim #1\unitlength
35   \ydim #2\unitlength
36   \multiput()

\multiput
37 \long\gdef\@multiput(#1,#2)#3#4{%
38   \killglue\multicnt #3\relax
39   \whilenum \multicnt >\z@\do
40     {\raise\ydim\hb@xt@\z@{\kern\xdim #4\hss}%
41      \advance\multicnt\m@ne
42      \advance\xdim#1\unitlength\advance\ydim#2\unitlength}%
43   \ignorespaces}

\@killglue
44 \gdef\@killglue{\unskip\whiledim \lastskip >\z@\do{\unskip}}
45 </2ekernel | def>

\thinlines
\thicklines 46 <2ekernel | def>
47 \gdef\thinlines{\let\linefnt\tenln \let\circlefnt\tencirc
48   \wholewidth\fontdimen8\tenln \halfwidth .5\wholewidth}
49 \gdef\thicklines{\let\linefnt\tenlnw \let\circlefnt\tencircw
50   \wholewidth\fontdimen8\tenlnw \halfwidth .5\wholewidth}
51 </2ekernel | def>
52 <autoload>
53 \def\thinlines{\pictur@\thinlines}
54 \def\thicklines{\pictur@\thicklines}
55 </autoload>

\linethickness
56 <2ekernel | def>
57 \gdef\linethickness#1{\wholewidth #1\relax \halfwidth .5\wholewidth}
58 </2ekernel | def>
59 <autoload>
60 \def\linethickness{\pictur@\linethickness}
61 </autoload>

\isshortstack
62 <2ekernel | def>
63 \gdef\shortstack{\ifnextchar[\@shortstack{\@shortstack[c]}}}

\@isshortstack
64 \gdef\@shortstack[#1]{%
65   \leavevmode
66   \vbox\bgroup

```

```

67  \baselineskip-\p@\\lineskip 3\\p@
68  \\let\\mb@1\\hss\\let\\mb@r\\hss
69  \\expandafter\\let\\csname mb@#1\\endcsname\\relax
70  \\let\\\\\\@stackcr
71  \\@ishortstack}

\\@ishortstack
72 \\gdef\\@ishortstack#1{\\ialign{\\mb@1 {##}\\unskip\\mb@r\\cr #1\\crcr}\\egroup}

\\@stackcr
\\@ixstackcr 73 \\gdef\\@stackcr{\\ifstar\\@ixstackcr\\@ixstackcr}
74 \\gdef\\@ixstackcr{\\ifnextchar[\\@istackcr{\\cr\\ignorespaces}}}

\\@istackcr
75 \\gdef\\@istackcr[#1]{\\cr\\noalign{\\vskip #1}\\ignorespaces}

\\line(X,Y){LEN} ==
BEGIN
    \\@xarg := X
    \\@yarg := Y
    \\@linelen := LEN * \\unitlength
    if \\@xarg = 0
        then \\@vline
    else if \\@yarg = 0
        then \\@hline
    else \\@sline
        if
    if
END

\\@sline ==
BEGIN
    if \\@xarg < 0
        then @negarg := T
            \\@xarg := -\\@xarg
            \\@yyarg := -\\@yarg
        else @negarg := F
            \\@yyarg := \\@yarg
    fi
    \\@tempcnta := |\\@yyarg|
    if \\@tempcnta > 6
        then error: 'LATEX ERROR: Illegal \\line or \\vector argument.'
            \\@tempcnta := 0
    fi
    \\box\\@linechar := \\hbox{\\@linefnt \\@getlinechar(\\@xarg,\\@yyarg)
}
    if \\@yarg > 0 then \\@upordown = \\raise
        \\@clnht := 0
    else \\@upordown = \\lower
        \\@clnht := height of \\box\\@linechar
    fi
    \\@clnwd := width of \\box\\@linechar
    if @negarg
        then \\hskip - width of \\box\\@linechar
            \\reserved@a == \\hskip - 2* width of box \\@linechar
        else \\reserved@a == \\relax
    fi

\\@shortstack
76 \\gdef\\@shortstack#1{\\ialign{\\mb@1 {##}\\unskip\\mb@r\\cr #1\\crcr}\\egroup}

\\@stackcr
\\@ixstackcr 77 \\gdef\\@stackcr{\\ifstar\\@ixstackcr\\@ixstackcr}
78 \\gdef\\@ixstackcr{\\ifnextchar[\\@istackcr{\\cr\\ignorespaces}}}

\\@istackcr
79 \\gdef\\@istackcr[#1]{\\cr\\noalign{\\vskip #1}\\ignorespaces}

\\line(X,Y){LEN} ==
BEGIN
    \\@xarg := X
    \\@yarg := Y
    \\@linelen := LEN * \\unitlength
    if \\@xarg = 0
        then \\@vline
    else if \\@yarg = 0
        then \\@hline
    else \\@sline
        if
    if
END

\\@sline ==
BEGIN
    if \\@xarg < 0
        then @negarg := T
            \\@xarg := -\\@xarg
            \\@yyarg := -\\@yarg
        else @negarg := F
            \\@yyarg := \\@yarg
    fi
    \\@tempcnta := |\\@yyarg|
    if \\@tempcnta > 6
        then error: 'LATEX ERROR: Illegal \\line or \\vector argument.'
            \\@tempcnta := 0
    fi
    \\box\\@linechar := \\hbox{\\@linefnt \\@getlinechar(\\@xarg,\\@yyarg)
}
    if \\@yarg > 0 then \\@upordown = \\raise
        \\@clnht := 0
    else \\@upordown = \\lower
        \\@clnht := height of \\box\\@linechar
    fi
    \\@clnwd := width of \\box\\@linechar
    if @negarg
        then \\hskip - width of \\box\\@linechar
            \\reserved@a == \\hskip - 2* width of box \\@linechar
        else \\reserved@a == \\relax
    fi

```

```

%% Put out integral number of line segments
while \@clnwd < \@linelen
    do \upordown \@clnht \copy\@linechar
        \reserved@a
        \@clnht := \@clnht + ht of \box\@linechar
        \@clnwd := \@clnwd + width of \box\@linechar
    od

%% Put out last segment
\@clnht := \@clnht - height of \box\@linechar
\@clnwd := \@clnwd - width of \box\@linechar
\@tempdima := \@linelen - \@clnwd
\@tempdimb := \@tempdima - width of \box\@linechar
if @negarg then \hskip -\@tempdimb
    else \hskip \@tempdimb
fi
\@tempdima := 1000 * \@tempdima
\@tempcpta := \@tempdima / width of \box\@linechar
\@tempdima := (\@tempcpta * ht of \box\@linechar)/1000
\@clnht := \@clnht + \@tempdima
if \@linelen < width of box\@linechar
    then \hskip width of box\@linechar
    else \hbox{\upordown \@clnht \copy\@linechar}
fi
END

\@hline ==
BEGIN
if \@xarg < 0 then \hskip -\@linelen \fi
\vrule height \@halfwidth depth \@halfwidth width \@linelen
if \@xarg < 0 then \hskip -\@linelen \fi
END

\@vline == if \@yarg < 0 \downline else \upline fi

\@getlinechar(X,Y) ==
BEGIN
\@tempcpta := 8*X - 9
if Y > 0
    then \@tempcpta := \@tempcpta + Y
    else \@tempcpta := \@tempcpta - Y + 64
fi
\char\@tempcpta
END

\vector(X,Y){LEN} ==
BEGIN
\@xarg := X
\@yarg := Y
\@linelen := LEN * \unitlength
if \@xarg = 0
    then \@vvector
    else if \@yarg = 0
        then \@hvector
        else \@svector
    if

```

```

if
END

\@hvector ==
BEGIN
  \@chline
  {\@linefnt if \@xarg < 0 then \@getlarrow(1,0)
   else \@getrarrow(1,0)
  fi}
END

\@vvector == if \@yarg < 0 \@downvector else \@upvector fi

\@svector ==
BEGIN
  \@sline
  \@tempcnta := |\@yarg|
  if \@tempcnta < 5
    then \hskip - width of \box\@linechar
        \@upordown \clnht \hbox
        {\@linefnt
         if @negarg then \@getlarrow(\@xarg,\@yyarg)
         else \@getrarrow(\@xarg,\@yyarg)
        fi }
  else error: 'LATEX ERROR: Illegal \line or \vector argument.'
  fi
END

\@getlarrow(X,Y) ==
BEGIN
  if Y = 0
    then \@tempcnta := '33
  else \@tempcnta := 16 * X - 9
    \@tempcntb := 2 * Y
    if \@tempcntb > 0
      then \@tempcnta := \@tempcnta + \@tempcntb
      else \@tempcnta := \@tempcnta - \@tempcntb + 64
    fi
  fi
  \char\@tempcnta
END

\@getrarrow(X,Y) ==
BEGIN
  \@tempcntb := |Y|
  case of \@tempcntb
    0 : \@tempcnta := '55
    1 : if X < 3
        then \@tempcnta := 24*X - 6
        else if X = 3
            then \@tempcnta := 49
            else \@tempcnta := 58 fi
    fi
    2 : if X < 3
        then \@tempcnta := 24*X - 3
        else \@tempcnta := 51      % X must = 3
    fi

```

```

3 : \@tempcnta := 16*X - 2
4 : \@tempcnta := 16*X + 7
endcase
if Y < 0
    then \@tempcnta := \@tempcnta + 64
fi
\char\@tempcnta
END

\if@negarg
76 \newif\if@negarg

\line
77 \gdef\line(#1,#2){\@xarg #1\relax \@yarg #2\relax
78   \@linelen #3\unitlength
79   \ifdim\@linelen<\z@\@badlinearg\else
80     \ifnum\@xarg =\z@ \@vline
81       \else \ifnum\@yarg =\z@ \@hline \else \@sline\fi
82     \fi
83   \fi}
84 \gdef\@sline{%
85   \ifnum\@xarg<\z@ \@negargtrue \@xarg -\@xarg \@yyarg -\@yarg
86   \else \@negargfalse \@yyarg \@yarg \fi
87 \ifnum \@yyarg >\z@ \@tempcnta\@yyarg \else \@tempcnta -\@yyarg \fi
88 \ifnum\@tempcnta>6 \@badlinearg\@tempcnta\z@ \fi
89 \ifnum\@xarg>6 \@badlinearg\@xarg \@ne \fi
90 \setbox\@linechar\hbox{\@linefnt\@getlinechar(\@xarg,\@yyarg)}%
If we have something like \line(5,5){30} the \@linechar will not contain a char
and later on we will end in an infinite loop. So we check the width of the box and
put in something as an emergency fix if necessary.
91 \ifdim\wd\@linechar=\z@
92   \setbox\@linechar\hbox{.}%
93   \@badlinearg
94 \fi
95 \ifnum \@yarg >\z@ \let\@upordown\raise \@clnht\z@
96   \else\let\@upordown\lower \@clnht \ht\@linechar\fi
97 \@clnwd \wd\@linechar
98 \if@negarg
99   \hskip -\wd\@linechar \def\reserved@a{\hskip -2\wd\@linechar}%
100 \else
101   \let\reserved@a\relax
102 \fi
103 \whiledim \@clnwd <\@linelen \do
104   {\@upordown\@clnht\copy\@linechar
105     \reserved@a
106     \advance\@clnht \ht\@linechar
107     \advance\@clnwd \wd\@linechar}%
108 \advance\@clnht -\ht\@linechar
109 \advance\@clnwd -\wd\@linechar
110 \tempdima\@linelen\advance\tempdima -\@clnwd
111 \tempdimb\tempdima\advance\tempdimb -\wd\@linechar
112 \if@negarg \hskip -\tempdimb \else \hskip \tempdimb \fi
113 \multiply\tempdima \@m
114 \tempcnta \tempdima
115 \tempdima \wd\@linechar \divide\tempcnta \tempdima
116 \tempdima \ht\@linechar \multiply\tempdima \tempcnta
117 \divide\tempdima \@m
118 \advance\@clnht \tempdima

```

```

119 \ifdim \clinenelen <\wd\linechar
120   \hskip \wd\linechar
    Warn if line gets so short that it can't be printed. But don't warn if it is exactly
    zero since that was probably deliberate (e.g., to get a vector head only).
121   \ifdim \clinenelen = \z@%
122   \else
123     \picture@warn
124   \fi
125   \else\upordown\clnht\copy\linechar\fi}

\@hline

126 \gdef\@hline{\ifnum \xarg <\z@ \hskip -\clinenelen \fi
127 \vrule \height \halfwidth \depth \halfwidth \width \clinenelen
128 \ifnum \xarg <\z@ \hskip -\clinenelen \fi}

\getlinechar

129 \gdef\@getlinechar(#1,#2){\tempcnta#1\relax\multiply\tempcnta 8%
130   \advance\tempcnta -9\ifnum #2>\z@ \advance\tempcnta #2\relax\else
131   \advance\tempcnta -#2\relax\advance\tempcnta 64 \fi
132   \char\tempcnta}

\vector

133 \gdef\vector(#1,#2)#3{\xarg #1\relax \yarg #2\relax
134   \tempcnta \ifnum\xarg<\z@ -\xarg\else\xarg\fi
135   \ifnum\tempcnta<5\relax
136     \clinenelen #3\unitlength
137     \ifdim\clinenelen<\z@\badlinearg\else
138       \ifnum\xarg =\z@ \vvector
139         \else \ifnum\yarg =\z@ \hvector \else \svector\fi
140       \fi
141     \fi
142   \else\badlinearg\fi}

\@hvector

143 \gdef\@hvector{\hline\hb@xt@\z@{\clinefnt
144   \ifnum \xarg <\z@ \getarrow(1,0)\hss\else
145     \hss\getarrow(1,0)\fi}

\@vvector

146 \gdef\@vvector{\ifnum \yarg <\z@ \downvector \else \upvector \fi}

\@svector

147 \gdef\@svector{\sline
148   \tempcnta\yarg \ifnum\tempcnta <\z@ \tempcnta -\tempcnta\fi
149   \ifnum\tempcnta <5%
150     \hskip -\wd\linechar
151     \upordown\clnht \hbox{\clinefnt \if@negarg
152       \getarrow(\xarg,\yyarg)\else \getarrow(\xarg,\yyarg)\fi}%
153   \else\badlinearg\fi}

\@getarrow

154 \gdef\@getarrow(#1,#2){\ifnum #2=\z@ \tempcnta 27 \% '33
155   \else
156   \tempcnta #1\relax\multiply\tempcnta \sixt@%
157   \advance\tempcnta -9 \tempcntb #2\relax\multiply\tempcntb \tw@
158   \ifnum \tempcntb >\z@ \advance\tempcnta \tempcntb
159   \else\advance\tempcnta -\tempcntb\advance\tempcnta 64
160   \fi\fi\char\tempcnta}

```

```

\@getrarrow
161 \gdef\@getrarrow(#1,#2){\@tempcntb #2\relax
162 \ifnum\@tempcntb <\z@ \@tempcntb -\@tempcntb\relax\fi
163 \ifcase \@tempcntb\relax \@tempcnta 45 % '55
164 \or
165 \ifnum #1<\thr@@ \@tempcnta #1\relax\multiply\@tempcnta
166 24\advance\@tempcnta -6 \else \ifnum #1=\thr@@ \@tempcnta 49
167 \else\@tempcnta 58 \fi\fi\or
168 \ifnum #1<\thr@@ \@tempcnta=#1\relax\multiply\@tempcnta
169 24\advance\@tempcnta -\thr@@ \else \@tempcnta 51 \fi\or
170 \@tempcnta #1\relax\multiply\@tempcnta
171 \sixt@n \advance\@tempcnta -\tw@ \else
172 \@tempcnta #1\relax\multiply\@tempcnta
173 \sixt@n \advance\@tempcnta 7 \fi\ifnum #2<\z@ \advance\@tempcnta 64 \fi
174 \char\@tempcnta}

\@vline
175 \gdef\@vline{\ifnum \c@yarg <\z@ \@downline \else \@upline\fi}

\@upline
176 \gdef\@upline{%
177   \hb@xt@\z@{\hskip -\@halfwidth \vrule \c@width \c@wholewidth
178   \c@height \c@linelen \c@depth \z@\hss}}
\@downline
179 \gdef\@downline{%
180   \hb@xt@\z@{\hskip -\@halfwidth \vrule \c@width \c@wholewidth
181   \c@height \z@ \c@depth \c@linelen \hss}}
\@upvector
182 \gdef\@upvector{\@upline\setbox\@tempboxa\hbox{\c@linefnt\char 54}%
183   \raise \c@linelen \hb@xt@\z@{\lower \ht\@tempboxa\box\@tempboxa\hss}}
\@downvector
184 \gdef\@downvector{\@downline\lower \c@linelen
185   \hb@xt@\z@{\c@linefnt\char 63 % '77
186   \hss}}
\@dashbox{D}(X,Y) ==
BEGIN
leave vertical mode
\hb@xt@ 0pt {
  \baselineskip := 0pt
  \lineskip := 0pt
%% HORIZONTAL DASHES
  \c@dashdim := X * \unitlength
  \c@dashcnt := \c@dashdim + 200 % to prevent roundoff error
  \c@dashdim := D * \unitlength
  \c@dashcnt := \c@dashcnt / \c@dashdim
  if \c@dashcnt is odd
    then \c@dashdim := 0pt
    \c@dashcnt := (\c@dashcnt + 1) / 2
  else \c@dashdim := \c@dashdim / 2
    \c@dashcnt := \c@dashcnt / 2 - 1
  \box\@dashbox := \hbox{\vrule height \c@halfwidth
    depth \c@halfwidth width \c@dashdim}
  \put(0,0){\copy\@dashbox}
  \put(0,Y){\copy\@dashbox}

```

```

    \put(X,0){\hskip -\@dashdim\copy\dashbox}
    \put(X,Y){\hskip -\@dashdim\box\dashbox}
    \@dashdim := 3 * \@dashdim
  fi
  \box\dashbox := \hbox{\vrule height \@halfwidth
    depth \@halfwidth width D * \unitlength
    \hskip D * \unitlength}
  \tempcpta := 0
  \put(0,0){\hskip \@dashdim
    while \tempcpta < \@dascnt
      do \copy\dashbox
      \tempcpta := \tempcpta + 1
    od
  }
  \tempcpta := 0
  put(0,Y){\hskip \@dashdim
    while \tempcpta < \@dascnt
      do \copy\dashbox
      \tempcpta := \tempcpta + 1
    od
  }

%% vertical dashes
  \@dashdim := Y * \unitlength
  \@dashcnt := \@dashdim + 200 % to prevent roundoff error
  \@dashdim := D * \unitlength
  \@dashcnt := \@dashcnt / \@dashdim
  if \@dashcnt is odd
    then \@dashdim := 0pt
    \@dashcnt := (@dashcnt + 1) / 2
  else \@dashdim := \@dashdim / 2
    \@dashcnt := \@dashcnt / 2 - 1
  \box\dashbox := \hbox{\hskip -\@halfwidth
    \vrule width \@wholewidth
    height \@dashdim }
  \put(0,0){\copy\dashbox}
  \put(X,0){\copy\dashbox}
  \put(0,Y){\lower \@dashdim\copy\dashbox}
  \put(X,Y){\lower \@dashdim\copy\dashbox}
  \@dashdim := 3 * \@dashdim
fi
\box\dashbox := \hbox{\vrule width \@wholewidth
  height D * \unitlength } }

\tempcpta := 0
put(0,0){\hskip -\halfwidth
  \vbox{while \tempcpta < \@dashcnt
    do \vskip D*\unitlength
    \copy\dashbox
    \tempcpta := \tempcpta + 1
  od
  \vskip \@dashdim
} }

\tempcpta := 0
put(X,0){\hskip -\halfwidth
  \vbox{while \tempcpta < \@dashcnt
    do \vskip D*\unitlength
    \copy\dashbox
  }
}

```

```

          \tempcnta := \tempcnta + 1
        od
        \vskip \dashdim
      }
    }
}      % END DASHES

\imakepicbox(X,Y)
END

\Dashbox
187 \gdef\dashbox#1(#2,#3){\leavevmode\hb@xt@z@{\baselineskip \z@skip
188 \lineskip \z@skip
189 \dashdim #2\unitlength
190 \dashcnt \dashdim \advance\dashcnt 200
191 \dashdim #1\unitlength\divide\dashcnt \dashdim
192 \ifodd\dashcnt \dashdim \z@
193 \advance\dashcnt \one \divide\dashcnt \tw@
194 \else \divide\dashdim \tw@ \divide\dashcnt \tw@
195 \advance\dashcnt \m@ne
196 \setbox\dashbox \hbox{\vrule \height \halfwidth \depth \halfwidth
197 \width \dashdim}\put(0,0){\copy\dashbox}%
198 \put(0,#3){\copy\dashbox}%
199 \put(#2,0){\hskip-\dashdim\copy\dashbox}%
200 \put(#2,#3){\hskip-\dashdim\box\dashbox}%
201 \multiply\dashdim \thr@@
202 \fi
203 \setbox\dashbox \hbox{\vrule \height \halfwidth \depth \halfwidth
204 \width #1\unitlength\hskip #1\unitlength}\tempcnta\z@
205 \put(0,0){\hskip\dashdim \whilenum \tempcnta <\dashcnt
206 \do{\copy\dashbox\advance\tempcnta \one }}\tempcnta\z@
207 \put(0,#3){\hskip\dashdim \whilenum \tempcnta <\dashcnt
208 \do{\copy\dashbox\advance\tempcnta \one }}%
209 \dashdim #3\unitlength
210 \dashcnt \dashdim \advance\dashcnt 200
211 \dashdim #1\unitlength\divide\dashcnt \dashdim
212 \ifodd\dashcnt \dashdim \z@
213 \advance\dashcnt \one \divide\dashcnt \tw@
214 \else
215 \divide\dashdim \tw@ \divide\dashcnt \tw@
216 \advance\dashcnt \m@ne
217 \setbox\dashbox\hbox{\hskip -\halfwidth
218 \vrule \width \wholewidth
219 \height \dashdim}\put(0,0){\copy\dashbox}%
220 \put(#2,0){\copy\dashbox}%
221 \put(0,#3){\lower\dashdim\copy\dashbox}%
222 \put(#2,#3){\lower\dashdim\copy\dashbox}%
223 \multiply\dashdim \thr@@
224 \fi
225 \setbox\dashbox\hbox{\vrule \width \wholewidth
226 \height #1\unitlength}\tempcnta\z@
227 \put(0,0){\hskip -\halfwidth \vbox{\whilenum \tempcnta <\dashcnt
228 \do{\vskip #1\unitlength\copy\dashbox\advance\tempcnta \one }}%
229 \vskip\dashdim}\tempcnta\z@
230 \put(#2,0){\hskip -\halfwidth \vbox{\whilenum \tempcnta <\dashcnt
231 \do{\vskip #1\unitlength\copy\dashbox\advance\tempcnta \one }}%
232 \vskip\dashdim}}\makepicbox(#2,#3)}

```

## CIRCLES AND OVALS

### USER COMMANDS:

\circle{D} : Produces the circle with the diameter as close as possible to D \* \unitlength. \put(X,Y){\circle{D}} puts the circle with its center at (X,Y).

\oval(X,Y) : Makes an oval as round as possible that fits in the rectangle of width X \* \unitlength and height Y \* \unitlength. The reference point is the center.

\oval(X,Y)[POS] : Save as \oval(X,Y) except it draws only the half or quadrant of the oval indicated by POS. E.G., \oval(X,Y)[t] draws just the top half and \oval(X,Y)[br] draws just the bottom right quadrant. In all cases, the reference point is the same as the unqualified \oval(X,Y) command.

\@ovvert {DELTA1} {DELTA2} : Makes a vbox containing either the left side or the right side of the oval being constructed. The baseline will coincide with the outside bottom edge of the oval; the left side of the box will coincide with the left edge of the vertical rule. The width of the box will be \tempdima.

DELTA1 and DELTA2 are added to the character number in

\@tempcnta  
to get the characters for the top and bottom quarter circle pieces.

\@ovhorz : Makes an hbox containing the straight rule for either the top or the bottom of the oval being constructed. The baseline will coincide with bottom edge of the rule; the left side of the box will coincide with the left side of the oval. The width of the box will be \ovxx.

\@getcirc {DIAM} : Sets \tempcnta to the character number of the top-right quarter circle with the largest diameter less than or equal to DIAM.  
Sets \tempboxa to an hbox containing that character.  
Sets \tempdima to \wd \tempboxa, which is the distance from the circle's left outside edge to its right inside edge.  
(These characters are like those described in the TeXbook, pp. 389-90.)

```
\@getcirc {DIAM} ==
BEGIN
  \tempcnta      := integer coercion of (DIAM + 2pt)
                  + 2pt added 1 Nov 88
  \tempcnta      := \tempcnta / integer coercion of 4pt
  if \tempcnta > 10
    then \tempcnta := 10 fi
  if \tempcnta > 0
    then \tempcnta := \tempcnta-1
    else LaTeX Warning: Oval too small.
  fi
  \tempcnta      := 4 * \tempcnta
  \tempboxa       := \hbox{\circle{4*\tempcnta}}
  \tempdima       := \wd \tempboxa
END
```

```
\@put{X}{Y}{OBJ} ==
```

```

BEGIN
  \raise Y \hb@xt@ 0pt{\hskip X OBJ \hss}
END

\@oval(X,Y)[POS] ==
BEGIN
  \begingroup
    \boxmaxdepth := \maxdimen
    @ovt := @ovb := @ovl := @ovr := true
    for all E in POS
      do @ovE := false od
    \@ovxx := X * \unitlength
    \@ovyy := Y * \unitlength
    \tempdima := min(\@ovxx,\@ovyy)
    \getcirc{\tempdima-2pt} %% "-2pt" added 7 Dec 89
    \@ovro := \ht \tempboxa
    \@ovri := \dp \tempboxa
    \@ovdx := \@ovxx - \tempdima
    \@ovdx := \@ovdx/2
    \@ovdy := \@ovyy - \tempdima
    \@ovdy := \@ovyy/2
    \circlefnt
    \tempboxa :=
      \hbox{
        if @ovr
          then \ovvert{3}{2} \kern -\tempdima
        fi
        if @ovl
          then \kern \@ovxx \ovvert{0}{1} \kern
- \tempdima
            \kern -\@ovxx
        fi
        if @ovt
          then \ovhorz \kern -\@ovxx
        fi
        if @ovb
          then \raise \@ovyy \ovhorz
        fi
      }
    \@ovdx := \@ovdx + \@ovro
    \@ovdy := \@ovdy + \@ovro
    \ht\tempboxa := \dp\tempboxa := 0
    \put{-\@ovdx}{-\@ovdy}{\box\tempboxa}
  \endgroup
END

\@ovvert {DELTA1} {DELTA2} ==
BEGIN
  \vbox to \@ovyy {
    if @ovb
      then \tempcntb := \tempcnta + DELTA1
      \kern -\@ovro
      \hbox{ \char \tempcntb }
      \nointerlineskip
    else \kern \@ovri \kern \@ovdy
    fi
    \leaders \vrule width \wholewidth \vfil

```

```

        \nointerlineskip
        if @ovt
            then \tempcntb := \tempcnta + DELTA2
                \hbox { \char \tempcntb }
            else \kern \ovdy \kern \ovro
        fi
    }
END

\@ovhorz ==
BEGIN
\hb@xt@ \@ovxx{
    \kern \ovro
    if @ovr
        then
        else \kern \ovdx
    fi
    \leaders \hrule height \wholewidth \hfil
    if @ovl
        then
        else \kern \ovdx
    fi
    \kern \ovri
}
END

\circle{DIAM} ==
BEGIN
\begingroup
\boxmaxdepth := maxdimen
\tempdimb := DIAM * \unitlength
if \tempdimb > 15.5pt
    then \@getcirc{\tempdimb}
        \ovro := \ht \tempboxa
        \tempboxa := \hbox{
            \circlefont
            \tempcnta := \tempcnta + 2
            \char \tempcnta
            \tempcnta := \tempcnta - 1
            \char \tempcnta
            \kern -2\tempdima
            \tempcnta := \tempcnta + 2
            \raise \tempdima \hbox { \char \tempcnta }
            \raise \tempdima \box \tempboxa
        }
        \ht \tempboxa := \dp \tempboxa := 0
        \put{-\ovro}{-\ovro}{\tempboxa}
    else
        \@circ{\tempdimb}{96}
    fi
\endgroup
END

\circle*{DIAM} == \dot{DIAM} ==
\circ{DIAM*\unitlength}{112}

\circ{DIAM}{CHAR} ==

```

```

BEGIN
  \tempcnta := integer coercion of (DIAM + .5pt)/1pt.
  if \tempcnta > 15 then \tempcnta := 15 fi
  if \tempcnta > 1 then \tempcnta := \tempcnta - 1 fi
  \tempcnta := \tempcnta + CHAR
  \circlefont
  \char \tempcnta
END

\if@ovt If producing the Top Bottom Left or Right of an oval.

\if@ovb 233 \newif\if@ovt
\if@ovl 234 \newif\if@ovb
\if@ovr 235 \newif\if@ovl
236 \newif\if@ovr

237 </2ekernel | def>
238 (*2ekernel | autoload)

\@ovxx

\@ovyy 239 \newdimen\@ovxx
\@ovdx 240 \newdimen\@ovyy
\@ovdy 241 \newdimen\@ovdx
\@ovro 242 \newdimen\@ovdy
\@ovri 243 \newdimen\@ovro
244 \newdimen\@ovri

245 </2ekernel | autoload>

\advance\tempdima 2pt\relax added 1 Nov 88 to fix bug in which size of
drawn circle not monotonic function of argument of \circle, caused by different
rounding for dimensions of large and small circles.

246 (*2ekernel | def)

\@getcirc

247 \gdef\@getcirc#1{\tempdima #1\relax \advance\tempdima 2\p@
248   \tempcnta\tempdima
249   \tempdima 4\p@\divide\tempcnta\tempdima
250   \ifnum \tempcnta >10\relax
251     \picture@warn
252     \tempcnta 10\relax
253   \fi
254   \ifnum \tempcnta >\z@ \advance\tempcnta\m@ne

Warn if requirements for oval or circle can't be met.

255   \else \picture@warn \fi
256   \multiply\tempcnta 4\relax
257   \setbox\tempboxa \hbox{\circlefont
258   \char \tempcnta}\tempdima \wd \tempboxa}

\picture@warn Generic warning for lines, vectors (used in \@sline) and oval or circle (used un
\@getcirc) are not available at right size.

259 \def\picture@warn{\@latex@warning{%
260   \string\oval, \string\circle, or \string\line\space
261   size unavailable}}

```

\@put

```

262 \gdef\@put#1#2#3{\raise #2\hb@xt@z@\hskip #1#3\hss}

```

\oval

```

263 \gdef\oval(#1,#2){\ifnextchar[{\@oval(#1,#2)}{\@oval(#1,#2)[]}}

```

```

\@oval
264 \gdef\@oval(#1,#2)[#3]{\begingroup\boxmaxdepth \maxdimen
265   \ovttrue \ovbtrue \ovltrue \ovrtrue
266   \tfor\reserved@a :=#3\do{\csname @ov\reserved@a false\endcsname}%
267   \ovxx
268   #1\unitlength \ovyy #2\unitlength
269   \tempdimb \ifdim \ovyy >\ovxx \ovxx\else \ovyy \fi
270   \advance \tempdimb -2\p@
271   \getcirc \tempdimb
272   \ovro \ht\tempboxa \ovri \dp\tempboxa
273   \ovdx\ovxx \advance\ovdx -\tempdima \divide\ovdx \tw@
274   \ovdy\ovyy \advance\ovdy -\tempdima \divide\ovdy \tw@
275   \circlefnt \setbox\tempboxa
276   \hbox{\if@ovr \ovr32\kern -\tempdima \fi
277   \if@ovl \kern \ovxx \ovr01\kern -\tempdima \kern -\ovxx \fi
278   \if@ovt \ovhorz \kern -\ovxx \fi
279   \if@ovb \raise \ovyy \ovhorz \fi}\advance\ovdx\ovro
280   \advance\ovdy\ovro \ht\tempboxa\z@ \dp\tempboxa\z@
281   \put{-\ovdx}{-\ovdy}{\box\tempboxa}%
282 \endgroup}

\@ovvert
283 \gdef\@ovvert#1#2{\vbox to\ovyy{%
284   \if@ovb \tempcntb \tempcnta \advance \tempcntb #1\relax
285   \kern -\ovro \hbox{\char \tempcntb}\nointerlineskip
286   \else \kern \ovri \kern \ovdy \fi
287   \leaders\vrule \width \wholewidth\vfil \nointerlineskip
288   \if@ovt \tempcntb \tempcnta \advance \tempcntb #2\relax
289   \hbox{\char \tempcntb}%
290   \else \kern \ovdy \kern \ovro \fi}}}

\@ovhorz
291 \gdef\@ovhorz{\hb@xt@0\ovxx{\kern \ovro
292   \if@ovr \else \kern \ovdx \fi
293   \leaders\hrule \height \wholewidth\hfil
294   \if@ovl \else \kern \ovdx \fi
295   \kern \ovri}{}}

\circle
296 \gdef\circle{\inmatherr\circle\ifstar\dot\circle}

\@circle
297 \gdef\@circle#1{%
298   \begingroup \boxmaxdepth \maxdimen \tempdimb #1\unitlength
299   \ifdim \tempdimb >15.5\p@ \getcirc\tempdimb
300   \ovro\ht\tempboxa
301   \setbox\tempboxa\hbox{\circlefnt
302   \advance\tempcnta\tw@ \char \tempcnta
303   \advance\tempcnta\m@ne \char \tempcnta \kern -2\tempdima
304   \advance\tempcnta\tw@
305   \raise \tempdima \hbox{\char \tempcnta}\raise \tempdima
306   \box\tempboxa\ht\tempboxa\z@ \dp\tempboxa\z@
307   \put{-\ovro}{-\ovro}{\box\tempboxa}%
308   \else \circ\tempdimb{96}\fi\endgroup}

\@dot Internal form of \circle*.
309 \gdef\@dot#1{\tempdimb #1\unitlength \circ\tempdimb{112}{}}

\@circ
310 \gdef\@circ#1#2{\tempdima #1\relax \advance\tempdima .5\p@
311   \tempcnta\tempdima \tempdima \p@}

```

```

312  \divide\@tempcnta\@tempdima
313  \ifnum\@tempcnta >15\relax \atempcnta 15\relax \fi
314  \ifnum \atempcnta >\z@ \advance\atempcnta\m@ne\fi
315  \advance\atempcnta #2\relax
316  \circlefont \char\atempcnta}

317 ⟨/2ekernel | def⟩
318 ⟨*2ekernel | autoload⟩

\@xarg Counters used for manipulating the ‘slope’ arguments.
\@yarg 319 \newcount\@xarg
\@yyarg 320 \newcount\@yarg
          321 \newcount\@yyarg

\@multicnt Counter used in \multiput, and also \multicolumn.
322 \newcount\@multicnt

\@xdim Length registers.
\yxdim 323 \newdimen\@xdim
          324 \newdimen\@ydim

\@linechar Box for holding a line segment character, for sloping lines.
325 \newbox\@linechar

\@linelen Length of the line currently being built.
326 \newdimen\@linelen

\@clnwd Height and width of current line segment.
\@clnht 327 \newdimen\@clnwd
          328 \newdimen\@clnht

\@dashdim \dashbox internal registers.
\@dashbox 329 \newdimen\@dashdim
\@dashcnt 330 \newbox\@dashbox
          331 \newcount\@dashcnt

Initialization: “\thinlines”
332 \let\@linefont\tenln
333 \let\@circlefont\tencirc
334 \wholewidth\fontdimen8\tenln
335 \halfwidth .5\wholewidth
336 ⟨/2ekernel | autoload⟩

```

## 59.1 Curves

The new `\qbezier` command, based on the old `\bezier` defined in `bezier.sty`.

```

\qbezier[N] == \bezier{N}

\bezier{N}(AX,AY)(BX,BY)(CX,CY) ==
BEGIN
  IF N = 0
    THEN \@xdima := |BX - AX|
          \@xb := |CX - BX|
          \@xa := Max(\@xa, \@xb)
          \@ya := |BY - AY|
          \@yb := |CY - BY|
          \@ya := Max(\@ya, \@yb)
          @sc := Max(\@xa, \@ya)

```

```

    %% The coefficient .5 below is the degree of overlap of
    %% successive points, where 1 is no overlap and 0 is
    %% complete overlap. A coefficient of C multiplies
    %% the number of points plotted by 1/C.
    %%
    \cxa := .5 * \halfwidth
    @sc := @sc / \halfwidth
    @sc := Max(@sc, qbeziermax)
    ELSE @sc := N
    @scp := @sc+1
    \cxb := 2 * (BX - AX) * \unitlength
    \cxa := ((CX-AX)*\unitlength - \cxb)/@sc
    \cyb := 2 * (BY - AY) * \unitlength
    \aya := ((CY-AY)*\unitlength - \cyb)/@sc
    \pictdot := square rule of width \wholewidth
    \count@ := 0
    WHILE \count@ < @scp
        DO  \xdim := ((\count@*\cxa + @xb) / @sc) * \count@
            \ydim := ((\count@*\aya + @yb) / @sc) * \count@
            plot pt with relative coords (\xdim,\ydim)
            \count@ := \count@+1
    OD

```

**\qbeziermax** The maximum number of points to plot.

```

337 {*2ekernel | def}
338 {def}\ifx\qbeziermax\undefined
339 \gdef\qbeziermax{500}
340 {def}\fi

```

In the code below, to save registers \a... are not used. Instead other registers are reused.

```

\newcounter{@sc} -> \c@multicnt
\newcounter{@scp} -> \tempcnta
\newdimen\cxa -> \ovxx
\newdimen\cxb -> \ovdx
\newdimen\aya -> \ovyy
\newdimen\ayb -> \ovdy
\newsavebox{\pictdot} -> \tempboxa

```

**\qbezier** Main user-level command to plot quadratic bezier curves. #2 should be (.

```
341 \newcommand\qbezier[2][0]{\bezier{#1}{#2}}
```

**\bezier** Form of \bezier compatible with 2.09 *bezier.sty*, but modified to ignore spaces between its arguments. #2 should be white space, and #4 should be (.

```
342 \gdef\bezier#1#2(#3){\@bezier#1)(#3)}
```

**\@bezier**

```

343 \gdef\@bezier#1(#2,#3)(#4,#5)(#6,#7){%
344   \ifnum #1=\z@%
345     \ovxx #4\unitlength
346     \advance\ovxx -#2\unitlength
347     \ifdim \ovxx<\z@ \ovxx -\ovxx \fi
348     \ovdx #6\unitlength
349     \advance\ovdx -#4\unitlength
350     \ifdim \ovdx<\z@ \ovdx -\ovdx \fi
351     \ifdim \ovxx<\ovdx \ovxx \ovdx \fi
352     \ovyy #5\unitlength
353     \advance\ovyy -#3\unitlength

```

```

354      \ifdim \ovyy<\z@ \ovyy -\ovyy \fi
355      \ovdy #7\unitlength
356      \advance\ovdy -#5\unitlength
357      \ifdim \ovdy<\z@ \ovdy -\ovdy \fi
358      \ifdim \ovyy<\ovdy \ovyy \ovdy \fi
359      \multicnt
360      \ifdim \ovxx>\ovyy \ovxx \else \ovyy \fi
361      \ovxx .5\halfwidth \divide\multicnt\ovxx
362      \ifnum \qbeziermax<\multicnt \multicnt\qbeziermax\relax \fi
363      \else \multicnt#1\relax \fi
364      \tempcpta\multicnt \advance\tempcpta\one
365      \ovdx #4\unitlength \advance\ovdx -#2\unitlength
366      \multiply\ovdx \tw@
367      \ovxx #6\unitlength \advance\ovxx -#2\unitlength
368      \advance\ovxx -\ovdx \divide\ovxx\multicnt
369      \ovdy #5\unitlength \advance\ovdy -#3\unitlength
370      \multiply\ovdy \tw@
371      \ovyy #7\unitlength \advance\ovyy -#3\unitlength
372      \advance\ovyy -\ovdy \divide\ovyy\multicnt

373      \setbox\tempboxa\hbox{%
374          \hskip -\halfwidth
375          \vrule \height\halfwidth
376          \depth \halfwidth
377          \width \wholewidth}%
378      \put(#2,#3){%
379          \count@\z@
380          \whilenum{\count@<\tempcpta}\do
381              {\xdim\count@\ovxx
382                  \advance\xdim\ovdx
383                  \divide\xdim\multicnt
384                  \multiply\xdim\count@
385                  \ydim\count@\ovyy
386                  \advance\ydim\ovdy
387                  \divide\ydim\multicnt
388                  \multiply\ydim\count@
389                  \raise\ydim
390                  \hbox{\kern\xdim
391                      \unhcopy\tempboxa\hss}%
392              \advance\count@\one}
393      }/2ekernel | def)

```

# File E

## ltthm.dtx

### 60 Theorem Environments

The user creates his own theorem-like environments with the command

`\newtheorem{name}{{text}}[counter] or  
\newtheorem{name}{{oldname}}{{text}}`

This defines the environment *name* to be just as one would expect a theorem environment to be, except that it prints *text* instead of "Theorem".

If *oldname* is given, then environments *name* and *oldname* use the same counter, so using a *name* environment advances the number of the next *name* environment, and vice-versa.

If *counter* is given, then environment *name* is numbered within *counter*.

E.g., if *counter* = subsection, then the first *name* in subsection 7.2 is numbered *text* 7.2.1.

The way *name* environments are numbered can be changed by redefining `\thename`.

#### DOCUMENT STYLE PARAMETERS

`\@thmcOUNTER` : A command such that

`\edef\theCOUNTER{\@thmcOUNTER}`

defines `\theCOUNTER` to produce a number for a theorem environment.

The default is:

BEGIN `\noexpand\arabic{COUNTER}` END

`\@thmcOUNTERsep` : A separator placed between a theorem number and the number of the counter within which it is numbered.

E.g., to make the third theorem of section 7.2 be numbered 7.2-3, `\@thmcOUNTERsep` should be `\def`'ed to '-'. Its default is '-'.

`\@begintheorem{NAME}{NUMBER}` : A command that begins a theorem

environment for a 'theorem' named 'NAME NUMBER' – e.g., `\@begintheorem{Lemma}{3.7}` starts Lemma 3.7.

`\@opargbegintheorem{NAME}{NUMBER}{OPARG}` :

A command that begins a theorem

environment for a 'theorem' named 'NAME NUMBER' with optional

argument OPARG – e.g., `\@begintheorem{Lemma}{3.7}{Jones}` starts 'Lemma 3.7 (Jones):'.

`\@endtheorem` : A command that ends a theorem environment.

`\newtheorem{NAME}{TEXT}[COUNTER] ==`

BEGIN

if `\NAME` is definable

then `\@definecounter{NAME}`

if COUNTER present

then `\@newctr{NAME}[COUNTER]` fi

`\theNAME == BEGIN \theCOUNTER \@thmcOUNTERsep`  
`eval\@thmcOUNTER{NAME}`

END

```

else \theNAME == BEGIN eval\@thmcounter{NAME} END
\NAME == \@thm{NAME}{TEXT}
\endNAME == \@endtheorem
else error
fi
END

\newtheorem{NAME}[OLDNAME]{TEXT} ==
BEGIN
if counter OLDNAME nonexistant
then ERROR
else
if \NAME is definable
then BEGIN
\theNAME == \theOLDNAME
\NAME == \@thm{OLDNAME}{TEXT}
\endNAME == \@endtheorem
END
else error
fi
fi
END

\@thm{NAME}{TEXT} ==
BEGIN
\refstepcounter{NAME}
if next char =
then \@ythm{NAME}{TEXT}
else \@xthm{NAME}{TEXT}
fi
END

\@xthm{NAME}{TEXT} ==
BEGIN
\@begintheorem{TEXT}{\theNAME}
\ignorespaces
END

\@ythm{NAME}{TEXT}[OPARG] ==
BEGIN
\@opargbegintheorem{TEXT}{\theNAME}{OPARG}
\ignorespaces
END

\newtheorem \newtheorem ought really be allowed only in the preamble Which would be good
document style, and allow some main memory to be saved by declaring these
commands to be \@onlypreamble. Unfortunately the LATEX book indicates that
\newtheorem may be used anywhere in the document...
1 <*2ekernel>
2 \def\newtheorem#1{%
3   \@ifnextchar[\{@othm{#1}\}{\@nthm{#1}}}

\@nthm
4 \def\@nthm#1#2{%
5   \@ifnextchar[\{@xnthm{#1}{#2}\}{\@ynthm{#1}{#2}}}

```

```

@xnthm 92/09/18 RmS: Changed \addtoreset to \newctr to produce error message if
counter #3 does not exist (to be consistent with behaviour of \newcounter)
6 \def\@xnthm#1#2[#3]{%
7   \expandafter\@ifdefinable\csname #1\endcsname
8     {\@definecounter{#1}\@newctr{#1}[#3]%
9      \expandafter\xdef\csname the#1\endcsname{%
10        \expandafter\noexpand\csname the#3\endcsname \thmcntersep
11        \thmcnter{#1}}%
12      \global\@namedef{#1}{\thmcnter{#1}{#2}}%
13      \global\@namedef{end#1}{\endtheorem}}}

\@ynthm
14 \def\@ynthm#1#2{%
15   \expandafter\@ifdefinable\csname #1\endcsname
16     {\@definecounter{#1}%
17      \expandafter\xdef\csname the#1\endcsname{\thmcnter{#1}}%
18      \global\@namedef{#1}{\thmcnter{#1}{#2}}%
19      \global\@namedef{end#1}{\endtheorem}}}

\@othm
20 \def\@othm#1[#2]#3{%
21   \@ifundefined{c@#2}{\nocounterr{#2}}%
22   {\expandafter\@ifdefinable\csname #1\endcsname
23    {\global\@namedef{the#1}{\nameuse{the#2}}%
24    \global\@namedef{#1}{\thmcnter{#2}{#3}}%
25    \global\@namedef{end#1}{\endtheorem}}}

\@thm
26 \def\@thm#1#2{%
27   \refstepcounter{#1}%
28   \@ifnextchar[{\@ythm{#1}{#2}}{\@xthm{#1}{#2}}}

\@xthm
\@ythm 29 \def\@xthm#1#2{%
30   \begin{theorem}{\csname the#1\endcsname}\ignorespaces}
31 \def\@ythm#1#2[#3]{%
32   \opargbegintheorem{#2}{\csname the#1\endcsname}{#3}\ignorespaces}

Default values

\@thmcnter
\@thmcntersep 33 \def\@thmcnter#1{\noexpand\arabic{#1}}
34 \def\@thmcntersep{.}

\@begintheorem Providing theorem defaults.

\@opargbegintheorem 35 \def\@begintheorem#1#2{\trivlist
36   \item[\hspace*{1em}\labelsep\bfseries #1\ #2]\itshape}
37 \def\@opargbegintheorem#1#2#3{\trivlist
38   \item[\hspace*{1em}\labelsep\bfseries #1\ #2\ (#3)]\itshape}
39 \def\@endtheorem{\endtrivlist}
40 \end{ekernel}

```

# File F

## ltsect.dtx

### 61 Sectioning Commands

This file defines the declarations such as `\author` which are used by `\maketitle`. `\maketitle` itself is defined by each class, not in the L<sup>A</sup>T<sub>E</sub>X kernel.

The second part of the file defines the generic commands used for defining sectioning commands such as `\chapter`. Again the actual document level commands are defined in the class files, in terms of these commands.

```
1 <*2ekernel>
2 \message{title,}
```

#### 61.1 The Title

```
\title The user defines the title and author by the declarations \title{<name>},
\author \author{<name>}
\date Similarly the date is declared with \date{<date>}.
\thanks Inside these, the \thanks{<footnote text>} command may be used to make
\and acknowledgements, notice of address, etc. in a footnote. If there are multiple
authors, they have to be separated with the \and command.
\maketitle And finally, the \maketitle command produces the actual title, using the
information previously saved with the other commands.

\title \title for use in \maketitle. If not given \maketitle will produce an error
\@title message.
3 \def\title#1{\gdef\@title{#1}}
4 \def\@title{\@latex@error{No \noexpand\title given}\@ehc}

\author \author for use in \maketitle. If not given \maketitle will produce a warning
\@author message.
5 \def\author#1{\gdef\@author{#1}}
6 \def\@author{\@latex@warning@no@line{No \noexpand\author given}}

\date \date for use in \maketitle. If not given \maketitle will produce \today as the
\@date default.
7 \def\date#1{\gdef\@date{#1}}
8 \gdef\@date{\today}

\thanks
9 \def\thanks#1{\footnotemark
10   \protected@xdef\@thanks{\@thanks
11     \protect\footnotetext[\the\c@footnote]{#1}}%
12 }

\@thanks
13 \let\@thanks\empty

\and
14 \def\and{%
15   \end{tabular}%
16   \hskip 1em \@plus.17fil%
17   \begin{tabular}[t]{c}%
18 \message{sectioning,}
```

## 61.2 Sectioning

```
\@secpenalty
19 \newcount\@secpenalty
20 \@secpenalty = -300

\if@noskipsec Way back in 1991 (08/26) FMi & RmS set the \@noskipsec switch to true for the
\@noskipsectrue preamble and to false in \document. This was done to trap lists and related text
in the preamble but it does not catch everything.
21 \newif\if@noskipsec \@noskipsectrue

\@startsection The \@startsection{{name}}{level}{indent}{beforeskip}
{}{afterskip}{style}*[{altheading}]{heading} command is the mother of all
the user level sectioning commands. The part after the *, including the * is
optional.

name: e.g., 'subsection'

level: a number, denoting depth of section – e.g., chapter=1, section = 2, etc.

indent: Indentation of heading from left margin

beforeskip: Absolute value = skip to leave above the heading. If negative, then
paragraph indent of text following heading is suppressed.

afterskip: if positive, then skip to leave below heading, else negative of skip to
leave to right of run-in heading.

style: Commands to set style. Since June 1996 release the last command in this
argument may be a command such as \MakeUppercase or \fbox that takes
an argument. The section heading will be supplied as the argument to this
command. So setting #6 to, say, \bfseries\MakeUppercase would produce
bold, uppercase headings.

If '*' is missing, then increment the counter. If it is present, then there should
be no [{altheading}] argument. The command uses the counter 'secnumdepth'.
It contains a pointer to the highest section level that is to be numbered.

Warning: The \@startsection command should be at the same or higher
grouping level as the text that follows it. For example, you should not do something like

\def\foo{ \begingroup ...
          \par{...}
        \endgroup}

Pseudocode for the \@startsection command
\@startsection
{NAME}{LEVEL}{INDENT}{BEFRESKIP}{AFTERSKIP}{STYLE} ==
BEGIN
  IF @noskipsec = T THEN \leavevmode FI
    % true if previous section had no body.

  \par
  \@tempskipa := BEFRESKIP
  @afterindent := T
  IF \@tempskipa < 0 THEN \@tempskipa := -\@tempskipa
    @afterindent := F
  FI
  IF @nobreak = true
    THEN \everypar == null
    ELSE \addpenalty{\@secpenalty}
```

```

        \addvspace{\@tempskipa}
    FI
    IF * next
        THEN \@ssect{INDENT}{BEForeskip}{AFTerskip}{Style}
        ELSE \dblarg{\@sect
            {NAME}{LEVEL}{INDENT}
            {BEForeskip}{AFTerskip}{Style}}
    FI
END

22 \def\@startsection#1#2#3#4#5#6{%
23   \if@noskipsec \leavevmode \fi
24   \par
25   \tempskipa #4\relax
26   \afterindenttrue
27   \ifdim \tempskipa <\z@
28     \tempskipa -\tempskipa \afterindentfalse
29   \fi
30   \if@nobreak
31     \everypar{}%
32   \else
33     \addpenalty\secpenalty\addvspace\tempskipa
34   \fi
35   \ifstar
36     {\@ssect{#3}{#4}{#5}{#6}}%
37     {\dblarg{\@sect{#1}{#2}{#3}{#4}{#5}{#6}}}

```

\@sect Pseudocode for the \@sect command

```

\@sect{NAME}{LEVEL}{INDENT}{BEForeskip}{AFTerskip}{Style}[ARG1][ARG2]
===
BEGIN
  IF LEVEL > \c@secnumdepth
    THEN \svsec := null
    ELSE \refstepcounter{NAME}
      \svsec := BEGIN \secntformat{#1}\relax END
  FI
  IF AFTERSKIP > 0
    THEN \begingroup
      STYLE
      \hangfrom{\hskip INDENT\svsec}
      {\interlinepenalty 10000 ARG2\par}
    \endgroup
    \NAMEmark{ARG1}
    \addcontentsline{toc}{NAME}
    { IF LEVEL > \c@secnumdepth
      ELSE \protect\numberline{\theNAME} FI
      ARG1 }
  ELSE \svsechd == BEGIN STYLE
    \hskip INDENT\svsec
    ARG2
    \NAMEmark{ARG1}
    \addcontentsline{toc}{NAME}
    { IF LEVEL > \c@secnumdepth
      ELSE
        \protect\numberline{\theNAME}
        FI
        ARG1 }
  END

```

```

    FI
    \@xsect{AFTERSKIP}
END

38 \def\@sect#1#2#3#4#5#6[#7]#8{%
39   \ifnum #2>\c@secnumdepth
40     \let\@svsec\empty
41   \else
42     \refstepcounter{#1}%

```

Since \seccntformat might end with an improper \hskip which is scanning forward for plus or minus we end the definition of \@svsec with \relax as a precaution.

```

43   \protected@edef\@svsec{\@seccntformat{#1}\relax}%
44 \fi
45 \tempskipa #5\relax
46 \ifdim \tempskipa>\z@
47 \begingroup

```

This { used to be after the argument to \changefrom but was moved here to allow commands such as \MakeUppercase to be used at the end of #6.

```

48   #6{%
49     \changefrom{\hskip #3\relax\@svsec}%
50     \interlinepenalty \OM #8\@par}%
51 \endgroup
52 \csname #1mark\endcsname{#7}%
53 \addcontentsline{toc}{#1}{%
54   \ifnum #2>\c@secnumdepth \else
55     \protect\numberline{\csname the#1\endcsname}%
56   \fi
57   #7}%
58 \else
59   \def\@svsechd{%
60     #6{\hskip #3\relax
61     \@svsec #8}%
62     \csname #1mark\endcsname{#7}%
63     \addcontentsline{toc}{#1}{%
64       \ifnum #2>\c@secnumdepth \else
65         \protect\numberline{\csname the#1\endcsname}%
66       \fi
67       #7}%
68 \fi
69 \@xsect{#5}}

```

```

\@xsect Pseudocode for the \@xsect command
\@xsect{AFTERSKIP} ==
BEGIN
  IF AFTERSKIP > 0
    THEN \par \nobreak
      \vskip AFTERSKIP
      \afterheading
  ELSE @nobreak :=G F
      @noskipsec :=G T
      \everypar{ IF @noskipsec = T
        THEN @noskipsec :=G F
          \clubpenalty :=G 10000
          \hskip -\parindent
          \begingroup
            \@svsechd
          \endgroup
      }
  ENDIF

```

```

        \unskip
        \hskip -AFTERSKIP \relax
        %% relax added 14 Jan 91
    ELSE \clubpenalty :=G \clubpenalty
        \everypar := NULL
    FI
}

FI

END

70 \def\@xsect#1{%
71   \tempskipa #1\relax
72   \ifdim \tempskipa>\z@

Why not combine \@sect and \@xsect and save doing the same test twice? It is
not possible to change this now as these have become hooks!
This \par seems unnecessary.

73   \par \nobreak
74   \vskip \tempskipa
75   \afterheading
76   \else

77   \nobreakfalse
78   \global\@noskipsectrue
79   \everypar{%
80     \if@noskipsec
81       \global\@noskipsecfalse
82       {\setbox\z@\lastbox}%
83       \clubpenalty\@M
84       \begingroup \svsechd \endgroup
85       \unskip
86       \tempskipa #1\relax
87       \hskip -\tempskipa
88     \else
89       \clubpenalty \clubpenalty
90       \everypar{}%
91     \fi}%
92   \fi
93   \ignorespaces}

```

\@secntformat This command formats the section number including the space following it.

```
94 \def\@secntformat#1{\csname the#1\endcsname\quad}
```

Pseudocode for the \@sect command

```

\@sect{INDENT}{BEFRESKIP}{AFTERSKIP}{STYLE}{ARG} ==
BEGIN
  IF AFTERSKIP > 0
    THEN \begingroup
      STYLE
      \hangfrom{\hskip INDENT}{\interlinepenalty 10000
      ARG\par}
    \endgroup
  ELSE \svsechd == BEGIN STYLE
    \hskip INDENT
    ARG
  END
  FI
  \xsect{AFTERSKIP}
END
Pseudocode for the \afterheading command
```

```

\@afterheading ==
BEGIN
    @nobreak :=G true
    \everypar := BEGIN IF @nobreak = T
        THEN @nobreak :=G false
        \clubpenalty :=G 10000
        IF @afterindent = F
            THEN remove \lastbox
        FI
        ELSE \clubpenalty :=G \@clubpenalty
        \everypar := NULL
    FI
END

```

\@sect

```

95 \def\@sect#1#2#3#4#5{%
96   \tempskipa #3\relax
97   \ifdim \tempskipa>\z@
98     \begingroup

```

This { used to be after the argument to \hangfrom but was moved here to allow commands such as \MakeUppercase to be used at the end of #4.

```

99   #4{%
100     \hangfrom{\hskip #1}%
101     \interlinepenalty \OM #5\@par}%
102   \endgroup
103 \else
104   \def\svsechd{\#4{\hskip #1\relax #5}}%
105 \fi
106 \@sect{#3}

```

\if@afterindent

\@afterindenttrue 107 \newif\if@afterindent \@afterindenttrue

\@afterheading This hook is used in setting up custom-built headings in classes.dtx.

```

108 \def\@afterheading{%
109   \nobreaktrue
110   \everypar{%
111     \if@nobreak
112       \nobreakfalse
113       \clubpenalty \OM
114       \if@afterindent \else
115         {\setbox\z@\lastbox}%
116       \fi
117     \else
118       \clubpenalty \clubpenalty
119       \everypar{}%
120     \fi}%

```

\hangfrom \hangfrom{<text>} : Puts <text> in a box, and makes a hanging indentation of the following material up to the first \par. Should be used in vertical mode.

```

121 \def\hangfrom{\setbox\tempboxa\hbox{#1}%
122   \hangindent \wd\tempboxa\noindent\box\tempboxa}

```

\c@sectiondepth

```

\c@tocdepth 123 \newcount\c@sectiondepth
124 \newcount\c@tocdepth

```

```

\secdef \secdef{\{unstarcmds\}}{\{unstarcmds\}}{\{starcmds\}}
When defining a \chapter or \section command without using \startsection,
you can use \secdef as follows:

1. \def\chapter{ ... \secdef {\starcmd} {\unstarcmd} }

2. \def{\starcmd}[#1]{#2{...}} % Command to define \chapter[...]{...}

3. \def{\unstarcmd}{#1{...}} % Command to define \chapter*{...}

125 \def\secdef{\secdef{\ifstar{\@ifstar{\@dblarg{#1}}}}}

```

### 61.2.1 Initializations

```

\sectionmark
\subsectionmark 126 \let\sectionmark\@gobble
\subsubsectionmark 127 \let\subsectionmark\@gobble
\paragraphmark 128 \let\subsubsectionmark\@gobble
\ subparagraphmark 129 \let\paragraphmark\@gobble
130 \let\subparagraphmark\@gobble

131 \message{contents,}

```

## 61.3 Table of Contents etc.

### 61.3.1 Convention

\tf@*foo* = file number for output for table foo. The file is opened only if @filesw = true.

### 61.3.2 Commands

A \l@*type*{*entry*}{*page*} Macro needs to defined by document style for making an entry of type *type* in a table of contents, etc. E.g., the document style should define \l@chapter, \l@section, etc.

**Note:** When the \protect command is used in the *entry* or *text* of one of the commands below, it causes the following control sequence to be written on the file without being expanded. The sequence will be expanded when the table of contents entry is processed.

**Surprise:** Inside an \addcontentsline or \addtocontents command argument, the commands: \index, \glossary, and \label are no-ops . This could cause a problem if the user puts an \index or \label into one of the commands he writes, or into the optional ‘short version’ argument of a \section or \caption command.

```

\starttoc The \starttoc{\ext} command is used to define the commands:
\tableofcontents, \listoffigures, etc.

For example: \starttoc{lof} is used in \listoffigures. This command
reads the .ext file and sets up to write the new .ext file.

\starttoc{EXT} ==
BEGIN
\begingroup
\makeatletter
read file \jobname.EXT
IF @filesw = true
    THEN open \jobname.EXT as file \tf@EXT
FI
@nobreak :=G FALSE %% added 24 May 89
\endgroup
END

132 \def\starttoc{\%

```

```

133  \begingroup
134    \makeatletter
135    \@input{\jobname.\#1}%
136    \if@filesw
137      \expandafter\newwrite\csname tf@\#1\endcsname
138      \immediate\openout \csname tf@\#1\endcsname \jobname.\#1\relax
139    \fi
140    \nobreakfalse
141  \endgroup}

\addcontentsline{<table>}{<type>}{<entry>} The \addcontentsline{<table>}{<type>}{<entry>} command allows the user to add his/her own entry to a table of contents, etc. The command adds the entry \contentsline{<type>}{<entry>}{<page>} to the .<table> file.
This macro is implemented as an application of \addtocontents. Note that \thepage is not expandable during \protected@write therefore one gets the page number at the time of the \shipout.

142 \def\addcontentsline#1#2#3{%
143   \addtocontents{#1}{\protect\contentsline{#2}{#3}{\thepage}}}

\addtocontents{<table>}{<text>} The \addtocontents{<table>}{<text>} command adds <text> to the .<table> file, with no page number.

144 \long\def\addtocontents#1#2{%
145   \protected@write\@auxout{%
146     {\let\label@gobble\let\index@gobble\let\glossary@gobble}%
147     {\string\@writefile{#1}{#2}}}}
\contentsline{<type>}{<entry>}{<page>} The \contentsline{<type>}{<entry>}{<page>} macro produces a <type> entry in a table of contents, etc. It will appear in the .toc or other file. For example, The entry for subsection 1.4.3 in the table of contents for example, might be produced by:
\contentsline{subsection}{\makebox[30pt][r]{1.4.3} Gnats and Gnus}{22}
The \protect command causes command sequences to be written without expanding them.

148 \def\contentsline#1{\csname l@#1\endcsname}

\@dottedtocline{<level>}{<indent>}{<numwidth>} {<title>}{<page>} Macro to produce a table of contents line with the following parameters:
level If <level> > \c@tocdepth, then no line produced.
indent Total indentation from the left margin.
numwidth Width of box for number if the <title> has a \numberline command. As of 25 Jan 1988, this is also the amount of extra indentation added to second and later lines of a multiple line entry.
title Contents of entry.
page Page number.

Uses the following parameters, which must be set by the document style. They should be defined with \def's.
pnumwidth Width of box in which page number is set.
tocrmarg Right margin indentation for all but last line of multiple-line entries.
dotsep Separation between dots, in mu units. Should be \def'd to a number like 2 or 1.7

```

```

\@dottedtocline

149 \def\@dottedtocline#1#2#3#4#5{%
150   \ifnum #1>\c@tocdepth \else
151     \vskip \z@ \@plus .2\p@
152     {\leftskip #2\relax \rightskip \c@tocrmarg \parfillskip -\rightskip
153     \parindent #2\relax \c@afterindenttrue
154     \interlinepenalty\OM
155     \leavevmode
156     \tempdima #3\relax
157     \advance\leftskip \tempdima \null\nobreak\hskip -\leftskip
158     {#4}\nobreak
159     \leaders\hbox{\$}\m@th

```

If a document uses fonts other than computer modern, the use of a dot from math can be very disturbing despite the fact that this might be the only place in a document that then uses computer modern. Therefore we surround the dot with an `\hbox` to escape to the surrounding text font.

```

160   \mkern \dotsep mu\hbox{.}\mkern \dotsep
161   mu$\}\hfill
162   \nobreak
163   \hb@xt@\pnumwidth{\hfil\normalfont \normalcolor #5}%
164   \par}%
165 \fi}

```

**Note:** `\nobreak`'s added 7 Jan 86 to prevent bad line break that left the page number dangling by itself at left edge of a new line.

Changed 25 Jan 88 to use `\leftskip` instead of `\hangindent` so leaders of multiple-line contents entries would line up properly.

`\numberline` `\numberline{<number>}`: For use in a `\contentsline` command. It puts `<number>` flushleft in a box of width `\tempdima` (Before 25 Jan 88 change, it also added `\tempdima` to the hanging indentation.)

```

166 \def\numberline#1{\hb@xt@\tempdima{#1\hfil}}
167 </2ekernel>

```

# File G

## ltfloat.dtx

### 62 Floats

The different types of floats are identified by a *<type>* name, which is the name of the counter for that kind of float. For example, figures are of type ‘figure’ and tables are of type ‘table’. Each *<type>* has associated a positive *<type number>*, which is a power of two. E.g., figures might have type number 1, tables type number 2, programs type number 4, etc.

The locations where a float can go are specified by a *<placement specifier>*, which is a list of the possible locations, each denoted by a letter as follows:

- h : here — at the current location in the text.
- t : top — at the top of a text page.
- b : bottom — at the bottom of a text page.
- p : page — on a separate float page

In addition, in conjunction with these, you can use ‘!’ which means that the current values of the float positioning parameters are ignored for this float. (Has no effect on ‘p’, float page positioning.) For example, ‘pht’ specifies that the float can appear in any of three locations: page, here or top.

#### 62.1 Floating Environments

```
1 {*2ekernel}  
2 \message{floats,}
```

Where floats may appear on a page, and how many may appear there are specified by the following float placement parameters. The numbers are named like counters so the user can set them with the ordinary counter-setting commands.

```
\c@topnumber      : Number of floats allowed at the top of a column.  
\topfraction     : Fraction of column that can be devoted to floats.  
\c@dbltopnumber, \dbltopfraction  
                  : Same as above, but for double-column floats.  
\c@bottomnumber, \bottomfraction  
                  : Same as above for bottom of page.  
\c@totalnumber   : Number of floats allowed in a single column,  
                  including in-text floats.  
\textfraction    : Minimum fraction of column that must contain text.  
\floatpagefraction: Minimum fraction of page that must be taken  
                   up by float page.  
\dblfloatpagefraction  
                  : Same as above, for double-column floats.
```

The document style must define the following.

```
\fps@TYPE      : The default placement specifier for floats of type  
                  TYPE.  
\ftype@TYPE    : The type number for floats of type TYPE.  
\ext@TYPE      : The file extension indicating the file on which the  
                  contents list for float type TYPE is stored.
```

For example, `\ext@figure` = 'lof'.

`\fnum@TYPE` : A macro to generate the figure number for a caption.  
For example, `\fnum@TYPE` == Figure `\thefigure`.

`\@makecaption{NUM}{TEXT}` :  
A macro to make a caption, with NUM the value  
produced by `\fnum@...` and TEXT the text of the caption.  
It can assume it's in a `\parbox` of the appropriate width.

`\@float{TYPE}[PLACEMENT]` : This macro begins a float environment  
for a  
single-column float of type TYPE with PLACEMENT as the  
placement  
specifier. The default value of PLACEMENT is defined by  
`\fps@TYPE`. The environment is ended by `\end@float`.  
E.g., `\figure` == `\@float{figure}`, `\endfigure` == `\end@float`.

```
\@float{TYPE}[PLACEMENT] ==
BEGIN
  if hmode then \@bsphack
    \@floatpenalty := -10002
  else \@floatpenalty := -10003
  fi
  \@capttype ==L TYPE
  \@dblflset
  \@fps ==L PLACEMENT
  \@onellevel@sanitize \@fps
  add default PLACEMENT if at most ! in PLACEMENT ==
  \@fpsadddefault
  if inner
    then LaTeX Error: 'Not in outer paragraph mode.'
    \@floatpenalty := 0
  else if \@freelist nonempty
    then \@currbox :=L head of \@freelist
    \@freelist :=G tail of \@freelist
    \count\@currbox :=G 32*\ftype@TYPE +
      bits determined by
  PLACEMENT
  else \@floatpenalty := 0
    LaTeX Error: 'Too many unprocessed floats'
  fi
  fi
  \@currbox :=G \color@vbox
  \normalcolor
  \vbox{
    %% 15 Dec 87 -
    %% removed \boxmaxdepth :=L 0pt
    %% that made box 0 depth because it screwed
    %% things up. Instead, added \vskip0pt at
  end
    \hsize = \columnwidth
    \@parboxrestore
    \@floatboxreset
END

\caption ==
```

```

BEGIN
  \refstepcounter{@captive}
  \@dblarg{@caption{@captive}}
END

```

In following definition, `\par` moved from after `\addcontentsline` to before `\addcontentsline` because the `\write` could cause an extra blank line to be added to the paragraph above the caption. (Change made 12 Jun 87)

```

{@caption{TYPE}[STEXT]{TEXT} ==
BEGIN
  \par

\addcontentsline{\ext@TYPE}{TYPE}{\numberline{\theTYPE}{STEXT}}
  \begingroup
    \parboxrestore
    \normalsize
    \makecaption{\fnum@TYPE}{TEXT}
    \par
  \endgroup
END

```

`\@dblfloat{TYPE}[PLACEMENT]` : Macro to begin a float environment for

a double-column float of type TYPE with PLACEMENT as the placement

specifier. The default value of PLACEMENT is 'tp'

The environment is ended by `\end@dblfloat`.

E.g., `\figure*` == `\@dblfloat{figure}`,  
`\endfigure*` == `\end@dblfloat`.

```

\@dblfloat{TYPE}[PLACEMENT] ==
  Identical to \@float{TYPE}[PLACEMENT] except \hsize and
\linewidth
  are set to \textwidth.

```

`\@floatpenalty`

3 `\newcount\@floatpenalty`

`\caption` This is set to be an error message outside a float since no captive is defined there; this may need to be changed by some classes.

```

4 \def\caption{%
5   \ifx@\captive\undefined
6     \@latex@error{\noexpand\caption outside float}\@ehd
7     \expandafter@gobble
8   \else
9     \refstepcounter@captive
10    \expandafter\firstofone
11  \fi
12  {\@dblarg{@caption@captive}}%
13 }

```

`\@caption`

```

14 \long\def\@caption#1[#2]{%
15   \par
16   \addcontentsline{\csname ext@#1\endcsname}{#1}%
17   {\protect\numberline{\csname the#1\endcsname}{\ignorespaces #2}}%
18   \begingroup

```

The paragraph setting parameters are normalised at this point, however `\@parboxrestore` resets `\everypar` which is not correct in this context so `\@setminipage` is called if needed.

The float mechanism, like minipage, sets the flag `@minipage` true before executing the user-supplied text. Many L<sup>A</sup>T<sub>E</sub>X constructs test for this flag and do not add vertical space when it is true. The intention is that this emulates T<sub>E</sub>X's 'top of page' behaviour. The flag must be set false at the start of the first paragraph. This is achieved by a redefinition of `\everypar`, but the call to `\@parboxrestore` removes that redefinition, so it is re-inserted if needed. If the flag is already false then the `\caption` was not the first entry in the float, and so some other paragraph has already activated the special `\everypar`. In this case no further action is needed.

```

19      \@parboxrestore
20      \if@minipage
21          \@setminipage
22      \fi
23      \normalsize
24      \@makecaption{\csname fnum@\#1\endcsname}{\ignorespaces #3}\par
25      \endgroup

\@float
\@dblflset 26 \def\@float#1{%
27     \@ifnextchar[%
28         {\@xfloat{#1}}%
29         {\edef\reserved@a{\noexpand\@xfloat{#1}[\csname fps@\#1\endcsname]}%
30         \reserved@a}
31 \def\@dblfloat{%
32     \if@twocolumn\let\reserved@a\@dbfllt\else\let\reserved@a\@float\fi
33     \reserved@a}

```

`\fps@dbl` Note that all double floats have default fps 'tp'.

`\@setfps` This sets the fps, dealing with error conditions by adding the default.

`\@xfloat` The first part of this sets the count register that stores all the information about the type and fps of the float.

We assume here that the default specifiers already contain no active characters.

It may be better to store the defaults as numbers, rather than symbol strings.

```

34 \def\@xfloat #1[#2]{%
35     \Qnocomment
36     \def \@captive {#1}%
37     \def \@fps {#2}%
38     \Qonelevel@sanitize \@fps
39     \def \reserved@b {!}%
40     \ifx \reserved@b \@fps
41         \@fpsadddefault
42     \else
43         \ifx \@fps \empty
44             \@fpsadddefault
45         \fi
46     \fi
47     \ifhmode
48         \@bsphack
49         \@floatpenalty -\@Mii
50     \else
51         \@floatpenalty-\@Miii
52     \fi
53     \ifinner

```

```

54      \@parmoderr\@floatpenalty\z@
55  \else
56    \@next\@currbox\@freelist
57    {%
58      \@tempcnta \sixt@n
59      \expandafter \@tfor \expandafter \reserved@a
60      \expandafter :\expandafter =\@fps
61      \do
62      {%
63        \if \reserved@a h%
64          \ifodd \@tempcnta
65          \else
66            \advance \@tempcnta \one
67          \fi
68        \fi
69        \if \reserved@a t%
70          \@setfpsbit \tw@
71        \fi
72        \if \reserved@a b%
73          \@setfpsbit 4%
74        \fi
75        \if \reserved@a p%
76          \@setfpsbit 8%
77        \fi
78        \if \reserved@a !%
79          \ifnum \@tempcnta>15
80            \advance\@tempcnta -\sixt@n\relax
81          \fi
82        \fi
83      }%
84      \@tempcntb \csname ftype@\@capttype \endcsname
85      \multiply \@tempcntb \xxxii
86      \advance \@tempcnta \@tempcntb
87      \global \count\@currbox \@tempcnta
88    }%
89  \@fltovf
90 \fi

```

The remainder sets up the box in which the float is typeset, and the typesetting environment to be used. It is essential to have the extra box to avoid the unwanted space that would otherwise often be put at the top of the float.

It ends with a hook; not sure how useful this is but it is needed at present to deal with double-column floats.

```

91 \global \setbox\@currbox
92   \color@vbox
93     \normalcolor
94     \vbox \bgroup
95       \hsize\columnwidth
96     \parboxrestore
97     \floatboxreset
98 }

```

**\@floatboxreset** The rational for allowing these normally global flags to be set locally here, via **\parboxrestore**, was stated originally by Donald Arseneau and extended by Chris Rowley. It is because these flags are only set globally to true by section commands, and these should never appear within marginals or floats or, indeed, in any group; and they are only ever set globally to false when they are definitely true.

If anyone is unhappy with this argument then both flags should be treated as in **\set@nobreak**; otherwise this command will be redundant.

```

99 \def \@floatboxreset {%
100   \reset@font

```

```

101      \normalsize
102      \@setminipage
103 }

\@setnobreak

104 \def \@setnobreak{%
105   \if@nobreak
106     \let\outer@nobreak\@nobreaktrue
107     \nobreakfalse
108   \fi
109 }

\@setminipage

110 \def \@setminipage{%
111   \minipagetrue
112   \everypar{\minipagetrue\everypar{}}
113 }

\end@float

114 \def\end@float{%
115   \endfloatbox
116   \ifnum\flo@penalty <\z@
    We make sure that we never exceed \textheight, otherwise float will never get
    typeset (91/03/15 FMI).
117   \largefloatcheck
118   \cons\currlist\currbox
119   \ifnum\flo@penalty <-\@Mii
120     \penalty -\@Miv
    Saving and restoring \prevdepth added 26 May 87 to prevent extra vertical space
    when used in vertical mode.
121   \tempdima\prevdepth
122   \vbox{%
123     \prevdepth\tempdima
124     \penalty\flo@penalty
125   }%
126   \vadjust{\penalty -\@Miv \vbox{}\penalty\flo@penalty}\@Eshack
127   \fi
128 \fi
129 }

\end@dblfloat

130 \def\end@dblfloat{%
131 \if@twocolumn
132   \endfloatbox
133   \ifnum\flo@penalty <\z@
    We make sure that we never exceed \textheight, otherwise float will never get
    typeset (91/03/15 FMI).
134   \largefloatcheck
135   \cons\dbldeflist\currbox
136   \fi
    RmS 92/03/18 changed \esphack to \Eshack.
137   \ifnum\flo@penalty =-\@Mii \Eshack\fi
138 \else
139   \end@float
140 \fi
141 }

```

\@endfloatbox This macro is not intended to be a hook; it is designed to help maintain the integrity of this code, which is used twice and, as can be seen, is subject to frequent changes.

```

142 \def \@endfloatbox{%
143     \par\vskip\z@skip      %% \par\vskip\z@ added 15 Dec 87
144     \minipagetrue
145     \outer@nobreak
146     \egroup                %% end of vbox
147     \color@endbox
148 }
149 %
150 % \begin{macro}{\outer@nobreak}
151 % \changes{v1.0h}{1994/05/20}{Macro added: default is to do nothing.}
152 %   \begin{macrocode}
153 \let\outer@nobreak\empty

```

\@largefloatcheck This calculates by how much a float is oversize for the page and prints this in a warning message.

```

154 \def \@largefloatcheck{%
155     \ifdim \ht@\currbox>\textheight
156         \tempdima -\textheight
157         \advance \tempdima \ht@\currbox
158         \latext@warning {Float too large for page by \the\tempdima}%
159         \ht@\currbox \textheight
160     \fi
161 }

```

\@dbflt

```

\@dblfloat 162 \def\@dbfltno#1{\@ifnextchar[{\@dblfloat{#1}}{\@dblfloat{#1}[tp]}}
163 \def\@dblfloat#1[#2]{%
164     \xfloat{#1}[#2]\hsize\textrmwidth\linewidth\textrmwidth}

```

Moved to ltfoutput 93/12/16

```

165 \%newcount\c@topnumber
166 \%newcount\c@dbltopnumber
167 \%newcount\c@bottomnumber
168 \%newcount\c@totalnumber

```

An analysis of \@floatplacement:

This should be called whenever \colht has been set.

```

169 \def\@floatplacement{\global\c@topnum\c@topnumber
170     % Textpage bit, global:
171     \global\c@toproom \c@topfraction\colht
172     \global\c@botnum \c@bottomnumber
173     \global\c@botroom \c@bottomfraction\colht
174     \global\c@colnum \c@totalnumber
175     % Floatpage bit, local:
176     \fpmin \c@floatpagefraction\colht}

```

\@dblfloatplacement This should be called only within a group. Now changed to provide extra checks in \addtodbcol, needed when processing a BANG float.

```

177 \def \@dblfloatplacement {%

```

Textpage bit: global, but need not be.

```

178     \global\c@dbltopnum \c@dbltopnumber
179     \global\c@dbltoproom \c@dbltopfraction\colht

```

This new bit uses \textmin to locally store the amount of extra room in the column.

```

180     \textmin \colht
181     \advance \textmin -\c@dbltoproom

```

```

Floatpage bit: must be local.

182  \@fpmin \dblfloatpagefraction\textheight
183  \@fptop \dblfpbot
184  \@fpsep \dblfpsep
185  \@fpbot \dblfpbot
186 }

```

#### MARGINAL NOTES:

Marginal notes use the same mechanism as floats to communicate with the `\output` routine. Marginal notes are distinguished from floats by having a negative placement specification. The command `\marginpar [LTEXT]{RTEXT}` generates a marginal note in a parbox, using LTEXT if it's on the left and RTEXT if it's on the right. (Default is RTEXT = LTEXT.) It uses the following parameters.

```

\marginparwidth : Width of marginal notes.
\marginparsep   : Distance between marginal note and text.
                  the page layout to determine how to move the marginal
                  note into the margin. E.g., \@leftmarginskip ==
                  \hskip -\marginparwidth \hskip -\marginparsep .
\marginparpush  : Minimum vertical separation between \marginpar's

```

Marginal notes are normally put on the outside of the page if `@mparswitch` = true, and on the right if `@mparswitch` = false. The command `\reversemarginpar` reverses the side where they are put. `\normalmarginpar` undoes `\reversemarginpar`. These commands have no effect for two-column output.

SURPRISE: if two marginal notes appear on the same line of text, then the second one could appear on the next page, in a funny position.

```

\marginpar [LTEXT]{RTEXT} ==
BEGIN
  if hmode then \@bsphack
    \@floatpenalty := -10002
  else \@floatpenalty := -10003
  fi
  if inner
    then LaTeX Error: 'Not in outer paragraph mode.'
    \@floatpenalty := 0
  else if \@freelist has two elements:
    then get \@marbox, \@currbox from \@freelist
    \count\@marbox := G -1
  else \@floatpenalty := 0
    LaTeX Error: 'Too many unprocessed floats'
    \@currbox, \@marbox := \@tempboxa %%use \def
  fi
  fi
  if optional argument
    then %% \@xmpar ==
      \@savemarbox\@marbox{LTEXT}
      \@savemarbox\@currbox{RTEXT}
    else %% \@ympar ==
      \@savemarbox\@marbox{RTEXT}
      \box\@currbox := G \box\@marbox

```

```

        fi
        \@xympar
    END

\reversemarginpar == BEGIN \c@mparbottom :=G 0
                        @reversemargin :=G true
    END

\normalmarginpar == BEGIN \c@mparbottom :=G 0
                        @reversemargin :=G false
    END

\marginpar
187 \def\marginpar{%
188   \ifhmode
189     \c@bsphack
190     \c@floatpenalty -\c@Mii
191   \else
192     \c@floatpenalty-\c@Miii
193   \fi
194   \ifinner
195     \c@parmoderr
196     \c@floatpenalty\z@
197   \else
198     \c@next\c@currbox\c@freelist{}{%
199     \c@next\c@marbox\c@freelist{\global\count\c@marbox\m@ne}{%
200       \c@floatpenalty\z@
201       \c@fltovf\def\c@currbox{\c@tempboxa}\def\c@marbox{\c@tempboxa}}%
202   \fi
203 \c@ifnextchar [\c@xmpar\c@ympar}

\c@xmpar
204 \long\def\c@xmpar[#1]\#2{%
205   \c@savemarbox\c@marbox{#1}%
206   \c@savemarbox\c@currbox{#2}%
207   \c@xympar}

\c@ympar
208 \long\def\c@ympar#1{%
209   \c@savemarbox\c@marbox{#1}%
210   \global\setbox\c@currbox\copy\c@marbox
211   \c@xympar}

\c@savemarbox
212 \long\def \c@savemarbox #1#2{%
213   \global\setbox #1%
214   \color@vbox
215   \vtop{%
216     \hsize\marginparwidth
217     \c@parboxrestore
218     \c@marginparreset
219     #2%
220     \c@minipagefalse
221     \outer@nobreak
222     }%
223   \color@endbox
224 }

\c@marginparreset The rational for allowing these normally global flags to be set locally here, via
\c@parboxrestore was stated originally by Donald Arsenau and extended by Chris

```

Rowley. It is because these flags are only set globally to true by section commands, and these should never appear within marginals or floats or, indeed, in any group; and they are only ever set globally to false when they are definitely true.

If anyone is unhappy with this argument then both flags should be treated as in `\set@nobreak`; otherwise this command will be redundant.

```

225 \def \@marginparreset {%
226     \reset@font
227     \normalsize
228 %     \let\if@nobreak\iffalse
229 %     \let\if@noskipsec\iffalse
230 %     \c@setnobreak
231     \c@setminipage
232 }

\@xympar

```

Setting the box here is done only because the code uses `\end@float`; it will be empty and gets discarded.

```

233 \def \@xympar{%
234   \ifnum\@floatpenalty <\z@ \c@cons\@currlist\@marbox\fi
235   \setbox\@tempboxa
236   \color@vbox
237   \vbox \bgroup
238   \end@float
239   \ignorespacesfalse
240   \c@esp@hack
241 }

```

```

\reversemarginpar
\normalmarginpar 242 \def\reversemarginpar{\global\@mparbottom\z@ \c@reversemargintrue}
243 \def\normalmarginpar{\global\@mparbottom\z@ \c@reversemarginfalse}

244 \message{footnotes,}

```

## 62.2 Footnotes

`\footnote{NOTE}` : User command to insert a footnote.

`\footnote[NUM]{NOTE}`: User command to insert a footnote numbered *NUM*, where *NUM* is a number – 1, 2, etc. For example, if footnotes are numbered \*, \*\*, etc. within pages, then `\footnote[2]{...}` produces footnote \*\*. This command does not step the footnote counter.

`\footnotemark[NUM]` : Command to produce just the footnote mark in the text, but no footnote. With no argument, it steps the footnote counter before generating the mark.

`\footnotetext[NUM]{TEXT}` : Command to produce the footnote but no mark. `\footnote` is equivalent to `\footnotemark \footnotetext`.

As in PLAIN, footnotes use `\insert\footins`, and the following parameters:

`\footnotesize` : Size-changing command for footnotes.

`\footnotesep` : The height of a strut placed at the beginning of

every footnote.

`\skip\footins` : Space between main text and footnotes. The rule separating footnotes from text occurs in this space. This space lies above the strut of height `\footnotesep` which is at the beginning of the first footnote.

`\footnoterule` : Macro to draw the rule separating footnotes from text. It is executed right after a `\vspace` of `\skip\footins`. It should take zero vertical space—i.e., it should skip to a negative value to compensate for any positive space it occupies. (See PLAIN.TEX.)

`\interfootnotelinepenalty` : Interline penalty for footnotes.

`\thefootnote` : In usual LaTeX style, produces the footnote number. If footnotes are to be numbered within pages, then the document style file must include an `\@addtoreset` command to cause the footnote counter to be reset when the page counter is stepped. This is not a good idea, though, because the counter will not always be reset in time to ensure that the first footnote on a page is footnote number one.

`\@thefnmark` : Holds the current footnote's mark—e.g., `\dag` or '1' or 'a'.

`\@mpfnnumber` : A macro that generates the numbers for `\footnote` and `\footnotemark` commands. It == `\thefootnote` outside a minipage environment, but can be changed inside to generate numbers for `\footnote`'s.

`\@makefnmark` : A macro to generate the footnote marker from `\@thefnmark`. The default definition was `\hbox{$^{\@thefnmark}$}`.

This is now replaced by  
`\textsuperscript{\@thefnmark}`

`\@makefntext{NOTE}` :

Must produce the actual footnote, using `\@thefnmark` as the mark of the footnote and NOTE as the text. It is called when effectively inside a `\parbox`, with `\hsize = \columnwidth`. For example, it might be as simple as  
`$^{\@thefnmark} NOTE`

In a minipage environment, `\footnote` and `\footnotetext` are redefined so that

- (a) they use the counter `mpfootnote`
  - (b) the footnotes they produce go at the bottom of the minipage.
- The switch is accomplished by letting `\@mpfn` == `footnote` or `mpfootnote` and `\thempfn` == `\thefootnote` or `\thempfootnote`, and by redefining `\@footnotetext` to be `\@mpfootnotetext` in the minipage.

```
\footnote{NOTE} ==
BEGIN
```

```

\stepcounter{\@mpfn}
begingroup
\protect == \noexpand
\@thefnmark :=G eval (\thempfn)
endgroup
\@footnotemark
\@footnotetext{NOTE}
END

\footnote[NUM]{NOTE} ==
BEGIN
begingroup
\protect == \noexpand
counter \@mpfn :=L NUM
\@thefnmark :=G eval (\thempfn)
endgroup
\@footnotemark
\@footnotetext{NOTE}
END

\footnotemark ==
BEGIN \stepcounter{footnote}
begingroup
\protect == \noexpand
\@thefnmark :=G eval(\thefootnote)
endgroup
\@footnotemark
END

\footnotemark[NUM] ==
BEGIN
begingroup
footnote counter :=L NUM
\protect == \noexpand
\@thefnmark :=G eval(\thefootnote)
endgroup
\@footnotemark
END

\@footnotemark ==
BEGIN
\leavevmode
IF hmode THEN \c@sf := \the\spacefactor FI
\@makefnmark % put number in main text
IF hmode THEN \spacefactor := \c@sf FI
END

\footnotetext ==
BEGIN begingroup \protect == \noexpand
\@thefnmark :=G eval (\thempfn)
endgroup
\@footnotetext
END

\footnotetext[NUM] ==
BEGIN begingroup counter \@mpfn :=L NUM
\protect == \noexpand

```

```

        \@thefnmark :=G eval (\thempfn)
    endgroup
    \@footnotetext
END

\footins LATEX does use the same insert for footnotes as PLAIN.
245 \newinsert\footins
    LATEX leaves these initializations for the \footins insert.
246 \skip\footins=\bigskipamount % space added when footnote is present
247 \count\footins=1000 % footnote magnification factor (1 to 1)
248 \dimen\footins=8in % maximum footnotes per page

\footnoterule LATEX keeps PLAIN TEX's \footnoterule as the default.
249 \def\footnoterule{\kern-3\p@
250   \hrule \width 2in \kern 2.6\p@} % the \hrule is .4pt high

\thefootnote
251 \definecounter{footnote}
252 \def\thefootnote{\arabic{c}\footnote}

\thempfootnote The default display for the footnote counter in minipages is to use italic letters.
We use \itshape not \textit as the latter would add an italic correction.
253 \definecounter{mpfootnote}
254 \def\thempfootnote{{\itshape\alph{c}\mpfootnote}}
```

\@makefnmark Default definition.

```

255 \% \def\@makefnmark{\hbox{$^{\@thefnmark}\m@th$}}
256 \def\@makefnmark{\hbox{\textsuperscript{\normalfont\@thefnmark}}}
```

\textsuperscript This command provides superscript characters in the current text font. It's implementation might change!!!

```

257 \DeclareRobustCommand*\textsuperscript[1]{%
258   \textsuperscript{\selectfont#1}}
```

\@textsuperscript This command should not be used directly, but may be used to define other commands \textsuperscript, \@makefnmark. #1 should always start with a font selection command, to activate the font size switch.

```

259 \def\@textsuperscript#1{%
260   {\m@th\ensuremath{{\mbox{\scriptsize\sf@size\z@#1}}}}}
```

\footnotesep

```

261 \newdimen\footnotesep
```

\footnote

```

262 \def\footnote{\@ifnextchar[\@xfootnote{\stepcounter\thempfn
263   \protected@xdef\@thefnmark{\thempfn}%
264   \footnotemark\footnotetext}}
```

\@xfootnote

```

265 \def\@xfootnote[#1]{%
266   \begingroup
267     \csname c@\thempfn\endcsname #1\relax
268     \unrestored@protected@xdef\@thefnmark{\thempfn}%
269   \endgroup
270   \footnotemark\footnotetext}
```

```

\@footnotetext
271 \long\def\@footnotetext#1{\insert\footins{%
272   \reset@font\footnotesize
273   \interlinepenalty\interfootnotelinepenalty
274   \splittopskip\footnotesep
275   \splitmaxdepth \dp\strutbox \floatingpenalty \z@MM
276   \hsize\columnwidth \parboxrestore
277   \protected@edef\@currentlabel{%
278     \csname p@footnote\endcsname\thefnmark
279   }%
280   \color@begingroup
281   \color@makefntext{%
282     \rule{z@\footnotesep}{\ignorespaces#1\finalstrut\strutbox}%
283   }%
284 }

\footnotemark
284 \def\footnotemark{%
285   \ifnextchar[\@xfootnotemark
286   {\stepcounter{footnote}%
287   \protected@xdef\thefnmark{\thefootnote}%
288   \@footnotemark}%
289 }

\@xfootnotemark
289 \def\@xfootnotemark[#1]{%
290   \begingroup
291   \c@footnote #1\relax
292   \unrestored@protected@xdef\thefnmark{\thefootnote}%
293   \endgroup
294   \@footnotemark}%
295 }

\@footnotemark
295 \def\@footnotemark{%
296   \leavevmode
297   \ifhmode\edef\x@sf{\the\spacefactor}\nobreak\fi
298   \color@makefnmark
299   \ifhmode\spacefactor\x@sf\fi
300   \relax}%
301 }

\footnotetext
301 \def\footnotetext{%
302   \ifnextchar[\@xfootnotenext
303   {\protected@xdef\thefnmark{\thempfn}%
304   \@footnotetext}%
305 }

\@xfootnotenext
305 \def\@xfootnotenext[#1]{%
306   \begingroup
307   \csname c@\thempfn\endcsname #1\relax
308   \unrestored@protected@xdef\thefnmark{\thempfn}%
309   \endgroup
310   \@footnotetext}%
311 }

\thempfn
\thempfn 311 \def\thempfn{footnote}
312 \def\thempfn{\thefootnote}
313 
```

# File H

## ltidxglo.dtx

### 63 Index and Glossary Generation

Index and Glossary commands.

```
\makeindex      A preamble command to turn on indexing.  
\makeglossary  A preamble command to turn on making glossary entries.  
    \index        Make an index entry for #1.  
    \glossary     Make a glossary entry for #1.  
\makeindex ==  
    BEGIN  
        \index ==  BEGIN \@bsphack  
            \begingroup  
                \protect{X} == \string X\space  
                %% added 3 Feb 87 for \index  
commands  
                %% in \footnotes  
                re-\catcode special characters  
                to 'other'  
                \@wrindex  
    END  
  
\@wrindex{ITEM} ==  
    BEGIN  
        write of {\indexentry{ITEM}{page number}}  
    \endgroup  
    \@esphack  
    END
```

INITIALIZATION:

```
\index == BEGIN \@bsphack  
    \begingroup  
        re-\catcode special characters (in case '%' there)  
    \@index  
END  
  
\@index{ITEM} == BEGIN \endgroup \@esphack END
```

Changes made 14 Apr 89 to write \glossaryentry's instead of \indexentry's on the .glo file.

```
1 <*2ekernel>  
2 \message{index,}
```

```
\makeindex  
3 \def\makeindex{  
4   \newwrite\@indexfile  
5   \immediate\openout\@indexfile=\jobname.idx  
6   \def\index{\@bsphack\begin{group}  
7             \@sanitize  
8             \@wrindex}\typeout  
9   {Writing index file \jobname.idx}%
```

Opening the write channel should be done only once since on some OS multiple opens are forbidden and in any case it is useless. So we turn this into a no-op after use.

```

10  \let\makeindex\@empty
11 }
12 \onlypreamble\makeindex

\@wrindex
13 \def\@wrindex#1{%
14   \protected@write\@indexfile{ }{%
15     {\string\indexentry{#1}{\thepage}}%
16   \endgroup
17   \esphack}

\index
18 \def\index{\bsphack\begin{group} \sanitize\@index}

\@index
19 \def\@index#1{\endgroup\esphack}

\makeglossary
20 \def\makeglossary{%
21   \newwrite\@glossaryfile
22   \immediate\openout\@glossaryfile=\jobname.glo
23   \def\glossary{\bsphack\begin{group}
24     \sanitize
25     \wrglossary\typeout
26     {Writing glossary file \jobname.glo }%
27   \let\makeglossary\@empty
28 }
29 \onlypreamble\makeglossary

\@wrglossary
30 \def\@wrglossary#1{%
31   \protected@write\@glossaryfile{ }{%
32     {\string\glossaryentry{#1}{\thepage}}%
33   \endgroup
34   \esphack}

\glossary
35 \def\glossary{\bsphack\begin{group}\sanitize\@index}

36 ⟨/2ekernel⟩

```

# File I

## ltbibl.dtx

### 64 Bibliography Generation

A bibliography is created by the `thebibliography` environment, which generates a title such as “References”, and a list of entries. The BIBTEX program will create a file containing such an environment, which will be read in by the `\bibliography` command. With BIBTEX, the following commands will be used.

`\bibliography`

`\bibliography{<file1,<file2, . . . ,<filen>}` : specifies the bibdata files. Writes a `\bibdata` entry on the `.aux` file and tries to read in `mainfile.bbl`.

`\bibliographystyle{<style>}` : Writes a `\bibstyle` entry on the `.aux` file.

The `thebibliography` environment is a list environment. To save the use of an extra counter, it should use `enumiv` as the item counter. Instead of using `\item`, items in the bibliography are produced by the following commands:

`\bibitem{<name>}` : Produces a numbered entry cited as `<name>`.

`\bibitem[<label>]{<name>}` : Produces an entry labeled by `<Label>` and cited by `<name>`.

The former is used for bibliographies with citations like [1], [2], etc.; the latter is used for citations like [Knuth82].

The document class must define the `thebibliography` environment. This environment has a single argument, which is the widest bibliography label— e.g., if the [Knuth67] is the widest entry, then this argument will be Knuth67. The `\thebibliography` command must begin a list environment, which the `\endthebibliography` command ends.

Entries are cited by the command `\cite{<name>}`.

`\nocite{<citations>}` puts information on the `.aux` file that causes BIBTEX to include the `{<citations>}` list in the bibliography, but puts nothing in the text.

`\nocite{*}` is special: it tells BIBTEX to put the whole of a collection of references into the bibliography.

1 (\*2ekernel)  
2 \message{bibliography,}

#### PARAMETERS

`\@cite` : A macro such that `\@cite{LABEL1,LABEL2}{NOTE}` produces the output for a `\cite[NOTE]{FOO1,FOO2}` command,

where entry FOO*i* is defined by `\bibitem[LABELi]{FOOi}`. The switch `@tempswa` is true if the optional NOTE argument

is present.

The default definition is :

```
\@cite{LABELS}{NOTE} ==
BEGIN [LABELS]
    IF @tempswa = T THEN , NOTE FI
]
END
```

`\@biblabel` : A macro to produce the label in the bibliography entry. For `\bibitem[LABEL]{NAME}`, the label is generated by `\@biblabel{LABEL}`. It has the default definition `\@biblabel{LABEL} -> [LABEL]`.

#### CONVENTION

`\b@FOO` : The name or number of the reference created by `\cite{FOO}`

E.g., if `\cite{FOO} -> [17]`, then `\b@FOO -> 17`.

```
\bibitem
 3 \def\bibitem{\@ifnextchar[\@lbibitem\@bibitem}
\@lbibitem
 4 \def\@lbibitem[#1]{\item[\@biblabel{#1}\hfill]\if@filesw
 5   {\let\protect\noexpand
 6    \immediate
 7    \write\@auxout{\string\bibcite{#2}{#1}}}\fi\ignorespaces}
\@bibitem
 8 \def\@bibitem#1{\item\if@filesw \immediate\write\@auxout
 9   {\string\bibcite{#1}{\the\value{\@listctr}}}\fi\ignorespaces}
\bibcite
10 \def\bibcite{\@newl@bel b}
\citation
11 \let\citation\gobble
\cite
12 \DeclareRobustCommand\cite{%
13   \@ifnextchar [{\@tempswatrue\@citex}{\@tempswafalse\@citex[]}}
\@citex \penalty\@m added to definition of \@citex to allow a line break after the ',' in
citations like [Jones80,Smith77] (Added 23 Oct 86)
      space added after the ',' (21 Nov 87)
14 \def\@citex[#1]{\leavevmode
15   \let\@citea\empty
16   \@cite{\@for\@citeb:=#2\do
17     {\@citea\def\@citeaf,\penalty\@m\ }%
18     \edef\@citeb{\expandafter\@firstofone\@citeb\@empty}%
19     \if@filesw\immediate\write\@auxout{\string\citation{\@citeb}}\fi
Using \hbox instead of \mbox is fine because of the \leavevmode above. In fact
the use of a box around the citation contents is more than questionable in my
view (FMi), but within 2e I have to keep that for compatibility reasons as it
would probably change too many existing documents. Its main reason is to avoid
hyphenation of labels such as [FOOB89] into [FOO- B89] so in certain styles it
makes sense; but, for example, in author year citations it becomes more than
questionable.
So Chris added yet another hook here, as suggested by, at least, Donald Arsenau. Note that this one is inside the first argument of the \@cite hook. This decouples the top-level typesetting of the citation from the details of the other business conducted here. All this really needs a complete rethink to get the right modularity.
20   \@ifundefined{b@\@citeb}{\hbox{\reset@font\bfseries ?}}%
21   \G@refundefinedtrue
22   \@latex@warning
23     {Citation '\@citeb' on page \thepage \space undefined}%
24   {\@cite@ofmt{\csname b@\@citeb\endcsname}}}{#1}}
\bibdata
\bibstyle 25 \let\bibdata=\gobble
26 \let\bibstyle=\gobble
```

```

\bibliography
27 \def\bibliography#1{%
28   \if@filesw
29     \immediate\write\auxout{\string\bibdata{#1}}%
30   \fi
31   \input{\jobname.bbl}

\bibliographystyle
32 \def\bibliographystyle#1{%
33   \ifx\begindocument\undefined\else
34     \expandafter\AtBeginDocument
35   \fi
36   {\if@filesw
37     \immediate\write\auxout{\string\bibstyle{#1}}%
38   \fi}}

```

**\nocite** (Added 14 Jun 85)

This puts information on the .aux file that causes BIB<sub>T</sub>E<sub>X</sub> to include the citation list in the bibliography, but puts nothing in the text.

RmS 93/08/06: Made loop for \nocite like that for \citet, to get rid of leading spaces.

```
39 \def\nocite#1{\@bsphack
```

With the implementation designed already in L<sup>A</sup>T<sub>E</sub>X 2.09 the \nocite command will not work before \begin{document} since it tries to write to the .aux file which is not open before that point. As a result the “reference” will appear on the terminal and nothing else will happen.

This would be easy to fix, but then a document using the fix will silently fail on an older release of L<sup>A</sup>T<sub>E</sub>X, missing all citations done with \nocite. Thus we do only generate an error message and leave the fix for a L<sup>A</sup>T<sub>E</sub>X 2<sub>c</sub> successor.

```
40 \ifx\onlypreamble\document
```

Since we are after \begin{document} we can do the citations:

```
41   \@for\citereb:=#1\do{%
42     \edef\citereb{\expandafter\firstofone\citereb}%
43     \if@filesw\immediate\write\auxout{\string\citation{\citereb}}\fi
44     \ifundefined{b@\citereb}{\G@refundefinedtrue
45       \G@warning{Citation ‘\citereb’ undefined}}{}%
46   \else
```

But before \begin{document} we raise an error message:

```
47   \G@error{Cannot be used in preamble}\@eha
```

Without the compatibility problems we could fix the problem as follows:

```
48   % \AtBeginDocument{\nocite{#1}}
49   \fi
50   \@esphack}
```

Since \nocite{\*} should not produce a warning about undefined citation keys (see PR 557), we need to set the control sequence ‘\b@\*’ to something other than \relax. As a result \citet{\*} will not warn either (but that never worked with BIB<sub>T</sub>E<sub>X</sub> in the first place).

```
51 \expandafter\let\csname b@\endcsname\empty
```

## 64.1 Default definitions

This hook determines the ‘relative formatting’ of the two logical parts of a citation with comment.

```
\@cite
52 \def\@cite#1#2{[#1\if@tempswa , #2\fi]}
```

\@cite@ofmt This is, in general, a command that appears to have one argument whose value is, in the kernel, a single cs whose name is the expansion of `b@\citeb`; the expansion of this cs will typically be some hmode material that produces the detailed typeset form of just the citations themselves.

53 \let\@cite@ofmt\hbox

\@biblabel

54 \def\@biblabel#1{[#1]}

55 ⟨/2ekernel⟩

# File J

## ltpage.dtx

### 65 Page styles and related commands

#### 65.1 Page Style Commands

`\pagestyle{<style>}` : sets the page style of the current and succeeding pages to *style*

`\thispagestyle{<style>}` : sets the page style of the current page only to *style*.

To define a page style *style*, you must define `\ps@style` to set the page style parameters.

#### 65.2 How a page style makes running heads and feet

The `\ps@...` command defines the macros `\@oddhead`, `\@oddfoot`, `\@evenhead`, and `\@evenfoot` to define the running heads and feet. (See output routine.) To make headings determined by the sectioning commands, the page style defines the commands `\chaptermark`, `\sectionmark`, etc., where `\chaptermark{<text>}` is called by `\chapter` to set a mark. The `\...mark` commands and the `\...head` macros are defined with the help of the following macros.

(All the `\...mark` commands should be initialized to no-ops.)

#### 65.3 marking conventions

L<sup>A</sup>T<sub>E</sub>X extends T<sub>E</sub>X's `\mark` facility by producing two kinds of marks a 'left' and a 'right' mark, using the following commands:

`\markboth{<left>}{<right>}` : Adds both marks.

`\markright{<right>}` : Adds a 'right' mark.

`\leftmark` : Used in the output routine, gets the current 'left' mark. Works like T<sub>E</sub>X's `\botmark`.

`\rightmark` : Used in the output routine, gets the current 'right' mark. Works like T<sub>E</sub>X's `\firstmark`. The marking commands work reasonably well for right marks 'numbered within' left marks—e.g., the left mark is changed by a `\chapter` command and the right mark is changed by a `\section` command. However, it does produce somewhat anomalous results if 2 `\markboth`'s occur on the same page.

Commands like `\tableofcontents` that should set the marks in some page styles use a `\@mkboth` command, which is `\let` by the `\pagestyle` command (`\ps@...`) to `\markboth` for setting the heading or to `\@gobbletwo` to do nothing.

1 (\*2ekernel)

`\pagestyle` User command to set the page style for this and following pages.

```
2 \def\pagestyle#1{%
3   \@ifundefined{ps@#1}%
4     \undefinedpagestyle
5   {\@nameuse{ps@#1}}}
```

`\thispagestyle` User command to set the page style for this page only.

```
6 \def>thispagestyle#1{%
7   \ifundefined{ps@#1}%
8     \undefinedpagestyle
9   {\global\@specialpagetrue\gdef\@specialstyle{#1}}}
```

`\ps@empty` The empty page style: No head or foot line.

```
10 \def\ps@empty{%
11   \let\@mkboth\@gobbletwo\let\@oddhead\@empty\let\@oddfoot\@empty
12   \let\@evenhead\@empty\let\@evenfoot\@empty}
```

<code>\ps@plain</code>	The plain page style: No head, centred page number in foot.
	13 <code>\def\ps@plain{\let\@mkboth\@gobbletwo</code> 14 <code>\let\@oddhead\@empty\def\@oddfoot{\reset@font\hfil\thepage</code> 15 <code>\hfil}\let\@evenhead\@empty\let\@evenfoot\@oddfoot}</code>
<code>\@leftmark</code>	We implement <code>\@leftmark</code> and <code>\@rightmark</code> in terms of already defined commands to save token space. We can't get rid of them since they are sometimes used in applications.
	16 <code>\let\@leftmark\@firstoftwo</code> 17 <code>\let\@rightmark\@secondoftwo</code>
<code>\markboth</code>	User commands for setting L <sup>A</sup> T <sub>E</sub> X marks.
<code>\markright</code>	Test for <code>\nobreak</code> added 15 Apr 86 in <code>\markboth</code> and <code>\markright</code> letting <code>\label</code> and <code>\index</code> to <code>\relax</code> added 22 Feb 86 so these commands can appear in sectioning command arguments RmS 91/06/21 Same for <code>\glossary</code>
	18 <code>\def\markboth#1#2{%</code> 19 <code>\begingroup</code> 20 <code>\let\label\relax \let\index\relax \let\glossary\relax</code> 21 <code>\unrestored@protected@xdef\@themark {\#1}{#2}}%</code> 22 <code>\@temptokena \expandafter{\@themark}%</code> 23 <code>\mark{\the\@temptokena}%</code> 24 <code>\endgroup</code> 25 <code>\if@nobreak\ifvmode\nobreak\fi\fi}</code> 26 <code>\def\markright#1{%</code> 27 <code>\begingroup</code> 28 <code>\let\label\relax \let\index\relax \let\glossary\relax</code> Protection is handled inside <code>\@markright</code> . 29 <code>\expandafter\@markright\@themark {\#1}%</code> 30 <code>\@temptokena \expandafter{\@themark}%</code> 31 <code>\mark{\the\@temptokena}%</code> 32 <code>\endgroup</code> 33 <code>\if@nobreak\ifvmode\nobreak\fi\fi}</code>
<code>\@markright</code>	
<code>\leftmark</code>	34 <code>\def\@markright#1#2#3{\@temptokena {\#1}%</code> 35 <code>\unrestored@protected@xdef\@themark{\the\@temptokena}{#3}}}</code>
<code>\rightmark</code>	36 <code>\def\leftmark{\expandafter\@leftmark\botmark\@empty\@empty}</code> 37 <code>\def\rightmark{\expandafter\@rightmark\firstmark\@empty\@empty}</code>
<code>\@themark</code>	Initialise L <sup>A</sup> T <sub>E</sub> X's marks without setting a T <sub>E</sub> X mark <i>(whatsit)</i> .
	38 <code>\def\@themark{{}{}{}}</code>
<code>\mark</code>	Test versions of L <sup>A</sup> T <sub>E</sub> X 2 <sub>E</sub> initialised T <sub>E</sub> X's <code>\mark</code> system at this point, but this was removed before the first release.
	<code>\AtBeginDocument{\mark{{}{}{}}}</code>
<code>\raggedbottom</code>	<code>\raggedbottom</code> typesets pages with no vertical stretch, so they have their natural height instead of all being exactly the same height. (Uses a space of .0001fil to avoid interfering with the 1fil space of <code>\newpage</code> .)
	39 <code>\def\raggedbottom{%</code> 40 <code>\def\@textbottom{\vskip \z@ \oplus.0001fil}\let\@texttop\relax}</code>
<code>\flushbottom</code>	<code>\flushbottom</code> : Inverse of <code>\raggedbottom</code> — makes all pages the same height.
	41 <code>\def\flushbottom{%</code> 42 <code>\let\@textbottom\relax \let\@texttop\relax}</code>

**\sloppy** \sloppy will never (well, hardly ever) produce overfull boxes, but may produce underfull ones. (14 June 85)

```
43 \def\sloppy{%
44   \tolerance 9999%
45   \emergencystretch 3em%
46   \hfuzz .5\p@
47   \vfuzz\hfuzz}
```

**sloppypar** A sloppypar environment is equivalent to {\par \sloppy ... \par}.

```
48 \def\sloppypar{\par\sloppy}
49 \def\endsloppypar{\par}
```

**\fussy** Resets T<sub>E</sub>X's parameters to their normal finicky values.

```
50 \def\fussy{%
51   \emergencystretch\z@%
52   \tolerance 200%
53   \hfuzz .1\p@
54   \vfuzz\hfuzz}
```

**\overfullrule** L<sup>A</sup>T<sub>E</sub>X default is no overfull box rule. Changed by document class option.

```
55 \overfullrule Opt
56 </2ekernel>
```

# File K

## ltoutput.dtx

### 66 Output Routine

#### 66.1 Floats

The ‘2ekernel’ code ensures that a `\usepackage{autoout1}` is essentially ignored if a ‘full’ format is being used that has the autoload file mode already in the format.

```
1 <defx>\begingroup
2 <defx>\makeatletter
3 <defx>\nfss@catcodes
4 <2ekernel>\expandafter\let\csname ver@autoout1.sty\endcsname\fmtversion
5 (*2ekernel | autoload)
6 \message{output,}

*****
*          OUTPUT
*****
*****
```

#### PAGE LAYOUT PARAMETERS

```
\topmargin      : Extra space added to top of page.
@twoside       : boolean. T if two-sided printing
\oddsidemargin : IF @twoside = T
                  THEN extra space added to left of odd-numbered
                  pages.
                  ELSE extra space added to left of all pages.
\evensidemargin : IF @twoside = T
                  THEN extra space added to left of
even-numbered
                  pages.
\headheight    : height of head
\headsep       : separation between head and text
\footskip      : distance separation between baseline of last
                  line of text and baseline of foot.
                  Note difference between \footSKIP and \headSEP.
\textheight    : height of text on page, excluding head and foot
\textwidth     : width of printing on page
\columnsep     : IF @twocolumn = T
                  THEN width of space between columns
\columnsep rule : IF @twocolumn = T
                  THEN width of rule between columns (0 if none).
\columnwidth   : IF @twocolumn = T
                  THEN (\textwidth - \columnsep)/2
                  ELSE \textwidth
                  It is set by the \twocolumn and
                  \onecolumn commands.
\@textbottom  : Command executed at bottom of vbox holding text
of
                  page (including figures). The \raggedbottom
                  command almost \let's this to \vfil (actually sets
                  it to \vskip \z@ plus.0001fil).
                  Should have depth 0pt.
```

`\@texttop` : Command executed at top of vbox holding text of page (including figures). Used by letter style; can also be used to produce centered pages.  
 Let to `\relax` by `\raggedbottom` and  
`\flushbottom`.

Page layout must initialize `\@colht` and `\@colroom` to `\textheight`.

#### PAGE STYLE PARAMETERS:

<code>\floatsep</code>	: Space left between floats.
<code>\textfloatsep</code>	: Space between last top float or first bottom float and the text.
<code>\topfigrule</code>	: Command to place rule (or whatever) between floats at top of page and text. Executed in inner vertical mode right before the <code>\textfloatsep</code> skip separating the floats from the text. Must occupy zero vertical space. (See <code>\footnoterule</code> .)
<code>\botfigrule</code>	: Same as <code>\topfigrule</code> , but put after the <code>\textfloatsep</code> skip separating text from the floats at bottom of page.
<code>\intextsep</code>	: Space left on top and bottom of an in-text float.
<code>\dblfloatsep</code>	: Space between double-column floats.
<code>\dbltextfloatsep</code>	: Space between top double-column floats and text.
<code>\dblfigrule</code>	: Similar to <code>\topfigrule</code> , but for double-column floats.
<code>\@fptop</code>	: Glue to go at top of float column – must be 0pt + stretch
<code>\@fpsep</code>	: Glue to go between floats in a float column.
<code>\@fpbot</code>	: Glue to go at bottom of float column – must be 0pt + stretch
<code>\@dblftop, \@dblfpsep, \@dblfpbot</code>	: Analogous for double-column float page in two-column format.

FOOTNOTES: As in PLAIN, footnotes use `\insert\footins`.

#### PAGE LAYOUT SWITCHES AND MACROS

`@twocolumn` : Boolean. T if two columns per page globally.

#### PAGE STYLE MACROS AND SWITCHES

<code>\@oddhead</code>	: IF <code>@twoside = T</code> THEN macro to generate head of odd-numbered
	pages. ELSE macro to generate head of all pages.
<code>\@evenhead</code>	: IF <code>@twoside = T</code> THEN macro to generate head of even-numbered
	pages.
<code>\@oddfoot</code>	: IF <code>@twoside = T</code> THEN macro to generate foot of odd-numbered

pages.  
ELSE macro to generate foot of all pages.  
\@evenfoot : IF @twoside = T  
THEN macro to generate foot of  
even-numbered  
pages.  
@specialpage : boolean. T if current page is to have a special  
format.  
\@specialstyle : If its value is foo then  
IF @specialpage = T  
THEN the command \ps@foo is executed to  
temporarily reset the page style parameters  
before composing the current page.  
This command should execute only \def's  
and  
\edef's, making only local definitions.

## FLOAT PLACEMENT PARAMETERS

The following parameters are set by the macro \@floatplacement.

When \@floatplacement is called,

\@colht is the height of the page or column being built. I.e.:

- \* For single-column page it equals \textheight.
- \* For double-column page it equals \textheight - height  
of double-column floats on page.

Note that some are set globally and some locally:

\@topnum :=G Maximum number of floats allowed on the top of a  
column.  
\@toproom :=G Maximum amount of top of column devoted to floats—  
excluding \textfloatsep separation below the floats  
and \floatsep separation between them. For  
two-column output, should be computed as a function  
of \@colht.  
\@botnum, \@botroom  
: Analogous to above.  
\@colnum :=G Maximum number of floats allowed in a column,  
including in-text floats.  
\@textmin :=L Minimum amount of text (excluding footnotes) that  
must appear on a text page.  
%% 27 Sep 85 : made local to  
%% \@addtocurcol and \@addtonextcol  
It is now also used locally in processing double  
floats.  
\@fpmin :=L Minimum height of floats in a float column.

The macro \dblfloatplacement sets the following parameters.

\@dbltopnum :=G Maximum number of double-column floats allowed  
at

the top of a two-column page.

\@dbltoproom :=G Maximum height of double-column floats allowed at  
top of two-column page.

\@fpmin :=L Minimum height of floats in a float column.

It should also perform the following local assignments where necessary  
– i.e., where the new value differs from the old one:

\@fptop :=L \@dblftop  
\@fpsep :=L \@dblfpsep  
\@fpbot :=L \@dblfpbot

## OUTPUT ROUTINE VARIABLES

\@colht : The total height of the current column. In single column style, it equals \textheight. In two-column style, it is \textheight minus the height of the double-column floats on the current page. MUST BE INITIALIZED TO \textheight.

\@colroom : The height available in the current column for text and footnotes. It equals \@colht minus the height of all floats committed to the top and bottom of the current column.

\@textfloatsheight : The total height of in-text floats on the current page.

\footins : Footnote insertion number.

\@maxdepth : Saved value of TeX's \maxdepth. Must be set when any routine sets \maxdepth.

## CALLING THE OUTPUT ROUTINE

---

The output routine is called either by TeX's normal page-breaking mechanism, or by a macro putting a penalty < or = -10000 in the output list. In the latter case, the penalty indicates why the output routine was called, using the following code.

penalty	reason
-10000	\pagebreak \newpage
-10001	\clearpage (\penalty -10000 \vbox{} \penalty -10001)
-10002	float insertion, called from horizontal mode
-10003	float insertion, called from vertical mode.
-10004	float insertion.

Note: A float or marginpar puts the following sequence in the output list: (i) a penalty of -10004,  
(ii) a null \vbox  
(iii) a penalty of -10002 or -10003.

This solves two special problems:

1. If the float comes right after a \newpage or \clearpage, then the first penalty is ignored, but the second one invokes the output routine.
2. If there is a split footnote on the page, the second 'page' puts out the rest of the footnote.

## THE OUTPUT ROUTINE

---

### FUNCTIONS USED IN THE OUTPUT ROUTINE:

\@outputpage : Produces an output page with the contents of box \@outputbox as the text part.

Also sets `\@colht :=G \textheight`.

The page style is determined as follows.

IF `@thispagestyle = true`  
THEN use `\thispagestyle` style  
ELSE use ordinary page style.

`\@tryfcolumn\FLIST` : Tries to form a float column composed of floats from `\FLIST` (if nonempty) with the following parameters:

`\@colht` : height of box  
`\@fpmin` : minimum height of floats in the box  
`\@fpsep` : interfloat space  
`\@fptop` : glue at top of box  
`\@fpbot` : glue at bottom of box.

If it succeeds, then it does the following:

- \* `\@outputbox :=L` the composed float box.
- \* `@fcolmade :=G true`
- \* `\FLIST :=G \FLIST - floats put in box`
- \* `\@freelist :=G \@freelist + floats put in box`

If it fails, then:

- \* `@fcolmade :=G false`

NOTE: BIT MUST BE A SINGLE TOKEN!

`\@makefcolumn \FLIST` : Same as `\@tryfcolumn` except that it fails to make a float column only if `\FLIST` is empty. Otherwise, it makes a float column containing at least the first box in `\FLIST`, disregarding `\@fpmin`.

`\@startcolumn` :

Calls `\@tryfcolumn\@deferlist`. If `\@tryfcolumn` returns with (globally set) `@fcolmade = false`, then:

- \* Globally sets `\@toplist` and `\@botlist` to floats from `\@deferlist` to go at top and bottom of column, deleting them from `\@deferlist`. It does this using `\@colht` as the total height, the page style parameters `\@floatsep` and `\@textfloatsep`, and the float placement parameters `\@topnum`, `\@toproom`, `\@botnum`, `\@botroom`, `\@colnum` and `\textfraction`.
- \* Globally sets `\@colroom` to `\@colht` minus the height of the added floats.

`\@startdblcolumn` :

Calls `\@tryfcolumn\@dbldeferlist{8}`. If `\@tryfcolumn` returns with (globally set) `@fcolmade = false`, then:

- \* Globally sets `\@dbltoplist` to floats from `\@dbldeferlist` to go at top and bottom of column, deleting them from `\@dbldeferlist`. It does this using `\textheight` as the total height, and the parameters `\@dblfloatsep`, etc.
- \* Globally sets `\@colht` to `\textheight` minus the height of the added floats.

`\@combinefloats` : Combines the text from box `\@outputbox` with the floats from `\@toplist` and `\@botlist`, putting the new box in `\@outputbox`. It uses `\floatsep` and `\textfloatsep` for the appropriate separations. It puts the elements of `\TOPLIST` and `\BOTLIST` onto

\@freelist, and makes those lists null.

\@makecol : Makes the contents of \box255 plus the accumulated footnotes, plus the floats in \@toplist and \@botlist, into a single column of height \@colht (unless the page height has been locally changed), which it puts into box \@outputbox. It puts boxes in \@midlist back onto \@freelist and restores \maxdepth.

\@opcol : Outputs a column whose text is in box \@outputbox  
If @twocolumn = false, then it calls \@outputpage,  
sets \@colht :=G \texttheheight, and calls  
\@floatplacement.

If @twocolumn = true, then:

If @firstcolumn = true, then it puts box \@outputbox into \@leftcolumn and sets @firstcolumn :=G false.

If @firstcolumn = false, then it puts out the current two-column page, any possible two-column float pages, and determines \@dbltoplist for the next page.

---

#### USER COMMANDS THAT CALL OR AFFECT THE OUTPUT ROUTINE

---

```
\newpage == BEGIN \par\vfil\penalty -10000 END

\clearpage == BEGIN \newpage
    \write -1{} % Part of hack to make sure no
    \vbox{}       % \write's get lost.
    \penalty -10001
END

\cleardoublepage == BEGIN \clearpage
    if @twoside = true and c@page is even
        then \hbox{} \newpage fi
    END
```

\twocolumn[BOX] : starts a new page, changing to twocolumn setting  
and puts BOX in a parbox of width \textwidth across the top.  
Useful for full-width titles for double-column pages.

SURPRISE: The stretch from \@dbltextfloatsep will be inserted  
between the BOX and the top of the two columns.

---

#### FLOAT-HANDLING MECHANISMS

---

The float environment obtains an insertion number B from the \@freelist (see below for a description of list manipulation), puts the float into box B and sets \count B to a FLOAT SPECIFIER. For a normal (not double-column) float, it then causes a page break in one of the following two ways:

- In outer hmode: `\vadjust{\penalty -10002}`
- In vmode : `\penalty -10003`.

For a double-column float, it puts B onto the `\@dbldeflist`.

The float specifier has two components:

- \* A PLACEMENT SPECIFICATION, describing where the float may be placed.
- \* A TYPE, which is a power of two—e.g., figures might be type 1 floats, tables type 2 floats, programs type 4 floats, etc.

The float specifier is encoded as follows, where bit 0 is the least significant bit.

Bit	Meaning
0	1 iff the float may go where it appears in the text.
1	1 iff the float may go on the top of a page.
2	1 iff the float may go on the bottom of a page.
3	1 iff the float may go on a float page.
4	1 unless the PLACEMENT includes a !
5	1 iff a type 1 float
6	1 iff a type 2 float
	etc.

A negative float specifier is used to indicate a marginal note.

## MACROS AND DATA STRUCTURES FOR PROCESSING FLOATS

---

A FLOAT LIST consisting of the floats in boxes `\boxa ... \boxN` has the form:

`\@elt \boxa ... \@elt \boxN`  
where `\boxI` is defined by  
`\newinsert\boxI`

Normally, `\@elt` is `\let` to `\relax`. A test can be performed on the entire float list by locally `\def`'ing `\@elt` appropriately and executing the list.

This is a lot more efficient than looping through the list.

The following macros are used for manipulating float lists.

```
\@next \CS \LIST {NONEEMPTY}{EMPTY} == %% NOTE: ASSUME
\@elt = \relax
BEGIN assume that \LIST == \@elt \B1 ... \@elt \Bn
  if n = 0
    then EMPTY
    else \CS :=L \B1
         \LIST :=G \@elt \B2 ... \@elt \Bn
         NONEEMPTY
  fi
END
```

`\@bitor\NUM\LIST` : Globally sets switch `@test` to the disjunction for all I of bit  $\log_2 \NUM$  of the float specifiers of all the floats in `\LIST`.  
I.e., `@test` is set to true iff there is at least one float in `\LIST` having bit  $\log_2 \NUM$  of its float specifier equal to 1.

Note:  $\log_2 [(\text{\count} I)/32]$  is the bit number corresponding to the type of float I. To see if there is any float in \LIST having the same type as float I, you run \@bitor with  
 $\text{\NUM} = [(\text{\count} I)/32] * 32$ .

```
\@bitor\NUM\LIST ==
BEGIN
    @test :=G false
    { \@elt \CTR ==  if \NUM <> 0 then
        if \count\CTR / \NUM is odd
            then @test := true      fi fi
        \LIST
    }
END
```

\@cons\LIST\NUM : Globally sets \LIST := \LIST \* \@elt \NUM

```
\@cons\LIST\NUM ==
BEGIN { \@elt == \relax
        \LIST :=G \LIST \@elt \NUM
    }
```

## BOX LISTS FOR FLOAT-PLACEMENT ALGORITHMS

\@freelist	: List of empty boxes for placing new floats.
\@toplist	: List of floats to go at top of current column.
\@midlist	: List of floats in middle of current column.
\@botlist	: List of floats to go at bottom of current column.
\@deferlist	: List of floats to go after current column.
\@dbltoplist	: List of double-col. floats to go at top of current page.
\@dbldeflist	: List of double-column floats to go on subsequent pages.

## FLOAT-PLACEMENT ALGORITHMS

\@addtobot : Tries to put insert \@currbox on \@botlist.

Called only when:

- \* \ht BOX < \@colroom
- \* type of \@currbox not on \@deferlist
- \* \@colnum > 0
- \* @insert = false

If it succeeds, then:

- \* sets @insert true
- \* decrements \@botroom by \ht BOX
- \* decrements \@botnum and \@colnum by 1
- \* decrements \@colroom by \ht BOX + either

\floatsep

or \textfloatsep, as appropriate.

- \* sets \maxdepth to 0pt

\@addtotoporbot : Tries to put insert \@currbox on \@toplist or \@botlist.

Called only under same conditions as \@addtobot.

If it succeeds, then:  
 \* sets @insert true  
 \* decrements \atoproom or \abotroom by \ht  
**BOX**  
 \* decrements \colnum and either \atopnum or  
 \abotnum by 1  
 \* decrements \colroom by \ht **BOX** +  
\floatsep  
 or \textfloatsep, as appropriate.

\addtocurcol : Tries to add \currbox to current column, setting  
 @insert true if it succeeds, false otherwise.

It will add \currbox to top only if bit 0 of  
 \count \currbox is 0, and to the bottom only if  
 bit 0 = 0 or an earlier float of the same type is  
 put on the bottom.

If the float is put in the text, then  
 \penalty\interlinepenalty is put  
 right after the float, before the following \vskip,  
 and \outputpenalty :=L 0.

\addtonextcol : Tries to add \currbox to the next column, setting  
 @insert true if it succeeds, false otherwise.

\addtoblcol : Tries to add \currbox to the next double-column page,  
 adding it to \dbltoplist if it succeeds and  
 \dbldeflist if it fails.

```
\addmarginpar ===
BEGIN
if @currlist nonempty
    then remove \marbox from @currlist
        add \marbox and \currbox to @freelist
        %% NOTE: \currbox = left box
    else LaTeX error: ? %% shouldn't happen
fi
@tempcnta := 1      %% 1 = right, -1 = left
if @twocolumn = true
    then if @firstcolumn = true
        then @tempcnta := -1
    fi
else if @mparswitch = true
    then if count0 odd
        else @tempcnta := -1
    fi
fi
if @reversemargin = true
    then @tempcnta := -@tempcnta
fi
if @tempcnta < 0 then \box\marbox :=G \box\currbox
fi
@tempdima :=L maximum(@mparbottom - @pageht
                    + ht of \marbox, 0)
if @tempdima > 0 then LaTeX warning: 'marginpar moved' fi
@mparbottom :=G @pageht + @tempdima + depth of \marbox
```

```

+ \marginparpush
\@tempdima :=L \@tempdima - ht of \@marbox
\box\@marbox :=G \box\@currbox
\ vbox { \vskip \@tempdima
          \box\@marbox
        }
height of \@marbox :=G depth of \@marbox :=G 0
\kern -\@pagedp
\nointerlineskip
\hbox{ if @tempcpta > 0 then \hskip \columnwidth
          \hskip \marginparsep
        else \hskip -\marginparsep
          \hskip -\marginparwidth
      fi
      \box\@marbox \hss
    }
\nobreak
\nointerlineskip
\hbox{\vrule height 0 width 0 depth \@pagedp}
END

```

Floats and marginpars add a lot of dead cycles.

```

7 \maxdeadcycles = 100
8 \let\@elt\relax
9 \def\@next#1#2#3#4{\ifx#2\empty #4\else
10   \expandafter\@next #2\@#1#2#3\fi}
11 \def\@next #1#2\@#3#4{\def#3{#1}\gdef#4{#2}}
\changes{v1.1v}{1996/07/26}{put \cs{global} into definition}
12 \def\@testfalse{\global\let\if@test\iffalse}
13 \def\@testtrue {\global\let\if@test\iftrue}
14 \@testfalse
\changes{v1.1v}{1996/07/26}{remove \cs{global} before \cs{@test...}}
15 \def\@bitor#1#2{\@testfalse {\let\@elt\@xbitor
16   \@tempcpta #1\relax #2}}

```

RmS 91/11/22: Added test for |\count#1 = 0|. Suggested by Chris Rowley.

```

\changes{v1.1v}{1996/07/26}{remove \cs{global} before \cs{@test...}}
17 \def\@xbitor #1{\@tempcntb \count#1
18   \ifnum \@tempcpta =z@
19   \else
20     \divide\@tempcntb\@tempcpta
21     \ifodd\@tempcntb \@testtrue\fi
22   \fi}

```

DEFINITION OF FLOAT BOXES:

```

23 \newinsert\bx@A
24 \newinsert\bx@B
25 \newinsert\bx@C
26 \newinsert\bx@D
27 \newinsert\bx@E
28 \newinsert\bx@F
29 \newinsert\bx@G
30 \newinsert\bx@H

```

```

31 \newinsert\bx@I
32 \newinsert\bx@J
33 \newinsert\bx@K
34 \newinsert\bx@L
35 \newinsert\bx@M
36 \newinsert\bx@N
37 \newinsert\bx@O
38 \newinsert\bx@P
39 \newinsert\bx@Q
40 \newinsert\bx@R

41 \gdef\@freelist{\@elt\bx@A\@elt\bx@B\@elt\bx@C\@elt\bx@D\@elt\bx@E
42           \@elt\bx@F\@elt\bx@G\@elt\bx@H\@elt\bx@I\@elt\bx@J
43           \@elt\bx@K\@elt\bx@L\@elt\bx@M\@elt\bx@N
44           \@elt\bx@O\@elt\bx@P\@elt\bx@Q\@elt\bx@R}

45 \gdef\@toplist{}
46 \gdef\@botlist{}
47 \gdef\@midlist{}
48 \gdef\@currlist{}
49 \gdef\@deferlist{}
50 \gdef\@dbltoplist{}
51 \gdef\@dbldeferlist{}

PAGE LAYOUT PARAMETERS

52 \newdimen\topmargin
53 \newdimen\oddsidemargin
54 \newdimen\evensidemargin
55 \let\@themargin=\oddsidemargin
56 \newdimen\headheight
57 \newdimen\headsep
58 \newdimen\footskip
59 \newdimen\textheight
60 \newdimen\textwidth
61 \newdimen\columnwidth
62 \newdimen\columnsep
63 \newdimen\columnseprule
64 \newdimen\marginparwidth
65 \newdimen\marginparsep
66 \newdimen\marginparpush

\AtBeginDvi We use a box register in which to put stuff that must appear before anything else
\@begindvibox in the .dvi file.
The stuff in the box should not add any typeset material to the page when it
is unboxed.
67 \newbox\@begindvibox
68 \def \AtBeginDvi #1{%
69   \global \setbox \@begindvibox
70   \vbox{\unvbox \@begindvibox #1}%
71 }

\@maxdepth This is not the right place to set this; it needs to be set in a class/style file when
\maxdepth is set.
Also, many settings to \maxdepth should be to \@maxdepth, probably?
72 \newdimen\@maxdepth
73 \@maxdepth = \maxdepth

\paperheight New \paper... registers.
\paperwidth 74 \newdimen\paperheight
75 \newdimen\paperwidth

\if@insert Local switches first:
\if@fcolmade 76 \newif \if@insert
\if@specialpage
\if@firstcolumn
\if@twocolumn
\if@twoside
\if@reversemarginpar
\if@mparswitch
\col@number

```

These should definitely be global:

```
77 \newif \if@fcollmade  
78 \newif \if@specialpage \@specialpagefalse
```

These should be global but are not always set globally in other files.

```
79 \newif \if@firstcolumn \@firstcolumntrue  
80 \newif \if@twocolumn \@twocolumnfalse
```

Not sure about these: two questions. Should things which must apply to a whole document be local or global (they probably should be ‘preamble only’ commands)? Are these three such things?

```
81 \newif \if@twoside \@twosidefalse  
82 \newif \if@reversemargin \@reversemarginfalse  
83 \newif \if@mparswitch \@mparswitchfalse
```

This counter has been imported from ‘multicol’.

```
84 \newcount \col@number  
85 \col@number \@ne
```

## INTERNAL REGISTERS

```
86 \newcount\@topnum  
87 \newdimen\@toproom  
88 \newcount\@dbltopnum  
89 \newdimen\@dbltoproom  
90 \newcount\@botnum  
91 \newdimen\@botroom  
92 \newcount\@colnum  
93 \newdimen\@textmin  
94 \newdimen\@fpmin  
95 \newdimen\@colht  
96 \newdimen\@colroom  
97 \newdimen\@pageht  
98 \newdimen\@pagedp  
99 \newdimen\@parbottom \@parbottom\z@  
100 \newcount\@currtype  
101 \newbox\@outputbox  
102 \newbox\@leftcolumn  
103 \newbox\@oldpg
```

```
104 \def\@thehead{\@oddhead} % initialization  
105 \def\@thefoot{\@oddfoot}
```

**\clearpage** The tests at the beginning are an experimental attempt to avoid a completely empty page after a `\twocolumn[...]`. This prevents the text from the argument vanishing into a float box, never to be seen again. We hope that it does not produce wrong formatting in other cases.

```
106 \def\clearpage{  
107   \ifvmode  
108     \ifnum \@dbltopnum =\m@ne  
109       \ifdim \pagetotal <\topskip  
110         \hbox{}%  
111       \fi  
112     \fi  
113   \fi  
114   \newpage  
115   \write\m@ne{}%  
116   \vbox{}%  
117   \penalty -\@Mi  
118 }
```

**\cleardoublepage**

```

119 \def\cleardoublepage{\clearpage\if@twoside \ifodd\c@page\else
120      \hbox{}\newpage\if@twocolumn\hbox{}\newpage\fi\fi\fi}
121 </2ekernel | autoload>

\onecolumn
122 <*2ekernel | autoload | fltrace>
123 \def\onecolumn{%
124   \clearpage
125   \global\columnwidth\textwidth
126   \global\hsize\columnwidth
127   \global\linewidth\columnwidth
128   \global\@twocolumnfalse
129   \col@number \one
130   \floatplacement{}}}
```

**\newpage** The two checks at the beginning ensure that an item label or run-in section title immediately before a **\newpage** get printed on the correct page, the one before the page break.

All three tests are largely to make error processing more robust; that is why they all reset the flags explicitly, even when it would appear that this would be done by a **\leavevmode**.

```

131 \def \newpage {%
132   \if@noskipsec
133     \ifx \c@nodocument\relax
134       \leavevmode
135       \global \c@noskipsecfalse
136     \fi
137   \fi
138   \if@inlabel
139     \leavevmode
140     \global \c@inlabelfalse
141   \fi
142   \if@nobreak \c@nobreakfalse \everypar{}\fi
143   \par
144   \vfil
145   \penalty -\OM{}}
```

**\c@emptycol** It may be better to use an invisible rule rather than an empty box here.

```
146 \def \c@emptycol {\vbox{}\penalty -\OM{}}
```

**\twocolumn** There are several bug fixes to the two-column stuff here.

```

\@topnewpage 147 \def \twocolumn {%
148   \clearpage
149   \global\columnwidth\textwidth
150   \global\advance\columnwidth-\columnsep
151   \global\divide\columnwidth\tw@
152   \global\hsize\columnwidth
153   \global\linewidth\columnwidth
154   \global\@twocolumntrue
155   \global\@firstcolumntrue
156   \col@number \tw@}
```

There is no reason to put a **\c@dblfloatplacement** here since **\@topnewpage** ignores these settings. The **\c@floatplacement** is needed in case this comes after some changes.

```
157   \c@ifnextchar [\@topnewpage\c@floatplacement
158 }
```

Note that here, getting a box from the freelist can assume success since this comes just after a **\clearpage**.

```
159 \long\def \@topnewpage [#1]{%
```

```

160  \@nодокумент
161  \@next\currbox\@freelist{}{}%
162  \global \setbox\currbox
163  \color@vbox
164  \normalcolor
165  \vbox {%
166  \hsize\textwidth
167  \@parboxrestore
168  \col@number \one
169  #1%
170  \vskip -\dbltextfloatsep
171  }%
172  \color@endbox

```

Added size test and warning message; perhaps we should use an error message.

```

173  \ifdim \ht@\currbox>\textheight
174    \ht@\currbox \textheight
175  \fi

```

This next line is not essential but it is more robust to make this value non-zero, in case of weird errors.

This next bit is what is needed from \addtodblcol, plus some extra checks for error trapping.

```

176  \global \count@\currbox \tw@
177  \tempdima -\ht@\currbox
178  \advance \tempdima -\dbltextfloatsep
179  \global \advance \colht \tempdima
180  \ifx \dbltoplist \empty
181  \else
182    \latexerr{Float(s) lost}\ehb
183    \let \dbltoplist \empty
184  \fi
185  \cons \dbltoplist \currbox

```

This setting of \dbltopnum is used only to change the typesetting in \combinedblfloats.

```

186  \global \dbltopnum \m@ne
187  <*trace>
188  \tr@ce{\dbltopnum set to -1 (= \the \dbltopnum) (topnewpage)}%
189  </trace>

```

At points such as this we need to check that there is still a minimal amount of room left on the page; this uses an arbitrary small value at present; but note that this value is larger than that used when checking that page is too full of normal floats.

If there is little room left we just force a page-break, OK? This involves producing two empty columns. The second empty column may be produced by \output, in which case an extra, misleading, warning will be generated, OK? (This happens only when there is too little room left on the page for any float.) Otherwise (i.e. if the size is such that it is allowed as a normal float) the extra \emptycol will be invoked in the second column by the conditional code guarded by the \if@firstcolumn test.

I now think that the cut-off point here should be 3\baselineskip, but we make it a bit less so that 3 lines of text will be allowed, OK?

Since this happens only when there is nothing on the page but the ‘top-box’, the empty box should not cause any problem other than some overfull box messages, which is not entirely misleading.

Here we need two page-ends since both columns need to be empty.

```

190  \ifdim \colht<2.5\baselineskip
191    \latex@warning@no@line {Optional argument of \noexpand\twocolumn
192      too tall on page \thepage}%
193    \emptycol

```

```

194     \if@firstcolumn
195     \else
196         \emptycol
197     \fi
198 \else
199     \global \vsize \@colht
200     \global \@colroom \@colht
201     \@floatplacement
202 \fi
203 }

```

\output \@specialoutput This needs some small adjustments. We cannot guarantee that the float mechanism will interact correctly with this stuff, but that mechanism does not always work properly with footnotes already.

RmS 91/09/29:

added reset of \par to the output routine. This avoids problems when the output routine is called within a list where \par may be a no-op.

```

204 \output {%
205   \let \par \@@par
206   \ifnum \outputpenalty<-\@M
207     \@specialoutput
208   \else
209     \makecol
210     \opcol

```

Moved to \opcol: \@floatplacement.

```
211   \startcolumn
```

This loop could be replaced by an \expandafter tail recursion in \startcolumn.

```

212   \whilesw \if@fcollmade \fi
213   {%
214   <*trace>
215     \tr@ce{PAGE: float \if@twocolumn column \else page \fi
216           completed}%
217   </trace>
218   \opcol\startcolumn}%
219 \fi
220 \ifnum \outputpenalty>-\@Mi
```

At points such as this we need to check that there is still a minimal amount of room left on the page; this uses an arbitrary small value at present. If there is little room left we just force a page-break, OK?

This bit is essential only if a float has just been processed so maybe it should be moved; but this is the natural place at which to set the vsize and a test would need to be done anyway. A check has been added to ensure that there really has been a change in the value of \@colroom.

Since this happens only when there is nothing on the page but floats, the empty box should not cause any problem other than some overfull box messages, which is not entirely misleading.

The twocolumn case does not need any extra code here since this is the \output itself; in the second column there will still not be enough room left so \emptycol will be executed again when the OR is called by the-page builder when it gets to the penalty inserted by the first execution. (The page-builder is never invoked whilst the OR is being executed since it builds a inner vlist; thus any conditional code for the two-column case within \output may not get executed with the correct value of \if@firstcolumn.

```

221   \ifdim \@colroom<1.5\baselineskip
222     \ifdim \@colroom<\textheight
223       \@latex@warning@no@line {Text page \thepage\space
224                               contains only floats}%
225     \emptycol

```

```

226 %           \if@twocolumn
227 %             \if@firstcolumn
228 %               \else
229 %                 \emptycol
230 %               \fi
231 %             \fi
232       \else
233         \global \vsize \colroom
234       \fi
235     \else
236       \global \vsize \colroom
237     \fi
238   \else
239     \global \vsize \maxdimen
240   \fi
241 }
242 </2ekernel | autoload | fltrace>

CHANGES TO \specialoutput:
* \penalty\z@ changed to \penalty\interlinepenalty so \samepage
  works properly with figure and table environments.
  (Changed 23 Oct 86)

```

\* Definition of \specialoutput changed 26 Feb 88 so \pageht and \pagedp aren't changed for a marginal note.  
 (Change suggested by Chris Rowley.)

```

243 <*2ekernel | def1 | autoload | fltrace>
244 \gdef\specialoutput{%
245   \ifnum \outputpenalty>-\@Mii
246     \docclearpage
247   \else
248     \ifnum \outputpenalty<-\@Mii
249       \ifnum \outputpenalty<-\@MM \deadcycles \z@ \fi
250       \global \setbox\holdpg \vbox {\unvbox\cclv}%
251   \else

```

Note that \boxmaxdepth should not be set here since we wish to record the natural depth of the holdpg box.

This is changed so as to not lose anything, such as writes and marks, which may get into box 255 and should be returned to the list. This should only happen when the first penalty in the mechanism is discarded and therefore \holdpg should always be void in this case. This can happen because a penalty is discarded whenever there is no box on the list.

It was just: \setbox\tempboxa \box \cclv.

The last box which is removed is the box put there by the double-penalty mechanism. The \unskip then removes the \topskip which is put there since the box is the first on the page.

```

252   \global \setbox\holdpg \vbox{%
253     \unvbox\holdpg
254     \unvbox\cclv

```

We must now remove the box added by the float mechanism and the \topskip glue therefore added above it by TeX.

```

255           \setbox\tempboxa \lastbox
256           \unskip
257         }%

```

These two are needed as separate dimensions only by \addmarginpar; for other purposes we put the whole size into \pageht (see below).

```

258   \pagedp \dp\holdpg
259   \pageht \ht\holdpg
260   \unvbox \holdpg

```

```

261      \next\currbox\currlist{%
262          \ifnum \count\currbox>\z@
263              \advance \pageht \pagedp
264              \ifvoid\footins \else
265                  \advance \pageht \ht\footins
266                  \advance \pageht \skip\footins
267                  \advance \pageht \dp\footins
268          \fi
269  {*2ekernel | def1}
270      \ifvbox \kludgeins

```

We want to make the adjustment due to this insert only if the non-star form is used. The \*-form will probably not work with floats, but maybe it still could make some adjustment here even so?

```

271          \ifdim \wd\kludgeins=\z@
272              \advance \pageht \ht\kludgeins
273  {*trace}
274      \tr@ce {Extra size added: \the \ht\kludgeins}%
275  {/trace}
276          \fi
277      \fi
278  {/2ekernel | def1}

```

This version puts the inserts back just before the additional material; it could be moved earlier, before unboxing the page-so-far. Neither is guaranteed not to put things on the wrong page. This version is similar to the original version.

```

279          \reinserts
280          \addtocurcol
281      \else
282          \reinserts
283          \addmarginpar
284      \fi
285  }\@latexbug

```

A 2e change: use `\addpenalty` instead of `\penalty` here. Some penalty is needed to create a potential break-point immediately after the reinserts (or the marginal). Otherwise there can be no possibility to break here and this can cause the reinserts or the marginal to appear on the next page (which is often incorrect). However, if the nobreak flag is true, a `\nobreak` must be correct.

```

286          \ifnum \outputpenalty<\z@
287              \if@nobreak
288                  \nobreak
289              \else
290                  \addpenalty \interlinepenalty
291              \fi
292          \fi
293      \fi
294  \fi
295 }
296  {/2ekernel | def1 | autoload | ftrace}

```

`\@doclearpage` This is a very much an emergency action, just dumping everything: footnotes first then floats. A more sophisticated version is needed; but even more urgent is a bug-free version (see, for example, pr/3528).

Also, it puts any left-over non-boxes (writes, specials, etc.) back after any float pages created: this is a very bad bug since, for example, a kludge insert will be in quite the wrong place and, worse, be irremovable and uncancelable.

```

297  {*2ekernel | autoload}
298 \def \@doclearpage {%
299     \ifvoid\footins

```

We empty any left over kludge insert box here; this is a temporary fix. It should perhaps be applied to one page of cleared floats, but who cares? The whole of this stuff needs completely redoing for many such reasons.

```

300      \ifvbox\@kludgeins
301          {\setbox \@tempboxa \box \@kludgeins}%
302 (*trace)
303      \tr@ce {kludgeins box made void}%
304 (/trace)
305      \fi
306      \setbox\@tempboxa\vsplit\@cclv to\z@ \unvbox\@tempboxa
307      \setbox\@tempboxa\box\@cclv
308      \xdef\@deferlist{\@toplist\@botlist\@deferlist}%

309      \global \let \@toplist \empty
310      \global \let \@botlist \empty
311      \global \@colroom \@colht
312      \ifx \@currlist\empty
313      \else
314          \@latexerr{Float(s) lost}\@ehb

315      \global \let \@currlist \empty
316      \fi
317      \@makefcolumn\@deferlist
318      \@whilesw\if@fcolmade \fi{\@opcol\@makefcolumn\@deferlist}%
319      \if@twocolumn
320          \if@firstcolumn
321              \xdef\@dbldeferlist{\@dbltoplist\@dbldeferlist}%

322          \global \let \@dbltoplist \empty
323          \global \@colht \textheight
324          \begingroup
325              \@dblfloatplacement
326              \@makefcolumn\@dbldeferlist
327              \@whilesw\if@fcolmade \fi{\@outputpage
328                  \@makefcolumn\@dbldeferlist}%
329          \endgroup
330      \else
331          \vbox{}\clearpage
332      \fi
333      \fi
334      \else
335          \setbox\@cclv\vbox{\box\@cclv\vfil}%
336          \@makecol\@opcol
337          \clearpage
338      \fi
339 }
340 </2ekernel | autoload>

```

\@opcol Several changes in detail here.

```

341 <*2ekernel | autoload | fltrace>
342 \def \@opcol {%
343     \if@twocolumn
344         \@outputdblcol
345     \else
346         \@outputpage
347 (*trace)
348         \tr@ce{PAGE: one column (float? see above) page completed}%
349 (/trace)}

```

Not needed since it comes after \@outputpage:

```

350 \% \global\@colht\textheight
351 \fi

```

These do not need to be done every time `\@copcol` is used: they should be grouped together since they all need to be done at the end of the non-special output routine, or at the end of a clearpage one.

```
352 \global \@mparbottom \z@ \global \textfloatsheight \z@
353 \floatplacement
354 }
355 </2ekernel | autoload | fltrace>
```

`\@makecol` We must rewrite this macro to allow for variations in page-makeup required by changes in page-length.

This uses a different macro if a special-length column is being produced.

```
356 (*2ekernel | def1 | autoload)
357 \gdef \@makecol {%
358   \ifvoid\footins
359     \setbox\@outputbox \box\@cclv
360   \else
361     \setbox\@outputbox \vbox {%
```

This `\boxmaxdepth` setting is to ensure that deep footnotes do not overwrite the footer (on account of the negative skip added later): it should use `\@maxdepth` otherwise the change is pointless when there are footnotes.

But see also its use when combining floats.

```
362   \boxmaxdepth \@maxdepth
363 %   \tempdima\dp\@cclv
364   \unvbox \@cclv
365 %   \vskip-\tempdima
366   \vskip \skip\footins
367   \color@begingroup
368   \normalcolor
369   \footnoterule
370   \unvbox \footins
371   \color@endgroup
372 }%
373 \fi
```

The h floats have now been finally committed to this page so we can reset their list. The top and bottom floats are then added to the page.

```
374 \let\@elt\relax
375 \xdef\@freelist{\@freelist\@midlist}%
376 \global \let \@midlist \empty
377 \combinefloats
```

The variations start here in case `\enlargethispage` has been used.

```
378 (*2ekernel | def1)
379   \ifvbox\@kludgeins
380     \makespecialcolbox
381   \else
382 </2ekernel | def1>
```

This extra reboxing is only needed to add the `\@texttop` and `\@textbottom` but this could be done earlier, when the floats are added.

The `\boxmaxdepth` resetting here will have no effect unless `\@textbottom` ends with a box or rule. So is this (or possibly `\@maxdepth`) the correct value?

The `\vskip -\dimen0` ensures that the visible depth of the box does not affect the placement of anything on the page. Thus very deep pages will overprint the footer; but these should have been prevented by suitable settings of the maxdepths at appropriate times.

If `\@textbottom` ends with a box or rule of non-zero depth then this skip adjustment should be done again after it.

I think that the final boxing of the main text page could have a common ending which may make it simpler to see what is going on.

This needs further investigation, especially in the ‘special case’.

Also, the `\boxmaxdepth` setting here affects what happens wthin `\@texttop` and `\@textbottom`, should it? Is it needed at all?

RmS 91/10/22: Replaced `\dimen128` by `\dimen0`.

```

383      \setbox\@outputbox \vbox to \@colht {%
384 %          \boxmaxdepth \maxdepth                      %??
385          \@texttop
386          \dimen0 \dp\@outputbox
387          \unvbox \@outputbox
388          \vskip -\dimen0
389          \@textbottom
390      }%
391 <*2ekernel | def1>
392     \fi
393 </2ekernel | def1>
394     \global \maxdepth \@maxdepth
395 }
396 </2ekernel | def1 | autoload>
```

`\@reinserts` This is the code which reinserts the inserts. It puts them all in one place; this can make some of them come out on the wrong page. It has been put into a separate macro to expedite experimentation.

```

397 <*2ekernel | def1 | autoload>
398 \gdef \@reinserts{%
399   \ifvoid\footins\else\insert\footins{\unvbox\footins}\fi
400 <+2ekernel | def1> \ifvbox\@kludgeins\insert\@kludgeins
401 <+2ekernel | def1>                                {\unvbox\@kludgeins}\fi
402 }
403 </2ekernel | def1 | autoload>
```

`\@makespecialcolbox` This implements certain variations in page-makeup.

```

404 <*2ekernel | def1 | ftrace>
405 \gdef \@makespecialcolbox {%
406 (*trace)
407   \tr@ce{\Kludgeins ht \the\ht\@kludgeins\space
408           dp \the\dp\@kludgeins\space
409           wd \the\wd\@kludgeins}%
410 }
```

First we find the natural height of the column.

See above for discussion of what is happening here.

This needs further investigation, especially in this ‘special case’.

```

411  \setbox\@outputbox \vbox {%
412    \@texttop
413    \dimen0 \dp\@outputbox
414    \unvbox\@outputbox
415    \vskip-\dimen0
416  }%
417  \tempdima \@colht
418  \ifdim \wd\@kludgeins>\z@
```

Note that in this case (the \*-version), the height of the `\@kludgeins` box is not used since its value is somewhat arbitrary: it need only be big enough to ensure that the page-break is not taken prematurely.

Here we calculate how much vertical space needs to be added in order to enable the column to fit into a box of size `\@colht` using the best information we have about the amount of shrink available (another thing which is known internally about a box, but cannot be accessed at the TeX level!).

This needs TeX3 otherwise `\pageshrink` is zero anyway; it may not be exactly the figure we wish as it is the total available from the all the material collected

before the page-break decision is made. It will, we think, always be an overestimate of the actual shrink in the box; therefore this should always force the shortest possible column with the possibility of an overfull box.

This should work for both flush- and ragged-bottom setting since it makes the contents no smaller than the size (`\@colht`) of the box into which they are put.

There should perhaps be an upper limit, of `0pt?`, on the extra space added to force shrinking.

See above for a discussion of the `\boxmaxdepth` setting here.

```

419      \advance \@tempdima -\ht\@outputbox
420      \advance \@tempdima \pageshrink
421 <*trace>
422      \tr@ce {Natural ht of col: \the \ht\@outputbox}%
423      \tr@ce {\string \@colht: \the \@colht}%
424      \tr@ce {Pageshrink added: \the \pageshrink}%
425      \tr@ce {Hence, space added: \the \@tempdima}%
426 </trace>
427      \setbox\@outputbox \vbox to \@colht {%
428 %          \boxmaxdepth \maxdepth
429          \unvbox\@outputbox
430          \vskip \@tempdima
431          \textbottom
432      }%

```

For the unstarred version, the final size of the page is precisely specified. Therefore, at least for the flush-bottom case, we need to ensure that, visually, it has this size exactly.

Thus we calculate this size and set the material in a box of this size, which is then put into a box of size `\@colht` with `\vss` at the bottom.

```

433      \else
434          \advance \@tempdima -\ht\@kludgeins
435 <*trace>
436      \tr@ce {Natural ht of col: \the \ht\@outputbox}%
437      \tr@ce {\string \@colht: \the \@colht}%
438      \tr@ce {Extra size added: -\the \ht \@kludgeins}%
439      \tr@ce {Hence, height of inner box: \the \@tempdima}%
440      \tr@ce {Max? pageshrink available: \the \pageshrink}%
441 </trace>

```

This type of final packaging could be done always; this may simplify all of this page-makeup.

It is not necessary to set `\boxmaxdepth` here since the `\@outputbox` ends with glue.

```

442      \setbox \@outputbox \vbox to \@colht {%
443          \vbox to \@tempdima {%
444              \unvbox\@outputbox
445              \textbottom}%
446          \vss}%
447      \fi

```

Finally we need to explicitly make the insert box void.

```

448      \setbox \@tempboxa \box \@kludgeins}%
449 <*trace>
450      \tr@ce {kludgeins box made void}%
451 </trace>
452 }
453 </2ekernel | def1 | fltrace>

```

`\@texttop` These do nothing as a default.

```

\@textbottom 454 <*2ekernel | autoload>
455 \let \@texttop \relax
456 \let \@textbottom \relax

```

\@resetactivechars RmS 93/09/06: added hook to protect against certain active characters in the output routine. Default checks are for active space and end-of-line.

```
457 \def\@activechar@info #1{%
458     \@latex@info@no@line {Active #1 character found while
459                             output routine is active
460                             \MessageBreak
461                             This may be a bug in a package file
462                             you are using}%
463 }
```

Do not put any spaces in this next bit!

```
464 \begingroup
465 \obeylines\obeyspaces%
466 \catcode`\\active%
467 \gdef\@resetactivechars{%
468 \def^~M{\@activechar@info{EOL}\space}%
469 \def {\@activechar@info{space}\space}%
470 \let`\active@math@prime}%
471 \endgroup
```

\@outputpage \@shipoutsetup \@writesetup The \color@hbox hooks here are used to avoid putting just a colour special into an otherwise empty box (in a header or footer). These boxes are often set to be completely empty and so adding a special produces a very underfull box message.

There has been extensive tidying up of the old code here; including the removal of a level of grouping.

The setting of \protect immediately before the \shipout is needed so that protected commands within \writes are handled correctly.

Within shipout's vbox it is reset to its default value, \relax.

Resetting it to its default value after the shipout has been completed (and the contents of the writes have been expanded) must be done by use of \aftergroup. This is because it must have the value \relax before macros coming from other uses of \aftergroup within this box are expanded.

Putting this into the \aftergroup token list does not affect the definition used in expanding the \writes because the aftergroup token list is only constructed when popping the save-stack, it is not expanded until after the shipout is completed.

Question: should things from an \aftergroup within the shipped out box be executed in the environment set up for the writes, or after it finishes?

A lot of this code has been in-lined to prevent mis-use of internal commands as hooks.

```
472 \def\@outputpage{%
473 \begingroup % the \endgroup is put in by \aftergroup
```

Now all the set-up stuff has been in-lined for Frank.

First the stuff for the writes.

From here ... was in the command \@writesetup.

```
474 \let \protect \noexpand
```

RmS 93/08/19: Redefined accents to allow changes in font encoding; but exactly why was this needed?

The \catcode`\ = 10 was removed as it was considered useless (presumably because nothing gets tokenised during shipout).

This was put in as some error produced active spaces in a mark, I think.

Why was the hyphen reset?

```
475 \@resetactivechars
```

If a page break happens between the start of a list and its first item the @newlist will be true and this will mess up any list that is used in the header or footer of the page. So we have to reset that flag.

```
476 \global\let\@@if@newlist\if@newlist
477 \global\@newlistfalse
```

This next hook replaces the following:

```
\let\-\@dischypn
\let'\@acci\let`@acci\let=\@acci
\let\\@normalcr
\let\par\@par %% 15 Sep 87 (this was once inside the box)
```

and it does more than they did; in particular it sets:

```
\parindent\z@
\parskip\z@skip
\everypar{}%
\leftskip\z@skip
\rightskip\z@skip
\parfillskip\@flushglue
\lineskip\normallineskip
\baselineskip\normalbaselineskip
\sloppy
```

478 \parboxrestore

... to here was in the command \writeshipout.

```
479 \shipout \vbox{%
480   \set@typeset@protect
481   \aftergroup \endgroup
482   \aftergroup \set@typeset@protect
483           % correct? or just restore by ending
484           % the group?
```

This first bit has been moved inside the shipped out box.

Now the setup inside the shipped out box; this should contain all the stuff that could only affect typesetting; other stuff may need to be reset for the writes also.

From here ... was in the command \shipoutsetup.

```
485 \if@specialpage
486   \global\@specialpagefalse\@nameuse{ps@\@specialstyle}%
487 \fi
488 \if@twoside
489   \ifodd\count\z@ \let\@thehead\@oddhead \let\@thefoot\@oddfoot
490     \let\@themargin\oddsidemargin
491   \else \let\@thehead\@evenhead
492     \let\@thefoot\@evenfoot \let\@themargin\evensidemargin
493   \fi
494 \fi
```

The rest was always inside the box.

RmS 91/08/15: added this line:

495 \reset@font

RmS 93/08/06 Added \lineskiplimit=0pt to guard against it being nonzero:  
e.g. by \offinterlineskip being in effect.

There are probably lots of other things that may need resetting.

496 \normalsize

Reset the space factors.

497 \normalsfcode

Reset these here (previously reset separately for head and foot)

```
498 \let\label\@gobble
499 \let\index\@gobble
500 \let\glossary\@gobble
501 \baselineskip\z@skip \lineskip\z@skip \lineskiplimit\z@
```

```

... to here was in the command \@shipoutsetup.

502   \@begindvi
503   \vskip \topmargin
504   \moveright\@themargin \vbox {%
505     \setbox\@tempboxa \vbox to\headheight{%
506       \vfil
507       \color@hbox
508         \normalcolor
509         \hb@xt@\textwidth{\@thehead}%
510       \color@endbox
511     }%                                %% 22 Feb 87
512     \dp\@tempboxa \z@
513     \box\@tempboxa
514     \vskip \headsep
515     \box\@outputbox
516     \baselineskip \footskip
517     \color@hbox
518       \normalcolor
519       \hb@xt@\textwidth{\@thefoot}%
520     \color@endbox
521   }%
522 }%

\endgroup now inserted by \aftergroup
  Restore \if@newlist
523 \global\let\if@newlist\@@if@newlist
524 \global \colht \textheight
525 \stepcounter{page}%

```

It is now clear that this does something useful, thanks to Piet van Oostrum. It is needed because a float page is made without using TeX's page-builder; thus the output routine is never called so the marks are not updated.

```

526 \let\firstmark\botmark
527 }
```

**\@begindvi** This unboxes stuff that must appear before anything else in the .dvi file, then returns that box register to the free list and cancels itself.

The stuff in the box should not add any typeset material to the page.

```

528 \def \@begindvi{%
529   \unvbox \@begindvibox
530   \global\let \@begindvi \empty
531 }
```

**\@combinefloats** The \boxmaxdepth setting here was not made local to a box so was dangerous. It  
**\@cflt** is needed only within the box made by \@cflt (and not normally even there), so  
**\@cflb** it has been moved there; this also agrees with the original pseudocode.

```

532 \def \@combinefloats {%
533 %   \boxmaxdepth \maxdepth
534   \ifx \@toplist\empty \else \@cflt \fi
535   \ifx \@botlist\empty \else \@cflb \fi
536 }

537 \def \@cfltf{%
538   \let \@elt \@comflelt
539   \setbox\@tempboxa \vbox{}%
540   \@toplist
541   \setbox\@outputbox \vbox{%
542     \boxmaxdepth \maxdepth
543     \unvbox\@tempboxa
544     \vskip -\floatsep
545     \topfigrule
546     \vskip \textfloatsep

```

```

547                               \unvbox\@outputbox
548                           }%
549   \let\@elt\relax
550   \xdef\@freelist{\@freelist\@toplist}%
551   \global\let\@toplist\@empty
552 }

553 \def \@cflb {%
554   \let\@elt\@comflelt
555   \setbox\@tempboxa \vbox{}%
556   \@botlist
557   \setbox\@outputbox \vbox{%
558     \unvbox\@outputbox
559     \vskip \textfloatsep
560     \botfigrule
561     \unvbox\@tempboxa
562     \vskip -\floatsep
563   }%
564   \let\@elt\relax
565   \xdef\@freelist{\@freelist\@botlist}%
566   \global \let \@botlist\@empty
567 }

\@comflelt
\@comdblfllelt 568 \def\@comflelt#1{\setbox\@tempboxa
\@combinedblfloats 569   \vbox{\unvbox\@tempboxa\box #1\vskip\floatsep}}
570 \def\@comdblfllelt#1{\setbox\@tempboxa
571   \vbox{\unvbox\@tempboxa\box #1\vskip\dblfloatsep}}
572 \def \@combinedblfloats{%
573   \ifx \@dbltoplist \@empty
574   \else
575     \setbox\@tempboxa \vbox{}%
576     \let \@elt \@comdblfllelt
577     \@dbltoplist
578     \let \@elt \relax
579     \xdef \@freelist {\@freelist\@dbltoplist}%
580     \global\let \@dbltoplist \@empty
581     \setbox\@outputbox \vbox to\textheight

```

The setting of `\boxmaxdepth` here has no effect since the `\@outputbox` should already have depth zero. Even so, it would have no effect on the layout of the page.

```

582   {%\boxmaxdepth\maxdepth %% probably not needed, CAR
583   \unvbox\@tempboxa\vskip-\dblfloatsep

```

Here we need different typesetting if the top float comes from `\@topnewpage`.

```

584   \ifnum \@dbltopnum>\m@ne
585     \dblfigrule
586   \fi
587   \vskip \dbltextfloatsep
588   \box\@outputbox
589 }%
590 \fi
591 }
592 </2ekernel | autoload>

```

`\@startcolumn` We could combine (most of) these two into `\@startcol <list>`. Note that `\@xstartcol` was only used once (i.e. in `\@startcolumn`); it has therefore been removed. This is not quite as efficient but it now has the same structure as `\@startdblcolumn`.

The empty-list test has been moved to `\@tryfcolumn`.

```

593 <*2ekernel | autoload | fltrace>

```

```

594 \def \@startcolumn {%
595   \global \@colroom \@colht
596   \@tryfcolumn \@deferlist
597   \if@fcolmade
598   (*trace)
599     \tr@ce{PAGE: float \if@twocolumn column \else page \fi
600           completed}%
601   
```

```

602   \else
603     \begingroup
604       \let \reserved@b \@deferlist
605       \global \let \@deferlist \empty
606       \let \@elt \@scolelt
607       \reserved@b
608     \endgroup
609   \fi
610 }

```

This one does not need to set \@colht.

```
611 \def \@startdblcolumn {%
```

Not needed since this always comes after \outputpage:

```

612 % \global \@colht \textheight
613 \@tryfcolumn \@dbldeferlist
614 \if@fcolmade
615 (*trace)
616   \tr@ce{PAGE: double float page completed}%
617 
```

```

618   \else
619     \begingroup
620       \let \reserved@b \@dbldeferlist
621       \global \let \@dbldeferlist \empty
622       \let \@elt \@sdblcolelt
623       \reserved@b
624     \endgroup
625   \fi
626 }

```

\@tryfcolumn Now tests if its list is empty before any further exertion.

```

627 \def \@tryfcolumn #1{%
628   \global \fcolmadefalse
629   \ifx #1\empty
630   \else
631   (*trace)
632     \tr@ce{PAGE: try float \if@twocolumn column/page\else page\fi
633           ---\string #1}%
634     \tr@ce{----- \string #1: #1}%
635 
```

```

636     \xdef\@trylist{\#1}%
637     \global \let \@failedlist \empty
638     \begingroup
639       \let \@elt \@xtryfc \@trylist
640     \endgroup
641     \if@fcolmade
642       \vtryfc #1%
643     \fi
644   \fi
645 }
646 
```

```
647 (*2ekernel | autoload | fltrace)
```

```

\@scolelt
648 \def\@scolelt#1{\def\@currbox{#1}\@addtonextcol}

\@sdblcolelt
649 \def\@sdblcolelt#1{\def\@currbox{#1}\@addtobblcol}

\@vtryfc
650 \def\@vtryfc #1{%
651   \global\setbox\@outputbox\vbox{}%
652   \let\@elt\@wtryfc
653   \@flsucceed
654   \global\setbox\@outputbox \vbox to\@colht{%
655     \vskip \@fptop
656     \vskip -\@fpsep
657     \unvbox \@outputbox
658     \vskip \@fpbot}%
659   \let\@elt\relax
660   \xdef #1{\@failedlist\@flfail}%
661   \xdef\@freelist{\@freelist\@flsucceed}}}

\@wtryfc
662 \def\@wtryfc #1{%
663   \global\setbox\@outputbox\vbox{%
664     \unvbox\@outputbox
665     \vskip\@fpsep
666     \box #1} }

\@xtryfc
667 \def\@xtryfc #1{%
668   \next\reserved@a\@trylist{}{}%
669   \currtype \count #1%
670   \divide\currtype\@xxxii
671   \multiply\currtype\@xxxii
672   \bitor \currtype \@failedlist
673   \testfp #1%
674   \ifdim \ht #1>\@colht
675     \testtrue
676   \fi
677   \if@test
678     \cons\@failedlist #1%
679   \else
680     \@ytryfc #1%
681   \fi}

\@ytryfc
682 \def\@ytryfc #1{%
683   \begingroup
684     \gdef\@flsucceed{\@elt #1}%
685     \global\let\@flfail\empty
686     \tempdima\ht #1%
687     \let\@elt\@ztryfc
688     \@trylist
689     \ifdim \tempdima >\@fpmin
690       \global\fcolmadetrue
691     \else
692       \cons\@failedlist #1%
693     \fi
694   \endgroup
695   \if\fcolmade
696     \let\@elt\@gobble
697   \fi}

```

```

\@ztryfc
698 \def\@ztryfc #1{%
699   \tempcnta \count#1%
700   \divide\tempcnta\@xxxii
701   \multiply\tempcnta\@xxxii
702   \bitor \tempcnta {\@failedlist \flfail}%
703   \testfp #1%
704   \tempdimb\tempdima
705   \advance\tempdimb \ht#1%
706   \advance\tempdimb\fpsep
707   \ifdim \tempdimb >\colht
708     \testtrue
709   \fi
710   \if@test
711     \cons\flfail #1%
712   \else
713     \cons\flsucceed #1%
714   \tempdima\tempdimb
715   \fi}
716 ⟨/2ekernel | autoload⟩

```

The major changes for float suppression and the changes to the float mechanism to make it conform to the documentation are in these next macros.

\@addtobot Lots of changes.

```

717 ⟨*2ekernel | autoload | ftrace⟩
718 \def \@addtobot {%
719   (*trace)
720   \tr@ce{***Start addtobot}%
721   /trace
722   \getfpsbit 4\relax
723   (*trace)
724   \tr@ce{fpstype ifodd \tempcnta OK \else not \fi bot:
725                                     \the \fpstype}%
726   /trace
727   \ifodd \tempcnta
728     \flsetnum \botnum
729     \ifnum \botnum>\z@
730       \tempswafalse
731       \flcheckspace \botroom \botlist
732       \if@tempswa

```

This next line means that this page is produced with box 255 having depth zero, rather than the normal maxdepth: is this needed, useful?

```

733   \global \maxdepth \z@
734   \flupdates \botnum \botroom \botlist
735   (*trace)
736   \tr@ce{colroom (after-bot) = \the \colroom}%
737   \tr@ce{colnum (after-bot) = \the \colnum}%
738   \tr@ce{botnum (after-bot) = \the \botnum}%
739   \tr@ce{***Success: bot}%
740   /trace
741   \inserttrue
742   \fi
743   (*trace)
744   \else
745     \tr@ce{Fail: botnum = \the \botnum:
746                           fpstype \the \fpstype=ORD?}%
747     \ifnum \fpstype<\sixteen
748       \tr@ce{ERROR: !b float not successful (addtobot)}%
749     \fi
750   /trace

```

```

751      \fi
752  \fi
753 }

\@addtotoporbot Lots of changes.

754 \def \@addtotoporbot {%
755 (*trace)
756   \tr@ce{***Start addtotoporbot}%
757 
758   \getfpsbit \tw@
759 (*trace)
760   \tr@ce{fpstype \ifodd \tempcpta OK \else not \fi top:
761                                     \the \fpstype}%
762 
763   \ifodd \tempcpta
764     \flsetnum \topnum
765     \ifnum \topnum > \z@
766       \tempswafalse
767       \flcheckspace \toproom \toplist
768       \if@tempswa
769         \obitor \currtype{\midlist \botlist}%
770 (*trace)
771         \tr@ce{(mid+bot)list: \midlist, \botlist:
772                           (addtotoporbot-before)}%
773 
774       \if@test
775 (*trace)
776         \tr@ce{type already on list: mid or bot---sent to addtobot}%
777 
778       \else
779         \flupdates \topnum \toproom \toplist
780 (*trace)
781         \tr@ce{colroom (after-top) = \the \colroom}%
782         \tr@ce{colnum (after-top) = \the \colnum}%
783         \tr@ce{topnum (after-top) = \the \topnum}%
784         \tr@ce{***Success: top}%
785 
786       \inserttrue
787     \fi
788   \fi
789 (*trace)
790   \else
791     \tr@ce{Fail: topnum = \the \topnum: fpstype
792                                     \the \fpstype=ORD?}%
793     \ifnum \fpstype < \sixt@n
794       \tr@ce{ERROR: !t float not successful (addtotoporbot)}%
795     \fi
796 
797   \fi
798   \fi
799   \if@insert
800   \else
801 (*trace)
802     \tr@ce{sent to addtobot (addtotoporbot)}%
803 
804   \addtobot
805   \fi
806 }
807 

```

\@addtocurcol Lots of changes.

```
808 (*2ekernel | autoload | fltrace | flafter)
```

```

809 \def \@addtocurcol {%
810   (*trace)
811   \tr@ce{***Start addtocurcol}%
812   (/trace)
813   \@insertfalse
814   \@setfloattypecounts
815   \ifnum \@fpstype=8
816   (*trace)
817   \tr@ce{fpstype !p only (addtocurcol): \the \@fpstype = 8?}%
818   (/trace)
819   \else
820   \ifnum \@fpstype=24
821   (*trace)
822   \tr@ce{fpstype p only (addtocurcol): \the \@fpstype = 24?}%
823   (/trace)
824   \else
825   \@flettextmin

```

This is a new adjustment which is quite a major change in functionality; but it implements the documentation. Note that `\@reqcolroom` will include the whole of the page-so-far, and hence includes `\@textfloatsheight` of floats, so before comparing it with `\@textmin`, we add this to `\@textmin` also.

```

826 (*trace)
827   \tr@ce{textfloatsheight (before) = \the \@textfloatsheight}%
828 (/trace)
829   \advance \@textmin \@textfloatsheight
830   \@reqcolroom \@pageht

```

This line must be removed since `\@specialoutput` changed.

```

831 %   \advance \@reqcolroom \@pagedp
832 (*trace)
833   \tr@ce{textmin + textfloatsheight: \the \@textmin}%
834   \tr@ce{page-so-far: \the \@reqcolroom}%
835 (/trace)
836   \ifdim \@textmin>\@reqcolroom
837   \@reqcolroom \@textmin
838 (*trace)
839   \tr@ce{ORD? textmin being used}%
840 (/trace)
841   \fi
842   \advance \@reqcolroom \ht\@currbox
843 (*trace)
844   \tr@ce{float size = \the \ht \@currbox (addtocurcol)}%
845   \tr@ce{colroom = \the \@colroom (addtocurcol)}%
846   \tr@ce{reqcolroom = \the \@reqcolroom (addtocurcol)}%
847 (/trace)
848   \ifdim \@colroom>\@reqcolroom
849   \@fletnum \@colnum
850   \ifnum \@colnum>\z@
851   \@bitor\@currtype\@deferlist
852 (*trace)
853   \tr@ce{deferlist: \@deferlist: (addtocurcol-before)}%
854 (/trace)
855   \if@test
856 (*trace)
857   \tr@ce{type already on list: defer (addtocurcol)}%
858 (/trace)
859   \else
860   \@bitor\@currtype\@botlist
861 (*trace)
862   \tr@ce{botlist: \@botlist: (addtocurcol-before)}%
863 (/trace)
864   \if@test

```

```

865 <*trace>
866           \tr@ce{type already on list: bot---sent to addtobot}%
867 </trace>
868           \addtobot
869       \else
870 <*trace>
871           \tr@ce{fpstype \ifodd \tempcnta OK \else not \fi
872             here: \the \fpstype}%
873 </trace>
874   \ifodd \count\currbox
875     \advance \reqcolroom \intextsep
876     \ifdim \colroom>\reqcolroom
877       \global \advance \colnum \m@ne
878       \global \advance \textfloatsheight \ht\currbox

```

This may sometimes give an overestimate.

```

879           \global \advance \textfloatsheight 2\intextsep
880           \cons \midlist \currbox
881 <*trace>
882           \tr@ce{***Success: here}%
883           \tr@ce{textfloatsheight (after-here) =
884             \the \textfloatsheight}%
885           \tr@ce{colnum (after-here) = \the \colnum}%
886 </trace>

```

CHANGE TO \addtocurcol:

\penalty\z@ changed to \penalty\interlinepenalty so \samepage works properly with figure and table environments. (Changed 23 Oct 86)

There is also an \addpenalty\interlinepenalty above.

Since in 2e \samepage is no longer supported, these could be removed.

Although it is best to use \addvspace in case two h floats come together, this makes other spacing more difficult to adjust; whereas if a user specifies two h floats together then they can more easily get the spacing correct by ad hoc commands.

It is necessary to adjust for the addition of \parskip here in case the float is added between paragraphs (i.e. when in vertical mode).

If the nobreak switch is true we need to reset it and clear \everypar since the float may not reset the flag and cannot reset the \everypar globally.

Typesetting starts here (we are in vertical mode).

```

887           \if@nobreak
888             \nobreak
889             \nobreakfalse
890             \everypar{}%
891           \else
892             \addpenalty \interlinepenalty
893             \fi
894             \vskip \intextsep
895             \box\currbox
896             \penalty\interlinepenalty
897             \vskip\intextsep
898             \ifnum\outputpenalty <- \Mii \vskip -\parskip\fi

```

Typesetting ends here.

```

899           \outputpenalty \z@
900           \inserttrue
901 <*trace>
902           \else
903             \tr@ce{Fail---no room at 2nd test of colroom
904               (addtocorcol \string\intextsep)}%
905 </trace>
906           \fi
907           \fi
908           \if@insert
909           \else

```

```

910 <*2ekernel | autoload | fltrace>
911 <*trace>
912           \tr@ce{not here: sent to addtotoporbot}%
913 </trace>
914           \addtotoporbot
915 </2ekernel | autoload | fltrace>
916 <!*2ekernel&!autoload&!fltrace>
917 <*trace>
918           \tr@ce{not here: sent to addtobot}%
919 </trace>
920           \addtobot
921 </!2ekernel&!autoload&!fltrace>
922           \fi
923           \fi
924           \fi
925 <*trace>
926           \else
927           \tr@ce{Fail: colnum = \the \colnum:
928                   fpstype \the \fpstype=ORD?}%
929           \ifnum \fpstype<\sixt@n
930             \tr@ce{ERROR: BANG float not successful (addtocurcol)}%
931           \fi
932 </trace>
933           \fi
934 <*trace>
935           \else
936             \tr@ce{Fail---no room: fl box ht: \the \ht \currbox
937                               (addtocurcol)}%
938 </trace>
939           \fi
940           \fi
941           \fi
942           \if@insert
943           \else
944             \resethfps
945 <*trace>
946             \tr@ce{put on deferlist (addtocurcol)}%
947 </trace>
948             \cons\@deferlist\currbox
949 <*trace>
950             \tr@ce{deferlist: \@deferlist: (addtocurcol-after)}%
951 </trace>
952           \fi
953 }
954 </2ekernel | autoload | fltrace | flafter>
```

\addtonextcol Lots of changes.

```

955 <*2ekernel | autoload | fltrace>
956 \def\@addtonextcol{%
957   \begingroup
958 <*trace>
959   \tr@ce{***Start addtonextcol}%
960 </trace>
961   \insertfalse
962   \setfloattypecounts
963   \ifnum \fpstype=8
964 <*trace>
965   \tr@ce{fpstype not curcol: \the \fpstype = 8?}%
966 </trace>
967   \else
968   \ifnum \fpstype=24
969 <*trace>
```

```

970           \tr@ce{fpstype not curcol: \the \@fpstype = 24?}%
971   </trace>
972       \else
973           \@flsettextmin
974   <*trace>
975       \tr@ce{text-so-far: Opt (top of col)}%
976   </trace>
977       \reqcolroom \ht\@currbox
978   <*trace>
979       \tr@ce{float size: \the \reqcolroom (addtonextcol)}%
980   </trace>
981       \advance \reqcolroom \textmin
982   <*trace>
983       \tr@ce{colroom = \the \colroom (addtonextcol)}%
984       \tr@ce{reqcolroom = \the \reqcolroom (addtonextcol)}%
985   </trace>
986       \ifdim \colroom>\reqcolroom
987           \@flsetnum \colnum
988           \ifnum\colnum>\z@
989               \bitor\currtype\deferlist
990   <*trace>
991       \tr@ce{deferlist: \deferlist: (addtonextcol-before)}%
992   </trace>
993       \if@test
994   <*trace>
995       \tr@ce{type already on list: defer (addtonextcol)}%
996   </trace>
997       \else
998   <*trace>
999       \tr@ce{sent to addtotopbot (addtonextcol)}%
1000  </trace>
1001      \addtotopbot
1002      \fi
1003      \fi
1004  <*trace>
1005      \else
1006          \tr@ce{Fail---no room: fl box ht: \the \ht \currbox
1007                                         (addtonextcol)}%
1008  </trace>
1009      \fi
1010      \fi
1011      \fi
1012      \if@insert
1013      \else
1014  <*trace>
1015      \tr@ce{put back on deferlist (addtonextcol)}%
1016  </trace>
1017      \cons\@deferlist\currbox
1018  <*trace>
1019      \tr@ce{deferlist: \deferlist: (addtonextcol-after)}%
1020  </trace>
1021      \fi
1022  <*trace>
1023      \tr@ce{End of addtonextcol -- locally counts:}%
1024      \tr@ce{col: \the \colnum. top: \the \topnum. bot: \the \botnum.}%
1025  </trace>
1026      \endgroup
1027  <*trace>
1028      \tr@ce{End of addtonextcol -- globally counts:}%
1029      \tr@ce{col: \the \colnum. top: \the \topnum. bot: \the \botnum.}%
1030  </trace>
1031 }

```

```
\@addtobdblcol Lots of changes.
```

```
1032 \def\@addtobdblcol{%
1033   \begingroup
1034   <*trace>
1035     \tr@ce{***Start addtobdblcol}%
1036   </trace>
1037     \@insertfalse
1038     \@setfloatattypecounts
1039     \@getfpsbit \tw@
1040   <*trace>
1041     \tr@ce{fpstype \ifodd \c@tempcnta OK \else not \fi dbltop:
1042                           \the \c@fpstype}%
1043   </trace>
1044     \ifodd\c@tempcnta
1045       \c@fllsetnum \c@dbltopnum
1046       \ifnum \c@dbltopnum>\z@
1047         \c@tempswafalse
1048         \ifdim \c@dbltoproom>\ht\currbox
1049           \c@tempswatrue
1050   <*trace>
1051     \tr@ce{Space OK: \c@dbltoproom =
1052               \the \c@dbltoproom > \the \ht \currbox
1053               (\c@dbltoproom)}%
1054   </trace>
1055     \else
1056   <*trace>
1057     \tr@ce{fpstype: \the \c@fpstype (addtobdblcol)}%
1058   </trace>
1059     \ifnum \c@fpstype<\sixt@n
1060   <*trace>
1061     \tr@ce{BANG float ignoring \c@dbltoproom}%
1062     \tr@ce{\c@spaces \c@dbltoproom = \the \c@dbltoproom.
1063                           Ht float: \the \ht \currbox-BANG}%
1064   </trace>
```

Need to check that there is room on the page, using the local value of \c@textmin to make the necessary adjustment to \c@dbltoproom.

```
1065           \advance \c@dbltoproom \c@textmin
1066   <*trace>
1067     \tr@ce{Local value of texmin: \the\c@textmin}%
1068     \tr@ce{\c@spaces space on page = \the \c@dbltoproom.
1069                           Ht float: \the \ht \currbox-BANG}%
1070   </trace>
1071     \ifdim \c@dbltoproom>\ht\currbox
1072       \c@tempswatrue
1073   <*trace>
1074     \tr@ce{Space OK BANG: space on page = \the \c@dbltoproom >
1075                           \the \ht \currbox}%
1076   \else
1077     \tr@ce{fpstype: \the \c@fpstype}%
1078     \tr@ce{Fail---no room dbltoproom-BANG?:}%
1079     \tr@ce{\c@spaces space on page = \the \c@dbltoproom.
1080                           Ht float: \the \ht \currbox}%
1081   </trace>
1082     \fi
1083     \advance \c@dbltoproom -\c@textmin
1084   <*trace>
1085   \else
1086     \tr@ce{fpstype: \the \c@fpstype}%
1087     \tr@ce{Fail---no room dbltoproom-ORD?:}%
1088     \tr@ce{\c@spaces \c@dbltoproom = \the \c@dbltoproom.
1089                           Ht float: \the \ht \currbox}%
```

```

1090 </trace>
1091         \fi
1092     \fi
1093     \if@tempswa
1094         \obitor \currtype \dbldeferlist
1095 <*trace>
1096         \tr@ce{dbldeferlist: \dbldeferlist: (before)}%
1097 </trace>
1098     \if@test
1099 <*trace>
1100         \tr@ce{type already on list: dbldefer}%
1101 </trace>
1102     \else
1103         \tempdima -\ht\currbox
1104         \advance\tempdima
1105             -\ifx \dbltoplist\empty \dbltextfloatsep \else
1106                 \dblfloatsep \fi
1107             \global \advance \dbltoproom \tempdima
1108             \global \advance \colht \tempdima
1109             \global \advance \dbltopnum \m@ne
1110             \cons \dbltoplist \currbox
1111 <*trace>
1112         \tr@ce{dbltopnum (after) = \the \dbltopnum}%
1113         \tr@ce{***Success: dbltop}%
1114 </trace>
1115         \inserttrue
1116     \fi
1117     \fi
1118 <*trace>
1119     \else
1120         \tr@ce{Fail: dbltopnum = \the \dbltopnum: fpstype
1121                                         \the \fpstype=ORD?}%
1122         \ifnum \fpstype<\sixt@n
1123             \tr@ce{ERROR: !t float not successful (addtoblcol)}%
1124         \fi
1125 </trace>
1126     \fi
1127     \fi
1128     \if@insert
1129     \else
1130 <*trace>
1131     \tr@ce{put on dbldeferlist}%
1132 </trace>
1133     \cons\dbldeferlist\currbox
1134 <*trace>
1135     \tr@ce{dbldeferlist: \dbldeferlist: (after)}%
1136 </trace>
1137     \fi
1138 <*trace>
1139     \tr@ce{End of addtoblcol -- locally count:}%
1140     \tr@ce{ dbltop: \the \dbltopnum.}%
1141 </trace>
1142     \endgroup
1143 <*trace>
1144     \tr@ce{End of addtoblcol -- globally count:}%
1145     \tr@ce{ dbltop: \the \dbltopnum.}%
1146 </trace>
1147 }
1148 </2ekernel | autoload | fltrace>

\addmarginpar
1149 <*2ekernel | autoload>
1150 \def\addmarginpar{\next\marbox\currlist{\cons\freelist\marbox

```

```

1151  \@cons\@freelist\@currbox}\@latexbug\@tempcnta\@ne
1152  \if@twocolumn
1153      \if@firstcolumn \@tempcnta\m@ne \fi
1154  \else
1155      \if@mparswitch
1156          \ifodd\c@page \else\@tempcnta\m@ne \fi
1157      \fi
1158      \if@reversemargin \@tempcnta -\@tempcnta \fi
1159  \fi
1160  \ifnum\@tempcnta <\z@ \global\setbox\@marbox\box\@currbox \fi
1161  \@tempdima\@mparbottom
1162  \advance\@tempdima -\@pageht
1163  \advance\@tempdima\ht\@marbox
1164  \ifdim\@tempdima >\z@
1165      \@latex@warning@no@line {Marginpar on page \thepage\space moved}%
1166  \else
1167      \@tempdima\z@
1168  \fi
1169  \global\@mparbottom\@pageht
1170  \global\advance\@mparbottom\@tempdima
1171  \global\advance\@mparbottom\dp\@marbox
1172  \global\advance\@mparbottom\marginparpush
1173  \advance\@tempdima -\ht\@marbox

```

Putting box movement inside the ‘marbox’:

```

1174  \global\setbox\@marbox
1175      \vbox {\vskip \@tempdima
1176          \box\@marbox}%
1177  \global\ht\@marbox \z@
1178  \global\dp\@marbox \z@

```

Sticking (rather than gluing:-) the ‘marbox’ to the line above, changed vskip to kern:

```

1179  \kern -\@pagedp
1180  \nointerlineskip
1181  \hb@xt@\columnwidth
1182      {\ifnum \@tempcnta >\z@
1183          \hskip\columnwidth \hskip\marginparsep
1184      \else
1185          \hskip -\marginparsep \hskip -\marginparwidth
1186      \fi
1187      \box\@marbox \hss}%

```

For this reason the following code can vanish:

```

\nobreak           %% No longer needed. CAR92/12
\vskip -\@tempdima %% No longer needed. CAR92/12

1188  \nointerlineskip
1189  \hbox{\vrule\height\z@ \width\z@ \depth\@pagedp}
1190  (/2ekernel | autoload)

```

### 66.1.1 Kludgeins

This part of the file is part of the implementation of the following two new commands for L<sup>A</sup>T<sub>E</sub>X2e.

```
\enlargethispage{<dim>}
```

Adds <dim> to the height of the current column only. On the printed page the bottom of this column is extended downwards by exactly <dim> without having any effect on the placement of the footer; this may result in an overprinting.

```
\enlargethispage*{<dim>}
```

Similar to `\enlargethispage` but it tries to squeeze the column to be printed in as small a space as possible, ie it uses any shrinkability in the column. If the column was not explicitly broken (e.g. with `\pagebreak`) this may result in an overfull box message but except for this it will come out as expected (if you know what to expect).

The star form of this command is dedicated to Leslie Lamport, the other we need for ourselves (FMi, CAR).

These commands may well have unwanted effects if used soon before a

: please give keep them clear of such places.

\@kludgeins The insert which makes TeX do a lot of the necessary work. All we need to put into it is the amount by which the pagegoal should be changed.

```
1191 <*2ekernel | def1>
1192 \newinsert \@kludgeins
1193 \global\dimen\@kludgeins \maxdimen
1194 \global\count\@kludgeins 1000
1195 </2ekernel | def1>
```

\enlargethispage The user command.

```
1196 <*2ekernel | def1>
1197 \gdef \enlargethispage {%
1198   \@ifstar
1199   {%
1200     \trace
1201       \tr@ce{Enlarging page height * }%
1202   \trace
1203     \enlargepage{\hbox{\kern\p@}}%
1204   {%
1205     \trace
1206       \tr@ce{Enlarging page height exactly---}%
1207   \trace
1208     \enlargepage\empty}%
1209 }
1210 </2ekernel | def1>
1211 <*autoload>
1212 \def\enlargethispage{\@autoload{out1}\enlargethispage}
1213 </autoload>
```

\enlargepage This actually inserts the insert, after checking for extreme values of the change.

```
1214 <*2ekernel | def1>
1215 \gdef\enlargepage#1#2{%
1216   \trace
1217   \tr@ce{\@spaces\@spaces by #2}%
1218   \trace
1219   \tempskipa#2\relax
1220   \ifdim \tempskipa>.5\maxdimen
1221     \laterr{Suggested space extra space height\space
1222       (\the\tempskipa) space dangerously\space
1223       large}\@eha
1224   \else
1225     \ifdim \vsize<.5\maxdimen
1226     \trace
1227       \tr@ce {Kludgeins added--pagegoal before: \the\pagegoal}%
1228   \trace
1229     \bsphack
1230     \insert\kludgeins{#1\skip\tempskipa}%
1231   \esphack
```

This next bit is for tracing only:

```
1232 <*trace>
1233   \ifvmode \par
1234     \tr@ce {Kludgeins added--pagegoal after: \the\pagegoal}%
1235   \fi
1236 </trace>
1237   \else
1238     \laterr{Page space height\space already\space
1239       too\space large}\@eha
1240   \fi
1241 \fi
1242 }
1243 </2ekernel | def1>
```

### 66.1.2 Float control

This part implements controllable floats and other changes to the float mechanism. It provides, at the document level, the following command for inclusion in L<sup>A</sup>T<sub>E</sub>X2e.

```
\suppressfloats
```

This suppresses all further floats on the current page.

With an optional argument it suppresses only floats only in certain positions on the current page.

[t] suppresses only floats at the top of the page [b] suppresses only floats at the bottom of the page

It also enables the use of an extra specifier, !, in the location optional argument of a float. If this is present then, just for this particular float, whenever it is processed by the float mechanism the following are ignored:

- all restrictions on the number of floats which can appear;
- all explicit restrictions on the amount of space which should (not) be occupied by floats and/or text.

The mechanism will still attempt to ensure that pages are not overfull.

These specifiers override, for the single float, the suppression commands described above.

In its current form, it also supplies a reasonably exhaustive, and somewhat baroque, means of tracing some aspects of the float mechanism.

More tracing.

```
\tr@ce Set-up tracing for floats independent of other tracing as it produces mega-output.
\notrace Default is no tracing.

\tracefloats 1244 {*trace}
  \traceval 1245 \def \@tracemessage #1{\typeout{LaTeX2e: #1}}
\tracefloatvals 1246 \def \tracefloats{\let \tr@ce \@tracemessage}
\@tracemessage 1247 \def \notrace {\let \tr@ce \gobble}
  1248 \notrace
  1249 \def \traceval #1{\tr@ce{\string #1 = \the #1}}
  1250 \def \tracefloatvals{%
  1251   \dblfloatplacement
  1252   \floatplacement
  1253   \traceval\colnum
  1254   \traceval\colroom
  1255   \traceval\topnum
  1256   \traceval\toproom
  1257   \traceval\botnum
  1258   \traceval\botroom
  1259   \traceval\fpmin
  1260   \tr@ce{\string\textration = \textration}%
  1261   \traceval\dbltopnum
  1262   \traceval\dbltoproom
  1263 }
  1264 \trace
  1265 {*flafter}
  1266 \providecommand\tr@ce[1]{}
  1267 \flafter

\suppressfloats Float suppression commands: these set the relevant counter globally to zero. Thus
  \flstop they are overridden for a particular float by an ! specifier.

1268 {*2ekernel | autoload}
```

```

1269 \def \suppressfloats {%
1270   \@ifnextchar [%
1271     \@flstop
1272   {\global \colnum \z@}%
1273 }

```

Maybe this should be a loop over #1?

```

1274 \def \@flstop [#1]{%
1275   \if t#1%
1276     \global \topnum \z@
1277   \fi
1278   \if b#1%
1279     \global \botnum \z@
1280   \fi
1281 }

```

Manipulation of float placement and type; both their strings and the corresponding count registers.

\@fpstype First a new count register to go with \currtype.

\reqcolroom Then a new skip register, for information needed to remove the \maxsep conservatism: it is possible that this could use a temporary register.

\textfloatsheight Finally a dimension register to hold the total height of in-text floats on the current page. This is needed to implement a major change in the functionality of \addtocurcol which is, nevertheless, a bug fix. It is not local and therefore cannot be a temporary register.

```

1282 \newcount \@fpstype
1283 \newdimen \reqcolroom
1284 \newdimen \textfloatsheight
1285 </2ekernel | autoload>

```

\fpsadddefault Adds the default placement to what is already there.

Should not need to change this, but could do it as follows:

```

\def \fpsadddefault {%
  \temptokena \expandafter\expandafter\expandafter
    {\csname fps@\currtype \endcsname}%
  \edef \reserved@a {\the\temptokena}%
  \onelevel@sanitize \reserved@a
  \edef \fps {\fps\reserved@a}%
}

```

```

1286 <2ekernel | autoload | fltrace>
1287 \def \fpsadddefault {%
1288 <*trace>
1289   \tr@ce{fps changed from: \fps}%
1290 </trace>
1291   \edef \fps {\fps\csname fps@\currtype \endcsname}%
1292   \@latex@warning{%
1293     No positions in optional float specifier.\MessageBreak
1294     Default added (so using '\fps')}%
1295 }

```

\setfloattypecounts Sets counters \@fpstype and \currtype.

BANG == bit4 of \count\currbox = 0.

```

1296 \def \setfloattypecounts {%
1297   \currtype \count\currbox
1298   \@fpstype \count\currbox
1299   \divide\currtype\xxxii \multiply\currtype\xxxii
1300   \advance \@fpstype -\currtype
1301 <*trace>

```

```

1302 \tr@ce{\mod{32} fpstype: \the\@fpstype}%
1303 \tr@ce{\mult{32} currtype: \the\@currtype}%
1304 % Tracing only: but some should be changed into real errors/warnings?
1305 \ifnum\@fpstype<\sixt@n
1306   \ifnum\@fpstype=\z@
1307     \tr@ce{ERROR: no PLACEMENT, fpstype = \the\@fpstype = 0?}%
1308   \fi
1309   \ifnum\@fpstype=\one
1310     \tr@ce{WARNING: only h, fpstype = \the\@fpstype = 1?}%
1311   \fi
1312   \tr@ce{BANG float}%
1313 \else
1314   \ifnum\@fpstype=\sixt@n
1315     \tr@ce{ERROR: no PLACEMENT, fpstype = \the\@fpstype = 16?}%
1316   \fi
1317   \ifnum\@fpstype=17
1318     \tr@ce{WARNING: only h, fpstype = \the\@fpstype = 17?}%
1319   \fi
1320   \tr@ce{ORD float}%
1321 \fi
1322 
```

1323 }  
1324

1324 </2ekernel | autoload | fltrace>

Macros for getting, testing and setting bits of the fps.

\@getfpsbit Sets \tempcnta to required bit of \count\currbox.

```

1325 <2ekernel | autoload>
1326 \def\@getfpsbit{%
1327   \boxfpsbit\currbox
1328 }
```

\boxfpsbit Used above.

```

1329 \def\@boxfpsbit#1#2{%
1330   \tempcnta\count#1%
1331   \divide\tempcnta#2\relax
1332 }
```

\testfp New definition of the float page test.

```

1333 \def\@testfp#1{%
1334   \boxfpsbit#18\relax% Really '#1 8' for human readers!
1335   \ifodd\tempcnta
1336   \else
1337     \testtrue
1338   \fi
1339 }
```

\setfpsbit Sets required bit of \tempcnta (to 1).

```

1340 \def\@setfpsbit#1{%
1341   \tempcntb\tempcnta
1342   \divide\tempcntb#1\relax
1343   \ifodd\tempcntb
1344   \else
1345     \advance\tempcnta#1\relax
1346   \fi
1347 }
```

1348

</2ekernel | autoload>

\resethfps Globally adds t as a possible location for an h or !h only placement: this must be done using the count.

Although it will leave `\@fpstype` set to 17 even if it was originally 1, this does not matter since it is the last thing in `\@addtocurcol`.

```

1349 (*2ekernel | autoload | ftrace)
1350 \def \@resethfps {%
1351   \let\reserved@a\@empty
1352   \ifnum \@fpstype=\@ne
1353     \def \reserved@a {!}%
1354     \@fpstype 17
1355   \fi
1356   \ifnum \@fpstype=17
1357     \global \advance \count\@currbox \tw@
1358     \@latex@warning@no@line {%
1359       'reserved@a h' float specifier changed to 'reserved@a ht'}%
1360 (*trace)
1361   \tr@ce{%
1362     't' added to 'reserved@a h'- new Count: \the \count\@currbox}%
1363 
```

Special stuff for BANG floats.

`\@flsetnum` Ignores any zero float counter value in case BANG.

It uses a local assignment to the normally global counter: a bit naughty, perhaps?

These assignments are safe so long as the counter involved is only consulted once (i.e. only for the ‘bang float’) with the changed value. This is the case within `\@addtocurcol` because it is used only once within a call of the output routine (which forms a group).

For `\@addtonextcol` this is achieved by putting a group around its code; this is needed because it is called (by `\@startcolumn`) for each float which was on the deferlist. Almost identical considerations pertain to `\@addtobblcol`. There may be more efficient ways to handle this, but the group seems to be the simplest.

```

1366 \def \@flsetnum #1{%
1367 (*trace)
1368   \tr@ce{\fpstype: \the \@fpstype (flsetnum \string#1)}%
1369 
```

```

1370   \ifnum \@fpstype<\sixt@n
1371     \ifnum #1=\z@
1372   (*trace)
1373     \tr@ce{BANG float resetting \string#1 to 1}%
1374 
```

```

1375   #1\@ne
1376   \fi
1377   \fi
1378 
```

```

1379   \tr@ce{#1 (before) = \the #1}%
1380 
```

```

1381 } 
```

`\@flsettextmin` This ignores `\textfraction` space restriction in case BANG.

```

1382 \def \@flsettextmin {%
1383 (*trace)
1384   \tr@ce{\fpstype: \the \@fpstype (flsettextmin)}%
1385 
```

```

1386   \ifnum \@fpstype<\sixt@n
1387   (*trace)
1388     \tr@ce{BANG ignoring textmin}%
1389 
```

```

1390     \@textmin \z@
1391   \else 
```

```

1392      \textmin \textfraction\colht
1393 (*trace)
1394      \tr@ce{ORD textmin = \the \textmin}%
1395 
```

```

1396   \fi
1397 }

```

**\@flcheckspace** This ignores space restriction in case BANG; this is still slightly conservative since it does not allow for the fact that, if there is no text in the column then \textfloatsep is not needed. Sets @tempswa true if there is room for \@currbox.

```

1398 \def \@flcheckspace #1#2{%
1399   \advance \reqcolroom
1400   \ifx #2\empty \textfloatsep \else \floatsep \fi
1401 (*trace)
1402   \tr@ce{colroom = \the \colroom (flcheckspace \string#1 \string#2)}%
1403   \tr@ce{reqcolroom = \the \reqcolroom
1404           (flcheckspace \string#1 \string#2)}%
1405 
```

```

1406   \ifdim \colroom>\reqcolroom
1407     \ifdim #1>\ht\currbox
1408       @tempswatru
1409 (*trace)
1410   \tr@ce{Space OK: #1 = \the #1 > \the \ht \currbox
1411           (flcheckspace \string#1 \string#2)}%
1412 
```

```

1413   \else
1414 (*trace)
1415   \tr@ce{fpstype: \the \fpstype
1416           (flcheckspace \string#1 \string#2)}%
1417 
```

```

1418   \ifnum \fpstype<\sixt@n
1419 (*trace)
1420   \tr@ce{BANG float ignoring #1
1421           (flcheckspace \string#1 \string#2):}%
1422   \tr@ce{@spaces #1 = \the #1. Ht float: \the \ht \currbox
1423           BANG}%
1424 
```

```

1425   @tempswatru
1426 (*trace)
1427   \else
1428   \tr@ce{Fail---no room (flcheckspace \string#1 \string#2)
1429           (fpstype \the \fpstype=ORD?):}%
1430   \tr@ce{@spaces #1 = \the #1. Ht float: \the \ht \currbox
1431           ORD?}%
1432 
```

```

1433   \fi
1434   \fi
1435 (*trace)
1436   \else
1437   \tr@ce{Fail---no room at 2nd test of colroom
1438           (flcheckspace \string#1 \string#2)}%
1439 
```

```

1440   \fi
1441 }
1442 
```

```

1442 /2ekernel | autoload | fltrace)

```

**\@flupdates** This updates everything when a float is placed.

```

1443 (*2ekernel | autoload)
1444 \def \@flupdates #1#2#3{%
1445   \global \advance #1\m@ne
1446   \global \advance \colnum \m@ne
1447   @tempdima -\ht\currbox

```

```

1448 \advance \@tempdima
1449   -\ifx #3\empty \textfloatsep \else \floatsep \fi
1450 \global \advance #2\@tempdima
1451 \global \advance \@colroom \@tempdima
1452 \cons #3\currbox
1453 }
1454 </2ekernel | autoload>

```

Interesting facts about float mechanisms past and present, together with a summary of various features, some unresolved:

1. The value `\textfraction` does not affect the processing of doublecol floats: this seems sensible, but should be documented.
2. `\twocolumn` floatplacement was wrong: dbl not needed, ord needed.
3. `\floatplacement` was not called after `\startdblcol` or `\topnewpage`. This has been changed; it is clearly a bug fix.
4. The use `\topnewpage` when `\dblfigrule` is non-trivial produced a rule in the wrong place. This has been fixed by not using `\dblfigrule` when processing the ‘float’ from `\topnewpage`.
5. If the specifier was just `h` and the float could not be put here, it went on the deferlist and stayed there until a clearpage. It now gets changed to a ‘`th`’: this is only an error-recovery action, putting just `h` or `!h` should be deprecated.
6. `\dblmaxsep` was ‘the maximum of `\dblfloatsep` and `\dbltexfloatsep`’. But it was never used! Now gone completely, like `\maxsep`.
7. After an `h` float is put on a page, it was counted as text when applying the `\textfraction` test; this is possibly too big a change although it is a bug fix?
8. Two consecutive `h` floats are separated by twice `\intextsep`: this could be changed to one by use of `\addvspace`, OK? Note that it would also mean that less space is put in if an `h` float immediately follows other spaces. This is also possibly too big a change, at least for compatibility mode? Or it may be simply wrong! It has not been changed.
9. Now `\addtocurcol` checks first for just `p` fps. I think that this is an increase in efficiency, but maybe the coding should be made even more efficient.
10. `\tryfcolumn` now tests if the list is empty first, otherwise lots of wasted time! Thus this test has been removed from `\startcolumn`. As Frank pointed out, this makes `\startcolumn` less efficient. But it is now the same as `\startdblcolumn`: I can see no reason why they should be different, but which is best?
11. Why is `\colroom` set in `\docclearpage`?
12. Footnotes. Check what `\clearpage` does when footnotes are left over. Footnotes are not put on float pages and, also, `\addtonextcol` ignores the existence of held-over footnotes in deciding what floats can go on the page. Not changed.
13. `\clearpage` can still lose non-boxes, at least when floats are involved. It also moves some to the ‘wrong page’, but this may be a coding problem.
14. The `!` option makes it necessary to check in `\output` that there is enough room left on the page after adding a float. (This would have been necessary anyway if anyone set `\textmin` too close to zero! A similar danger existed

also if the text in a `\twocolumn[text]` entity gets too large.) The current implementation of this also makes the normal case a little less efficient, OK? Not enough room means, at present, less than `\baselineskip`, with a warning: is this OK? Should it be made generic (another parameter)?

15. There are four possibilities for supporting this:

```
\twocolumn[\maketitle more text]
```

One is to change `\maketitle` slightly to allow this. Another is to change `\@topnewpage` so that more than one `\twocolumn[]` command is allowed; in this case `\maketitle\twocolumn[more text]` will work. The former is more robust from the user's viewpoint, but makes the code for `\maketitle` rather ad hoc (maybe it is already?). Another is to misuse the global `twocolumn` flag locally within `\@topnewpage`. Yet another is to move the column count register from the `multicol` package into the kernel. This has beeен done.

16. Where should the reinserts be put to maximise the probability that footnotes come out on the correct page? Or should we go for as much compatibility as possible (but see next item)?

17. Should we continue to support (as much as possible) `\samepage`? Some of its intended functionality is now advertised as being provided by `\enlargethispage`. Use of either is likely to result in wrongly placed footnotes, marginals, etc. Which should have priority: obeying the pagination instructions, or correct placement of notes/marginalia?

18. Is the adjustment of space to cause shrinking in the kludge-\* case correct? Should it be limited to 0pt?

19. Is the setting of `\boxmaxdepth` in `makecol` and friends needed? It only has any effect if `\@textbottom` ends with a box or rule, in which case the vskip to allow for its depth should also be added. If it is kept, it should probably be the last thing in the box. It has now been removed.

It would perhaps be better to document that `\@textbottom` and `\@texttop` must have natural height 0pt.

20. I cannot see why the vskip adjustement for the depth is needed if `boxmaxdepth` is used to ensure that there is never a too deep box.

21. The value of `\boxmaxdepth` should be explicitly set whenever necessary: it is too risky to assume that it has any particular value. Care is needed in deciding what to set it to.

It is interesting to note that the value of `\boxmaxdepth` is unique in being read before the local settings for the box group are reset; all other parameter settings which affect the box construction use their values outside the box group.

22. Should `\@maxdepth` store the setting of `\maxdepth` from `lplain`? Or should we provide a proper interface to class files for setting these?

An analysis of various other macros.

`\@opcol` should do `\@floatplacement`, but where? Right at the end, since it always occurs at the start of a column.

```
\def\@opcol{%
  % Why is this done first?
  \global \z@\@mparbottom \z@
  \if@twocolumn
    \@outputdblcol
  \else
    \@outputpage
```

```
% This is not needed since it is done at the end of
%   |\@outputpage|:
\global \@colht \textheight
\fi}
```

Only tracing has been added to these.

```
1455 (*2ekernel | autoload | ftrace)
1456 \def\@makefcolumn #1{%
1457   \begingroup
1458     \@fpmin \z@
1459     \let \cetestfp \@gobble
1460     \@tryfcolumn #1%
1461   \endgroup
1462 *}trace
1463 \if@fcolmade
1464   \tr@ce{PAGE: in \string\clearpage \if@twocolumn ---twocolumn\fi---}%
1465   \tr@ce{----- float column/page completed from \string#1}%
1466 \fi
1467 }/trace
1468 }
```

This will line up the last baselines in the two columns provided they are constructed in the normal way: i.e. ending in a skip of minus the original depth, with `\@textbottom` adding nothing.

Thus again it is essential for `\@textbottom` to have depth 0pt.

```
1469 \def\@outputdblcol{%
1470   \if@firstcolumn
1471     \global \@firstcolumnfalse
1472     \global \setbox\@leftcolumn \box\@outputbox
1473 *}trace
1474 \tr@ce{PAGE: first column boxed}%
1475 }/trace
1476 \else
1477   \global \@firstcolumntrue
1478   \setbox\@outputbox \vbox {%
1479     \hb@xt@\textwidth {%
1480       \hb@xt@\columnwidth {%
1481         \box\@leftcolumn \hss}%
1482         \hfil
1483         {\normalcolor\vrule \@width\columnseprule}%
1484         \hfil
1485         \hb@xt@\columnwidth {%
1486           \box\@outputbox \hss}%
1487         }%
1488       }%
1489 *}trace
1490 \tr@ce{PAGE: second column also boxed}%
1491 }/trace
1492 \@combinedblfloats
1493 \@outputpage
1494 *}trace
1495 \tr@ce{PAGE: two column page completed}%
1496 }/trace
1497 \begingroup
1498   \@dblfloatplacement
1499   \@startdblcolumn

This loop could be replaced by an \expandafter tail recursion in
\@startdblcolumn.

1500   \@whilesw\if@fcolmade \fi
1501   {\@outputpage
1502 *}trace
```

```

1503      \tr@ce{PAGE: double float page completed}%
1504  </trace>
1505      \c@startdblcolumn}%
1506  \endgroup
1507 \fi
1508 }
1509 </2ekernel | autoload | fltrace>

```

### 66.1.3 Float placement parameters

The main purpose of this section is to ensure that all the float-placement parameters which need to be set in a class file or package have been declared. It also describes their use and sets values for them which are reasonable for typical documents using US letter or A4 sized paper.

#### Limits for the placement of floating objects

**\c@topnumber** This counter holds the maximum number of floats that can appear at the top of a text page or column.

```

1510 <*2ekernel | autoload>
1511 \newcount\c@topnumber
1512 \setcounter{topnumber}{2}

```

**\topfraction** This macro holds the maximum proportion (as a decimal number) of a text page or column that can be occupied by floats at the top.

```
1513 \newcommand\topfraction{.7}
```

**\c@bottomnumber** This counter holds the maximum number of floats that can appear at the bottom of a text page or column.

```

1514 \newcount\c@bottomnumber
1515 \setcounter{bottomnumber}{1}

```

**\bottomfraction** This macro holds the maximum proportion (as a decimal number) of a text page or column that can be occupied by floats at the bottom.

```
1516 \newcommand\bottomfraction{.3}
```

**\c@totalnumber** This counter holds the maximum number of floats that can appear on any text page or column.

```

1517 \newcount\c@totalnumber
1518 \setcounter{totalnumber}{3}

```

**\textfraction** This macro holds the minimum proportion (as a decimal number) of a text page or column that must be occupied by text.

```
1519 \newcommand\textfraction{.2}
```

**\floatpagefraction** This macro holds the minimum proportion (as a decimal number) of a page or column that must be occupied by floating objects before a ‘float page’ is produced.

```
1520 \newcommand\floatpagefraction{.5}
```

**\c@dbltopnumber** This counter holds the maximum number of double-column floats that can appear on the top of a two-column text page.

```

1521 \newcount\c@dbltopnumber
1522 \setcounter{dbltopnumber}{2}

```

**\dbltopfraction** This macro holds the maximum proportion (as a decimal number) of a two-column text page that can be occupied by double-column floats at the top.

```
1523 \newcommand\dbltopfraction{.7}
```

**\dblfloatpagefraction** This macro holds the minimum proportion (as a decimal number) of a page that must be occupied by double-column floating objects before a ‘double-column float page’ is produced.

```
1524 \newcommand\dblfloatpagefraction{.5}
```

### Floats on a text page

\floatsep When a floating object is placed on a page with text, these parameters control the separation between the float and the other objects on the page. These parameters are used for both one-column mode and single-column floats in two-column mode. They are all rubber lengths.

\textfloatsep is the space between adjacent floats that are placed at the top or bottom of the text page or column.

\intextsep is the space between the main text and floats at the top or bottom of the page or column.

\intextsep is the space between in-text floats and the text.

```
1525 \newskip\floatsep  
1526 \newskip\textfloatsep  
1527 \newskip\intextsep  
1528 \setlength\floatsep {12\p@ \oplus 2\p@ \ominus 2\p@}  
1529 \setlength\textfloatsep{20\p@ \oplus 2\p@ \ominus 4\p@}  
1530 \setlength\intextsep {12\p@ \oplus 2\p@ \ominus 2\p@}
```

\dblfloatsep When double-column floats (floating objects that span the whole \textwidth) are placed at the top of a text page in two-column mode, the separation between the float and the text is controlled by \dblfloatsep and \dbltextfloatsep. They are rubber lengths.

\dblfloatsep is the space between adjacent double-column floats placed at the top of the text page.

\dbltextfloatsep is the space between the main text and double-column floats at the top of the page.

```
1531 \newskip\dblfloatsep  
1532 \newskip\dbltextfloatsep  
1533 \setlength\dblfloatsep {12\p@ \oplus 2\p@ \ominus 2\p@}  
1534 \setlength\dbltextfloatsep{20\p@ \oplus 2\p@ \ominus 4\p@}
```

### Floats on their own page or column

\@fptop When floating objects are placed on a separate page or column, called a ‘float page’, the layout of the page is controlled by these parameters, which are rubber lengths.

At the top of the page \@fptop is inserted; typically this supplies some stretchable whitespace. At the bottom of the page \@fpbot is inserted. Between adjacent floats \@fpsep is inserted.

These parameters are used for all floating objects on a ‘float page’ in one-column mode, and for single-column floats in two-column mode.

Note that at least one of the two parameters \@fptop and \@fpbot should contain a plus ...fil so as to fill the remaining empty space.

```
1535 \newskip\fptop  
1536 \newskip\fpsep  
1537 \newskip\fpbot  
1538 \setlength\fptop{0\p@ \oplus 1fil}  
1539 \setlength\fpsep{8\p@ \oplus 2fil}  
1540 \setlength\fpbot{0\p@ \oplus 1fil}
```

\@dblfpptop Double-column ‘float pages’ in two-column mode use similar parameters.

```
\@dblfpsep 1541 \newskip\dblfpptop  
\@dblfpbot 1542 \newskip\dblfpsep  
1543 \newskip\dblfpbot  
1544 \setlength\dblfpptop{0\p@ \oplus 1fil}  
1545 \setlength\dblfpsep{8\p@ \oplus 2fil}  
1546 \setlength\dblfpbot{0\p@ \oplus 1fil}
```

```
\topfigrule The macros can be used to put in rules between floats and text; whatever they
\botfigrule insert should be vertical mode material which takes up zero space.
\dblfigrule 1547 \let\topfigrule=\relax
            1548 \let\botfigrule=\relax
            1549 \let\dblfigrule=\relax
            1550 {/2ekernel | autoload}
```

# File L

## ltclass.dtx

### 67 Introduction

This file implements the following declarations, which replace `\documentstyle` in L<sup>A</sup>T<sub>E</sub>X 2<sub>E</sub> documents.

Note that old documents containing `\documentstyle` will be run using a compatibility option—thus keeping everyone happy, we hope!

The overall idea is that there are two types of ‘style files’: ‘class files’ which define elements and provide a default formatting for them; and ‘packages’ which provide extra functionality. One difference between L<sup>A</sup>T<sub>E</sub>X 2<sub>E</sub> and L<sup>A</sup>T<sub>E</sub>X 2.09 is that L<sup>A</sup>T<sub>E</sub>X 2<sub>E</sub> packages may have options. Note that options to classes/packages may be implemented such that they input files, but these file names are not necessarily directly related to the option name.

### 68 User interface

`\documentclass[<main-option-list>]{<class>} [<version>]`

There must be exactly one such declaration, and it must come first. The `<main-option-list>` is a list of options which can modify the formatting of elements which are defined in the `<class>` file as well as in all following `\usepackage` declarations (see below). The `<version>` is a version number, beginning with a date in the format YYYY/MM/DD. If an older version of the class is found, a warning is issued.

`\documentstyle[<main-option-list>]{<class>} [<version>]`

The `\documentstyle` declaration is kept in order to maintain upward compatibility with L<sup>A</sup>T<sub>E</sub>X 2.09 documents. It is similar to `\documentclass`, but it causes all options in `<main-option-list>` that the `<class>` does not use to be passed to `\RequirePackage` after the options have been processed. This maintains compatibility with the 2.09 behaviour. Also a flag is set to indicate that the document is to be processed in L<sup>A</sup>T<sub>E</sub>X 2.09 compatibility mode. As far as most packages are concerned, this only affects the warnings and errors L<sup>A</sup>T<sub>E</sub>X generates. This flag does affect the definition of font commands, and `\sloppy`.

`\usepackage[<package-option-list>]{<package-list>} [<version>]`

There can be any number of these declarations. All packages in `<package-list>` are called with the same options.

Each `<package>` file defines new elements (or modifies those defined in the `<class>`), and thus extends the range of documents which can be processed. The `<package-option-list>` is a list of options which can modify the formatting of elements defined in the `<package>` file. The `<version>` is a version number, beginning with a date in the format YYYY/MM/DD. If an older version of the package is found, a warning is issued.

Each package is loaded only once. If the same package is requested more than once, nothing happens, unless the package has been requested with options that were not given the first time it was loaded, in which case an error is produced.

As well as processing the options given in the `<package-option-list>`, each package processes the `<main-option-list>`. This means that options that affect all of the packages can be given globally, rather than repeated for every package.

Note that class files have the extension `.cls`, packages have the extension `.sty`.

**filecontents**  
The environment `filecontents` is intended for passing the contents of packages, options, or other files along with a document in a single file. It has one argument, which is the name of the file to create. If that file already exists (maybe only in the current directory if the OS supports a notion of a ‘current directory’ or

‘default directory’) then nothing happens (except for an information message) and the body of the environment is bypassed. Otherwise, the body of the environment is written verbatim to the file name given as the first argument, together with some comments about how it was produced.

The environment is allowed only before `\documentclass` to ensure that all packages or options necessary for this particular run are present when needed. The begin and end tags should each be on a line by itself. There is also a star-form; this does not write extra comments into the file.

## 68.1 Option processing

When the options are processed, they are divided into two types: *local* and *global*:

- For a class, the options in the `\documentclass` command are local.
- For a package, the options in the `\usepackage` command are local, and the options in the `\documentclass` command are global.

The options for `\documentclass` and `\usepackage` are processed in the following way:

1. The local and global options that have been declared (using `\DeclareOption` as described below) are processed first.

In the case of `\ProcessOptions`, they are processed in the order that they were declared in the class or package.

In the case of `\ProcessOptions*`, they are processed in the order that they appear in the option-lists. First the global options, and then the local ones.

2. Any remaining local options are dealt with using the default option (declared using the `\DeclareOption*` declaration described below). For document classes, this usually does nothing, but records the option on a list of unused options. For packages, this usually produces an error.

Finally, when `\begin{document}` is reached, if there are any global options which have not been used by either the class or any package, the system will produce a warning.

# 69 Class and Package interface

## 69.1 Class name and version

`\ProvidesClass` A class can identify itself with the `\ProvidesClass{\langle name \rangle}[\langle version \rangle]` command. The `\langle version \rangle` should begin with a date in the format YYYY/MM/DD.

## 69.2 Package name and version

`\ProvidesPackage` A package can identify itself with the `\ProvidesPackage{\langle name \rangle}[\langle version \rangle]` command. The `\langle version \rangle` should begin with a date in the format YYYY/MM/DD.

## 69.3 Requiring other packages

`\RequirePackage` Packages or classes can load other packages using `\RequirePackage[\langle options \rangle]{\langle name \rangle}[\langle version \rangle]`.

If the package has already been loaded, then nothing happens unless the requested options are not a subset of the options with which it was loaded, in which case an error is called.

Similar to `\RequirePackage`, but for classes, may not be used in package files.

Packages can pass options to other packages using:

`\PassOptionsToPackage{\langle options \rangle}{\langle package \rangle}`.

`\PassOptionsToClass` This adds the *<options>* to the options list of any future `\RequirePackage` or `\usepackage` command. For example:

```
\PassOptionsToPackage{foo,bar}{fred}
\RequirePackage[baz]{fred}
```

is the same as:

```
\RequirePackage[foo,bar,baz]{fred}
```

`\LoadClassWithOptions` `\LoadClassWithOptions{<name>}[<version>]`: This is similar to `\LoadClass`, but it always calls class *<name>* with exactly the same option list that is being used by the current class, rather than an option explicitly supplied or passed on by `\PassOptionsToClass`. `\RequirePackageWithOptions` is the analogous command for packages.

This is mainly intended to allow one class to simply build on another, for example:

```
\LoadClassWithOptions{article}
```

This should be contrasted with the slightly different construction

```
\DeclareOption*{\PassOptionsToClass{\CurrentOption}{article}}
\ProcessOptions
\LoadClass{article}
```

As used here, the effects are more or less the same, but the version using `\LoadClassWithOptions` is slightly quicker (and less to type). If, however, the class declares options of its own then the two constructions are different; compare, for example:

```
\DeclareOption{landscape}{...}
\ProcessOptions
\LoadClassWithOptions{article}
```

with:

```
\DeclareOption{landscape}{...}
\DeclareOption*{\PassOptionsToClass{\CurrentOption}{article}}
\ProcessOptions
\LoadClass{article}
```

In the first case, the `article` class will be called with option `landscape` precisely when the current class is called with this option; but in the second example it will not as in that case `article` is only passed options by the default option handler, which is not used for `landscape` as that option is explicitly declared.

To find out if a package has already been loaded, use

```
\@ifpackageloaded{<package>}{<true>}{{<false>}}.
```

To find out if a package has already been loaded with a version more recent than *<version>*, use `\ifpackagelater{<package>}[<version>]{<true>}{{<false>}}`.

To find out if a package has already been loaded with at least the options *<options>*, use `\ifpackagewith{<package>}[<options>]{<true>}{{<false>}}`.

There exists one package that can't be tested with the above commands: the `fontenc` package pretends that it was never loaded to allow for repeated reloading with different options (see `ltoutenc.dtx` for details).

## 69.4 Declaring new options

Options for classes and packages are built using the same macros.

To define a builtin option, use `\DeclareOption{<name>}[<code>]`.

To define the default action to perform for local options which have not been declared, use `\DeclareOption*{<code>}`.

*Note:* there should be no use of  
`\RequirePackage`, `\DeclareOption`, `\DeclareOption*` or `\ProcessOptions`  
inside `\DeclareOption` or `\DeclareOption*`.

Possible uses for `\DeclareOption*` include:  
`\DeclareOption*{}`

Do nothing. Silently accept unknown options. (This suppresses the usual warnings.)

`\DeclareOption*{\@unkownoptionerror}`

Complain about unknown local options. (The initial setting for package files.)

`\DeclareOption*{\PassOptionsToPackage{\CurrentOption}{\pkg-name}}`  
Handle the the current option by passing it on to the package `\pkg-name`, which will presumably be loaded via `\RequirePackage` later in the file. This is useful for building ‘extension’ packages, that perhaps handle a couple of new options, but then pass everything else on to an existing package.

`\DeclareOption*{\InputIfFileExists{xx-\CurrentOption.yyy}%
{}%
{\OptionNotUsed}}`

Handle the option `foo` by loading the file `xx-foo.yyy` if it exists, otherwise do nothing, but declare that the option was not used. Actually the `\OptionNotUsed` declaration is only needed if this is being used in class files, but does no harm in package files.

## 69.5 Safe Input Macros

<code>\InputIfFileExists</code>	<code>\InputIfFileExists{\file}{\then}{\else}</code> Inputs <code>\file</code> if it exists. Immediately before the input, <code>\then</code> is executed. Otherwise <code>\else</code> is executed.
<code>\IfExists</code>	As above, but does not input the file. One thing you might like to put in the <code>\else</code> clause is
<code>\@missingfileerror</code>	This starts an interactive request for a filename, supplying default extensions. Just hitting return causes the whole input to be skipped and entering <code>x</code> quits the current run,
<code>\input</code>	This has been redefined from the L <sup>A</sup> T <sub>E</sub> X2.09 definition, in terms of the new commands <code>\InputIfFileExists</code> and <code>\@missingfileerror</code> .
<code>\listfiles</code>	Giving this declaration in the preamble causes a list of all files input via the ‘safe input’ commands to be listed at the end. Any strings specified in the optional argument to <code>\ProvidesPackage</code> are listed alongside the file name. So files in standard (and other non-standard) distributions can put informative strings in this argument.

## 70 Implementation

<code>1 (*2ekernel)</code>	
<code>\if@compatibility</code>	The flag for compatibility mode. <code>2 \newif\if@compatibility</code>
<code>\@documentclasshook</code>	The hook called after the first <code>\documentclass</code> command. By default this checks to see if <code>\@normalsize</code> is undefined, and if so, sets it to <code>\normalsize</code> . <code>3 \def\@documentclasshook{% 4   \ifx\@normalsize\@undefined 5     \let\@normalsize\normalsize 6   \fi 7 }</code>
<code>\@declaredoptions</code>	This list is automatically built by <code>\DeclareOption</code> . It is the list of options (separated by commas) declared in the class or package file and it defines the order in which the corresponding <code>\ds@{option}</code> commands are executed. All local

*<option>*s which are not declared will be processed in the order defined by the optional argument of `\documentclass` or `\usepackage`.

8 `\let\@declaredoptions\@empty`

`\@classoptionslist` List of options of the main class.

9 `\let\@classoptionslist\relax`

10 `\onlypreamble\@classoptionslist`

`\@unusedoptionlist` List of options of the main class that haven't been declared or loaded as class option files.

11 `\let\@unusedoptionlist\@empty`

12 `\onlypreamble\@unusedoptionlist`

`\CurrentOption` Name of current package or option.

13 `\let\CurrentOption\@empty`

`\@currname` Name of current package or option.

14 `\let\@currname\@empty`

`\@currext` The current file extension.

15 `\global\let\@currext=\@empty`

`\@clsextension` The two possible values of `\@currext`.

`\@pkgextension` 16 `\def\@clsextension{cls}`

17 `\def\@pkgextension{sty}`

18 `\onlypreamble\@clsextension`

19 `\onlypreamble\@pkgextension`

`\@pushfilename` Commands to push and pop the file name and extension.

`\@popfilename` #1 current name.

`\@currnamestack` #2 current extension.

#3 current catcode of @.

#4 Rest of the stack.

20 `\def\@pushfilename{%`

21   `\xdef\@currnamestack{%`

22     `{\@currname}%`

23     `{\@currext}%`

24     `{\the\catcode`@}%`

25     `\@currnamestack}}`

26 `\onlypreamble\@pushfilename`

27 `\def\@popfilename{\expandafter\@p@filename\@currnamestack\@nil}`

28 `\onlypreamble\@popfilename`

29 `\def\@p@filename#1#2#3#4\@nil{%`

30   `\gdef\@currname{#1}%`

31   `\gdef\@currext{#2}%`

32   `\catcode`\@#3\relax`

33   `\gdef\@currnamestack{#4}}`

34 `\onlypreamble\@p@filename`

35 `\gdef\@currnamestack{}`

36 `\onlypreamble\@currnamestack`

`\@optionlist` Returns the option list of the file.

37 `\def\@optionlist#1{%`

38   `\@ifundefined{opt@#1}\@empty{\csname opt@#1\endcsname}`

39 `\onlypreamble\@optionlist`

```

\@ifpackageloaded \@ifpackageloaded{\langle name\rangle} Checks to see whether a file has been loaded.
\@ifclassloaded 40 \def\@ifpackageloaded{\@ifl@aded\@pkgextension}
41 \def\@ifclassloaded{\@ifl@aded\@clsextension}
42 \@onlypreamble\@ifpackageloaded
43 \@onlypreamble\@ifclassloaded
44 \def\@ifl@aded#1#2{%
45   \expandafter\ifx\csname ver@#2.#1\endcsname\relax
46     \expandafter\@secondoftwo
47   \else
48     \expandafter\@firstoftwo
49   \fi}
50 \@onlypreamble\@ifl@aded

\@ifpackagelater \@ifpackagelater{\langle name\rangle}{YYYY/MM/DD} Checks that the package loaded is
\@ifclasslater more recent than the given date.
51 \def\@ifpackagelater{\@ifl@ter\@pkgextension}
52 \def\@ifclasslater{\@ifl@ter\@clsextension}
53 \@onlypreamble\@ifpackagelater
54 \@onlypreamble\@ifclasslater
55 \def\@ifl@ter#1#2{%
56   \expandafter\@ifl@t@r
57   \csname ver@#2.#1\endcsname}
58 \@onlypreamble\@ifl@ter

      This internal macro is also used in \NeedsTeXFormat.
59 \def\@ifl@t@r#1#2{%
60   \ifnum\expandafter\@parse@version#1//00\@nil<%
61     \expandafter\@parse@version#2//00\@nil
62   \expandafter\@secondoftwo
63 \else
64   \expandafter\@firstoftwo
65 \fi}
66 \@onlypreamble\@ifl@t@r
67 \def\@parse@version#1/#2/#3#4\@nil{#1#2#3#4 }
68 \@onlypreamble\@parse@version

\@ifpackagewith \@ifpackagewith{\langle name\rangle}{\langle option-list\rangle} Checks that \langle option-list\rangle is a subset of
\@ifclasswith the options with which \langle name\rangle was loaded.
69 \def\@ifpackagewith{\@if@ptions\@pkgextension}
70 \def\@ifclasswith{\@if@ptions\@clsextension}
71 \@onlypreamble\@ifpackagewith
72 \@onlypreamble\@ifclasswith
73 \def\@if@ptions#1#2{%
74   \expandafter\@if@pti@ns{\@optionlist{#2.#1}}}
75 \@onlypreamble\@if@ptions

      Probably shouldnt use \CurrentOption here... (changed to \reserved@b.)
76 \def\@if@pti@ns#1#2{%
77   \let\reserved@a\@firstoftwo
78   \for\reserved@b:=#2\do{%
79     \expandafter\in@\expandafter{\expandafter,\reserved@b,},#1,}%
80     \ifin@\else\let\reserved@a\@secondoftwo\fi}%
81   \reserved@a
82 \@onlypreamble\@if@pti@ns

\ProvidesPackage Checks that the current filename is correct, and defines \ver@filename.
83 \def\ProvidesPackage#1{%
84   \xdef\@gtempa{#1}%
85   \ifx\@gtempa\@currname\else
86     \@latex@warning@no@line{You have requested

```

```

87      \@cls@pkg\space`@\currname', \MessageBreak
88      but the \@cls@pkg\space provides '#1'}%
89 \fi
90 \ifnextchar[\@pr@videopackage{\@pr@videopackage[]}]%
91 \onlypreamble\ProvidesPackage
92 \def\@pr@videopackage[#1]{%
93   \expandafter\xdef\csname ver@\currname.\currentt\endcsname{#1}%
94   \ifx\currentt\clsextension
95     \typeout{Document Class: \gtempa\space#1}%
96   \else
97     \wlog{Package: \gtempa\space#1}%
98   \fi}
99 \onlypreamble\@pr@videopackage

```

**\ProvidesClass** Like **\ProvidesPackage**, but for classes.

```

100 \let\ProvidesClass\ProvidesPackage
101 \onlypreamble\ProvidesClass

```

**\ProvidesFile** Like **\ProvidesPackage**, but for arbitrary files. Do not apply **\onlypreamble** to these, as we may want to label files input during the document.

**\@providesfile**

```

102 \def\ProvidesFile#1{%
103   \begingroup
104   \catcode`\ 10 %
105   \ifnum \endlinechar<256 %
106     \ifnum \endlinechar>\m@ne
107       \catcode\endlinechar 10 %
108     \fi
109   \fi
110   \makeother\/%
111   \makeother\&%
112   \kernel@ifnextchar[{@\providesfile{#1}}{\providesfile{#1}[]}]}

```

During initex a special version of **\@providesfile** is used. The real definition is installed right at the end, in **ltfinal.dtx**.

```

\def\@providesfile#1[#2]{%
  \wlog{File: #1 #2}%
  \expandafter\xdef\csname ver@#1\endcsname{#2}%
\endgroup
\end{macrocode}

```

**\PassOptionsToPackage** If the package has been loaded, we check that it was first loaded with the options.  
**\PassOptionsToClass** Otherwise we add the option list to that of the package.

```

113 \def\@pass@options#1#2#3{%
114   \expandafter\xdef\csname opt@#3.#1\endcsname{%
115     \ifundefined{opt@#3.#1}\empty
116       {\csname opt@#3.#1\endcsname,}%
117     \zap@space#2 \empty}
118 \onlypreamble\@pass@options
119 \def\PassOptionsToPackage{\@pass@options\@pkextension}
120 \def\PassOptionsToClass{\@pass@options\@clsextension}
121 \onlypreamble\PassOptionsToPackage
122 \onlypreamble\PassOptionsToClass

```

**\DeclareOption** Adds an option as a **\ds@** command, or the default **\default@ds** command.

```

123 \def\DeclareOption{%
124   \let\@files@with@ptions\@badrequireerror
125   \@ifstar\@def\default@ds\@declareoption}
126 \long\def\@declareoption#1#2{%

```

```

127 \xdef\@declaredoptions{\@declaredoptions,#1}%
128 \toks@{#2}%
129 \expandafter\edef\csname ds@#1\endcsname{\the\toks@}%
130 \long\def\@defdefault@ds#1{%
131 \toks@{#1}%
132 \edef\default@ds{\the\toks@}%
133 \onlypreamble\DeclareOption
134 \onlypreamble\@declareoption
135 \onlypreamble\@defdefault@ds

\OptionNotUsed If we are in a class file, add \CurrentOption to the list of unused options. Otherwise, in a package file do nothing.
136 \def\OptionNotUsed{%
137 \ifx\@currext\clsextension
138 \xdef\@unusedoptionlist{%
139 \ifx\@unusedoptionlist\empty\else\@unusedoptionlist,\fi
140 \CurrentOption}%
141 \fi}
142 \onlypreamble\OptionNotUsed

\default@ds The default default option code. Set by \onefilewithoptions to either \OptionNotUsed for classes, or \unknownoptionerror for packages. This may be reset in either case with \DeclareOption*.
143 % \let\default@ds\OptionNotUsed

\ProcessOptions \ProcessOptions calls \ds@option for each known package option, then calls \default@ds for each option on the local options list. Finally resets all the declared options to \relax. The empty option does nothing, this has to be reset on the off chance it's set to \relax if an empty element gets into the \@declaredoptions list.
\ProcessOptions* The star form is similar but executes options given in the order specified in the document, not the order they are declared in the file. In the case of packages, global options are executed before local ones.
144 \def\ProcessOptions{%
145 \let\ds@\empty
146 \edef\@curroptions{\optionlist{\currname.\@currext}}%
147 \@ifstar\xprocessoptions\processoptions
148 \onlypreamble\ProcessOptions

149 \def\processoptions{%
150 \for\CurrentOption:=\declaredoptions\do{%
151 \ifx\CurrentOption\empty\else
152 \expandtwoargs\in@{\CurrentOption,}%
153 ,\ifx\@currext\clsextension\else\classoptionslist,\fi
154 \curroptions}%
155 \ifin@
156 \useoption
157 \expandafter\let\csname ds@\CurrentOption\endcsname\empty
158 \fi
159 \fi}%
160 \processoptions
161 \onlypreamble\processoptions

162 \def\xprocessoptions{%
163 \ifx\@currext\clsextension\else
164 \for\CurrentOption:=\classoptionslist\do{%
165 \ifx\CurrentOption\empty\else
166 \expandtwoargs\in@{\CurrentOption,}%,\declaredoptions,}%
167 \ifin@
168 \useoption
169 \expandafter\let\csname ds@\CurrentOption\endcsname\empty
170 \fi

```

```

171      \fi}%
172  \fi
173 \@process@pti@ns}
174 \onlypreamble\@xprocess@ptions

```

The common part of `\ProcessOptions` and `\ProcessOptions*`.

```

175 \def\@process@pti@ns{%
176   \@for\CurrentOption:=\@curroptions\do{%
177     \ifundefined{ds@\CurrentOption}{%
178       {\@use@option
179         \default@ds}}%

```

There should not be any non-empty definition of `\CurrentOption` at this point, as all the declared options were executed earlier. This is for compatibility with 2.09 styles which use `\def\ds@...` directly, and so have options which do not appear in `\@declaredoptions`.

```
180   \use@option}}%
```

Clear all the definitions for option code. First set all the declared options to `\relax`, then reset the ‘default’ and ‘empty’ options. and the lst of declared options.

```

181 \@for\CurrentOption:=\@declaredoptions\do{%
182   \expandafter\let\csname ds@\CurrentOption\endcsname\relax}%
183 \let\CurrentOption\empty
184 \let\@fileswith@pti@ns\@fileswith@pti@ns
185 \AtEndOfPackage{\let\unprocessedoptions\relax}%
186 \onlypreamble\@process@pti@ns

```

`\@options` `\@options` is a synonym for `\ProcessOptions*` for upward compatibility with L<sup>A</sup>T<sub>E</sub>X2.09 style files.

```

187 \def\@options{\ProcessOptions*}
188 \onlypreamble\@options

```

`\@use@option` Execute the code for the current option.

```

189 \def\@use@option{%
190   \expandafter\removeelement\CurrentOption
191   \unusedoptionlist\unusedoptionlist
192   \csname ds@\CurrentOption\endcsname}%
193 \onlypreamble\@use@option

```

`\ExecuteOptions` `\ExecuteOptions{\langle option-list\rangle}` executes the code declared for each option.

```

194 \def\ExecuteOptions#1{%
195   \def\reserved@a##1\@nil{%
196     \@for\CurrentOption:=#1\do{\csname ds@\CurrentOption\endcsname}%
197     \edef\CurrentOption{##1}}%
198   \expandafter\reserved@a\CurrentOption\@nil}
199 \onlypreamble\ExecuteOptions

```

The top-level commands, which just set some parameters then call the internal command, `\@fileswithoptions`.

`\documentclass` The main new-style class declaration.

```

200 \def\documentclass{%
201   \let\documentclass\@twoclasseserror
202   \if@compatibility\else\let\usepackage\RequirePackage\fi
203   \fileswithoptions\@clsextension}
204 \onlypreamble\documentclass

```

`\documentstyle` 2.09 style class ‘style’ declaration.

```

205 \def\documentstyle{%
206   \makeatletter\input{latex209.def}\makeatother
207   \documentclass}
208 \onlypreamble\documentstyle

```

```

\RequirePackage Load package if not already loaded.
209 \def\RequirePackage{%
210   \o@fileswithoptions\@pkgextension}
211 \onlypreamble\RequirePackage

\LoadClass Load class.
212 \def\LoadClass{%
213   \ifx\@currext\@pkgextension
214     \@latex@error
215       {\noexpand\LoadClass in package file}%
216     {You may only use \noexpand\LoadClass in a class file.}%
217   \fi
218   \o@fileswithoptions\@clsextension}
219 \onlypreamble\LoadClass

\@loadwithoptions Pass the current option list on to a class or package. #1 is \@cls-or-pkgextension, #2 is \RequirePackage or \LoadClass, #3 is the class or package to be loaded.
220 \def\@loadwithoptions#1#2#3{%
221   \expandafter\let\csname opt@\#3.\#1\expandafter\endcsname
222     \csname opt@\@currname.\@currext\endcsname
223   #2{#3}%
224 \onlypreamble\@loadwithoptions

\LoadClassWithOptions Load class '#1' with the current option list.
225 \def\LoadClassWithOptions{%
226   \o@loadwithoptions\@clsextension\LoadClass}
227 \onlypreamble\LoadClassWithOptions

\RequirePackageWithOptions Load package '#1' with the current option list.
228 \def\RequirePackageWithOptions{%
229   \AtEndOfPackage{\let\@unprocessedoptions\relax}%
230   \o@loadwithoptions\@pkgextension\RequirePackage}
231 \onlypreamble\RequirePackageWithOptions

\usepackage To begin with, \usepackage produces an error. This is reset by \documentclass.

232 \def\usepackage#1{%
233   \@latex@error
234     {\noexpand \usepackage before \string\documentclass}%
235     {\noexpand \usepackage may only appear in the document
236       preamble, i.e., \MessageBreak
237       between \noexpand\documentclass and
238       \string\begin{document}.}%
239   \gobble}
240 \onlypreamble\usepackage

\NeedsTeXFormat Check that the document is running on the correct system.
241 \def\NeedsTeXFormat#1{%
242   \def\reserved@a{\#1}%
243   \ifx\reserved@a\fmtname
244     \expandafter\@needsformat
245   \else
246     \@latex@error{This file needs format '\reserved@a'%
247       \MessageBreak but this is '\fmtname'}{%
248       The current input file will not be processed
249       further, \MessageBreak
250       because it was written for some other flavor of
251       TeX. \MessageBreak\@ehd}%
252   \endinput \fi}
253 \onlypreamble\NeedsTeXFormat

```

If the file is not meant to be processed by L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  we stop inputting it, but we do not end the run. We just end inputting the current file.

```

254 \def\@needsformat{%
255   \@ifnextchar[%]
256     \@needsf@rmat
257   {}}
258 \onlypreamble\@needsformat

259 \def\@needsf@rmat[#1]{%
260   \@ifl@t@r\fmtversion{#1}{}%
261   {\@latex@warning@no@line
262     {You have requested release '#1' of LaTeX,\MessageBreak
263      but only release '\fmtversion' is available}}}
264 \onlypreamble\@needsf@rmat

\zap@space \zap@space foo<space>\empty removes all spaces from foo that are not pro-
tected by {} groups.
265 \def\zap@space#1 #2{%
266   #1%
267   \ifx#2\empty\else\expandafter\zap@space\fi
268   #2}

\@fileswithoptions The common part of \documentclass and \usepackage.

269 \def\@fileswithoptions#1{%
270   \@ifnextchar[%]
271     {\@fileswithoptions#1}%
272     {\@fileswithoptions#1[]}}
273 \onlypreamble\@fileswithoptions

274 \def\@fileswithoptions#1[#2]#3{%
275   \@ifnextchar[%]
276   {\@fileswithoptions@pti@ns#1[#2]#3}%
277   {\@fileswithoptions@pti@ns#1[#2]#3[]}}
278 \onlypreamble\@fileswithoptions

```

Then we do some work.

First of all, we define the global variables. Then we look to see if the file has already been loaded. If it has, we check that it was first loaded with at least the current options. If it has not, we add the current options to the package options, set the default version to be 0000/00/00, and load the file if we can find it. Then we check the version number.

Finally, we restore the old file name, reset the default option, and we set the catcode of @.

For classes, we can immediately process the file. For other types, #2 could be a comma separated list, so loop through, processing each one separately.

```

279 \def\@fileswithoptions@pti@ns#1[#2]#3[#4]{%
280   \ifx#1\@clsextension
281     \ifx\@classoptionslist\relax
282       \xdef\@classoptionslist{\zap@space#2 \empty}%
283     \def\reserved@a{%
284       \onefilewithoptions#3[#2] [##4]#1%
285       \documentclasshook}%
286   \else
287     \def\reserved@a{%
288       \onefilewithoptions#3[#2] [##4]#1}%
289   \fi
290 \else

```

build up a list of calls to \onefilewithoptions (one for each package) without thrashing the parameter stack.

```

291   \def\reserved@b##1,{%
292     \ifx\@nil##1\relax\else
293       \ifx\relax##1\relax\else
294         \noexpand\onefilewithoptions##1[#2] [##4]%

```

```

295      \noexpand\@pkgextension
296      \fi
297      \expandafter\reserved@b
298      \fi}%
299      \edef\reserved@a{\zap@space#3 \empty}%
300      \edef\reserved@a{\expandafter\reserved@b\reserved@a,\@nil,}%
301 \fi
302 \reserved@a}
303 \@onlypreamble\@files with @pti@ns

```

Have the main argument as #1, so we only need one `\expandafter` above.

```

304 \def\@onefilewithoptions#1[#2] [#3] #4{%
305   \pushfilename
306   \xdef\@currname{#1}%
307   \global\let\@currext\@currext#4%
308   \expandafter\let\csname\@currname.\@currext-h@@k\endcsname\empty
309   \let\CurrentOption\empty
310   \reset@ptions
311   \makeatletter

```

Grab everything in a macro, so the parameter stack is popped before any processing begins.

```

312 \def\reserved@a{%
313   \@ifl@aded\@currext{#1}%
314   {\@if@ptions\@currext{#1}{#2}{}}%
315   {\@latex@error
316     {Option clash for \cls@pkg\space #1}%
317     {The package #1 has already been loaded
318      with options:\MessageBreak
319      \space\space[\optionlist{#1.\@currext}]\MessageBreak
320      There has now been an attempt to load it
321      with options\MessageBreak
322      \space\space[#2]\MessageBreak
323      Adding the global options:\MessageBreak
324      \space\space
325      \optionlist{#1.\@currext},#2\MessageBreak
326      to your \noexpand\documentclass declaration may fix this.%\MessageBreak
327      Try typing \space <return> \space to proceed.}}}}%
328   {\@pass@ptions\@currext{#2}{#1}%
329
330   \global\expandafter
331   \let\csname ver@\@currname.\@currext\endcsname\empty
332   \InputIfFileExists
333   {\@currname.\@currext}%
334   {}%
335   {\@missingfileerror\@currname\@currext}%

```

`\@unprocessedoptions` will generate an error for each specified option in a package unless a `\ProcessOptions` has appeared in the package file.

```

336   \let\@unprocessedoptions\@unprocessedoptions
337   \csname\@currname.\@currext-h@@k\endcsname
338   \expandafter\let\csname\@currname.\@currext-h@@k\endcsname
339   \undefined
340   \@unprocessedoptions}
341   \@ifl@ter\@currext{#1}{#3}{}}%
342   {\@latex@warning@no@line
343   {You have requested,\on@line,
344   version\MessageBreak
345   '#3' of \cls@pkg\space #1,\MessageBreak
346   but only version\MessageBreak
347   '\csname ver@\#1.\@currext\endcsname'\MessageBreak
348   is available}}%

```

```

349   \ifx\@currext\@clsextension\let\LoadClass\@twoloadclasserror\fi
350   \@popfilename
351   \@reset@ptions}%
352 \reserved@a}
353 \onlypreamble\onefilewithoptions

\@@files with @ptions Save the definition (for error checking).
354 \let\@@files with @ptions\@files with @ptions
355 \onlypreamble\@@files with @ptions

\@reset@ptions Reset the default option, and clear lists of declared options.
356 \def\@reset@ptions{%
357   \global\ifx\@currext\@clsextension
358     \let\default@ds\OptionNotUsed
359   \else
360     \let\default@ds\@unknownoptionerror
361   \fi
362   \global\let\ds@\empty
363   \global\let\@declaredoptions\empty}
364 \onlypreamble\@reset@ptions

```

## 70.1 Hooks

Allow code do be saved to be executed at specific later times.

Save things in macros, I considered using toks registers, (and \addto@hook from the NFSS code, that would require stacking the contents in the case of required packages, so just generate a new macro for each package.

\@begindocumenthook Stuff to appear at the begining or end of the document.

```

\@enddocumenthook 365 \ifx\@begindocumenthook\@undefined
366   \let\@begindocumenthook\empty
367 \fi
368 \let\@enddocumenthook\empty

```

\g@addto@macro Globally add to the end of a macro.

```

369 \long\def\g@addto@macro#1#2{%
370   \begingroup
371     \toks@\expandafter{\#1#2}%
372     \xdef#1{\the\toks@}%
373   \endgroup

```

\AtEndOfPackage The access functions.

```

\AtEndOfClass 374 \def\AtEndOfPackage{%
\AtBeginDocument 375   \expandafter\g@addto@macro\csname\currname.\@currext-h@k\endcsname}%
\AtEndDocument 376 \let\AtEndOfClass\AtEndOfPackage
377 \onlypreamble\AtEndOfPackage
378 \onlypreamble\AtEndOfClass
379 \def\AtBeginDocument{\g@addto@macro\@begindocumenthook}
380 \def\AtEndDocument{\g@addto@macro\@enddocumenthook}
381 \onlypreamble\AtBeginDocument

```

\@cls@pkg The current file type.

```

382 \def\@cls@pkg{%
383   \ifx\@currext\@clsextension
384     document class%
385   \else
386     package%
387   \fi}
388 \onlypreamble\@cls@pkg

```

```

\@unknownoptionerror Bad option.

389 \def\@unknownoptionerror{%
390   \@latex@error
391   {Unknown option '\CurrentOption' for \c@cls@pkg\space`\@currname'}%
392   {The option '\CurrentOption' was not declared in
393    \c@cls@pkg\space`\@currname', perhaps you\MessageBreak
394    misspelled its name.
395   Try typing \space <return>
396   \space to proceed.}%
397 \onlypreamble\@unknownoptionerror

\@@unprocessedoptions Declare an error for each option, unless a \ProcessOptions occurred.

398 \def\@@unprocessedoptions{%
399   \ifx\@currext\@pkgeextension
400   \edef\@curroptions{\optionlist{\@currname.\@currext}}%
401   \@for\CurrentOption:=\@curroptions\do{%
402     \ifx\CurrentOption\empty\else\@unknownoptionerror\fi}%
403   \fi}
404 \onlypreamble\@unprocessedoptions
405 \onlypreamble\@unprocessedoptions

\@badrequireerror \RequirePackage or \LoadClass occurs in the options section.

406 \def\@badrequireerror#1[#2]#3[#4]{%
407   \@latex@error
408   {\noexpand\RequirePackage or \noexpand\LoadClass
409    in Options Section}%
410   {The \c@cls@pkg\space`\@currname' is defective.\MessageBreak
411    It attempts to load '#3' in the options section, i.e.,\MessageBreak
412    between \noexpand\DeclareOption and \string\ProcessOptions.}%
413 \onlypreamble\@badrequireerror

\@twoloadclasserror Two \LoadClass in a class.

414 \def\@twoloadclasserror{%
415   \@latex@error
416   {Two \noexpand\LoadClass commands}%
417   {You may only use one \noexpand\LoadClass in a class file}}
418 \onlypreamble\@twoloadclasserror

\@twoclasseserror Two \documentclass or \documentstyle.

419 \def\@twoclasseserror#1{%
420   \@latex@error
421   {Two \noexpand\documentclass or \noexpand\documentstyle commands}%
422   {The document may only declare one class.}\@gobble}
423 \onlypreamble\@twoclasseserror

```

## 70.2 Providing shipment

```

\two@digits Prefix a number less than 10 with '0'.

424 \def\two@digits#1{\ifnum#1<10 0\fi\number#1}

\filecontents This environment implements inline files. The star-form does not write extra
\endfilecontents comments into the file.

425 \begingroup%
426 \catcode`*=11 %
427 \catcode`^^M\active%
428 \catcode`^^L\active\let^^L\relax%
429 \catcode`^^I\active%
430 \gdef\filecontents{\@tempswatrue\filecontents}%
431 \gdef\filecontents*{\@tempswafalse\filecontents}%

```

```

432 \gdef\filecontents#1{%
433   \openin\@inputcheck#1 %
434   \ifeof\@inputcheck%
435     \@latex@warning@no@line%
436       {Writing file '\@currdir#1'}%
437 
438   \chardef\reserved@c15 %
439   \ch@ck7\reserved@c\write%
440   \immediate\openout\reserved@c#1\relax%
441 \else%
442 
443   \closein\@inputcheck%
444   \@latex@warning@no@line%
445   {File '#1' already exists on the system.\MessageBreak%
446     Not generating it from this source}%
447   \let\write\gobbletwo%
448   \let\closeout\gobble%
449   \fi%
450   \if@tempswa%
451 
452   \immediate\write\reserved@c{%
453     \percentchar\percentchar\space%
454     \expandafter\gobble\string\LaTeXe file '#1'^^J%
455     \percentchar\percentchar\space generated by the %
456     '\currenvir' \expandafter\gobblefour\string\newenvironment^^J%
457     \percentchar\percentchar\space from source '\jobname' on %
458     \number\year/\two@digits\month/\two@digits\day.^^J%
459     \percentchar\percentchar}%
460   \fi%
461   \let\do\makeother\dospecials%
462 
463 \edef\E{\@backslashchar end\string{\currenvir\string}%
464 \edef\reserved@b{%
465   \def\noexpand\reserved@b{%
466     ####1\E####2\E####3\relax}%
467   \reserved@b{%
468     \ifx\relax##3\relax%
469 
470     There was no \end{filecontents}%
471     \immediate\write\reserved@c{##1}%
472   \else%
473 
474     There was a \end{filecontents}, so stop this time.%
475     \edef^M{\noexpand\end{\currenvir}}%
476     \ifx\relax##1\relax%
477   \else%
478 
479     Text before the \end, write it with a warning.%
480     \immediate\warning{Writing text '##1' before %
481       \string\end{\currenvir}\MessageBreak as last line of #1}%
482     \immediate\write\reserved@c{##1}%
483   \fi%
484   \ifx\relax##2\relax%
485   \else%
486 
487     Text after the \end, ignore it with a warning.%
488     \immediate\warning{%
489       Ignoring text '##2' after \string\end{\currenvir}}%
490     \fi%
491   \fi%
492 ^M}%
493 
494   \catcode`\^L\active%
495   \let\L\@undefined%
496   \def^L{\@ifundefined L^J^J^J}%

```

```

484  \catcode`^^I\active%
485  \let\I\@undefined%
486  \def^^I{\@ifundefined I\space\space}%
487  \catcode`^^M\active%
488  \edef^^M##1^^M{%
489    \noexpand\reserved@b##1\relax}%
490 \endgroup%

491 \begingroup
492 \catcode`|= \catcode`\%
493 \catcode`\%=12
494 \catcode`\*=11
495 \gdef\@percentchar{%
496 \gdef\endfilecontents{%
497   \immediate\closeout\reserved@c
498   \def\T##1##2##3{%
499     \ifx##1\@undefined\else
500       \@latex@warning@no@line{##2 has been converted to Blank ##3e}%
501     \fi}%
502   \T\L{Form Feed}{Lin}%
503   \T\I{Tab}{Spac}%
504   \immediate\write\@unused{}}
505 \global\let\endfilecontents*\endfilecontents
506 \onlypreamble\filecontents
507 \onlypreamble\endfilecontents
508 \onlypreamble\filecontents*
509 \onlypreamble\endfilecontents*
510 \endgroup
511 \onlypreamble\filecontents

```

512 ⟨/2ekernel⟩

## 71 After Preamble

Finally we declare a package that allows all the commands declared above to be `\onlypreamble` to be used after `\begin{document}`.

```

513 (*afterpreamble)
514 \NeedsTeXFormat{LaTeX2e}
515 \ProvidesPackage{pkgindoc}
516   [1994/10/20 v1.1 Package Interface in Document (DPC)]
517 \def\reserved@a#1\do\@classoptionslist#2\do\filecontents#3\relax{%
518   \gdef\@preamblecmds{#1#3}}
519 \expandafter\reserved@a\@preamblecmds\relax
520 ⟨/afterpreamble⟩

```

## File M

# lthyphen.dtx

This file contains the code for loading hyphenation patterns into L<sup>A</sup>T<sub>E</sub>X. Most of this will end up in a file called `hyphen.ltx`. If you wish to customize your L<sup>A</sup>T<sub>E</sub>X system in respect of hyphenation patterns, write a file `hyphen.cfg`. If this file exists, it will be loaded instead of `hyphen.ltx`. See the comments below for additional information.

To produce the printed version of this file the following code is used. It can be extracted with the `DOCSTRIP` program, or one can run this file directly through L<sup>A</sup>T<sub>E</sub>X 2<sub>E</sub>.

```
1 <*driver>
2 \documentclass{ltxdoc}
3 \begin{document}
4 \DocInput{lthyphen.dtx}
5 \end{document}
6 </driver>
```

The default file `hyphen.ltx` loads hyphenation patterns for US english. If you want to load additional or other hyphenation patterns, you should create a file `hyphen.cfg`. This is best done by starting from `hyphen.ltx`.

For backward compatibility, the default file, `hyphen.ltx`, first tries to load the file `hyphen.tex`. If this file exists, an information message is issued and the appropriate defaults for T<sub>E</sub>X's internal parameters are set: `\language` is initialized to 0, and `\lefthyphenmin` and `\righthyphenmin` to 2 and 3, respectively, to disallow x- or -xx breaks.

```
7 <*default>
8 \InputIfFileExists{hyphen.tex}%
9   { \message{Loading hyphenation patterns for US english.}%
10     \language=0
11     \lefthyphenmin=2 \righthyphenmin=3 }%
```

Otherwise, since we cannot do anything without any hyphenation patterns, an error message is printed and the Init<sub>E</sub>X run is terminated by invoking `\@@end` (which is the L<sup>A</sup>T<sub>E</sub>X 2<sub>E</sub> name for T<sub>E</sub>X's `\end` primitive).

```
12   \errhelp{The configuration for hyphenation is incorrectly
13           installed.^^J%
14           If you don't understand this error message you need
15           to seek^^Jexpert advice.}%
16   \errmessage{OOPS! I can't find any hyphenation patterns for
17           US english.^^J \space Think of getting some or the
18           latex2e setup will never succeed}\@@end}
19 </default>
```

The following example describes the possible contents of a file `hyphen.cfg` that will load both US English and German hyphenation patterns, making the former the default. It sets `\language` to 0 for the US patterns and to 1 for the German patterns. Then `\language` is set to 0 to make this the default and the default values of `\lefthyphenmin` and `\righthyphenmin` are set.

```
\language=0
\input hyphen % (or \input ushyphen1 if the file has been renamed)
\language=1
\input ghyph31
\language=0
\lefthyphenmin=2
\righthyphenmin=3
\endinput
```

Another possibility is to use the package `babel`, by Johannes Braams. That package is distributed with a suitable `hyphen.cfg` file.

# File N

## ltfinal.dtx

### 72 Final settings

This section contains the final settings for L<sup>A</sup>T<sub>E</sub>X. It initialises some debugging and typesetting parameters, sets the default \catcodes and uc/lc codes, and inputs the hyphenation file.

#### 72.1 Debugging

By default, L<sup>A</sup>T<sub>E</sub>X shows statistics:

```
1 {*ekernel}
2 \tracingstats1
```

#### 72.2 Typesetting parameters

\@lowpenalty These are penalties used internally.  
\@medpenalty 3 \newcount\@lowpenalty  
\@highpenalty 4 \newcount\@medpenalty  
5 \newcount\@highpenalty

The default values of the picture and \fbox parameters:

```
6 \unitlength = 1pt
7 \fboxsep = 3pt
8 \fboxrule = .4pt
```

The saved value of T<sub>E</sub>X's \maxdepth:

```
9 \emaxdepth = \maxdepth
```

\vsize initialized because a \clearpage with \vsize < \topskip causes trouble.  
\@colroom and \@colht also initialized because \vsize may be set to them if a \clearpage is done before the \begin{document}

```
10 \vsize = 1000pt
11 \@colroom = \vsize
12 \@colht = \vsize
```

Initialise \textheight \textwidth and page style, to avoid internal errors if they are not set by the class.

```
13 \textheight=.5\maxdimen
14 \textwidth=\textheight
15 \ps@empty
```

#### 72.3 Lccodes for hyphenation

We set things up so that hyphenation files can assume that the default (T1) lccodes are in use (at present this also sets up the uccodes). We temporarily define \reserved@a to apply \reserved@c to all the numbers in the range of its arguments.

```
16 \def\reserved@a#1#2{%
17   \@tempcnta#1\relax
18   \@tempcntb#2\relax
19   \reserved@c
20 }
21 \def\reserved@c{%
22   \ifnum\@tempcnta>\@tempcntb\else
23     \reserved@c\@tempcnta
24     \advance\@tempcnta\@ne
25     \expandafter\reserved@c
```

```

26     \fi
27 }

Depending on the TeX version, we might not be allowed to do this for non-ASCII
characters.

28 \def\reserved@c#1{%
29     \count@=#1\advance\count@ by -"20
30     \uccode#1=\count@
31     \lccode#1=#1
32 }
33 \reserved@a{\`a}{\z}
34 \ifnum\inputlineno=\m@ne\else
35   \reserved@a{"A0}{\BC}
36   \reserved@a{"E0}{\FF}
37 \fi

```

The upper case characters need their `\uccode` and `\lccode` values set, and their `\sfface` set to 999.

```

38 \def\reserved@c#1{%
39     \count@=#1\advance\count@ by "20
40     \uccode#1=#1
41     \lccode#1=\count@
42     \sfface#1=999
43 }
44 \reserved@a{\`A}{\Z}
45 \ifnum\inputlineno=\m@ne\else
46   \reserved@a{"80}{\9C}
47   \reserved@a{"C0}{\DF}
48 \fi

```

Well, it would be nice if that were correct, but unfortunately, the Cork encoding contains some odd slots whose uicode or lccode isn't quite what you'd expect.

```

49 \uccode`\^^Y=\I      % dotless i
50 \lccode`\^^Y=\`^Y    % dotless i
51 \uccode`\^^Z=\J      % dotless j, ae in OT1
52 \lccode`\^^Z=\`^Z    % dotless j, ae in OT1
53 \ifnum\inputlineno=\m@ne\else
54   \lccode`\^^9d=\`i    % dotted I
55   \uccode`\^^9d=\`^9d % dotted I
56   \lccode`\^^9e=\`^9e % d-bar
57   \uccode`\^^9e=\`^d0 % d-bar
58 \fi

```

Finally here is one that helps hyphenation in the OT1 encoding.

```
59 \lccode`\^^[=\`^[\  % oe in OT1
```

And we also set the `\lccode` of `\-` and `\textcompwordmark` so that they do not prevent hyphenation in the remainder of the word (as suggested by Lars Helström).

```

60 \lccode`\-=\`-    % default hyphen char
61 \lccode 127=127    % alternate hyphen char
62 \lccode 23 =23     % textcompwordmark in T1

```

## 72.4 Hyphenation

The following code will be compiled into the format file. It checks for the existance of `hyphen.cfg` in inputs that file if found. Otherwise it inputs `hyphen.ltx`. Note that these are loaded in *before* the `\catcodes` are set, so local hyphenation files can use 8-bit input.

We try to load the customized hyphenation description file.

```

63 \InputIfFileExists{hyphen.cfg}%
64           {\typeout{=====
65                         Local configuration file hyphen.cfg used^J%}

```

```

66      ======%
67      \def\@addtofilelist##1{\xdef\@filelist{\@filelist,##1}}%
68      }
69      {\input{hyphen.ltx}}
70 \let\@addtofilelist\gobble

```

## 72.5 Font loading

Fonts loaded during the formatting process might already have changed the `\font@submax` from `0pt` to something higher. If so, we put out a bold warning.

```

71 % \changes{v1.1c}{2000/08/23}{Fix typo in warning}
72 \ifdim \font@submax >\z@
73   \font@warning{Size substitutions with differences\MessageBreak
74     up to \font@submax\space have occurred.\MessageBreak
75     \MessageBreak
76     Please check the transcript file
77     carefully\MessageBreak
78     and redo the format generation if necessary!
79     \@gobbletwo}%
80   \errhelp{Only stopped, to give you time to
81     read the above message.}%
82 \errmessage{%

```

We reset the macro. Otherwise every user will get a warning on every job.

```

83 \def\font@submax{0pt}
84 \fi

```

## 72.6 Input encoding

We temporarily define `\reserved@a` to apply `\reserved@c` to all the numbers in the range of its arguments.

```

85 \def\reserved@a#1#2{%
86   \tempcnta#1\relax
87   \tempcntb#2\relax
88   \reserved@b
89 }
90 \def\reserved@b{%
91   \ifnum\tempcnta>\tempcntb\else
92     \reserved@c\tempcnta
93     \advance\tempcnta\one
94     \expandafter\reserved@b
95   \fi
96 }

```

Set the special catcodes (although some of these are useless, since an error will have occurred if the catcodes have changed). Note that `^J` has catcode ‘other’ for use in warning messages.

```

97 \catcode`\\=10
98 \catcode`#=6
99 \catcode`\$=3
100 \catcode`\%=14
101 \catcode`\&=4
102 \catcode`\\=0
103 \catcode`\^=7
104 \catcode`\_=8
105 \catcode`\{=1
106 \catcode`\}=2
107 \catcode`\^=13
108 \catcode`\@=11
109 \catcode`\^I=10
110 \catcode`\^J=12
111 \catcode`\^L=13

```

```

112 \catcode`^^M=5
Set the ‘other’ catcodes.
113 \def\reserved@c#1{\catcode#1=12\relax}
114 \reserved@c{'!'}
115 \reserved@c{'"}
116 \reserved@a{'\'}{'\?'}
117 \reserved@c{'[]'}
118 \reserved@c{'[]'}
119 \reserved@c{'\'}
120 \reserved@c{'\|'}
Set the ‘letter’ catcodes.
121 \def\reserved@c#1{\catcode#1=11\relax}
122 \reserved@a{'\A}{'\Z}
123 \reserved@a{'\a}{'\z}
All the characters in the range 0–31 and 127–255 are illegal, except tab (^I), nl (^J), ff (^L) and cr (^M).
Now allow 8-bit characters, although their use in this way is strongly discouraged. See inputenc.dtx for a supported mechanism for 8-bit input.
124 \def\reserved@c#1{\catcode#1=15\relax}
125 \reserved@a{0}{'^H}
126 \reserved@c{'^K}
127 \reserved@a{'^N}{31}
128 %\ifnum\inputlineno=\m@ne
129   \catcode"7F=15
130 %\else
131 %  \reserved@a{"7F}{FF}
132 %\fi

```

## 72.7 Lccodes and uccodes

We now again set up the default (T1) uc/lccodes. The lower case characters need their `\uccode` and `\lccode` values set. Some of this is a repeat of the set-up before loading hyphenation files. Depending on the T<sub>E</sub>X version, we might not be allowed to do this for non-ASCII characters.

```

133 \def\reserved@c#1{%
134   \count@=#1\advance\count@ by -"20
135   \uccode#1=\count@
136   \lccode#1=#1
137 }
138 \reserved@a{'\a}{'\z}
139 \ifnum\inputlineno=\m@ne\else
140   \reserved@a{"A0}{BC}
141   \reserved@a{"E0}{FF}
142 \fi

```

The upper case characters need their `\uccode` and `\lccode` values set, and their `\sfcode` set to 999.

```

143 \def\reserved@c#1{%
144   \count@=#1\advance\count@ by "20
145   \uccode#1=#1
146   \lccode#1=\count@
147   \sfcode#1=999
148 }
149 \reserved@a{'\A}{'\Z}
150 \ifnum\inputlineno=\m@ne\else
151   \reserved@a{"80}{9C}
152   \reserved@a{"C0}{DF}
153 \fi

```

Well, it would be nice if that were correct, but unfortunately, the Cork encoding contains some odd slots whose uccode or lccode isn’t quite what you’d expect.

```

154 \uccode`^^Y='I      % dotless i
155 \lccode`^^Y='^^Y   % dotless i
156 \uccode`^^Z='J     % dotless j, ae in OT1
157 \lccode`^^Z='^^Z   % dotless j, ae in OT1
158 \ifnum\inputlineno=\m@ne\else
159   \lccode`^^9d='i    % dotted I
160   \uccode`^^9d='^^9d % dotted I
161   \lccode`^^9e='^^9e % d-bar
162   \uccode`^^9e='^^d0 % d-bar
163 \fi

```

Finally here is one that helps hyphenation in the OT1 encoding.

```
164 \lccode`^^[='^^[  % oe in OT1
```

\MakeUppercase And whilst we're doing things with uc/lc tables, here are two commands to upper-  
\MakeUppercase and lower-case a string.  
\@uclclist

*Note* that this implementation is subject to change! At the moment we're not providing any way to extend the list of uc/lc commands, since finding a good interface is difficult. These commands have some nasty features, such as uppercasing mathematics, environment names, labels, etc. A much better long-term solution is to use all-caps fonts, but these aren't generally available.

```

165 \DeclareRobustCommand{\MakeUppercase}[1]{%
166   \def\i{I}\def\j{J}%
167   \def\reserved@a##1##2{\let##1##2\reserved@a}%
168   \expandafter\reserved@a\@uclclist\reserved@b{\reserved@b\@gobble}%
169   \protected\edef\reserved@a{\uppercase{\#1}}%
170   \reserved@a
171 }
172 \DeclareRobustCommand{\MakeLowercase}[1]{%
173   \def\reserved@a##1##2{\let##2##1\reserved@a}%
174   \expandafter\reserved@a\@uclclist\reserved@b{\reserved@b\@gobble}%
175   \protected\edef\reserved@a{\lowercase{\#1}}%
176   \reserved@a
177 }
178 \def\@uclclist{\oe\OE\o\O\ae\AE
179   \dh\DH\dj\DJ\l\L\ng\NG\ss\SS\th\TH}

```

The above code works, but has the nasty side-effect that if you say something like:

```
\markboth{\MakeUppercase\contentsname}
         {\MakeUppercase\contentsname}
```

then the uppercasing is only done to the first letter of the contents name, since the mark expands out to:

```
\mark{\protect\MakeUppercase Table of Contents}
      {\protect\MakeUppercase Table of Contents}
```

In order to get round this, we redefine \MakeUppercase and \MakeLowercase to grab their argument and brace it. This is a very low-level hack, and is *not* recommended practice! This is an instance of a general problem that makes it unsafe to grab arguments unbraced, and probably needs a more general solution. For the moment though, this hack will do:

```
180 \protected\edef\MakeUppercase#1{\MakeUppercase{\#1}}
181 \protected\edef\MakeLowercase#1{\MakeLowercase{\#1}}
```

## 72.8 Applying Patch files

Between major releases, small patches will be distributed in files `ltpatch.ltx` which must be added at this point.

```
182 \IfFileExists{ltpatch.ltx}
183   {\typeout{=====^~^J%}
```

```

184          Applying patch file ltpatch.ltx^^J%
185          =====
186 \def\fmtversion@topatch{unknown}
187 \input{ltpatch.ltx}
188 \ifx\fmtversion\fmtversion@topatch
189   \ifx\patch@level\@undefined
190     \typeout{^^J^^J^^J%
191       !!!!!!!Patch file 'ltpatch.ltx' not suitable for this^^J%
192       !! Patch file 'ltpatch.ltx' not suitable for this^^J%
193       !! version of LaTeX.^^J^^J%
194       !! Please check if initex found an old patch file:^^J%
195       !! --- if so, rename it or delete it, and redo the^^J%
196       !! initex run.^^J%
197       !!!!!!!Patch file 'ltpatch.ltx' not suitable for this^^J%
198     \batchmode \@@end
199   \else
```

The code below adds the ‘patch level’ string to the first `\typeout` in the startup banner.

```

200   \def\fmtversion@topatch{0}%
201   \ifx\fmtversion@topatch\patch@level\else
202     \def\reserved@a\typeout##1##2\reserved@a{%
203       \typeout{##1 patch level \patch@level}##2}
204     \everyjob\expandafter\expandafter\expandafter{%
205       \expandafter\reserved@a\the\everyjob\reserved@a}
206     \let\reserved@a\relax
207     \the\everyjob
208   \fi
209   \fi
210 \else
211   \typeout{^^J^^J^^J%
212   !!!!!!!Patch file 'ltpatch.ltx' (for version <\fmtversion@topatch>)^^J%
213   !! Patch file 'ltpatch.ltx' (for version <\fmtversion@topatch>)^^J%
214   !! is not suitable for version <\fmtversion> of LaTeX.^^J^^J%
215   !! Please check if initex found an old patch file:^^J%
216   !! --- if so, rename it or delete it, and redo the^^J%
217   !!     initex run.^^J%
218   !!!!!!!Patch file 'ltpatch.ltx' (for version <\fmtversion@topatch>)^^J%
219   \batchmode \@@end
220 \fi
221 \let\fmtversion@topatch\relax
222 \{}}
```

## 72.9 Freeing Memory

`\reserved@a` And just to make sure nobody relies on those definitions of `\reserved@b` and friends. These macros are reserved for use in the kernel. *Do not use them as general scratch macros.*

```

223 \let\reserved@a\@filelist
224 \let\reserved@b=\@undefined
225 \let\reserved@c=\@undefined
226 \let\reserved@d=\@undefined
227 \let\reserved@e=\@undefined
228 \let\reserved@f=\@undefined

\toks
229 \toks0{}
230 \toks2{}
231 \toks4{}
232 \toks6{}
233 \toks8{}
```

`\errhelp` Empty the error help message, which may have some rubbish:

234 `\errhelp{}`

## 72.10 Initialise file list

`\@providesfile` Initialise for use in the document. During initex a modified version has been used which leaves debugging information for `latexbug.tex`.

235 `\def\@providesfile#1[#2]{%`  
236     `\wlog{File: #1 #2}%`  
237     `\expandafter\xdef\csname ver@#1\endcsname{#2}%`  
238     `\endgroup}`

`\@filelist` Reset `\@filelist` so files input while making the format are not listed. The list built up so far may take up a lot of memory and so it is moved to `\reserved@a` where it will be overwritten as soon as almost any L<sup>A</sup>T<sub>E</sub>X command is issued in a class file. However the `latexbug.tex` program will be able to access this information and insert it into a bug report.

239 `\let\@filelist\@gobble`  
240 `\def\@addtofilelist#1{\xdef\@filelist{\@filelist,#1}}%`

## 72.11 Dumping the format

Finally we make `@` into a letter, ensure the format will be in the ‘normal’ error mode, and dump everything into the format file.

241 `\makeatother`  
242 `\errorstopmode`  
243 `\dump`  
244 `</2ekernel>`

# File O

## ltpatch

Things we did wrong...

```
1 %%%%
2 %%%% Patch file for the LaTeX2e kernel dated 2009/09/24
3 %%%% (2009/09/24)
4
5 \def\fmtversion@topatch{2009/09/24} % This patch will not work with
6 % any other release.
7
8 \def\patch@level{0}
9
10
11
12
13 %%%%%%%%%%%%%%
14 \iffalse
15
16 \typeout{%
17 ^J%
18 *****^J%
19 ltpatch.ltx has fixed certain problems with the ‘kernel’ of LaTeX.^J%
20 Certain other files in the LaTeX distribution have also been updated^J%
21 since the last release (list correct as of 2009/09/24):^J%
22 base/xxxxxx.dtx.....(patch 1)^J%
23 unpacked/yyyyyy.cls.....(patch 1)^J%
24 ^J%
25 See the file patches.txt for more details.^J%
26 *****^J%
27
28 \fi
29
30 \endinput
31
32
33
34
35
36
37
```

1985/11/04 ltmath.dtx	LaTeX2.09		1989/05/01 ltfssbas.dtx	v1.0j
General:	produce warning message if line extends into margin.		General:	Default for <code>\base-linestretch</code> added. . . . .
Doesn't warn about formula overprinting equation number.	215			107
1989/04/10 ltfssbas.dtx	v1.0a		1989/05/22 ltfssbas.dtx	v1.0k
General:	Starting with version numbers!			
	<code>\ifmmode</code> added in <code>\math@group</code> . . . . .	107	General:	Lines longer than 72 characters folded. . . . .
1989/04/10 ltfssbas.dtx	v1.0b		1989/05/22 ltfssini.dtx	v1.0g
General:	<code>\preload@sizes</code> added. 107		General:	Lines shortened to 72 characters . . . . .
	<code>\wrong@fontshape</code> changed to define substitution font/shape macro. . . . .	107	1989/09/14 ltfssbas.dtx	v1.0m
1989/04/10 ltfssini.dtx	v1.0a		General:	Global replacement: <code>\group</code> to <code>\mathgroup</code> . . . . .
General:	Starting with version numbers <code>\newif</code> for <code>\@tempswa</code> added since this switch is unknown at the time when this file is read in. (latex.tex is loaded later.) <code>\math@famname</code> changed to <code>\math@version</code> . . . . .	168	<code>\mathversion</code> :	Corrected typo: <code>\endcname</code> to <code>\endcsname</code> . . . . .
1989/04/14 ltfssbas.dtx	v1.0c		1989/11/07 ltfssini.dtx	v1.0i
General:	More documentation added. . . . .	107	General:	All family, series, and shape names abbreviated. . . . .
1989/04/15 ltfssini.dtx	v1.0b		1989/11/08 ltfssbas.dtx	v1.0o
General:	<code>\mathfontset</code> renamed to <code>\mathversion</code> . . . . .	168	General:	First parameter of <code>\define@mathalphabet</code> and <code>\define@mathgroup</code> changed from string to control sequence. . . . .
1989/04/19 ltfssbas.dtx	v1.0d		1989/11/14 ltfssbas.dtx	v1.0p
General:	Even more doc. . . . .	107	<code>\math@version</code> :	Math version prefix ‘mv@’ added. . . . .
1989/04/21 ltfssbas.dtx	v1.0e		1989/11/19 ltfssbas.dtx	v1.0q
General:	Documentation is fun! Parameters of <code>\define@mathalphabet</code> changed. 107		<code>\define@newfont</code> :	Group added. 116
1989/04/21 ltfssini.dtx	v1.0c		<code>\wrong@fontshape</code> :	Instead of calling <code>\family\default@family</code> , etc. we directly set <code>\f@family</code> , etc. . . . .
General:	Changed to conform to fam.tex. . . . .	168	1989/11/22 ltfssbas.dtx	v1.0r
1989/04/23 ltfssbas.dtx	v1.0f		<code>\math@version</code> :	<code>\def → \edef</code> for <code>\math@version</code> . . . . .
General:	% in <code>\getanddefinefonts</code> added. . . . .	107	1989/11/25 ltfssbas.dtx	v1.0s
1989/04/26 ltfssini.dtx	v1.0d		General:	All <code>\edef\font@name</code> changed to <code>\xdef\font@name</code> . Necessary after introduction of <code>\begingroup\endgroup</code> in v1.0q. . . . .
General:	<code>\xpt</code> added. . . . .	168		107
extra// → + in <code>\extra@def</code> . . . . .	107		1989/11/26 ltfssbas.dtx	v1.0t
1989/04/27 ltfssbas.dtx	v1.0g		<code>\select@group</code> :	<code>\bgroup\egroup</code> changed to <code>\begin{group}\end{group}</code> to avoid empty Ord atom on math list. 120
General:	Documentation revised. 107		1989/12/02 ltfssini.dtx	v1.1b
1989/04/27 ltfssini.dtx	v1.0e		General:	<code>\rmmath</code> renamed to <code>\mathrm</code> . . . . .
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1993/11/29 ltplain.dtx LaTeXe	
General: All accents in decimals; suggested by Paul Taylor . . . . .	19
1993/11/30 ltoutput.dtx v1.0c	
\@tracemessage: Commands	
added . . . . .	352
1993/12/01 fontdef.dtx v2.1a	
General: Update for LaTeXe . . . . .	173
1993/12/01 ltoutput.dtx v1.0e	
\@reinserts: Command added . . . . .	333
1993/12/03 ltboxes.dtx v0.1a	
\@argrsbox: macro removed . . . . .	240
\@begin@tempboxa: macro added . . . . .	233
\@end@tempboxa: macro added . . . . .	234
\@iirsbox: redefined to support \height . . . . .	240
\@imakebox: macro modified . . . . .	234
\@iirsbox: redefined to support \height . . . . .	240
\@isavebox: color support . . . . .	235
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\@isavepicbox: extra group . . . . .	235
\@makebox: default changed from x to c . . . . .	233
\@makepicbox: macro modified . . . . .	234
\@savebox: default c not x . . . . .	235
\bm@b: macros added . . . . .	234
\endlrbox: macro added . . . . .	235
\fbox: extra group . . . . .	236
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\minipage:	Redefined to support extra optional arguments . . . . .
238	394
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235	235
\parbox:	Redefined to support ex- tra optional arguments . . . . .
237	237
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General: \@onlypreamble:	Many commands declared. . . . .
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1993/12/03 lterror.dtx v1.0b	
\@latexerr: Set \c@errorcontextlines to -1 . . . . .	42
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1993/12/04 ltfiles.dtx v0.9b	
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\@input: Macro reimplemented . . . . .	66
\IfFileExists: Macro added . . . . .	65
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1993/12/05 ltfloat.dtx LaTeXe	
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\@boxfpsbit: Command added . . . . .	354
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\@flsetnum: Command added . . . . .	355
\@flsettextmin: Command added . . . . .	355
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Hook added . . . . .	331
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\@resethfps: Command added . . . . .	354
\@setfloattypecounts: Command added . . . . .	353
\@setfpsbit: Command added . . . . .	354
\@shipoutsetup: Command added . . . . .	335

<i>Change History</i>			
\@startcolumn:	Command changed	1993/12/09 ltfiles.dtx v0.9e	395
\@startdblcolumn:	Command changed	\document: Hook added	62
\@testfp:	Command added	1993/12/09 ltmiscen.dtx v0.9e	354
\@textfloatsheight:	Commands added	\enddocument: Hook added	203
\@topnewpage:	Commands changed	1993/12/10 ltoutenc.dtx v1.2	353
\@tryfcolumn:	Command changed	General: Added source code for t1enc.sty	326
\@writesetup:	\@startpagehook added	1993/12/11 ltfnctcmd.dtx v3.0a	335
\output:	Command changed	General: Complete reworking of all text commands, using just one creator function	328
1993/12/06 ltclass.dtx v0.2k		italic correction now put in front of penalty before glue	191
\ExecuteOptions:	Preserve \CurrentOption	newcommands replaced by defs	371
1993/12/06 ltoutput.dtx v1.0f		newfontswitch command corrected and changed	191
\@specialoutput:	Unboxing of 255 added to rescue writes	\DeclareTextFontCommand: Macro changed	328
1993/12/06 ltoutput.dtx v1.0g		\emph: Macro changed	194
\@topnewpage:	\@floatplacement placement bug fixed	\fix@penalty: Macro added	326
1993/12/07 ltclass.dtx v0.2l		\maybe@ic: Macro name changed	195
\ProvidesFile:	Macro added	\maybe@ic@: Macro and name changed	369
1993/12/07 ltclass.dtx v0.2m		\sw@slant: Macro changed	195
\@fileswithoptions:	Reset \CurrentOption	\textup: Macros changed	374
1993/12/07 ltoutenc.dtx 1.1		1993/12/11 ltmath.dtx v0.9g	193
General: Protected all special characters with \string		General: Added a group around the first argument of \frac to prevent changes (for example font changes) from modifying the contents of the second argument.	72
1993/12/07 ltoutenc.dtx v1.1		1993/12/11 ltoutenc.dtx v1.2a	215
General: Made all character numbers decimal		General: Corrected for t1enc, math	69
Removed a lot of equal signs and the like		1993/12/11 ltsect.dtx LaTeX2e	69
1993/12/08 ltboxes.dtx v0.1b		\@author: Added default	282
\@begin@tempboxa:	Extra braces for color support (braces removed from other macros)	\@title: Added default	233
\@irsbox: fix typo		1993/12/11 ltxref.dtx LaTeX2e	282
\@parboxto:	\endgraf added due to extra group in \@begin@tempboxa	\@setref: Macro added	240
\lrbox:	move \@endpefalse out of the inner group	\pageref: Macro reimplemented	237
1993/12/08 ltfnctcmd.dtx v2.1b		\ref: Macro reimplemented	235
General: Macros \rm, \bf and \sf moved to classes.dtx		1993/12/12 ltoutput.dtx v1.0h	200
1993/12/08 ltlists.dtx LaTeX2e		\@cflb: boxmaxdepth setting moved	197
\@item:	use \sbox to support colour	defs changed to lets	229
1993/12/08 ltspace.dtx LaTeX2e		\@cflt: name changed	337
\@bsphack:	Command reimplemented	\@doclearpage: defs changed to lets	52
Command reimplemented; late birthday present for Chris		\@makecol: defs changed to lets	52
\@vbsphack:	Command added	\@resetfps: Warnings added: minimal	54
1993/12/09 ltboxes.dtx v0.1c		\@startdblcolumn: defs changed to lets	240
\@irsbox: fix another typo		\@topnewpage: braces removed	352
1993/12/09 ltclass.dtx v0.2n		\@tracemessage: Commands changed	326
\documentstyle:	input 209 compatibility file	\@tryfcolumn: defs changed to lets	371
1993/12/13 ltclass.dtx v0.2o		1993/12/13 ltclass.dtx v0.2o	339
General: Removed setting \errorcontextlines (now in latex.tex)		General: Removed setting \errorcontextlines (now in latex.tex)	366

<i>Change History</i>		
\@documentstyle: compatibility file now latex209.sty . . . . .	371	1993/12/16 ltab.dtx latex2e 396
\usepackage: Fixed error handling	372	\@xhline: Measure from middle of vertical rules . . . . . 258
1993/12/13 ltdirchk.dtx v0.2a		1993/12/17 ltclass.dtx v0.2q
General: on the ‘docstrip’ pass, do not check openin path . . . . .	8	\@documentclasshook: Macro added . . . . . 366
\IfFileExists: Removed interac- tive prompting for current di- rectory syntax . . . . .	7	\@fileswithoptions: Add \@com- patibility hook . . . . . 373
\strip@prefix: modified, name changed from \stripmeaning. . .	3	\documentstyle: Match Alan’s new code. . . . . 371
1993/12/13 ltlists.dtx latex2e		1993/12/17 ltoutenc.dtx 1.3
\trivlist: Initialised \@itemla- bel . . . . .	226	General: Added this section . . . . . 72
1993/12/13 ltmiscen.dtx v0.9h		Removed all the hackery for use in \DeclareFontEncoding, and redid everything using \De- clareTextFoo. . . . . 81, 82
\@noligs: Readded \@noligs . . .	209	Removed the catcode hackery, since the file is only read as a package in the preamble, and re- moved all the messages on the screen, which just confuse users.
\@verbatim: Readded \@noligs . .	207	Replaced them by the appro- priate \ProvidesPackage com- mands. Added XXXenc. . . . . 72
Removed optional argument of \item . . . . .	207	1993/12/17 ltoutenc.dtx v1.3
center: Removed optional argu- ment of \item . . . . .	206	General: Added \EncodingSpeci- ficAccent, \EncodingSpeci- ficAccentedLetter and \En- codingSpecificCommand. . . . . 69
flushleft: Removed optional argu- ment of \item . . . . .	206	Made Rokicki’s encoding a proper encoding scheme rather than a variant of OT1. . . . . 69
flushright: Removed optional ar- gument of \item . . . . .	206	1993/12/17 ltoutput.dtx v1.0j
1993/12/13 ltoutenc.dtx v1.2b		\@opcol: Hook removed . . . . . 331
General: Corrected file name in driver code. . . . .	69	\@specialoutput: Page room test added . . . . . 328
1993/12/13 ltab.dtx latex2e		\@topnewpage: check for vsiz too small added . . . . . 326
\tabbing: Removed optional argu- ment of \item . . . . .	246	Page room test added . . . . . 327
1993/12/14 ltoutput.dtx v1.0i		\@tracemessage: tracefloatvals made a document command 352
General: Section added to declare all parameters . . . . .	360	\@writesetup: —and then re- moved . . . . . 335
1993/12/15 ltboxes.dtx v0.1d		1993/12/17 ltpage.dtx LaTeX2e
\@iminipage: Changed default from ‘c’ to ‘s’ . . . . .	238	\mark: Removed init \mark at be- gin document, since it doesn’t work. . . . . 312
\@iparbox: Changed default from ‘c’ to ‘s’ . . . . .	237	\rightmark: Stopgap solution to mark \leftmark and \right- mark work without initializ- ing mark until the problem is solved. . . . . 312
\minipage: Changed default from ‘c’ to ‘s’ . . . . .	238	1993/12/18 ltoutenc.dtx 1.3b
extra space removed. . . . .	238	General: Fixed typos with \Pro- videsPackage lines. Added the \NeedsTeXFormat line. Added the last argument to \Decla- reEncoding. Moved the use of the encodings to after their dec- laration. . . . . 72
\parbox: Changed default from ‘c’ to ‘s’ . . . . .	237	
1993/12/15 ltclass.dtx v0.2p		
General: Removed extra ‘.’s from \@@warnings . . . . .	366	
1993/12/16 ltlogos.dtx LaTeX2e		
\LaTeXe: Extended logo by DPC	59	
1993/12/16 ltmath.dtx v0.9i		
\@eqncr: use \refstepcounter in- stead of shortcut . . . . .	216	
General: use \refstepcounter in- stead of shortcut . . . . .	215	
1993/12/16 ltmiscen.dtx v0.9i		
General: \literal added . . . . .	209	
1993/12/16 ltpage.dtx LaTeX2e		
\mark: Init \mark at begin docu- ment . . . . .	312	
1993/12/16 ltspace.dtx LaTeX2e		
\@bsphack: Corrected optimisation :-) . . . . .	52	

<i>Change History</i>	Replaced the missing last argument to <code>\DeclareFontEncoding</code> . . . . .	81, 82	1994/01/05 fontdef.dtx v2.1d	397
	General: Removed nf prefix from file names. . . . .	175	General: Removed nf prefix from file names. . . . .	175
1993/12/18 ltoutenc.dtx 1.3c	General: Rewrote for the new syntax of <code>\EncodingSpecific</code> . . . . .	81, 82	1994/01/13 ltmath.dtx v0.9o	
	Split <code>\EncodingSpecificAccent</code> up into <code>\EncodingSpecific</code> and <code>\DeclareAccent</code> . . . . .	72	<code>\@eqncr</code> : correcting 0.9i . . . . .	216
1993/12/18 ltoutenc.dtx v1.3a	General: Replaced OT3 by XXX . . . . .	69	General: correcting 0.9i . . . . .	215
1993/12/18 ltoutenc.dtx v1.3b	General: Corrected typos. . . . .	69	1994/01/14 ltdirchk.dtx v0.2d	
	Replaced the missing last argument to <code>\DeclareFontEncoding</code> . . . . .	69	<code>\IfFileExists</code> : Close the texsys.aux output stream . . . . .	8
1993/12/18 ltoutenc.dtx v1.3c	General: A new syntax, separating accent-definitions from encoding-specific definitions, and allowing encoding-specific <code>\chardef</code> , <code>\let</code> , etc. . . . .	69	1994/01/15 ltfiles.dtx v0.9o	
	Rewrote for the new syntax of <code>\EncodingSpecific</code> . . . . .	69	<code>\document</code> : move <code>\@preamblecmds</code> after document hook . . . . .	63
1993/12/18 ltoutenc.dtx v1.3d	General: Some T1 stuff had drifted into the OT1 file. . . . .	69	1994/01/17 ltclass.dtx v0.2s	
1993/12/18 ltpage.dtx LaTeX2e	<code>\sloppy</code> : Added <code>\emergencystretch</code> . . . . .	313	<code>\@fileswithoptions</code> : Modify to reduce parameter stack usage . . . . .	373, 374
1993/12/19 ltclass.dtx v0.2r	<code>\endfilecontents</code> : Different message when ignoring a file . . . . .	376	General: Added many more <code>\on</code> - <code>\preamble</code> commands . . . . .	366
1993/12/19 lftntcmd.dtx v3.0b	General: <code>\@pdef</code> command added . . . . .	191	Wrapped long lines to column 72 . . . . .	366
	Added by ASAJ. . . . .	197	1994/01/17 ltfiles.dtx LaTeX2e	
	Made <code>\@newfontswitch</code> produce an error if command already exists, and added <code>\@renewfontswitch</code> , ASAJ . . . . .	191	<code>\listfiles</code> : New Version, adds '.tex' if needed, and lines up columns . . . . .	67
	Other tidying . . . . .	191	1994/01/17 ltfsbas.dtx v2.1a	
	Some more tidying done . . . . .	191	General: New math font setup . . . . .	107
	Untidying added, so this is now a TEMPORARY version. . . . .	191	<code>\curr@math@size</code> : New math font setup . . . . .	115
	Wording changes by CAR. . . . .	197	<code>\everydisplay</code> : New math font setup . . . . .	115
	<code>\DeclareOldFontCommand</code> : Corrected and tidied . . . . .	197	<code>\everymath</code> : New math font setup . . . . .	115
	<code>\DeclareTextFontCommand</code> : Corrected and tidied . . . . .	193	<code>\frozen@everydisplay</code> : New math font setup . . . . .	115
1993/12/19 ltspace.dtx LaTeX2e	<code>\@bsphack</code> : There seem to be problems with selfmade birthday presents . . . . .	53	<code>\frozen@everymath</code> : New math font setup . . . . .	115
1993/12/20 ltdefns.dtx LaTeX2e	<code>\@reargdef</code> : Kept old version of <code>\@reargdef</code> , for array.sty . . . . .	26	<code>\math@version</code> : New math font setup . . . . .	114
1993/12/20 ltfiles.dtx v0.9m	<code>\@obsoletefile</code> : Added this command, removed @oldfilewarning . . . . .	67	1994/01/17 ltfsini.dtx v2.1e	
			<code>\not@math@alphabet</code> : Message changed . . . . .	169
			1994/01/17 ltfsstrc.dtx v2.3a	
			General: New math font setup . . . . .	125
			<code>\check@mathfonts</code> : New math font setup . . . . .	132
			<code>\glb@currsize</code> : New math font setup . . . . .	130
			<code>\restglb@settings</code> : New math font setup . . . . .	133
			1994/01/18 ltbibl.dtx LaTeX2e	
			<code>\bibliography</code> : Use <code>\@input@</code> so include files are listed. . . . .	309
			1994/01/18 ltclass.dtx v0.2t	
			<code>\ifclassloaded</code> : Fix typo <code>\@pkgetension</code> . . . . .	368
			1994/01/18 ltfiles.dtx v0.9p	
			<code>\@iffileonpath</code> : Macro added . . . . .	65
			<code>\@input</code> : do not use a different definition for <code>\input@path</code> . . . . .	66
			<code>\@input@</code> : Macro added . . . . .	66
			<code>\IfExists</code> : New Definition . . . . .	65
			<code>\include</code> : Use <code>\@input@</code> so include files are listed. . . . .	64

<i>Change History</i>			
\putiffileexists: New Definition .....	66	1994/01/26 lfsstrc.dtx v2.3c 398	
1994/01/18 ltfssini.dtx v2.1f		\check@mathfonts: Correct trace info placement ..... 132	
\not@math@alphabet: Message corrected .....	169	\restglb@settings: Correct trace info placement ..... 133	
1994/01/18 ltmissen.dtx v0.9p		1994/01/27 lfntcmd.dtx v3.1a	
\verbatim: Add \global\inlabelfalse .....	207	\nocorlist: Only ., used as default for cm fonts ..... 196	
Only add \penalty if in hmode	207	1994/01/29 ltclass.dtx v0.2v	
1994/01/19 fontdef.dtx v2.1e		\@unprocessedoptions: Macro added. ..... 376	
General: Added missing setting for symbols in bold version. ....	177	\@fileswithoptions: All options raise error if no \ProcessOptions appears ..... 374	
1994/01/19 ltdirchk.dtx v0.2e		1994/01/31 ltclass.dtx v0.2w	
\IfFileExists: name changed from \test .....	7	\g@addto@macro: Use toks register to avoid 'hash' problems ... 375	
\input@path: No longer check that an empty group is in the path	8	1994/01/31 lffiles.dtx v0.9t	
\strip@prefix: name changed from \strip@meaning, to match NFSS. ....	3	\document: set \normalsize or \normalsize if necessary .... 62	
1994/01/19 ltmath.dtx v1.0n classes		1994/01/31 lfntcmd.dtx v3.1b	
\mathindent: Deferred setting of \mathindent .....	217	General: \normalsize no longer defined ..... 191	
1994/01/20 ltdirchk.dtx v0.2f		1994/02/01 ltpage.dtx LaTeX2e	
General: \copytexsys and the texsys.new file removed .....	7	\pagestyle: (DPC) Modify to get nicer error message ..... 311	
Modify all of ltxcheck .....	10	\thispagestyle: (DPC) Modify to get nicer error message .... 311	
\IfFileExists: \copytexsys removed .....	7	1994/02/02 ltclass.dtx v0.2x	
1994/01/21 ltclass.dtx v0.2u		\@fileswithoptions: Only run the hook and options check if the file was loaded. ..... 374	
\documentstyle: compatibility file now latex209.def. ....	371	1994/02/03 ltoutput.dtx v1.0k	
1994/01/21 ltdirchk.dtx v0.2g		\makespecialcolbox: correct mistakes in the documentation .. 334	
General: Improve documentation, reorganise docstrip module ...	1	1994/02/07 ltclass.dtx v0.2y	
\filename@parse: Minor changes, and add Mac version (:)	9	\@fileswithoptions: Run \compatibility on the first class to start (not the first to finish) 373	
\today: Name changed from \stamp, to save memory .....	7	\@ifclasswith: Add extra ,s so 'two' is not matched with 'twocolumn' .....	368
1994/01/21 ltfloat.dtx LaTeX2e		\ProcessOptions*: Add extra ,s so 'two' is not matched with 'twocolumn' .....	370
\oxfloat: Added missing percent characters. ....	294	1994/02/07 ltfssbas.dtx v2.1c	
1994/01/21 ltmissen.dtx v0.9s		\DeclareFontEncoding: revert catcode settings earlier ..... 109	
\verbatim@font: Removed unnecessary category code hackery.	208	\DeclareFontShape: revert catcode settings earlier ..... 108	
1994/01/24 ltdirchk.dtx v0.2h		1994/02/08 ltoutput.dtx v1.0k	
\IfFileExists: Stop testing once texsys.aux has been found .....	7	\makespecialcolbox: boxmaxdepth setting added ... 334	
1994/01/24 ltpage.dtx LaTeX2e		boxmaxdepth setting removed 333	
\pagestyle: (DPC) Complain if pagestyle is undefined. ....	311	General: Documentation and tasks tidied. ..... 314	
1994/01/25 ltdirchk.dtx v0.2i		1994/02/10 ltclass.dtx v0.2z	
General: Protect against looping on \@@input and \@@end. ....	2	\@documentclasshook: Changed the name from \compatibility to \documentclasshook, and added the check for	
1994/01/25 ltfssbas.dtx v2.1b			
\math@version: Corrections for math setup .....	114		
1994/01/25 ltmath.dtx LaTeX2e			
\bordermatrix: Removed \p@renwd. ....	212		

<i>Change History</i>	
whether <code>\normalsize</code> has been defined. ASAJ. ....	366
<code>\@fileswithoptions</code> : Renamed <code>\@compatibility</code> to <code>\@documentclasshook</code> . ASAJ. ....	373
1994/02/10 <code>ltfssbas.dtx</code> v2.1d	
<code>\addto@hook</code> : Made <code>\addto@hook</code> long. ....	123
1994/02/10 <code>ltfsscmp.dtx</code> v2.1d	
<code>\scan@@fontshape</code> : scan away stuff after pt ....	146
1994/02/22 <code>ltfssini.dtx</code> v2.1g	
General: Correct error message ..	171
1994/02/24 <code>ltfssbas.dtx</code> v2.1e	
<code>\DeclareFontShape</code> : Separate restoration of catcodes for fd cmd ..	108
<code>\define@newfont</code> : Separate restoration of catcodes for fd cmd ..	117
<code>\nfss@catcodes</code> : Separate restoration of catcodes for fd cmd ..	118
1994/02/25 <code>ltdirchk.dtx</code> v0.2j	
General: Remove need for drv file .	1
1994/03/01 <code>ltdirchk.dtx</code> v0.2k	
General: Add unstripped module, so that <code>dircheck.dtx</code> may be used with <code>initex</code> .....	1
1994/03/02 <code>ltboxes.dtx</code> v0.1e	
General: Add 2ekernel module ..	233
Remove need for drv file .....	233
1994/03/02 <code>ltclass.dtx</code> v0.3a	
General: Remove need for driver file .....	366
1994/03/03 <code>ltboxes.dtx</code> v0.1f	
<code>\@irsbox</code> : Replaced a missing <code>\else</code> .....	240
1994/03/04 <code>ltfloat.dtx</code> v1.0a	
General: Initial version, split from <code>latex.dtx</code> .....	291
1994/03/04 <code>ltsect.dtx</code> v1.0a	
General: Initial version, split from <code>latex.dtx</code> .....	282
1994/03/04 <code>lttab.dtx</code> v1.0a	
General: Initial version, split from <code>latex.dtx</code> .....	241
1994/03/04 <code>ltvers.dtx</code> v1.0a	
General: Initial version, split from <code>latex.dtx</code> .....	21
1994/03/07 <code>ltboxes.dtx</code> v0.1a	
<code>\@mpfootnotetext</code> : Extra group for colour .....	239
1994/03/07 <code>ltboxes.dtx</code> v1.0a	
General: Unify format with other Kernel files .....	233
1994/03/07 <code>ltdefns.dtx</code> v1.0a	
<code>\@@italiccorr</code> : Macro added ..	23
1994/03/07 <code>ltfiles.dtx</code> v1.0a	
General: Initial version, split from <code>latex.dtx</code> .....	60
Long lines wrapped to 72 columns .....	60
1994/03/07 <code>ltfinal.dtx</code> v0.1a	
General: Add code from the old <code>dump.dtx</code> .....	384
1994/03/07 <code>ltfloat.dtx</code> v1.0a	
<code>\@endfloatbox</code> : (DPC) Extra group for colour .....	297
<code>\@footnotetext</code> : (DPC) Extra group for colour .....	304
<code>\@xfloat</code> : (DPC) Extra group for colour .....	295
1994/03/07 <code>lthyphen.dtx</code> v0.1c	
General: move the 2ekernel code to <code>ltfinal.dtx</code> .....	379
1994/03/07 <code>ltlength.dtx</code> v1.0a	
<code>\@settodim</code> : (DPC) Extra group for colour .....	106
1994/03/07 <code>ltlists.dtx</code> v1.0a	
General: Initial version, split from <code>latex.dtx</code> .....	219
Long lines wrapped to 72 columns .....	219
1994/03/07 <code>ltpage.dtx</code> v1.0a	
General: Initial version, split from <code>ltherest.dtx</code> .....	311
1994/03/07 <code>ltpicture.dtx</code> v0.1a	
General: Initial version, split from <code>latex.dtx</code> .....	260
Long lines wrapped to 72 columns .....	260
1994/03/07 <code>ltsect.dtx</code> v1.0a	
<code>\@hangfrom</code> : (DPC) Extra groups for colour .....	287
1994/03/07 <code>lttab.dtx</code> v1.0a	
General: Long lines wrapped to 72 columns .....	241
1994/03/08 <code>ltclass.dtx</code> v0.3b	
General: Modify driver code into ‘new style’ .....	366
1994/03/08 <code>ltdirchk.dtx</code> v1.0a	
General: Reorganise driver module into ‘new style’ .....	1
1994/03/08 <code>ltplain.dtx</code> v1.0a	
General: Remove need for a driver file .....	11
1994/03/10 <code>ltfssbas.dtx</code> v2.2f	
<code>\math@egroup</code> : Changed <code>\begin{group}/\endgroup</code> to <code>\bgroup/\egroup</code> . ....	122
1994/03/11 <code>ltfssdcl.dtx</code> v2.1b	
<code>\DeclareSymbolFontAlphabet</code> :	
Added check against use of alphabet switch outside of math mode. ....	166

<i>Change History</i>	
\SetMathAlphabet@: Changed parameter template in temporary macro to catch check add below.	159
1994/03/12 ltclass.dtx v0.3c	
\@fileswithoptions: Do not use \pr@videpackage to avoid typeout	374
General: Change name from doc-class to ltclass	366
\ProvidesFile: Add \wlog	369
\ProvidesPackage: Add \wlog .. use \gtempa	368
1994/03/12 ltdefns.dtx v1.0b	
\@reargdef: New defn, in terms of \@yargdef	26
\@yargd@f: Name changed from \XXX@argdef	26
1994/03/12 ltdirchk.dtx v1.0b	
General: Change name from dircheck.dtx	1
Minor edits to the typeouts in ltxcheck	1
1994/03/12 ltfloat.dtx v1.0b	
\@savemarbox: (DPC) Extra group for colour	299
\@xmpar: (DPC) Extra bgroup for colour	300
1994/03/12 ltplain.dtx v1.0b	
General: Name changed from lplain. The end of an era	11
1994/03/12 ltplain.dtx v1.0e	
General: Replaced remaining width, height, depth by L <sup>A</sup> T <sub>E</sub> X macro names to save tokens.	11
1994/03/13 ltcntrl.dtx v1.0c	
\@tfor: (DPC) Add \@tfcr so a single group is correctly treated.	37
1994/03/13 ltfiles.dtx L <sup>A</sup> T <sub>E</sub> X2e	
\@addtofilelist: Macro added	67
\listfiles: Reset \@addtofilelist at begin document	67
1994/03/13 ltfiles.dtx v0.3b	
\InputIfFileExists: Use new cmd \@addtofilelist	66
1994/03/13 ltfssbas.dtx v2.1g	
General: add 2ekernel module to omit repeated code	107
1994/03/13 ltfssdcl.dtx v2.1c	
General: add 2ekernel module to omit repeated code	149
1994/03/14 ltboxes.dtx v1.0b	
\@isavebox: Use \color@setgroup	235
\@isavepicbox: Use \color@setgroup	235
\color@begingroup: macro added for colour support	234
\color@endgroup: macro added for colour support	234
\lrbox: Use \color@setgroup	235
\sbox: Use \color@setgroup	400
1994/03/14 ltfloat.dtx 1.0c	
\@xmpar: (DPC) Use \color@begingroup	300
1994/03/14 ltfloat.dtx v1.0c	
\@endfloatbox: (DPC) Use \color@endgroup	297
\@footnotetext: (DPC) Use \color@begingroup, add \endgraf	304
\@savemarbox: (DPC) Use \color@begingroup	299
\@xfloat: (DPC) Use \color@begingroup	295
1994/03/15 ltfiles.dtx L <sup>A</sup> T <sub>E</sub> X2e	
\@missingfileerror: Quit on x or X just like a real error	66
1994/03/15 ltftcmd.dtx v3.2a	
General: Adapted to mass formatting	191
Changed \/ to \@@italiccorr	191
Removed \@renewfontswitch	191
Removed defs of short-forms and all sizes except \normalize	191
1994/03/15 ltoutput.dtx v1.0l	
\@addtocurcol: Changed \addvspace to \vskip	344
\@combinedblfloats: Removed boxmaxdepth setting	338
\@makecol: \maxdepth changed to \@maxdepth	332
Removed boxmaxdepth setting	333
\@makespecialcolbox: Removed boxmaxdepth setting	334
\@topnewpage: Corrected and amended warning message	327
Warning added: it should be improved	327
General: Added some warnings when page gets full of top floats	314
Driver added and further tidying	314
Removed duplicated code and corrected docstrip options	314
Some boxmaxdepth settings removed	314
1994/03/16 ltclass.dtx v0.3f	
General: Add pkgindoc package	378
1994/03/16 ltfiles.dtx L <sup>A</sup> T <sub>E</sub> X2e	
\listfiles: Move this code directly into \document	67
1994/03/16 ltfiles.dtx v1.0c	
\document: (DPC) directly add file list settings	63
1994/03/16 ltmiscen.dtx v1.0b	
\@verbatim: Remove \global\@inlabelfalse again	207
1994/03/28 lalloc.dtx v1.0d	
General: Redefinition of ‘new’ allocations removed	34

1994/03/28 lanchk.dtx v1.0d	\stepcounter: Use \addtocounter to have name checked . . . . .	401 104
General: Improve documentation . . . . .	1	
1994/03/28 lterror.dtx v1.0d	\@invalidchar: (DPC) Comment out (use catcode15 instead) . . . . .	45
	General: Remove test for \input- lineno undefined. . . . .	42
1994/03/28 ltfiles.dtx v1.0d	\document: (DPC) Use \normal- size not \normalsize . . . . .	62
	(DPC) remove \normalsize check . . . . .	62
1994/03/28 ltfloat.dtx v1.0b	\caption: Use \normalsize not \normalsize . . . . .	293
	General: Split further from lther- est.dtx . . . . .	291
1994/03/28 ltlists.dtx v1.0b	General: Improve documentation . . . . .	219
1994/03/28 ltmiscen.dtx v1.0c	General: Improve Documentation . . . . .	202
1994/03/28 ltplain.dtx v1.0c	\newtoks: Remove some \outer declarations. . . . .	13
1994/03/28 ltsect.dtx v1.0b	General: Split further from lther- est.dtx . . . . .	282
1994/03/28 lttab.dtx v1.0b	General: Improve documentation . . . . .	241
1994/03/28 ltthm.dtx v1.0a	General: Initial version, split from latext.dtx . . . . .	279
1994/03/29 ltcnts.dtx v1.0c	General: Create file from parts of lt- miscen and ltherest. . . . .	103
1994/03/29 ltlenth.dtx v1.0c	General: Create file ltctlen from parts of ltmiscen and ltherest. . . . .	106
1994/03/29 ltmiscen.dtx v1.0d	General: Remove counter macros to ltctlen . . . . .	202
1994/03/29 ltpageno.dtx v1.0c	General: Create file ltctlen from parts of ltmiscen and ltherest. . . . .	198
1994/03/29 ltxref.dtx v1.0c	General: Create file ltctlen from parts of ltmiscen and ltherest. . . . .	199
1994/03/31 ltblibl.dtx v1.0a	General: Initial version of ltidxbib.dtx, split from lther- est.dtx . . . . .	307
1994/03/31 ltidxglo.dtx v1.0a	General: Initial version of ltidxbib.dtx, split from lther- est.dtx . . . . .	305
1994/04/09 ltcnts.dtx v1.0d	\newctr: \@nocnterr now has counter name argument . . . . .	104
	\addtocounter: \@nocnterr now has counter name argument . . . . .	104
	\setcounter: \@nocnterr now has counter name argument . . . . .	104
1994/04/09 ltthm.dtx v1.0b	\@othm: Use standard counter error message (FMi) . . . . .	281
1994/04/11 ltclass.dtx v0.3g	\endfilecontents: Add star form, dont write \endinput at the end of the file. . . . .	376
	\ProvidesFile: Protect against weird catcodes. . . . .	369
1994/04/11 ltfsbsas.dtx v2.1h	General: Added \default- scriptratio and \default- scriptscriptratio. ASA.J. . . . .	107
	\defaultscriptratio: Macro added . . . . .	122
	\defaultscriptscriptratio: Macro added . . . . .	122
1994/04/12 ltboxes.dtx v1.0c	General: Remove \acci, now de- fined in ltplain.dtx . . . . .	237
	Remove \dischyp, now de- fined in ltinit.dtx . . . . .	237
1994/04/12 ltdefns.dtx v1.0g	\dischyp: Define \dischyp, was previously in ltboxes.dtx . . . . .	23
1994/04/12 ltplain.dtx v1.0d	General: Define \acci . . . . .	19
1994/04/12 ltvers.dtx v1.0b	General: Have version info gener- ated automatically. . . . .	21
1994/04/14 lftntcmd.dtx v3.2b	General: Macros renamed to non- private forms, JB . . . . .	191
	\DeclareOldFontCommand: Re- named from \newfontswitch . . . . .	196
1994/04/15 ltboxes.dtx v1.0d	\isavebox: Added missing precent character. . . . .	235
1994/04/17 ltcnts.dtx v1.0e	\newctr: Use \@nocnterr in- stead of \@nocnterr . . . . .	104
	\addtocounter: Use \@nocnterr instead of \@nocnterr . . . . .	104
	\setcounter: Use \@nocnterr instead of \@nocnterr . . . . .	104
1994/04/17 lterror.dtx v1.0h	\nocnterr: New name for er- ror message, old error message (without arg) kept . . . . .	43
1994/04/17 ltthm.dtx v1.0c	\@othm: Use new std counter error message (FMi) . . . . .	281
1994/04/18 ltfinal.dtx v0.1b	General: Initialise \textheight, \textwidth and page style . . . . .	380
1994/04/18 ltfloat.dtx v1.0d	\footnotetext: (DPC) Remove Colour support . . . . .	304
	\savemarbox: (DPC) Remove Colour support . . . . .	299

<i>Change/History</i>	
1994/04/18 ltfsbas.dtx v2.1i	
General: Macro <code>\no@alphabet@help</code> removed again . . . . .	107
<code>\calculate@math@sizes</code> : Changed message to log only . . . . .	122
<code>\no@alphabet@error</code> : Use std La- TeX error macro . . . . .	107
1994/04/18 ltfssdcl.dtx ???	
<code>\DeclareMathAlphabet</code> : Pass cor- rect arg (2 not 3) . . . . .	157
1994/04/18 ltfssdcl.dtx v2.1d	
General: Removed surplus <code>\no@alphabet@error</code> (see fam.dtx) . . . . .	149
1994/04/18 ltfssstrc.dtx v2.3d	
General: Changed to new er- ror/warning scheme . . . . .	125
<code>\font@submax</code> : Changed dimen to macro . . . . .	140
<code>\fontsubfuzz</code> : Changed dimen to macro . . . . .	140
<code>\subst@size</code> : <code>\font@submax</code> and <code>\fontsubfuzz</code> now macros . .	141
1994/04/19 ltpage.dtx v1.0b	
General: Improve documentation	311
1994/04/20 ltfntcmd.dtx v3.3a	
General: Documentation up-dated	191
New implementation of <code>\nocorr</code>	191
<code>\check@nocorr@</code> : Macros added .	194
<code>\maybe@ic@</code> : <code>\nocorr</code> etc removed from list of tokens to check, leaving only punctuation char- acters . . . . .	195
1994/04/20 ltmiscen.dtx v1.0e	
<code>\enddocument</code> : Changed logic for producing warning messages	204
1994/04/21 ltboxes.dtx v1.0e	
<code>\@iiminipage</code> : Extra <code>\bgroup</code> for colour . . . . .	238
<code>\@mpfootnotetext</code> : Extra <code>\end-</code> <code>graf</code> for colour . . . . .	239
<code>\endminipage</code> : Extra <code>\egroup</code> for colour . . . . .	239
1994/04/21 ltfinal.dtx v0.1c	
General: Added comments, set the catcodes of 128–255. . . . .	380
1994/04/22 ltfsini.dtx v2.1g	
<code>\not@math@alphabet</code> : Message changed again . . . . .	169
1994/04/23 ltfinal.dtx v0.1d	
General: Check that <code>\font@submax</code> is still zero . . . . .	380
1994/04/24 ltoutput.dtx v1.0m	
<code>\@resetfps</code> : Number 2 changed to <code>\tw@</code> . . . . .	354
Warning changed . . . . .	354
<code>\@specialoutput</code> : Message changed to give more info and ‘top’ removed . . . . .	328
<code>\@topnewpage</code> : Message changed to give more info . . . . .	327
	Warning message removed as it will be generated later . . . . .
	402 327
	General: Changed <code>\@normalsize</code> to <code>\normalsize</code> . . . . .
	314
	Corrected unverbed commands in documentation. . . . .
	314
	Removed some long lines and other aesthetic changes. . . . .
	314
	Warning messages changed/corrected. . . . . .
	314
1994/04/24 ltpictur.dtx v0.1b	
General: Removed surplus spaces after <code>\hbox</code> to in several cases . . . . .	260
1994/04/25 ltclass.dtx v0.3h	
General: Removed spurious extra ‘.’s at the end of error messages	366
1994/04/25 ltfloat.dtx v1.0e	
<code>\@largefloatcheck</code> : Changed warning message to give more info . . . . .	297
Command added . . . . .	297
General: Changed warning mes- sages . . . . .	291
Removed obsolete tracing code	291
1994/04/27 ltfssstrc.dtx v2.3e	
General: Corrected item that was forgotten in last change. . .	125
1994/04/28 lterror.dtx v1.0j	
<code>\@inmatherr</code> : Macro added . . .	45
1994/04/28 lterror.dtx v1.1c	
<code>\@inmatherr</code> : Replaced <code>\noexpand</code> with <code>\protect</code> . . . . .	45
1994/04/28 ltfssdcl.dtx v2.1e	
General: Removed all <code>\uppercase</code> in hex num parsing macros .	149
1994/04/28 ltlists.dtx v1.0c	
General: Replaced <code>\@ltxnomath</code> by <code>\@inmatherr</code> . . . . .	227
1994/04/28 ltpictur.dtx v0.1c	
General: bezier curves added . .	276
<code>\multiput</code> : (DPC) Ignore spaces between )( . . . . .	262
(DPC) Macro added . . . . .	262
<code>\picture</code> : (DPC) Ignore spaces be- fore ( . . . . .	261
1994/04/28 lplain.dtx v1.0g	
General: Turn off overfull box trac- ing in log . . . . .	16
1994/04/29 ltclass.dtx v1.0a	
General: Change version number to 1 (no other change) . . . . .	366
1994/04/29 ltmiscen.dtx v1.0f	
<code>\@verbatim</code> : <code>\leavevmode</code> added	207
Change to <code>\everypar</code> added ..	208
1994/04/29 ltoutenc.dtx 1.4a	
General: Removed <code>\EncodingSpe-</code> <code>cific</code> . Renamed all the com- mands. Added <code>\DeclareTextG-</code> <code>lyph</code> and <code>\UndeclareTextCom-</code> <code>mand</code> . . . . .	72

<i>Change History</i>	Removed Rokicki's OT1 variant encoding. Moved the driver to the top. . . . .	72	Renamed the commands, re-moved the \EncodingSpecific command. Turned all slots into decimal. Added \a. . . . .	403 69
1994/04/30 ltfntcmd.dtx v3.3b			1994/05/02 ltcntrl.dtx v1.0l	
General: Documentation up-dated and tidied . . . . .	191	\@break@tfor: Macro added (from ltfles.dtx) . . . . .	37	
Prefix frag@ changed to frag in \@protecteddef . . . . .	191	1994/05/02 ltfiles.dtx v1.0f		
Title changed . . . . .	191	\@iffileonpath: \@break@loop renamed to \@break@tfor . . . . .	65	
Warning changed to info message in \@protecteddef . . . . .	191	\@obsoletefile: Make \con-		
1994/04/30 ltoutput.dtx v1.0n		lypreamble . . . . .	67	
\@activechar@info: \@activechar@warning changed to \@activechar@info . . . . .	335	1994/05/02 ltfinal.dtx v0.1e		
\@combinedblfloats: Removed rule in topnewpage case . . . . .	338	General: Added setting the 'letter' catcodes. . . . .	383	
\@emptycol: Empty column action added: \@emptycol . . . . .	326	Added setting the 'other' catcodes. . . . .	383	
\@flsetnum: Rogue space removed . . . . .	355	Added setting the special catcodes. . . . .	382	
\@specialoutput: Cut-off point changed to 2\baselineskip . . . . .	328	Made slot 127 illegal . . . . .	383	
Empty column action added: \@emptycol . . . . .	328	Set all the catcodes . . . . .	380	
Extra empty column added for twocolumn case . . . . .	328	1994/05/02 ltfinal.dtx v0.1f		
Extra empty column added for twocolumn case (wrong, see below) . . . . .	328	General: Set the catcode of control-J. . . . .	382	
\@topnewpage: Added setting of \col@number . . . . .	326	1994/05/02 ltmiscen.dtx v1.0g		
Cut-off point changed to 3\baselineskip . . . . .	327	General: Changed 91 to 1991 and moved some bits . . . . .	202	
Empty column action added: \@emptycol . . . . .	327	1994/05/02 ltoutput.dtx v1.0o		
Message changed for Frank . . . . .	327	\@resetfhps: Code shortened . . . . .	354	
General: \@activechar@warning changed to an info message. . . . .	314	General: Code of \@resetfhps shortened. . . . .	314	
Added \col@number. . . . .	314	1994/05/03 ltbibl.dtx v1.0b		
Documentation tidied. . . . .	314	\nocite: Make \nocite issue a warning for an undefined citation key. . . . .	309	
Empty column action added. . . . .	314	1994/05/03 ltfinal.dtx v0.1f		
Fixed bug from \dblfigrule with \@topnewpage. . . . .	314	General: Set the catcode of control-J to be 'other', for use in messages. . . . .	380	
Full of floats action improved. . . . .	314	1994/05/03 ltfloat.dtx v1.0f		
\col@number: Added \col@number . . . . .	324	General: (CAR) Added \@large- floatcheck . . . . .	291	
\onecolumn: Added setting of \col@number . . . . .	326	Removed unnecessary braces from arguments of \@ifnextchar . . . . .	291	
1994/05/01 lterror.dtx v1.0k		\end@dblfloat: \@large- floatcheck added . . . . .	296	
\@latexerr: (CAR) Added draft \@latexinfo. . . . .	42	\end@float: (CAR) Added \@largefloatcheck . . . . .	296	
1994/05/01 ltoutenc.dtx 1.4a		1994/05/03 ltfssdcl.dtx v2.1f		
General: Added the \a command. . . . .	78	General: Renamed \@@Declare- MathDelimiter to \@Declare- MathDelimiter . . . . .	149	
Added the \SaveAtCatcode and \RestoreAtCatcode commands. . . . .	81	1994/05/03 ltlists.dtx v1.0d		
Removed the uc/lc table settings, since the T1 uc/lc table is now the default. . . . .	86	\@item: \hskip changed to \kern . . . . .	228	
Rewrote for the new syntax. . . . .	81, 82	General: Removed superfluous braces . . . . .	227	
1994/05/01 ltoutenc.dtx v1.4a		1994/05/03 ltmiscen.dtx v1.0h		
General: Removed Rokicki's encoding. . . . .	69	\@centercr: \@badcrerr replaced by \@nolnerr . . . . .	206	

Change/Histor&.dtx v1.0d	
\@endpbox: Use new \finalstrut based on depth of \carstrutbox . . . . .	259
1994/05/04 ltclass.dtx v1.0b	
\NeedsTeXFormat: Changed wording of the warning . . . . .	373
1994/05/04 lterror.dtx v1.0m	
\@badcrror: Error message removed . . . . .	45
1994/05/05 ltblib.dtx v1.0c	
\@citex: Set switch for warning and end of run. . . . .	308
\nocite: Do not write page number in \nocite warning message. . . . .	309
Set switch for warning and end of run. . . . .	309
1994/05/05 ltfinal.dtx v0.1g	
General: Added empty errhelp. . . . .	380
\errhelp: Set error help empty. . . . .	386
1994/05/05 ltfntcmd.dtx v3.3c	
\@math@egroup: Corrected \@fontswitch and added saved versions . . . . .	197
General: Corrected \@fontswitch . . . . .	191
1994/05/05 ltmiscen.dtx v1.0i	
General: Removed braces from ifnextchar and ifstar arguments . . . . .	202
1994/05/07 ltab.dtx v1.0c	
\@maxtab: Changed \@firsttab to \chardef . . . . .	245
Changed \@maxtab to \chardef . . . . .	245
General: Removed definition of \+ . . . . .	241
Removed surplus braces from \@ifnextchar constructs . . . . .	241
1994/05/08 ltfntcmd.dtx v3.3d	
General: Removed \@undefined-fonterror . . . . .	191
\normalsize: Removed \@undefinedfonterror . . . . .	197
1994/05/09 ltfntcmd.dtx v3.3f	
General: Replaced all \next by \@let@token and undo change 3.3e, whatever that was. . . . .	191
1994/05/10 ltdefns.dtx v1.0n	
General: (ASAJ) Added \DeclareProtectedCommand. . . . .	22
Added \DeclareProtectedCommand . . . . .	29
Added \makeatletter and \makeatother ASAJ. . . . .	33
Removed braces around \@ifundefined argument. ASAJ. . . . .	27
1994/05/10 lterror.dtx v1.0n	
\@latexerr: (ASAJ) Added extra blank lines to \@latexerr. . . . .	42
1994/05/10 ltmiscen.dtx v1.0j	
\@sverb: Slight change in error message text. . . . .	208
1994/05/11 ltboxes.dtx v1.0f	
\@begin@tempboxa: Use new \color@setgroup concept. . . . .	233
\@iiiminipage: Use new \color@setgroup concept. . . . .	404
\@mpfootnotetext: Use new \color@setgroup concept. . . . .	239
Use new \normalcolor and \finalstrut. . . . .	239
General: Superfluous braces removed from several commands . . . . .	233
\color@setgroup: macro added for colour support . . . . .	234
\endminipage: Use new \color@setgroup concept. . . . .	239
1994/05/11 ltclass.dtx v1.0c	
\endfilecontents: Add checks for form feed and tab . . . . .	376
1994/05/11 ltdirchk.dtx v1.0e	
General: Add \ProvidesFile as used in fd files. . . . .	3
1994/05/11 lterror.dtx v1.0o	
\@latexerr: (ASAJ) Removed one of the extra blank lines to \@latexerr. . . . .	42
1994/05/11 ltlogos.dtx v1.0o	
\LaTeXe: Use \DeclareProtectedCommand. ASAJ. . . . .	59
\LaTeXe: Use \DeclareProtectedCommand. ASAJ. . . . .	59
1994/05/11 ltoutenc.dtx 1.5a	
General: Made T1 and OT1 generate packages rather than def files. Renamed the ‘package’ module to ‘teststy’. . . . .	72
1994/05/11 ltoutenc.dtx v1.5a	
General: Reimplemented \DeclareTextCommand using \@changed@cmd and \DeclareProtectedCommand. . . . .	72
Renamed the commands again. Made the encoding part of the command syntax. Added the \DeclareTextCommand interface. Used \DeclareProtectedCommand. . . . .	69
\DeclareTextAccent: Reimplemented using \DeclareTextCommand. . . . .	74
1994/05/11 ltspace.dtx v1.0o	
\,: Use \DeclareRobustCommand. ASAJ. . . . .	57
\hspace: Use \DeclareRobustCommand. ASAJ. . . . .	57
1994/05/12 ltboxes.dtx v1.0g	
\@finalstrut: macro added . . . . .	240
\fbox: New definition, merged with \framebox . . . . .	236
\framebox: Merged \fbox and \framebox . . . . .	236
\normalcolor: macro added for colour support . . . . .	234
1994/05/12 ltdefns.dtx v1.0p	
General: (ASAJ) Fixed a bug with	

<i>Change History</i>	
which was using \gob-	405
ble before defining it. ....	22
Fixed a bug with \relax which	
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General: Added output enc stuff	384
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1994/05/13 ltoutenc.dtx v1.5b		General: (ASAJ) Split from ltinit.dtx.	34
General: Added \{, \} and \\$.	69	1994/05/16 ltcntrl.dtx v1.0a	
Renamed \DeclareProtectedCommand to \DeclareRobustCommand.	69	General: (ASAJ) Split from ltinit.dtx.	35
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1994/05/13 ltpictur.dtx v0.1d		General: (ASAJ) Split from ltinit.dtx.	22
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1994/05/13 ltab.dtx v1.0d		General: (ASAJ) Completely new error interface.	38
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\@startfield: Colour support	246	1994/05/16 ltfinal.dtx v1.0i	
\@stopfield: Colour support	246	General: moved output enc stuff to lfonts	384
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1994/05/14 ltfssbas.dtx v2.1m		1994/05/16 ltfssini.dtx v2.1m	
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1994/05/14 ltfssini.dtx v2.1k		General: \pounds was still using u rather than ui shape.	81
General: Init error font just before checking for fontdef.cfg	171	1994/05/16 ltoutenc.dtx v1.5f	
\p@reset@font: Remove surplus braces	170	General: enc files now have uc encoding name parts (FMi)	69
1994/05/14 lfsstrc.dtx v2.3h		Revert code so that the encoding given is used in \DeclareTextCommand (FMi)	69
\selectfont: Added \enc@update	129	1994/05/16 ltoutenc.dtx v1.5g	
1994/05/14 ltoutenc.dtx 1.5d		General: Made fontenc.sty use the new mixed-case encoding files.	69
General: Moved the driver to the top.	72	Removed the lowercasing of the filename.	93
1994/05/14 ltoutenc.dtx v1.5c		1994/05/16 ltoutenc.dtx v1.5h	
General: Added the fontenc package	93	General: Added \NG, \ng, \TH, \th, \DH, \dh, \DJ and \dj.	69
Added the fontenc package.	69	Added \r (ring accent) and \k (ogonek) accents.	69
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Moved fontsmp to its own dtx file.	69	Removed \P from the OT1 definitions file.	69
1994/05/14 ltoutenc.dtx v1.5d		1994/05/16 ltoutenc.dtx v1.5i	
General: Rewrote \DeclareTextCommand to define its argument to use the current encoding by default, rather than the encoding provided to \DeclareTextCommand.	69, 72	General: Fixed a bug with \d.	69
Tidied up the documentation.	69	1994/05/16 ltoutput.dtx v1.0q	
1994/05/14 ltoutenc.dtx v1.5e		\@writesetup: Changed setting of accents (FMi): with the new encoding setup they can use \let. It could also use the new internal commands?	336
General: Replaced \ENC@cmd by \ENC-cmd.	69		
1994/05/15 ltfssbas.dtx v2.1o			
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1994/05/16 ltpar.dtx v1.1a		General: (ASAJ) Added the TeX logo. . . . .	59
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1994/05/16 ltplain.dtx v1.0h		1994/05/18 ltoutenc.dtx v1.5k	
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General: (ASAJ) Split from ltinit.dtx. . . . .	48	General: Extracted file from ltcntlen. . . . .	103
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\@use@option: Execute option after removing from list, not before . . . . .	371	General: (RmS) Added definitions for \@namedef and \@nameuse again. . . . .	22
1994/05/17 ltdefns.dtx 1.1b		1994/05/19 ltfinal.dtx v0.1k	
General: (ASAJ) Added the \@protect@... commands. . . . .	30	General: Removed \makeat. . . . .	380
1994/05/17 ltdefns.dtx v1.1b		1994/05/19 ltidxglo.dtx v1.1a	
General: (ASAJ) Added definitions for protect. . . . .	22	General: Initial version of ltidxglo.dtx, split from ltidxbib.dtx . . . . .	305
(ASAJ) Removed warnings and logging to lterror.dtx. . . . .	22	1994/05/19 ltlength.dtx v1.1a	
Added the discussion of protected commands, defined the values that \protect should have. . . . .	29	General: Extract file ltlength from ltcntlen. . . . .	106
1994/05/17 ltdefns.dtx v1.1c		1994/05/19 ltpageno.dtx v1.1a	
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1994/05/17 ltfssini.dtx v2.1n		\showoverfull: used \cne not 1 . . . . .	20
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1994/05/17 ltmath.dtx v1.0i		1994/05/19 fontdef.dtx v2.1g	
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1994/05/18 ltdefns.dtx 1.1c		\renewenvironment: Removed surplus \space in error . . . . .	27
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1994/05/18 ltdefns.dtx v1.1c		General: Changed command name from \@checkcommand to \CheckCommand. . . . .	22
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(ASAJ) Fixed a bug with \in-		
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1994/05/21 ltbibl.dtx v1.1b		
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1994/05/21 lterror.dtx v1.1d		
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1994/05/22 ltdefns.dtx v1.1f		
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icWarning and \GenericInfo. . .	38	
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\@activechar@info: Added \Mes-		
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1994/05/24 ltmiscen.dtx v1.0q		
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1994/05/25 ltdirchk.dtx v1.0g		
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<code>\check@icr:</code> Macros added . . . . .	194	
<code>\check@nocorr@:</code> Insertion of <code>\af-</code> <code>\tergroups</code> moved and defaults set up for efficiency . . . . .	194	
<code>\DeclareTextFontCommand:</code> <code>\ex-</code> <code>\pandafter</code> inserted . . . . .	193	
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1994/05/25 ltoutput.dtx v1.0v		
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1994/05/25 ltsect.dtx v1.0e		
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1994/05/25 ltthm.dtx v1.0c		
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1994/05/25 ltvers.dtx v1.0d		
General: Remove PRELIMINARY TEST RELEASE from startup banner (spring is here) . . . . .	21	
1994/05/25 ltxref.dtx v1.1c		
General: Modify documentation .	199	
1994/05/26 ltfles.dtx LaTeXe		
<code>\missingfileerror:</code> Modify mes-		
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1994/05/26 ltlogos.dtx v1.1c		
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1994/05/26 ltplain.dtx v1.1m		
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1994/05/26 ltplain.dtx v1.1p		
<code>\underbar:</code> (DPC) changed to use <code>\sbox</code> . . . . .	19	
1994/05/26/16 ltmiscen.dtx v1.0r		
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1994/05/29 ltfssdcl.dtx v2.1j		
General: Use new error commands	149	
1994/05/31 ltfinal.dtx v1.0n		
General: Renamed <code>lthyphen.*</code> to <code>lthyphen.*.</code> . . . . .	380	
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<code>\fbox:</code> New version, using <code>\framebox@x</code> . . . . .	236	
<code>\framebox:</code> New version, so <code>\width</code> is correct in <code>\framebox</code> . . . . .	236	
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1994/06/01 ltoutput.dtx v1.0w		
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1994/06/08 ltfinal.dtx v1.0m		
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ble. . . . .	381, 383	
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1994/10/07 ltoutenc.dtx v1.5l		
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1994/10/14 fontdef.dtx v2.2a		
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1994/10/14 ltfssini.dtx v2.2a		
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1994/10/14 ltmiscen.dtx v1.0s		
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1994/10/14 ltplain.dtx v1.1a		
General: Moved code to other files.	11	
1994/10/15 ltfssbas.dtx v2.1t		
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General: Move \listfiles to ltfiles.dtx	378
1994/10/18 ltdefns.dtx v1.2a	
\@star@\or@\long: macro added	24
General: Add extra test for \endgraf	22
Add star-forms for all commands	22
\renewenvironment: reset end command	27
1994/10/18 ltfiles.dtx v1.0i	
\listfiles: code moved here from ltclass	67
1994/10/18 ltoutenc.dtx v1.5l	
General: Added new definitions of \patterns and \hyphenation	78
1994/10/18 ltoutenc.dtx v1.5m	
General: Added new definitions of \patterns and \hyphenation	69
1994/10/18 ltsect.dtx v1.0g	
\@dottedtocline: Added \normalcolor for page number	290
General: Added \normalcolor	282
1994/10/19 ltfssbas.dtx v2.1t	
\DeclareFontEncoding: Add missing \relax	109
1994/10/23 lfsstrc.dtx v23.k	
\every@math@size: Renamed to \every@math@size	131
1994/10/23 ltmath.dtx v1.0l	
\@eqnnum: Added \normalcolor since \eqno introduces a subgroup of the displayed math group	214
\ensuremath: Remove extra braces: but see p 168 of Leslie's book	216
1994/10/24 ltboxes.dtx v1.0k	
\fbox: Inner braces added (to fix latex/1061)	236
1994/10/25 fontdef.dtx v2.2c	
General: Added OMSenc.def	175
1994/10/25 ltboxes.dtx v1.0l	
\@isavepicbox: missing percent (moved from ltpatch)	235
1994/10/25 ltdefns.dtx v1.2b	
General: Documentation improvements	22
1994/10/25 ltoutenc.dtx 1.6a	
General: Added \textdollar, \textlbrace, \textrbrace, \textsterling, \textunderline	82
Removed \textlbrace, \textrbrace, \textunderline to give them their proper names.	82
1994/10/25 ltoutenc.dtx v1.6a	
General: Added \ProvideTextCommand, \UseTextSymbol, \UseTextAccent, \DeclareTextSymbolDefault, \DeclareTextAccentDefault,	
\DeclareTextCommandDefault, and \ProvideTextCommandDefault	410
	69
Added the \Provide commands, and the default definitions	72
Added the defaults	79
Added the files OT1enc.def, T1enc.def and OMSenc.def	78
Added the OMS encoding	86
1994/10/27 ltoutenc.dtx 1.6b	
General: Added \textascicircum, \textasciitilde, \textbackslash, \textbar, \textbraceleft, \textbraceright, \textcompwordmark, \textemdash, \textendash, \textexclamdown, \textgreater, \texthyphenchar, \texthyphen, \textless, \textquestiondown, \textquotedblleft, \textquotedblright, \textquotelleft, \textquoteright, \textunderscore, \textvisiblespace	82
Added: \textemdash, \textendash, \textexclamdown, \texthyphenchar, \texthyphen, \textquestiondown, \textquotedblleft, \textquotedblright, \textquotelleft, \textquoteright	81
1994/10/27 ltoutenc.dtx v1.5d	
General: Rewrote \DeclareTextSymbol to define its argument to use the current encoding by default, to fit with \DeclareTextCommand	72
1994/10/27 ltoutenc.dtx v1.6b	
General: Added \textbackslash	86
Added more defaults for OT1	79
Removed the enc.def files	69
Removed the files OT1enc.def, T1enc.def and OMSenc.def	78
Renamed \textlbrace to \textbraceleft and \textrbrace to \textbraceright	86
1994/10/29 ltmath.dtx 1.0m	
General: ASAJ: Added \DeclareMathOperator	210
ASAJ: Tidied up documentation	214
1994/10/29 ltmath.dtx v1.0m	
General: ASAJ: Added \mathellipsis, \mathdollar and \mathsterling	214
ASAJ: Removed \dag, \ddag	214
ASAJ: Renamed \S and \P to \mathsection and \mathparagraph and made them \mathchardef	214

<b>Change History</b>	
1994/09/29 ltoutenc.dtx v1.6c	
General: Added commands like \dot for use in text and math. . . . .	79
Renamed \P, \S, \dag and \ddag to \textparagraph, \text- section, \textdagger and \textdaggerdbl. . . . .	69
1994/10/30 ltdefns.dtx v1.2c	
\@onellevel@sanitize: Macro added . . . . .	33
General: (CAR)\@onellevel@sanitize added . . . . .	22
1994/10/30 ltdefns.dtx v1.2f	
General: (DPC)\newwrite's moved to ltfiles . . . . .	22
1994/10/30 ltmath.dtx v1.0n	
General: ASA.J: Moved the new commands to ltoutenc. . . . .	214
1994/10/30 ltoutenc.dtx v1.6d	
General: Added \DeclareTextCom- positeCommand. . . . .	69
Added \textcircled. . . . .	69, 80, 86
Added \t. . . . .	80
Added math commands. . . . .	69
Added OML encoding. . . . .	69, 80
Added the OML encoding. . . . .	87
Made \textless and \textgreater come from OML. . . . .	80
Moved math commands here from ltmath. . . . .	81
Removed \textregistered. . . . .	80
Rewrote \copyright to use \textcircled. . . . .	80
1994/10/31 fontdef.dtx v2.2d	
General: Added OMLenc.def . . . . .	175
1994/10/31 fontdef.dtx v2.2e	
General: ... and moved further down . . . . .	175
1994/10/31 ltfloat.dtx v1.1a	
\@dblfloat: Major changes since two-column and one-column cases merged . . . . .	294
\@dblflset: Macro added . . . . .	294
Major changes to parameter parsing, setting of local vari- ables, etc; two-column and one- column cases merged; space hacks moved . . . . .	294
\@endfloatbox: (DPC/CAR) Ex- tra box added to remove colour resetting from vmode . . . . .	297
\@floatboxreset: Macro added . . . . .	295
\@footnotetext: (DPC/CAR) Move colour setting to output routine . . . . .	304
\@savemarbox: (DPC/CAR) Extra box added for colour . . . . .	299
\@setfps: Macro added . . . . .	294
\@xdblfloat: Macros removed: \@dbflt, \@xdblfloat . . . . .	297
\@xfloat: (DPC/CAR) Extra box added to remove colour reset- ting from vmode . . . . .	411 295
Major changes, removing set- ting of local variables, space hacks etc; two-column and one- column cases merged . . . . .	294
Reset hook added . . . . .	295
\@xympar: (DPC/CAR) Extra box added since needed for floats	300
\fps@dbl: Macro added . . . . .	294
1994/10/31 ltoutput.dtx v1.1a	
\@makecol: (DPC/CAR) Colour re- setting moved to here . . . . .	332
\@topnewpage: (DPC/CAR) Extra box added to remove colour re- setting from vmode . . . . .	326
(DPC/CAR) Use \color@begingroup for colour . . . . .	326
(DPC/CAR) Use \normalcolor	326
1994/11/02 ltoutenc.dtx v1.6d	
General: Wrapped lines longer than 70 characters. . . . .	69
1994/11/03 ltclass.dtx v1.0k	
General: Move \@missingfileer- ror to ltfiles . . . . .	366
1994/11/03 ltdirchk.dtx v1.0i	
General: Generate an error if la- tex.ltx not used with clean ini- tex . . . . .	1
1994/11/03 ltfiles.dtx v1.0j	
\@missingfileerror: Move here from ltclass . . . . .	66
1994/11/04 ltboxes.dtx v1.0m	
\@mpfootnotetext: Added \pro- tected@edef. ASA.J. . . . .	239
1994/11/04 ltdefns.dtx v1.2e	
General: Added \set@display@protect to \typeout. ASA.J. . . . .	22
Added commands for setting and restoring \protect. ASA.J. . . . .	31
Rewrote protected short com- mands using \x@protect. ASA.J. . . . .	30
1994/11/04 lterror.dtx v1.2g	
General: Added \set@display@protect to \Generic* commands. ASA.J. . . . .	38
1994/11/04 ltfiles.dtx v1.0k	
\nofiles: Added setting of \pro- tected@write, \makeindex and \makeglossary to \nofiles. ASA.J. . . . .	63
\protected@write: Macro added ASA.J. . . . .	64
1994/11/04 ltfloat.dtx v1.1b	
\@footnotetext: (ASA.J) Added \protected@edef. . . . .	304
\footnotemark: Added \pro- tected@xdef to \foot- notemark. . . . .	304

Change/History	
1994/04 maxglo.dtx v1.1b	
\@wrglossary: Added \protected@write to \@wrglossary. ....	306
\@wrindex: Added \protected@write to \@wrindex. ....	306
General: Removed \if@filesw from \makeindex. ....	305
\makeglossary: Removed \if@filesw from \makeglossary. ....	306
1994/11/04 ltmiscen.dtx v1.0t	
\@writefile: Removed setting of \protect. ASAJ. ....	204
1994/11/04 ltoutenc.dtx v1.6f	
General: Added \_. ....	80
Added \mathunderscore. ....	81
1994/11/04 ltpage.dtx v1.0e	
\markright: Added \unexpandable@protect. ASAJ. ....	312
1994/11/04 ltsect.dtx 1.0h	
\@sect: (ASAJ) Added \protected@edef. ....	285
General: (ASAJ) Added \protected@xdef to \thanks. ....	282
1994/11/04 ltsect.dtx v1.0h	
General: Added \protected@write to \addcontents. ASAJ. ....	289
\addcontentsline: Added \protected@write to \addcontentsline. ASAJ. ....	289
1994/11/04 lttab.dtx v1.0h	
\@mkpream: (ASAJ) Added \unexpandable@protect to \@mkpream. ....	256
\multicolumn: (ASAJ) added \set@typeset@protect. ....	253
1994/11/04 ltxref.dtx v1.1d	
\label: (ASAJ) Added \protected@write. ....	200
\refstepcounter: (ASAJ) Added \protected@edef. ....	200
1994/11/05 ltboxes.dtx v1.0n	
\@mpfootnotetext: Colour resetting for footnotes moved to end-minipage: as for main page. ....	239
\color@endbox: macro added for colour support. ....	234
\color@hbox: macro added for colour support. ....	234
\endminipage: Colour resetting for footnotes moved to here: as for main page. ....	239
1994/11/05 ltboxes.dtx v1.0o	
\@mpfootnotetext: Colour groups restored here. ....	239
1994/11/05 ltfloat.dtx v1.1c	
\@dblflset: Add compatibility with old version of \@xfloat. ....	294
\@endfloatbox: Use new \color@hbox concept. ....	297
\@footnotetext: Removed \nor malcolor (again) ....	412
\@savemarbox: Use new \color@hbox concept. ....	299
\@setfps: Add compatibility with old version of \@xfloat. ....	294
\@xfloat: Add compatibility with old version of \@xfloat: but the arguments, provided at exorbitant cost, are now completely ignored ....	294
Use new \color@hbox concept. ....	295
\@xympar: Use new \color@hbox concept. ....	300
1994/11/05 ltoutenc.dtx v1.6g	
General: Added setting of \type set@protect to \patterns and \hyphenation. ....	78
1994/11/05 ltoutput.dtx v1.1b	
\@topnewpage: Use new \color@hbox concept. ....	326
\@writesetup: Change protect settings for new-style, protect-free aux-files. ....	335
Use new \color@hbox concept. ....	335
1994/11/05 ltoutput.dtx v1.1c	
\@begindvi: Added macro. ....	337
\@begindvibox: Added macro. ....	324
\@writesetup: Add new \AtBeginDvi concept. ....	335
\AtBeginDvi: Added macro. ....	324
1994/11/06 ltfsbas.dtx v2.1u	
\cf@encoding: New macro. ....	114
\DeclareFixedFont: Renamed \every@size to \every@math@size. ....	108
1994/11/06 ltfsmini.dtx v2.2b	
\@setsizes: Use \type set@protect. ....	169
1994/11/06 ltfsstrc.dtx v2.3k	
\glb@currsize: New implementation. ....	130
\try@simples: New implementation. ....	140
\try@size@substitution: New implementation. ....	140
\tryis@simple: New implementation. ....	140
1994/11/07 fontdef.dtx v2.2f	
General: (DPC) Add \Declare MathSizes declarations. ....	177
(DPC) Updated to use \ProvidesFile. ....	175
1994/11/07 ltfiles.dtx v1.0l	
\@unused: move here from ltdefns, remove duplicate \mainaux. ....	61
1994/11/07 ltfiles.dtx v1.0m	
\document: Renamed \every@size to \every@math@size. ....	62
1994/11/07 preload.dtx v2.1e	
General: (DPC) Updated to use \ProvidesFile. ....	188

Change/History	
1994/09/tb6es.dtx v1.0p	
\@finalstrut: Revert \finalstrut to 2.09 equivalent (from lt- patch) . . . . .	240
General: more colour changes. . .	233
1994/11/09 ltfssbas.dtx v2.1v	
\@vpt: (DPC) macros added, from setsize.dtx . . . . .	123
(DPC) reduce save stack usage latex/1742 . . . . .	123
1994/11/10 ltbibl.dtx v1.1c	
General: Fix \nocite{*} . . . . .	307
\nocite: Fix \nocite{*} . . . . .	309
1994/11/10 ltmath.dtx v1.2v classes	
eqnarray: Added value of \parskip to \abovedisplayskip to com- pensate for negative \topsep	218
1994/11/10 ltoutput.dtx v1.1e	
\@writesetup: Modify \protect setting . . . . .	335
1994/11/10 ltplain.dtx v1.1b	
General: (CAR) added patch to \loop. . . . .	11
\iterate: (CAR) added extra \re- lax . . . . .	18
1994/11/11 ltspace.dtx v1.2a	
\\: (DPC) Make robust . . . . .	51
1994/11/12 lftntcmd.dtx v3.3o	
\normalsize: Added \Message- Break . . . . .	197
1994/11/12 ltlists.dtx v1.2b ltspace	
\endtrivlist: Changed order of tests to make \noitemerror correct: end of an era. . . . .	227
1994/11/12 ltmiscen.dtx v1.0u	
center: Changed end macro to \def: safer and consistent . .	206
flushleft: Changed end macro to \def: safer and consistent . .	206
flushright: Changed end macro to \def: safer and consistent . .	206
1994/11/12 ltplain.dtx v1.1c	
General: Comment out more encod- ing specific commands . . . . .	19
1994/11/12 ltspace.dtx v1.2b	
\addpenalty: Corrected error mes- sage . . . . .	55
\addvspace: Corrected error mes- sage . . . . .	55
1994/11/13 ltspace.dtx v1.2c	
\addpenalty: Recorrected error message . . . . .	55
\addvspace: Recorrected error mes- sage . . . . .	55
1994/11/14 ltoutput.dtx v1.1f	
\@begindvi: Use normal box regis- ter: why a box? . . . . .	337
\@begindvibox: Use normal box register: why a box? . . . . .	324
\@writesetup: Modify new \AtBe- ginDvi concept . . . . .	335
General: Removed old definition of	413
\@testfp. . . . .	314
1994/11/14 ltspace.dtx v1.2d	
\\: (DPC) Macro modified . . . .	51
1994/11/14 lttab.dtx v1.0i	
\tabularnewline: (DPC) Macro added . . . . .	252
1994/11/16 fontdef.dtx v2.2h	
General: (DPC) Removed \{ and \} . . . . .	175
1994/11/17 ltboxes.dtx v1.0q	
General: \@tempa to \reserved@a	233
1994/11/17 ltclass.dtx v1.0l	
General: \@tempa to \reserved@a	363
1994/11/17 ltcntrl.dtx v1.0b	
General: \@tempa to \reserved@a	35
1994/11/17 ltdfnns.dtx v1.0g	
General: \@tempa to \reserved@a	22
1994/11/17 ltdirchk.dtx v1.0j	
General: \@tempa to \reserved@a .	1
1994/11/17 lterror.dtx v1.2h	
General: \@tempa to \reserved@a	38
1994/11/17 ltfiles.dtx v1.0n	
General: \@tempa to \reserved@a	60
1994/11/17 ltfinal.dtx v1.0o	
General: \@tempa to \reserved@a	380
1994/11/17 ltfloat.dtx v1.1e	
General: \@tempa to \reserved@a	291
1994/11/17 lftntcmd.dtx v3.3p	
General: \@tempa to \reserved@a	191
1994/11/17 ltfssdcl.dtx v2.1w	
General: \@tempa to \reserved@a	107
1994/11/17 ltfssdcl.dtx v2.1m	
General: \@tempa to \reserved@a	149
1994/11/17 lfsstrc.dtx v2.3l	
General: \@tempa to \reserved@a	125
1994/11/17 ltmath.dtx v1.0o	
General: \@tempa to \reserved@a	210
1994/11/17 ltmiscen.dtx v1.0v	
General: \@tempa to \reserved@a	202
1994/11/17 ltoutenc.dtx v1.6h	
General: (DPC) \@tempa to \re- served@a . . . . .	69
1994/11/17 ltoutput.dtx v1.1h	
General: \@tempa to \reserved@a.	314
1994/11/17 ltpictur.dtx v1.0f	
General: \@tempa to \reserved@a	260
1994/11/17 ltsect.dtx v1.0i	
General: \@tempa to \reserved@a	282
1994/11/17 lttab.dtx v1.0j	
General: \@tempa to \reserved@a	241
1994/11/18 ltboxes.dtx v1.0r	
\color@vbox: macro added for colour support . . . . .	234
1994/11/18 ltfinal.dtx v1.0n	
General: re-allow slots 127–255 . .	383
1994/11/18 ltfssbas.dtx v2.1x	
General: (DPC) use \reserved@f not \next . . . . .	107
1994/11/18 ltfssdcl.dtx v2.1m	
\DeclareMathDelimiter: (DPC) \expandafter instead of \next	161

Change History		
1994/11/18 lfsstrc.dtx v2.3m		
General: <code>\next</code> to <code>\reserved@f</code> .	125	
1994/11/18 ltmath.dtx v1.0p		
<code>\phantom</code> : (DPC) colour support	211	
(DPC) use <code>\expandafter</code> instead of <code>\next</code> .....	211	
<code>\prime@s</code> : (DPC) use <code>\@let@token</code> instead of <code>\next</code> and <code>\ex-</code> <code>\pandafter</code> instead of <code>\nxt</code> ..	213	
<code>\smash</code> : (DPC) colour support ..	212	
(DPC) use <code>\expandafter</code> instead of <code>\next</code> .....	212	
1994/11/21 ltfloat.dtx v1.1f		
<code>\@endfloatbox</code> : Added reset of minipage flag .....	297	
Corrected position of <code>\outer@nobreak</code> .....	297	
<code>\@marginparreset</code> : Macro added	299	
<code>\@savemarbox</code> : Added <code>\@setmini-</code> page etc .....	299	
Added resetting of size and font	299	
Changed to <code>\color@vbox</code> .....	299	
Use <code>\@setnobreak</code> etc .....	299	
<code>\@setminipage</code> : Macro added ..	296	
<code>\@setnobreak</code> : Macro added ..	296	
<code>\@xfloat</code> : Added <code>\@setminipage</code>	295	
Added resetting of size and font	295	
Changed to <code>\color@vbox</code> so that large floats overflow at the bot- tom .....	295	
Missing percents reinserted after 4, 8: these are not numbers.	294	
Use <code>\@setnobreak</code> .....	295	
<code>\@xympar</code> : Changed to <code>\color@vbox</code>	300	
1994/11/21 ltoutput.dtx v1.1i		
<code>\@addtocurcol</code> : Added <code>\if@nobreak</code> test before float box .....	344	
<code>\@specialoutput</code> : Added <code>\if@nobreak</code> test .....	330	
<code>\@topnewpage</code> : Changed to <code>\color@vbox</code> .....	326	
1994/11/22 ltfssdcl.dtx v2.1o		
General: wrap long lines .....	149	
1994/11/22 ltoutenc.dtx v1.6i		
General: Corrected <code>\dots</code> so that there's no kerning in monowidth fonts. .....	69	
Corrected typo with <code>\mathun-</code> <code>\derscore</code> . .....	69	
Fixed empty accents. Again. .	69	
1994/11/24 ltdefns.dtx v1.2h		
<code>\@newenv</code> : Added test for <code>\endgraf</code>	27	
1994/11/25 ltplain.dtx v1.1f		
General: (DPC) Comment out lots of obsolete code .....	11	
1994/11/26 ltfloat.dtx v1.1b		
<code>\footnote</code> : (ASAJ) Added <code>\pro-</code> <code>\tected@xdef</code> . .....	303	
1994/11/28 lcntrl.dtx v1.0c		
General: Documentation improve- ments .....	35	
1994/11/30 ltfiles.dtx v1.0o		414
<code>\@dofilelist</code> : Macro added .....	68	
<code>\listfiles</code> : Use <code>\@dofilelist</code> .	67	
<code>\nofiles</code> : There is no <code>\@gob-</code> <code>\blethree</code> ... .....	63	
1994/11/30 lfssbas.dtx v2.1y		
<code>\fontshape</code> : Use <code>\@current@cmd</code> in <code>\@enc@update</code> . ASAJ. ....	113	
1994/11/30 ltmath.dtx 1.0q		
General: ASAJ: <code>\DeclareMathOp-</code> <code>\erator</code> moved to AMSIATEX.	210	
1994/11/30 ltmiscen.dtx v1.0w		
<code>\enddocument</code> : (DPC) Do warnings even for <code>\nofiles</code> .....	203	
(DPC) Use <code>\@dofilelist</code> ....	203	
1994/11/30 ltoutenc.dtx 1.7a		
General: Redefined <code>\a</code> for the new scheme. ....	78	
1994/11/30 ltoutenc.dtx v1.6g		
General: Removed new definitions of <code>\patterns</code> and <code>\hyphen-</code> <code>\ation</code> , since encoding-specific commands now expand in the mouth. ....	78	
1994/11/30 ltoutenc.dtx v1.7a		
General: Added new code for encoding-specific commands. These now expand in the mouth, which means that ligat- ing and kerning can happen.	69	
Always load the enc.def file, so that the default encoding for the commands will change. .	93	
Redefined <code>\@changed@cmd</code> to ex- pand in the mouth. ....	72	
Removed <code>\@changed@x@mouth</code> since <code>\@changed@x</code> now expands in the mouth. ....	72	
Rewrote <code>\@text@composite</code> so it allows an empty argument, or an argument containing lots of commands. ....	74	
1994/12/01 ltfinal.dtx v1.0p		
General: Renamed <code>lthyphen.*</code> to <code>hyphen.*</code> .....	380	
1994/12/01 lthyphen.dtx v1.0g		
General: Rename <code>lthyphen.ltx/cfg</code> to <code>hyphen.ltx/cfg</code> .....	379	
1994/12/01 ltplain.dtx v1.1g		
General: (DPC) More doc changes	11	
1994/12/02 fontdef.dtx v2.2i		
General: Commented out <code>\ldots</code> . ASAJ. ....	173	
1994/12/02 ltfssini.dtx v2.2c		
<code>\copyright</code> : <code>\copyright</code> is now in ltoutenc. ASAJ .....	170	
1994/12/02 ltlists.dtx v1.0e		
<code>\@trivlist</code> : RmS: Added check for looping .....	226	
1994/12/02 ltoutenc.dtx 1.7b		
General: Redefined <code>\a</code> properly. .	78	

<b>Change History</b>	
1994/02/02 loutenc.dtx v1.7b	Added check for math mode in <b>415</b>
General: Fixed a bug with \a. . . . .	\@changed@cmd. . . . . <b>69</b>
1994/12/04 lthyphen.dtx v1.0h	Commented out \textasciicircum, \textasciitilde, \textbackslash, \textbar, \textgreater, \texthyphenchar, \texthyphen and \textless to save memory. . . . . <b>69</b>
General: Documentation edits for /1989 . . . . .	<b>379</b>
1994/12/05 ltoutenc.dtx v1.7c	1995/01/12 ltmath.dtx v1.2y classes
General: Added braces to \textcircled. . . . .	\@eqnnum: Added \normalcolor . <b>216</b>
1994/12/06 ltfssbas.dtx v2.1z	1995/03/03 ltoutenc.dtx 1.7g
\DeclareFontEncoding: use \nfss@catcodes . . . . .	General: Corrected an error in documentation referring to the tabular rather than the tabbing environment. . . . . <b>78</b>
\nfss@catcodes: Added tab char as well . . . . .	<b>109</b> <b>118</b>
1994/12/08 ltoutenc.dtx v1.7d	1995/04/02 lftntcmd.dtx v3.3r
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1996/04/04 ltcass.dtx v1.0v	
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1996/10/05 ltfiles.dtx v1.1h	
\clubpenalty: Added setting its value . . . . .	62
1996/10/08 ltfntcmd.dtx v3.3u	
\DeclareTextFontCommand: Removed \check@icr when in vmode since it causes various errors (see pr/2157) . . . . .	193
1996/10/21 lttab.dtx v1.1i	
\array: Use \set@typeset@protect . . . . .	251
General: Moved the code associated with \mkpream into the group provided by the box, for robustness (latex/2183) . . . . .	251
\multicolumn: Make \multicolumn long (latex/2180) . . . . .	253
\tabbing: Moved the \indent so that the \everypar can remove it when necessary; this is needed because the code for items in lists has changed (see pr/22111) . . . . .	246
1996/10/23 ltlists.dtx v1.0m	
\item: \nobreak... moved into the \everypar and not executed unconditionally, see above . . . . .	229
\kern... changed to \setbox... . . . . .	228
Added setting of \clubpenalty and set \nobreakfalse only when necessary . . . . .	229
1996/10/23 ltsect.dtx v1.0x	
\sect: Replaced \hskip... with \setbox... as used in \afterheading . . . . .	286
1996/10/24 ltboxes.dtx v1.1a	
\arrayparboxrestore: Added local settings of flags: dangerous! . . . . .	238
\iiiminipage: Use it or lose it (@setminpage): Frank will want to lose it . . . . .	238
1996/10/24 ltfloat.dtx v1.1p	
\floatboxreset: Added local settings of flags: dangerous! . . . . .	295
\marginparreset: Added local settings of flags: dangerous! . . . . .	300
\xffloat: Added \nодокумент to trap floats in the preamble . . . . .	294
1996/10/24 ltoutput.dtx v1.1z	
\addtocurcol: Added \nobreak, etc as appropriate . . . . .	344
\specialoutput: Added \nobreak as appropriate . . . . .	330
\topnewpage: Added \nодокумент to trap \twocolumn in the preamble . . . . .	326
1996/10/25 ltlists.dtx v1.0n	
\newpage: Better checks for noskipsec and inlabel added, plus nobreak . . . . .	425
\endtrivlist: Change \indent to \leavevmode . . . . .	227
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1996/10/25 ltoutput.dtx v1.2a	
\newpage: Reset all flags explicitly . . . . .	326
1996/10/26 ltlists.dtx v1.0o	
\endtrivlist: Correct typo . . . . .	227
1996/10/27 ltoutenc.dtx v1.8c	
\strip@args: Removed macro . . . . .	75
General: Added \r A . . . . .	82
Added \textasteriskcentered . . . . .	79, 86
Corrected syntax descriptions . . . . .	69
Removed \aa and \AA . . . . .	79, 82, 83
1996/10/28 ltplain.dtx v1.1u	
General: (CAR) More doc changes . . . . .	11
\dotfill: Removed math mode . . . . .	20
1996/10/29 ltplain.dtx v1.1v	
\dotfill: Got arithmetic correct (CAR) . . . . .	20
1996/10/29 ltspace.dtx v1.2u	
\gnewline: Added macro . . . . .	52
\cno@lnbk: Macro replaces \lnbk and \cno@lnbk . . . . .	51
\:\: Corrected and rationalised code . . . . .	51
\nolinebreak: Reimplemented both using \cno@lnbk . . . . .	51
1996/10/31 ltfinal.dtx v1.0z	
General: Added extra \lcode, hoping it does no harm in T1 (pr/1969) . . . . .	381, 384
1996/10/31 ltlists.dtx v1.0p	
\trivlist: Added check for missing item in outer list . . . . .	226
1996/10/31 ltsect.dtx v1.0y	
General: Corrected and tidied documentation; removed long lines . . . . .	282
1996/11/03 ltplain.dtx v1.1w	
\dotfill: Saved tokens by using \hb@xt@ . . . . .	20
1996/11/04 lterror.dtx v1.2m	
\nodocument: Always define \nодокумент in kernel, so that it can be cleared by \document . . . . .	43
1996/11/04 ltlists.dtx v1.0q	
\trivlist: Moved check for missing item: only checked when not inlabel flag is false . . . . .	226
1996/11/05 ltfiles.dtx v1.1i	
\nofiles: Standard \if@nobreak test added . . . . .	63
1996/11/09 ltmath.dtx v1.1c	
\ensuredmath: Made long, as it was before. /2104 . . . . .	216
1996/11/18 ltfsbsas.dtx v3.0s	
\define@newfont: (DPC) lowercase fd file names. internal/1044 . . . . .	117

<b>Change History</b>	
1996/01/18 ltoutenc.dtx v1.8d	
General: (DPC) lowercase external file names. internal/1044 . . . . .	93
1996/11/20 fontdef.dtx v2.2p	
General: lowercase fd and enc.def file names /1044 . . . . .	173
1996/11/20 ltvers.dtx v1.0f	
General: Check for old format mod- ified /2319 . . . . .	21
1996/11/23 ltoutenc.dtx v1.8e	
General: Corrected description 69, 70 Extended description . . . . .	70
1996/11/28 ltvers.dtx v1.0g	
General: Check for old format mod- ified /2319 . . . . .	21
1996/12/06 ltdirchk.dtx v1.0u	
\IfFileExists: *** removed from various messages for GNU Make. internal/2338 . . . . .	7
1996/12/06 ltfloat.dtx v1.1r	
\@caption: Call \csetminpage if needed. latex/2318 . . . . .	293
1996/12/06 ltfssini.dtx v3.0h	
General: (DPC) Remove *** from messages internal/2338 . . . . .	171
1996/12/17 ltclass.dtx v1.0w	
\g@addto@macro: Use \begingroup to save making a mathord . . . . .	375
1996/12/20 ltsect.dtx v1.0z	
\@dottedtocline: Added \nobreak for latex/2343 . . . . .	290
1997/01/08 fontdef.dtx v2.2q	
General: Use \DeclareMathDelim- iter to set delimiter codes . . . . .	179
\mathparagraph: Define using \De- clareMathSymbol . . . . .	186
1997/01/08 ltfiles.dtx v1.1j	
\@include: reset \deadcycles la- tex/2365 . . . . .	65
1997/01/08 ltmath.dtx v1.1d	
\root: (DPC) Remove spurious space tokens from plain TeX definition /2359 . . . . .	211
1997/02/05 ltclass.dtx v1.0x	
\g@addto@macro: missing percent /2402 . . . . .	375
1997/02/21 ltlists.dtx v1.0r	
\@item: \ifvoid check added for \noindent. latex/2414 . . . . .	228
1997/03/21 ltcounds.dtx v1.1e	
\fnsymbol: Use \mathsection and \mathparagraph. latex/2445 . . . . .	105
1997/04/14 ltfiles.dtx v1.1k	
\document: Set the document space factor defaults. latex/2404 . . . . .	62
\normalsfcodes: Macro added (from patch file) latex/2404 . . . . .	63
1997/04/14 ltoutput.dtx v1.2b	
\@writesetup: Call \normalsf- codes (from patch file) la- tex/2404 . . . . .	336
Move \label and \index (from patch file) . . . . .	426 336
1997/04/24 ltbibl.dtx v1.1m	
\@citex: \empty to avoid primi- tive error on empty cite keys. latex/2432 . . . . .	308
1997/04/30 ltoutenc.dtx v1.9a	
General: Changed \textsc to \sc- shape . . . . .	80
Introduced \textcopyright and modified \copyright . . . . .	80
Introduced \textcopyright and modify \copyright . . . . .	80
Modified \textunderscore, re- moving \mathunderscore . . . . .	80
Modified \underline, removing \mathunderline . . . . .	80
1997/04/30 ltoutenc.dtx v1.9b	
General: Added \leavevmode to \textunderscore . . . . .	80
1997/05/04 ltoutenc.dtx v1.9c	
General: Added 'hex index tabs' . . . . .	84
Added TS1 encoding v2.2.beta . . . . .	89
1997/05/07 ltoutenc.dtx v1.9d	
General: Added \leavevmode to \textcompwordmark . . . . .	80
1997/05/07 ltspace.dtx v1.2v	
\newline: Made completely ro- bust. . . . .	52
1997/05/29 lfssstrc.dtx v3.0j	
General: Replaced \\ by \Message- Break, as suggested by Donald Arseneau. . . . .	127
1997/05/29 ltlogos.dtx v1.1f	
\LaTeXe: Added \math so that the L <sup>A</sup> T <sub>E</sub> X 2 <sub>⊙</sub> logo works with non- zero values of \mathsurround. . . . .	59
1997/06/16 ltdirchk.dtx v1.0v	
General: documentation impro- vements mainly from inter- nal/2520 . . . . .	1
1997/06/16 ltfloat.dtx v1.1s	
General: documentation fixes . . . . .	291
1997/06/16 lfntcmd.dtx v3.3v	
General: Fix typo in documen- tation. . . . .	191
1997/08/05 ltoutenc.dtx v1.9e	
General: Corrected order of argu- ments in \UseTextSymbol ex- ample. . . . .	70
1997/08/29 ltoutenc.dtx v1.9f	
General: Added OT4 encoding, pro- vided by Marcin Woliński. . . . .	69
1997/09/09 ltdefns.dtx v1.2z	
\provide@command: Use \begin- group to avoid generating math ords if used in math mode. pr/2573 . . . . .	28
1997/09/15 ltpictur.dtx v1.1g	
\@getcirc: Warn if lines become in- visible pr/2524 . . . . .	274

<i>Change History</i>			
<b>\picture@warn:</b> Macro added pr/2524 . . . . .	<b>274</b>	1997/11/19 ltoutput.dtx v1.2d 427	
<b>\@sline:</b> Warn if lines become invisible pr/2524 . . . . .	<b>267</b>	<b>\@vtryfc:</b> Reindent code, to be understandable(DPC). . . . .	<b>340</b>
1997/10/06 ltcnts.dtx v1.1f		1997/11/20 ltfssdcl.dtx v3.0g	
<b>\@Roman:</b> Change \@Roman to be fully expandable, so that the result is written properly to files.	<b>105</b>	<b>\document@select@group:</b> (DPC) inline use of \stepcounter (faster, and saves a csname per math version as no reset list)	<b>152</b>
<b>\@slowromancap:</b> Macro added.	<b>105</b>	<b>\select@group:</b> (DPC) inline use of \stepcounter (faster, and saves a csname per math version as no reset list)	<b>151</b>
1997/10/08 ltlogos.dtx v1.1h		1997/11/23 ltoutenc.dtx v1.9g	
<b>\LaTeX:</b> Simplify macro (force loading of suitable math fonts once).	<b>59</b>	General: Use \textperthousand, \textpertenthousand and \textfractionsolidus not \textpermill, \textperthousand and \textfraction.	
1997/10/10 ltclass.dtx v1.0y		/2673 . . . . .	<b>89</b>
<b>\endfilecontents:</b> \@currenvir in banner . . . . .	<b>377</b>	1997/12/17 ltoutenc.dtx v1.9h	
<b>\reserved@c</b> not \verb@atout to save a csname . . . . .	<b>377</b>	General: Added \textperthousand and \textpertenthousand	<b>82</b> , <b>83</b>
Check for text before or after \end environment. latex/2636	<b>377</b>	Added code for textcomp.sty. . . . .	<b>92</b>
Use \@gobbletwo . . . . .	<b>377</b>	Added section. . . . .	<b>92</b>
1997/10/17 lftntcmd.dtx v3.3w		Added textcomp.sty. . . . .	<b>69</b>
<b>\check@nocorr@:</b> Check for vertical mode moved here, from \DeclareTextFontCommand (see PR/2646). . . . .	<b>194</b>	As in OT1, Added \leavevmode at start of \c, otherwise the output routine might be invoked within the macro. . . . .	<b>83</b>
<b>\DeclareTextFontCommand:</b> Reinstalled \check@icr as check is now done in \check@nocorr@ (see PR/2646). . . . .	<b>193</b>	Changed to decimal codes in \oalign. . . . .	<b>90</b>
1997/10/20 ltfinal.dtx v1.1a		Changed to decimal codes. . . . .	<b>87</b>
<b>\@uclclist:</b> Removed \aa and \AA from \uclclist as these are macros. . . . .	<b>384</b>	Documentation changes and additions. . . . .	<b>69</b>
1997/10/21 ltdefns.dtx v1.2z1		Example corrected, braces removed. . . . .	<b>69</b>
<b>\renew@command:</b> Use \begin-group/\endgroup rather than braces for grouping, to avoid generating empty math atom.	<b>26</b>	Removed default settings, see next section. . . . .	<b>89</b>
1997/10/21 ltfssbas.dtx v3.0t		1997/12/19 ltoutenc.dtx v1.9i	
<b>\define@newfont:</b> Move \makeatletter to \nfss@catcodes. . . . .	<b>117</b>	General: Documentation corrections. . . . .	<b>69</b>
<b>\nfss@catcodes:</b> Moved \makeatletter from \try@load@font@shape.		1997/12/20 fontdef.dtx v2.2s	
. . . . .	<b>118</b>	General: Added documentation . . . . .	<b>175</b>
1997/11/09 ltoutput.dtx v1.2c		1997/12/31 ltoutenc.dtx v1.9k	
<b>\@specialoutput:</b> Remove incorrect code: only one \emptycol is needed here . . . . .	<b>328</b>	General: Further correction . . . . .	<b>69</b>
<b>\@topnewpage:</b> Documentation of vsize check enhanced . . . . .	<b>326</b>	1998/01/12 ltoutenc.dtx v1.9k	
1997/11/13 ltfssdcl.dtx v3.0f		General: Added \ProvidesPackage for textcomp.sty . . . . .	<b>69</b>
<b>\DeclareSymbolFont:</b> (DPC) Really update \group@list dont leave new version in \toks@. latex/2661 . . . . .	<b>155</b>	Adding missing braces and \ushape. . . . .	<b>90</b>
<b>\stepcounter:</b> (DPC) Remove as never used. (Re)defined in ltcnts . . . . .	<b>151</b>	1998/01/16 ltoutenc.dtx v1.9m	
1997/11/19 ltfloat.dtx v1.1t		General: fixed decimal codes. latex/2734 . . . . .	<b>87</b>
<b>\@footnotetext:</b> Missing percent, again . . . . .	<b>304</b>	1998/03/04 ltdefns.dtx v1.2z2	
		<b>\@xargdef:</b> Unnecessary \expandafter removed: pr/2758 . . . . .	<b>25</b>
		1998/03/05 ltoutenc.dtx v1.9n	
		General: Added masc/fem ord as in pr/2579 . . . . .	<b>80</b>
		1998/03/20 ltdefns.dtx v1.2z3	
		<b>\@thirdofthree:</b> Macro added . . . . .	<b>29</b>

Change History			
1998/03/20 ltoutenc.dtx v1.9o			
General: Added various \UndeclareTextCommand declarations for pr/2783 .....	100	Renamed \textmacron pr/2840 .....	428
Documentation added about order of decls .....	71	1998/06/12 ltoutenc.dtx v1.9q	92, 98
Documentation added for pr/2783 .....	71	\add@accent: Explicitly set \spacefactor after \accent (pr/2877) .....	75
Load decls after defaults for speed. ....	100	1998/06/18 ltab.dtx v1.1k	
\UndeclareTextCommand: Macro added for pr/2783 .....	77	General: Small addition to documentation .....	241
1998/03/21 ltclass.dtx v1.0z		1998/07/06 ltab.dtx v1.1l	
General: Added to documentation of filecontents .....	363	General: Small correction to documentation .....	241
1998/03/21 ltclass.dtx v1.1a		1998/08/17 ltboxes.dtx v1.1e	
\@providesfile: Allow &. Internal/2702 .....	369	General: (RmS) Minor Documentation fixes. ....	232
General: Correct to new only preamble command list .....	378	1998/08/17 ltclass.dtx v1.1c	
1998/03/25 ltfssbas.dtx v3.0u		General: (RmS) Minor documentation fixes. ....	363
\showhyphens: Suppress unnecessary error when used in preamble .....	123	1998/08/17 ltdirchk.dtx v1.0w	
1998/04/11 fontdef.dtx v2.2t		General: (RmS) Documentation improvements. ....	1
General: Added \mathring accent (pr2785) .....	185	1998/08/17 lfntcmd.dtx v3.3x	
1998/04/15 fontdef.dtx v2.2u		General: (RmS) Minor documentation fixes. ....	191
General: Use new syntax for \DeclareMathDelimiter .....	179	1998/08/17 ltfssbas.dtx v3.0v	
1998/04/15 ltfssdcl.dtx v3.0h		General: (RmS) Documentation fixes. ....	107
\@xxDeclareMathDelimiter:		1998/08/17 ltfssdcl.dtx v3.0i	
Macro added (pr/2662) .....	161	General: (RmS) Corrected minor glitches in changes entries. ....	149
1998/04/17 fontdef.dtx v2.2v		1998/08/17 ltfssini.dtx v3.0i	
General: Reinsert symbol defs for < and > chars. ....	180	General: (RmS) Minor documentation fixes. ....	168
1998/04/18 fontdef.dtx v2.2w		1998/08/17 ltlogos.dtx v1.1i	
General: Reinsert symbol def for / char. ....	180	General: (RmS) Minor documentation fixes. ....	59
1998/05/07 ltclass.dtx v1.1b		1998/08/17 ltmath.dtx v1.1c	
\@fileswithoptions: Modify help message for latex/2805 .....	374	General: (RmS) Minor documentation fixes. ....	210
1998/05/18 ltab.dtx v1.1j		1998/08/17 ltmscenc.dtx v1.1g	
\@endpbox: Use \setlength to set \hsize, so that the changes in the calc package apply here. ....	259	General: (RmS) Minor documentation fixes. ....	202
\tabular*: Use \setlength, so that calc extensions apply. ....	251	1998/08/17 ltspace.dtx v1.2w	
1998/05/20 ltfinal.dtx v1.1b		General: Documentation fixes. ....	48
General: Set up lccodes before loading hyphenation files: pr/2639 .....	380	1998/08/17 preload.dtx v2.1g	
Set up uc/lccodes after loading hyphenation files: pr/2639 .....	383	General: (RmS) Minor documentation fixes. ....	188
1998/05/28 lterror.dtx v1.2n		1998/09/19 ltoutenc.dtx v1.9r	
\@notdefinable: Added message re 'end...' pr/1555 .....	43	\a: Added \string (pr/2878) .....	78
1998/06/04 ltboxes.dtx v1.1c		1998/11/13 ltab.dtx v1.1m	
\@rule: Support calc-expressions .....	239	\@array: Check for hmode to see if something went wrong during parsing (pr/2884) .....	252
1998/06/12 ltoutenc.dtx v1.9p		1999/01/05 fontdef.dtx v2.2x	
General: Corrected 130 and 131, see pr/2834 .....	91	General: Need special protection for character > in \changes entry. ....	173

<i>Change History</i>			
\LastDeclaredEncoding:	Added \LastDeclaredEncoding to support cyrillic integration (pr/2988) . . . . .	110	
1999/01/06 ltoutenc.dtx v1.9r	\@strip@args: New impl for latex/2930 . . . . .	76	
	General: Minor documentation fix.	90	
1999/01/06 ltoutput.dtx v1.2e	\@makecol: Added negative vskip, as when processing outputbox below: suggested by Fred Bartlett pr/2892 . . . . .	332	
1999/01/07 ltdefns.dtx v1.3a	\@ifnextchar: made long . . . . .	32	
	\@newenvb: made long and brace optional arg. latex/2896 . . . . .	27	
	\@testopt: made long and brace optional arg. latex/2896 . . . . .	25	
1999/01/07 ltdefns.dtx v1.3b	\@ifnextchar: extra \long. latex/2902 . . . . .	32	
1999/01/07 ltoutenc.dtx v1.9r	General: Hackery to allow using fontenc several times . . . . .	94	
	Hackery to temp support cyrillic uc/lc . . . . .	93	
1999/01/13 ltoutenc.dtx v1.9s	\@strip@args: Simplified solution for latex/2930 . . . . .	76	
1999/01/18 ltdefns.dtx v1.3c	\@yargd@f: New implementation DPC /2942 . . . . .	26	
1999/02/09 ltdefns.dtx v1.3d	\@yargd@f: catch bad argument forms by re-inserting #3 . . . . .	26	
1999/02/12 ltfssini.dtx v3.0j	\oldstylenums: Use \rmdefault instead of cmm (pr/2954) . . . . .	170	
1999/02/24 ltoutenc.dtx v1.9t	General: Corrected hackery cyrillic uc/lc list . . . . .	93	
1999/03/01 ltdefns.dtx v1.3e	\@ifnextchar: remove extra \long. internal/2967 . . . . .	32	
1999/04/15 ltpictur.dtx v1.1h	\@getarrow: Replaced octal number, CAR . . . . .	267	
	\@upvector: Replaced octal number, CAR . . . . .	268	
	General: Replaced octal number, CAR . . . . .	267, 268	
	Replaced octal numbers, CAR . . . . .	260	
1999/04/19 ltfloat.dtx v1.1u	\caption: Made caption an error outside a float: latex/2815 . . . . .	293	
1999/04/27 ltboxes.dtx v1.1f	\@parboxto: (CAR) Changed \@empty to \relax as flag for natural width: pr/2975 . . . . .	237	
		1999/04/29 ltdefns.dtx v1.3f	429
	\@yargd@f: Full expansion and conversion needed for digit in new version, see pr/3013 . . . . .	26	
	New macro added . . . . .	26	
1999/06/10 ltoutenc.dtx v1.9u	General: Ensure that we also forget old options (pr/2888) . . . . .	94	
1999/06/12 ltoutenc.dtx v1.9v	General: Extend \@uclclist only once . . . . .	94	
1999/10/09 ltmath.dtx v1.1e	\active@math@prime: Macro added, see PR 3104. . . . .	213	
	\prime@s: Introduce \active@math@prime. . . . .	213	
1999/10/09 ltoutput.dtx 1.2f	\@activechar@info: Reset definition of active prime character (used in math mode) . . . . .	335	
1999/10/28 ltoutenc.dtx v1.9w	\add@accent: Give \accent@spacefactor a default definition (pr/3084) . . . . .	75	
	General: Changed \CYRRHOOK and \cyrrhook to \CYRRHK and \cyrrhk as name changed in the cyrillic bundle for naming consistency with other “hook” glyphs. . . . .	93	
2000/01/07 ltmiscen.dtx v1.1h	\@verbatim: Disable hyphenation even if the font allows it. . . . .	207	
2000/01/15 ltpictur.dtx v1.1i	\@upvector: Removed space at end-of-line, CAR . . . . .	268	
2000/01/30 lftntcmd.dtx v3.3y	\DeclareTextFontCommand: Use \hmode@bgroup now (pr/3160) . . . . .	193	
2000/01/30 ltoutenc.dtx v1.9y	General: Use \hmode@bgroup where applicable (pr/3160) . . . . .	81–83, 86, 88–90	
	\add@accent: Use \hmode@bgroup where applicable (pr/3160) . . . . .	75	
	\hmode@bgroup: Macro added . . . . .	75	
2000/01/30 ltoutenc.dtx v1.9z	\@use@text@encoding: Macro reimplemented (pr/3160) . . . . .	76, 77	
	\add@accent: Macro reimplemented (pr/3160) . . . . .	75	
	\hmode@start@before@group: Macro added (pr/3160) . . . . .	77	
2000/05/19 ltmiscen.dtx v1.1i	\enddocument: Reset \AtEndDocument for latex/3060 . . . . .	203	
2000/05/26 ltpage.dtx v1.0j	\@markright: Reimplementation to fix expansion error (pr/3203). . . . .	312	
	\leftmark: Use \empty instead of brace group (pr/3203). . . . .	312	

<i>Change History</i>	Reimplementation to fix expansion error (pr/3203). . . . .	312
	\rightmark: Use \empty instead of brace group (pr/3203). . . . .	312
2000/06/02	ltpage.dtx v1.0k	
	\@markright: Small adjustment to give slightly less expansion, CAR . . . . .	312
	\markright: Small adjustment to give slightly less expansion, CAR . . . . .	312
	Tidied 1.0j reimplementation, CAR . . . . .	312
2000/07/11	ltmisen.dtx v1.1j	
	\enddocument: Fix typo in warning	203
2000/07/12	ltoutput.dtx 1.2g	
	General: Ensure that rule is in \normalcolor . . . . .	359
2000/07/12	ltoutput.dtx 1.2i	
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