

The microtype package

Subliminal refinements towards typographical perfection

— IMPLEMENTATION —

R Schlicht

w.m.l@gmx.net

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<https://github.com/schlicht/microtype>

The `microtype` package provides a \LaTeX interface to the micro-typographic extensions that were introduced by `pdfTeX` and have since also propagated to `LuaTeX` and `XYTeX`: most prominently, character protrusion and font expansion, furthermore the adjustment of interword spacing and additional kerning, as well as hyphenatable letterspacing (tracking) and the possibility to disable all or selected ligatures. These features may be applied to customisable sets of fonts, and all micro-typographic aspects of the fonts can be configured in a straight-forward and flexible way. Settings for various fonts are provided.

Note that character protrusion requires `pdfTeX` (version 0.14f or later), `LuaTeX`, or `XYTeX` (at least version 0.9997). Font expansion works with `pdfTeX` (version 1.20 for automatic expansion) or `LuaTeX`. The package will by default enable protrusion and expansion if they can safely be assumed to work. Disabling ligatures requires `pdfTeX` (≥ 1.30) or `LuaTeX`, while the adjustment of interword spacing and of kerning only works with `pdfTeX` (≥ 1.40). Letterspacing is available with `pdfTeX` (≥ 1.40) or `LuaTeX` (≥ 0.62).

The alternative package `letterspace`, which also works with plain `TeX`, provides the user commands for letterspacing only, omitting support for all other extensions (see section 7 of the User manual).

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User manual (external document)

1 Implementation

The docstrip modules in this file are:

driver: The documentation driver, only visible in the dtx file.
 package: The code for the microtype package (microtype.sty).
 show: The code for the microtype-show package (microtype-show.sty).
 pdf-: Definitions specific to pdfTeX (microtype-pdftex.def).
 lua-: Definitions specific to LuaTeX (microtype-luatex.def).
 xe-: Definitions specific to XeTeX (microtype-xetex.def).
 letterspace: The code for the letterspace package (letterspace.sty).

plain: Code for eplain, miniltx (letterspace only).

debug: Code for additional output in the log file.

Used for – surprise! – debugging purposes.

luafile: Lua functions (microtype.lua).

config: Surrounds all configuration modules.

cfg-t: Surrounds (Latin) text configurations.

m-t: The main configuration file (microtype.cfg).

bch: Settings for Bitstream Charter (mt-bch.cfg).

blg: Settings for Bitstream Letter Gothic (mt-blg.cfg).

cmr: Settings for Computer Modern Roman (mt-cmr.cfg).

ebg: Settings for EB Garamond (mt-EBGaramond.cfg).

ppl: Settings for Palatino (mt-ppl.cfg).

ptm: Settings for Times (mt-ptm.cfg).

pmn: Settings for Adobe Minion (mt-pmn.cfg).

Contributed by *Harald Harders*.

ugm: Settings for URW Garamond (mt-ugm.cfg).

cfg-u: Surrounds non-text configurations (U encoding).

msa: Settings for AMS ‘a’ symbol font (mt-msa.cfg).

msb: Settings for AMS ‘b’ symbol font (mt-msb.cfg).

euf: Settings for Euler Fraktur font (mt-euf.cfg).

eur: Settings for Euler Roman font (mt-eur.cfg).

eus: Settings for Euler Script font (mt-eus.cfg).

cfg-e: Surrounds Euro symbol configurations.

zpeu: Settings for Adobe Euro symbol fonts (mt-zpeu.cfg).

mvs: Settings for marvosym Euro symbol (mt-mvs.cfg).

test: A helper file that may be used to create and test protrusion settings (test-microtype.tex).

And now for something completely different.

¹ `{*package|letterspace}`

1.1 Preliminaries

```

\MT@MT      This is us.
2 \def\MT@MT
3 (package) {microtype}
4 (letterspace) {letterspace}

\MT@fix@catcode  We have to make sure that the category codes of some characters are correct (the
                  german package, for instance, makes " active). Probably overly cautious. Ceterum
                  censo: it should be forbidden for packages to change catcodes within the preamble.

\MT@restore@catcodes  Polite as we are, we'll restore them afterwards.
5 \let\MT@restore@catcodes\@empty
6 \def\MT@fix@catcode#1#2{%
7   \edef\MT@restore@catcodes{%
8     \MT@restore@catcodes
9     \catcode#1=\the\catcode#1\relax
10  }%
11  \catcode#1=#2\relax
12 }
13 \MT@fix@catcode{17}{14}% ^^Q (comment)
14 \MT@fix@catcode{24}{9}% ^^X (ignore)
15 (package)\MT@fix@catcode{33}{12}% !
16 (package)\MT@fix@catcode{34}{12}% "
17 \MT@fix@catcode{36}{3}% $ (math shift)
18 \MT@fix@catcode{39}{12}% '
19 \MT@fix@catcode{42}{12}% *
20 \MT@fix@catcode{43}{12}% +
21 \MT@fix@catcode{44}{12}% ,
22 \MT@fix@catcode{45}{12}% -
23 \MT@fix@catcode{58}{12}% :
24 \MT@fix@catcode{60}{12}% <
25 \MT@fix@catcode{61}{12}% =
26 \MT@fix@catcode{62}{12}% >
27 (package)\MT@fix@catcode{63}{12}% ?
28 \MT@fix@catcode{94}{7}% ^ (superscript)
29 \MT@fix@catcode{96}{12}% ~
30 (package)\MT@fix@catcode{124}{12}% |

These are all commands for the outside world. We define them here as blank
commands, so that they won't generate an error if we are not running pdfTeX.
31 (package)
32 \newcommand*\DeclareMicrotypeSet[3] [] {}
33 \newcommand*\UseMicrotypeSet[2] [] {}
34 \newcommand*\DeclareMicrotypeSetDefault[2] [] {}
35 \newcommand*\SetProtrusion[3] [] {}
36 \newcommand*\SetExpansion[3] [] {}
37 \newcommand*\SetTracking[3] [] {}
38 \newcommand*\SetExtraKerning[3] [] {}
39 \newcommand*\SetExtraSpacing[3] [] {}
40 \newcommand*\DisableLigatures[2] [] {}
41 \newcommand*\DeclareCharacterInheritance[3] [] {}
42 \newcommand*\DeclareMicrotypeVariants[1] {}
43 \newcommand*\DeclareMicrotypeAlias[2] {}
44 \newcommand*\LoadMicrotypeFile[1] {}
45 \newcommand*\DeclareMicrotypeFilePrefix[1] {}
46 \newcommand*\DeclareMicrotypeBabelHook[2] {}
47 \newcommand*\microtypesetup[1] {}
48 \newcommand*\microtypecontext[1] {}
49 \newcommand*\textmicrotypecontext[2] {#2}
50 \newcommand\leftprotrusion[1] {#1}
51 \newcommand\rightprotrusion[1] {#1}
52 \providecommand*\noprotrusion{}
53 \newcommand*\noprotrusionifmode{}

```

```

54 \ifpackageloaded{letterspace}{\let\MT@textls\relax}{%
55 /package
56 \newcommand*{lsstyle}{}
57 \newcommand{textls}[2]{}{}
58 \def\textls#1#{}
59 \newcommand*{lslig}[1]{#1}
60 *package
61 }

```

These commands also have a starred version.

```

62 \def\DeclareMicrotypeSet#1#{\@gobbletwo}
63 \def\DeclareMicrotypeVariants#1#{\@gobble}

```

Set declarations are only allowed in the preamble (resp. the main configuration file). The configuration commands, on the other hand, must be allowed in the document, too, since they may be called inside font configuration files, which, in principle, may be loaded at any time.

```

64 \@onlypreamble\DeclareMicrotypeSet
65 \@onlypreamble\UseMicrotypeSet
66 \@onlypreamble\DeclareMicrotypeSetDefault
67 \@onlypreamble\DisableLigatures
68 \@onlypreamble\DeclareMicrotypeVariants
69 \@onlypreamble\DeclareMicrotypeBabelHook
70 \@onlypreamble\DeclareMicrotypeFilePrefix

```

Don't load letterspace.

```

71 \expandafter\let\csname ver@letterspace.sty\endcsname\@empty

```

`\MT@old@cmd` The old command names had one more hunch (`\..MicroType..`). Before finally letting them sink into oblivion, raise an error.

```

72 \def\MT@old@cmd#1#2{%
73   \newcommand*#1{\MT@error{%
74     \string#1 is deprecated. Please use\MessageBreak
75     \string#2 instead}{As I said}%
76   \let #1#2#2}}
77 \MT@old@cmd\DeclareMicroTypeAlias\DeclareMicrotypeAlias
78 \MT@old@cmd\DeclareMicroTypeSet \DeclareMicrotypeSet
79 \MT@old@cmd\UseMicroTypeSet \UseMicrotypeSet
80 \MT@old@cmd\LoadMicroTypeFile \LoadMicrotypeFile
81 /package

```

`\MT@warning` Communicate.

```

\MT@warning@n1 82 \def\MT@warning{\PackageWarning\MT@MT}
\MT@info 83 \def\MT@warning@n1#1{\MT@warning{#1\@gobble}}
\MT@info@n1 84 *package
\MT@vinfo 85 \def\MT@info{\PackageInfo\MT@MT}
\MT@vinfo 86 \def\MT@info@n1#1{\MT@info{#1\@gobble}}
\MT@error 87 \let\MT@vinfo\@gobble
\MT@warn@err 88 \def\MT@error{\PackageError\MT@MT}
89 \def\MT@warn@err#1{\MT@error{#1}{%
90   This error message appears because you loaded the `~\MT@MT'\MessageBreak
91   package with the option `verbose=errors'. Consult the documentation\MessageBreak
92   in \MT@MT.pdf to find out what went wrong.}}

```

1.1.1 Debugging

`\tracingmicrotype` Cases for `\tracingmicrotype`:

```

\MT@dinfo 0: almost none
\MT@dinfo@n1 1: + sets & lists
2: + heirs

```

3: + slots

4: + factors

```

93 (*debug)
94 \MT@warning@n1{This is the debug version}
95 \newcount\tracingmicrotype
96 \tracingmicrotype=2
97 \def\MT@info#1{\PackageInfo\MT@MT{#1}\MT@addto@annot{#1}}
98 \def\MT@info@n1#1{\PackageInfo\MT@MT{#1}@gobble}\MT@addto@annot{#1}}
99 \let\MT@vinfo\MT@info@n1
100 \def\MT@warning#1{\PackageWarning\MT@MT{#1}\MT@addto@annot{Warning: #1}}
101 \def\MT@warning@n1#1{\PackageWarning\MT@MT{#1}@gobble}\MT@addto@annot{Warning: #1}}
102 \def\MT@dinfo#1#2{\ifnum\tracingmicrotype<#1 \else\MT@info{#2}\fi}
103 \def\MT@dinfo@n1#1#2{\ifnum\tracingmicrotype<#1 \else\MT@info@n1{#2}\fi}

```

`\tracingmicrotypeinpdf` Another debug method: font switches can be marked in the PDF file with a small caret, an accompanying popup text box displaying all debug messages.

Cases for `\tracingmicrotypeinpdf`:

1: show new fonts

2: + show known fonts

```
104 \newcount\tracingmicrotypeinpdf
```

Let's see how it works . . . (if you don't see anything special on this page, your PDF viewer doesn't support annotations).

```
\tracingmicrotypeinpdf=2
```

`\MT@pdf@annot` During font setup, we save the text for the popup in `\MT@pdf@annot`. (This requires `pdfTeX ≥ 1.30`.) The `pdftexcmds` package provides `pdfTeX`'s utility commands in `\ifMT@inannot` `\MT@addto@annot` `\ifMT@inannot` `\MT@xadd\MT@pdf@annot`

```

105 \RequirePackage{pdftexcmds}
106 \newif\ifMT@inannot \MT@inannottrue
107 \let\MT@pdf@annot\empty
108 \def\MT@addto@annot#1{\ifnum\tracingmicrotypeinpdf>\z@ \ifMT@inannot
109   {\def\MessageBreak{^^J@spaces}%
110   \MT@xadd\MT@pdf@annot{\pdf@escapestring{#1^^J}}}\fi\fi}

```

`\iftracingmicrotypeinpdfall` With `\tracingmicrotypeinpdfall` false, the PDF output is (hopefully) identical, but some font switches will not be displayed; otherwise the output is affected, but *all* font switches are visible. In the latter case, we also insert a small kern so that multiple font switches are discernable.

```
111 \newif\iftracingmicrotypeinpdfall
```

`\MT@show@pdfannot` A red caret is shown for fonts which are actually set up by *Microtype*, a green one marks fonts that we have already seen. The `/Caret` annotation requires a viewer for PDF version 1.5 (you could use `/Text` if you're using an older PDF viewer).

```

112 \ifx\directlua\undefined \else
113   \protected\def\pdfannot{\pdfextension annot }\fi
114 \def\MT@show@pdfannot#1{%
115   \ifnum\tracingmicrotypeinpdf<#1 \else
116     \iftracingmicrotypeinpdfall\leavevmode\fi
117     \pdfannot height 4pt width 4pt depth 2pt {%
118       /Subtype/Caret
119       /T(\expandafter\string\font@name)
120       \ifcase#1\or
121       /Subj(New font)/C[1 0 0]
122       \else
123       /Subj(Known font)/C[0 1 0]
124       \fi
125       /Contents(\MT@pdf@annot)

```

```

126 }%
127 \iftracingmicrotypeinpdfall\kern1pt \fi
128 \global\MT@inannotfalse
129 \fi
130 }
131 </debug>
132 </package>
133 </package|letterspace>

```

1.1.2 Visual debugging

The `microtype-show` package offers some tools for preparing protrusion settings. We make use of the `microtype` infrastructure, redefining some of its internal commands (done later, in sections 1.2.1 and 1.2.8). First, some preparation:

```

134 < *show >
135 \RequirePackage{iftex}
136 \ifetex\else
137 \PackageError{microtype-show}
138 {This package only works with e-TeX}{Use e-TeX}
139 \fi
140 \ifxetex
141 \PackageError{microtype-show}
142 {This package only works with pdfTeX or luaTeX}{Don't use XeTeX}
143 \fi
144 \PackageWarning{microtype-show}{DO NOT USE THIS PACKAGE FOR REAL DOCUMENTS\@gobble}
145 \DeclareOption*{\PassOptionsToPackage{\CurrentOption}{microtype}}
146 \ProcessOptions\relax
147 \PassOptionsToPackage{verbose}{microtype}
148 \RequirePackage{microtype,graphicx,xcolor}

```

`\ifShowGlyphIndex` The following commands are configurable:

```

\ifShowMissingGlyphs 149 \newif\ifShowGlyphIndex
\GlyphScaleFactor 150 \newif\ifShowMissingGlyphs
\Showbaselinecolor 151 \newcommand*\GlyphScaleFactor{2}
\Showposcolor 152 \newcommand*\Showbaselinecolor{\color{black!40}}
\Shownegcolor 153 \newcommand*\Showposcolor{\color{green!50}}
154 \newcommand*\Shownegcolor{\color{red!50}}
\MTS@printtext Make sure to have a readable font.
\MTS@show@index 155 \ifluatex
\MTS@crulefill 156 \def\MTS@printtext#1{\usefont{TU}{lmr}{m}{n}#1}
157 \else
158 \def\MTS@printtext#1{\usefont{T1}{cmr}{m}{n}#1}
159 \fi
160 \def\MTS@show@index#1{\ifShowGlyphIndex{\tiny$_{#1}$%
161 % \ifluatex^{\mathrm{#1}}%
162 % \MT@lua{tex.print(luatofload.aux.name_of_slot(tonumber([[#1]]))}}}\fi
163 % }\fi\space}
164 \def\MTS@crulefill{\leaders\hrule height \dimexpr1ex/2+.4pt depth -\dimexpr1ex/2\hfill}

```

`\MTS@Prot` Add the show commands to `microtype`'s setup.

```

\MTS@Char 165 \g@addto@macro\MT@setupfont{\MTS@Prot\MTS@Char}
166 \let\MTS@Prot\relax
167 \let\MTS@Char\relax

```

`\MTS@setup` Common setup. `\MTS@glyphlist` stores all glyphs we've seen.

```

\MTS@glyphlist 168 \def\MTS@setup{%
169 \fboxsep=0pt
170 \fboxrule=.1pt
171 \raggedright
172 \let\MTS@glyphlist\@gobble
173 \def\MT@feat{pr}%
174 }

```


`\ShowProtrusion` Activate the sleeper command, then trigger the setup.

```
175 \newcommand*\ShowProtrusion{%
176   \begingroup
177   \MTS@setup
178   \let\MTS@Prot\MTS@Prot@do
179   \def\MT@cat{c}%
180   \selectfont
181 }
```

`\MTS@Prot@do` But in all other cases of a font being picked up, there should be no special treatment. After we're done, select the previous font again.

```
182 \def\MTS@Prot@do{%
183   \MT@ltx@pickupfont
184   \let\MT@pr@split@val\MTS@pr@split@val
185   \let\MT@load@list\MTS@load@list
186   \let\MT@set@pr@prefixes@\MTS@set@pr@prefixes@
187   \MTS@show@pr
188   \endgroup
189   \aftergroup\selectfont
190 }
```

`\ShowCharacterInheritance`

```
191 \newcommand*\ShowCharacterInheritance{%
192   \begingroup
193   \MTS@setup
194   \let\MTS@Char\MTS@Char@do
195   \def\MT@cat{inh}%
196   \selectfont
197 }
```

`\MTS@Char@do`

```
198 \def\MTS@Char@do{%
199   \MT@ltx@pickupfont
200   \let\MT@set@pr@prefixes@\MTS@set@pr@prefixes@
201   \MTS@show@inheritance
202   \endgroup
203   \aftergroup\selectfont
204 }
```

`\ShowProtrusionLineGlyph` By glyph.

```
205 \newcommand*\ShowProtrusionLineGlyph[1]{%
206   {\MTS@setup
207   \MTS@showprotrusionline{~#1}}%
208 }
```

`\ShowProtrusionLineIndex` By glyph number.

```
209 \newcommand*\ShowProtrusionLineIndex[1]{%
210   {\MTS@setup
211   \MTS@showprotrusionline{#1}}%
212 }
```

`\MTS@showprotrusionline`

```
\MTS@lpcode 213 \def\MTS@showprotrusionline#1{%
\MTS@rprcode 214   \edef\MTS@lpcode{\number\lpcode\font#1}%
215   \edef\MTS@rprcode{\number\rprcode\font#1}%
216   \char#1%
217   lorem ipsum dolor sit amet, \MTS@crulefill\ %
218   \MTS@printtext{\ifnum\MTS@lpcode=z@Showbaselinecolor\fi[\MTS@lpcode]}
219   \fbox{\char#1}\MTS@show@index{\number#1}
220   \MTS@printtext{\ifnum\MTS@rprcode=z@Showbaselinecolor\fi[\MTS@rprcode]}
221   \MTS@crulefill\ you know the rest%
222   \char#1\par
223   \ShowDummyLine
224 }
```

`\ShowDummyLine` The first and last glyphs in this line should have a straight (non-protruded) shape. We also reset to default shape and series, because that's what, say, italic shapes should be matched with.

```
225 \newcommand*\ShowDummyLine{%
226 {\fontencoding{\encodingdefault}\fontseries{\seriesdefault}\fontshape{\shapedefault}%
227 \selectfont\noindent
228 here is the beginning of a line, \dotfill and here is its end}\par
229 }
```

`\ShowProtrusionAll`

```
230 \newcommand*\ShowProtrusionAll{%
231 {\MTS@setup
232 \MTS@lede{}}%
233 \MT@do@font{\iffontchar\font\@tempcnta\MTS@showprotrusionline{\@tempcnta}\fi}}%
234 }
```

`\ShowProtrusionDefined`

```
235 \newcommand*\ShowProtrusionDefined{%
236 {\MTS@setup
237 \MTS@lede{defined}%
238 \let\MTS@first@gobble
239 \let\MTS@second@firstofone
240 \MT@do@font{%
241 \MTS@firstorsecond
242 \MTS@temp{%
243 \iffontchar\font\@tempcnta\MTS@showprotrusionline{\@tempcnta}\else
244 \MT@warning@n1{Glyph \the\@tempcnta\space is missing in font
245 \MessageBreak\font@name}%
246 \fi}}}%
247 }
```

`\ShowProtrusionMissing`

```
248 \newcommand*\ShowProtrusionMissing{%
249 {\MTS@setup
250 \MTS@lede{missing}%
251 \let\MTS@first@firstofone
252 \let\MTS@second@gobble
253 \MT@do@font{%
254 \MTS@firstorsecond
255 \iffontchar\font\@tempcnta\MTS@temp{\MTS@showprotrusionline{\@tempcnta}}\fi}}%
256 }
```

`\MTS@lede`

```
257 \def\MTS@lede#1{%
258 \selectfont
259 \edef\MTS@font{\expandafter\string\font@name}%
260 \MTS@printtext{All glyphs \MT@ifempty{#1}{in}{#1 in protrusion list for}
261 font \texttt{\MTS@font:}\par
262 \ShowDummyLine
263 }
```

`\MTS@firstorsecond`

```
264 \def\MTS@firstorsecond{%
265 \let\MTS@temp\MTS@first
266 \ifnum\lcode\font\@tempcnta=\z@ \else
267 \let\MTS@temp\MTS@second
268 \fi
269 \ifnum\rpcode\font\@tempcnta=\z@ \else
270 \let\MTS@temp\MTS@second
271 \fi
272 }
```

`\MTS@charwd` Display the glyph with protrusion.

`\MTS@lp@` 273 \newdimen\MTS@charwd

`\MTS@rp@`

`\MTS@show@char@pr`

```

274 \newdimen\MTS@lp@
275 \newdimen\MTS@rp@
276 \def\MTS@show@char@pr#1{%
277   \xdef\MTS@glyphlist{\MTS@glyphlist,#1}%
278   \scalebox{\GlyphScaleFactor}{\strut\escapechar~\
279     \MTS@charwd=\fontcharwd\MT@font#1\relax

```

The baseline rule.

```

280   {\Showbaselinecolor\vrule width \dimexpr\MTS@charwd+.3em\relax height 1sp depth 0pt}%
281   \hskip-\dimexpr\MTS@charwd+.15em\relax

```

Left protrusion.

```

282   {\ifdim\MTS@lp@<\z@\Shownegcolor\else\Showposcolor\fi
283     \vrule width \ifdim\MTS@lp@<\z@ -\fi\MTS@lp@ height 1em depth .2em}%
284   \hskip\dimexpr\MTS@charwd\ifdim\MTS@lp@>\z@-\MTS@lp@\fi
285     \ifdim\MTS@rp@>\z@-\MTS@rp@\fi\relax

```

Right protrusion.

```

286   {\ifdim\MTS@rp@<\z@\Shownegcolor\else\Showposcolor\fi
287     \vrule width \ifdim\MTS@rp@<\z@ -\fi\MTS@rp@ height 1em depth .2em}%
288   \hskip-\dimexpr\MTS@charwd+\fbxrule\ifdim\MTS@rp@<\z@-\MTS@rp@\fi\relax

```

Finally the glyph, so that it's on top.

```

289   \fbox{\char#1}}\,%
290   \MTS@show@index{#1}%
291 }

```

`\MTS@show@char` Just show the glyph; the second command also remembers it.

```

\MTS@show@char@x 292 \def\MTS@show@char#1{\scalebox{\GlyphScaleFactor}{%
293   \strut\fbox{\char#1}}\MTS@show@index{#1}}
294 \def\MTS@show@char@x#1{\xdef\MTS@glyphlist{\MTS@glyphlist,#1}\MTS@show@char{#1}}

```

`\MTS@show@missing`

```

295 \def\MTS@show@missing{%
296   \MT@ifdefined@c@T\MT@pr@inh@name{%
297     \MTS@lp@=\z@ \MTS@rp@=\z@
298     \par \MTS@printtext{Glyphs not included in configuration (with defined heirs):}%
299     \MT@do@font{%
300       \edef\MT@temp{\the\@tempcnta}%
301       \MT@ifdefined@n@T\MT@inh@\MT@pr@inh@name @\MT@temp @}{%
302         \MT@exp@one@n\MT@in@clist\MT@temp\MTS@glyphlist
303         \ifMT@inlist@else \newline
304         \llap{\MTS@show@char@pr{\MT@temp} \MTS@printtext{=} }%
305         \MT@exp@cs\MT@map@tlist@c
306         {\MT@inh@\MT@pr@inh@name @\the\@tempcnta @}%
307         \MTS@show@char@x
308       \fi
309     }%
310   }%
311 }%
312 \MTS@show@missing@
313 }

```

`\MTS@show@missing@`

```

314 \def\MTS@show@missing@{%
315   \par \MTS@printtext{Other glyphs not in configuration:}\newline
316   \MT@do@font{%
317     \edef\MT@temp{\the\@tempcnta}%
318     \MT@exp@one@n\MT@in@clist\MT@temp\MTS@glyphlist
319     \ifMT@inlist@else
320       \MTS@show@char\MT@temp
321     \fi
322   }%
323 }

```

`\MTS@show@inheritance`

```

324 \def\MTS@show@inheritance{%
325   \MT@get@inh@list
326   \MTS@printtext{Character inheritance for font `~\texttt{\MT@font}' : \\
327   \MT@ifdefined@c@TF\MT@listname{%
328     \MTS@printtext{First matching list is for `~\texttt{\@tempa}' : \\
329     \texttt{\MT@listname} : } \par \leavevmode
330   \MT@do@font{%
331     \MT@ifdefined@n@T{MT@inh@MT@listname @\the\@tempcnta @}{%
332       \newline
333       \xdef\MTS@glyphlist{\MTS@glyphlist,\the\@tempcnta}%
334       \llap{\MTS@show@char{\the\@tempcnta}\MTS@printtext{= }}%
335       \MT@exp@cs\MT@map@tlist@c
336       {MT@inh@MT@listname @\the\@tempcnta @}%
337       \MTS@show@char@x
338     }%
339   }%
340   \MT@ifdefined@n@T{MT@inh@MT@listname @prefixes}{%
341     \par \MTS@printtext{(with prefixes :)}%
342     \@tempcntb=\z@
343     \let\MTS@show@char@pr\MTS@show@char@x
344     \MT@set@pr@prefixheirs}%
345   \ifShowMissingGlyphs\MTS@show@missing@f{i
346 }%
347   \MTS@printtext{NOT DEFINED}%
348 }%
349 \par
350 }
351 </show>

```

1.1.3 Requirements

Back to the user packages.

`\MT@plain` The letterspace package works with:

- 0: miniltx
- 1: eplain
- 2: L^AT_EX

For plain usage, we have to copy some commands from `latex.ltx`.

```

352 <*package|letterspace>
353 <*plain>
354 \def\MT@plain{2}
355 \ifx\documentclass@undefined
356   \def\MT@plain{1}
357   \def\hmode@bgroup{\leavevmode\bgroup}
358   \def\nfss@text#1{{\mbox{#1}}}
359   \let@typeset@protect\relax
360   \ifx\epain@undefined
361     \def\MT@plain{0}
362     \def\PackageWarning#1#2{%
363       \begingroup
364         \newlinechar=10 %
365         \def\MessageBreak{^^J(#1)\@spaces\@spaces\@spaces\@spaces}%
366         \immediate\write16{^^JPackage #1 Warning: #2\on@line.^^J}%
367       \endgroup
368     }
369     \def\on@line{ on input line \the\inputlineno}
370     \def\@spaces{\space\space\space\space}
371   \fi
372 \fi

```

`\MT@requires@latex` Better use groups than plain ifs.

```
373 \def\MT@requires@latex#1{%
374   \ifnum\MT@plain<#1 \expandafter\@secondoftwo\else\expandafter\@firstoftwo\fi
375 }
376 </plain>
```

For definitions that depend on e-TeX features.

```
377 \ifcase 0%
378   \ifx\TeXversion\undefined 1\else
379   \ifx\TeXversion\relax 1\else
380   \ifcase\TeXversion 1\fi
381   \fi
382 \fi
383 \else
384   \catcode`\^^Q=9 \catcode`\^^X=14
385 \fi
386 <letterspace>^^Q\MT@warning@n1{This package requires the etex extensions.
387 <letterspace>^^Q \MessageBreak Exiting}\MT@restore@catcodes\endinput
388 <debug>\MT@dinfo@n1{0}{this is
389 <debug>^^Q not
390 <debug> etex}
```

We check whether we are running pdfTeX, XeTeX, or LuaTeX, and load the appropriate definition file (later in section 1.4.2).

`\MT@clear@options` If we are using neither of these engines, or a too old version, we disable everything and exit.

```
391 \def\MT@clear@options{%
392 <plain> \MT@requires@latex1{%
393   \AtEndOfPackage{\let\unprocessedoptions\relax\MT@restore@catcodes}%
394   \let\CurrentOption\@empty
395 <plain> }\relax
396 }
```

A hack circumventing the TeX Live 2004 hack which undefines the pdfTeX primitives in the format in order to hide the fact that pdfTeX is being run from the user. This has been *fixed* in TeX Live 2005.

```
397 \ifx\normalpdftexversion\undefined \else
398   \let\pdftexversion \normalpdftexversion
399   \let\pdftexrevision \normalpdftexrevision
400   \let\pdfoutput \normalpdfoutput
401 \fi
```

`\MT@engine` Old packages might have let `\pdftexversion` to `\relax`.

```
\ifMT@engine@unfit 402 \let\MT@engine\relax
\MT@engine@minversion 403 \newif\ifMT@engine@unfit
404 \MT@engine@unfittrue
405 \ifx\pdftexversion\undefined \else
406   \ifx\pdftexversion\relax \else
407     \def\MT@engine{pdf}
408 <package> \def\MT@engine@minversion{0.14f}
409 <letterspace> \let\MT@pdf@or@lua\@firstoftwo
410 \ifnum\pdftexversion
411 <package> > 13
412 <letterspace> > 139
413 \MT@engine@unfitfalse
414 <package> \ifnum \pdftexversion=14
415 <package> \ifnum \expandafter`\pdftexrevision < `f
416 <package> \MT@engine@unfittrue
417 <package> \fi
418 <package> \fi
419 \fi
420 \fi
421 \fi
```

```

422 \ifx\directlua\@undefined \else
423   \ifx\directlua\relax \else
424     \def\MT@engine{lua}
425     \MT@engine@unfitfalse

```

Since approx. LuaTeX 0.80, `\pdfTeXversion` is let to `\luatexversion`, so that we would be fooled into thinking that pdfTeX is too old.

```

426 <*\letterspace>
427   \let\MT@pdf@or@lua@secondoftwo
428   \ifnum\luatexversion < 62 \MT@engine@unfittrue
429   \else
430     \let\MT@lua\directlua
431     \ifnum\luatexversion > 84
432       \let\pdfoutput\outputmode
433       \let\pdfprotrudechars\protrudechars
434       \let\pdfadjustspacing\adjustspacing
435     \fi
436   \fi
437 </\letterspace>
438 \fi
439 \fi
440 <*\package>
441 \ifx\MT@engine\relax
442   \ifx\XeTeXversion\@undefined \else
443     \ifx\XeTeXversion\relax \else
444       \def\MT@engine{xe}
445       \def\MT@engine@minversion{0.9997}
446       \ifdim 0\XeTeXrevision pt > 0.9996pt
447         \MT@engine@unfitfalse
448       \fi
449     \fi
450   \fi
451 \fi
452 </\package>
453 </\package|\letterspace>

```

`\MT@pdfTeX@no` pdfTeX's features for which we provide an interface here haven't always been available, and some specifics have changed over time. Therefore, we have to test which pdfTeX we're using, if any. `\MT@pdfTeX@no` will be used throughout the package to respectively do the right thing. Currently, we have to distinguish the following cases for pdfTeX:

- 0: not running pdfTeX
- 1: pdfTeX (< 0.14f) (already checked above)
- 2: + micro-typographic extensions (0.14f,g)
- 3: + protrusion relative to 1 em (≥ 0.14 h)
- 4: + automatic font expansion; protrusion no longer has to be set up first; scale factor fixed to 1000; default `\efcode = 1000` (≥ 1.20)
- 5: + `\(left,right)marginkern`; `\pdfnoligatures`; `\pdfstrcmp`; `\pdfescapestring` (≥ 1.30)
- 6: + adjustment of interword spacing; extra kerning; `\letterspacefont`; `\pdfmatch1`; `\pdftracingfonts`; always e-TeX (≥ 1.40)
- 7: + `\letterspacefont` doesn't disable ligatures and kerns; `\pdfcopyfont` ($\geq 1.40.4$)
- 8: + `\letterspacefont` uses explicit `\fontdimen 6` if specified ($\geq 1.40.23$)

1 This command was actually introduced in 1.30, but failed on strings longer than 1023 bytes.

```

454 {*pdf-}
455 {debug}\MT@info@n1{0}{this is pdftex \the\pdftexversion(\pdftexrevision)}
456 \def\MT@pdftex@no{8}
457 \ifnum\pdftexversion = 140
458   \ifnum\pdftexrevision < 23
459     \def\MT@pdftex@no{7}
460     \ifnum\pdftexrevision < 4
461       \def\MT@pdftex@no{6}
462     \fi
463   \fi
464 \else
465   \ifnum\pdftexversion < 140
466     \def\MT@pdftex@no{5}
467     \ifnum\pdftexversion < 130
468       \def\MT@pdftex@no{4}
469       \ifnum\pdftexversion < 120
470         \def\MT@pdftex@no{3}
471         \ifnum\pdftexversion = 14
472           \ifnum \expandafter`\pdftexrevision < `h
473             \def\MT@pdftex@no{2}
474           \fi
475         \fi
476       \fi
477     \fi
478   \fi
479 \fi
480 {debug}\MT@info@n1{0}{pdftex no.: \MT@pdftex@no}
481 {/pdf-}

```

`\MT@xetex@no` $X_{\text{E}}\text{T}_{\text{E}}\text{X}$ supports character protrusion since version 0.9997. This test is not necessary here, we just keep it for the (unlikely) case that features get added to $X_{\text{E}}\text{T}_{\text{E}}\text{X}$ in the future.

```

482 {*xe-}
483 {debug}\MT@info@n1{0}{this is xetex (\the\XeTeXversion\XeTeXrevision)}
484 %\ifdim 0\XeTeXrevision pt < 0.9997pt
485 % \def\MT@xetex@no{1}
486 %\else
487 % \def\MT@xetex@no{2}
488 %\fi
489 {debug}\MT@info@n1{0}{xetex no.: \MT@xetex@no}
490 {/xe-}

```

`\MT@luatex@no` Cases for Lua $\text{T}_{\text{E}}\text{X}$ (`\luatexversion` ought to have been enabled by the format):

- 0: N/A
- 1: Lua $\text{T}_{\text{E}}\text{X}$ (< 0.36)
- 2: + `\directlua` without state number (≥ 0.36)
- 3: + `\letterspacefont`; non-automatic expansion doesn't work anymore, and automatic expansion in DVI mode is realised by modifying the tracking, not the glyphs² (≥ 0.62)
- 4: + almost all of the pdf $\text{T}_{\text{E}}\text{X}$ primitives have been renamed (≥ 0.85)
- 5: + default `\efcode = 1000`; `\protrusionboundary` [doesn't seem to work] (≥ 0.90)
- 6: + `\glet` (≥ 1.10)

Also, sometime between 1.0.4 and 1.0.7, the function `font.setexpansion` has been introduced (but we're not using it for now).

² This may have been changed earlier, but I'm no longer able to find out when (the last version that actually works for me is 0.40).

```

491 <lua-
492 <debug>\MT@info@n10{this is luatex (\the\luatexversion)}
\MT@lua    Communicate with lua. Beginning with LuaTeX 0.36, \directlua no longer requires
           a state number.
493 \let\MT@lua\directlua
494 \def\MT@luatex@no{6}
495 \ifnum\luatexversion<110
496   \def\MT@luatex@no{5}
497   \ifnum\luatexversion<90
498     \def\MT@luatex@no{4}
499     \ifnum\luatexversion<85
500       \def\MT@luatex@no{3}
501       \ifnum\luatexversion<62
502         \def\MT@luatex@no{2}
503         \ifnum\luatexversion<36
504           \def\MT@lua{\directlua0}
505           \def\MT@luatex@no{1}
506         \fi
507       \fi
508     \fi
509   \fi
510 \fi
511 <debug>\MT@info@n1{0}{luatex no.: \MT@luatex@no}
512 </lua-

```

Abort if no capable engine found.

```

513 <package|letterspace>
514 \ifMT@engine@unfit
515   \MT@warning@n1{You
516     \ifx\MT@engine\relax
517       don't seem to be using pdftex%
518 <package>      , luatex or xetex%
519 <letterspace>  \space or luatex%
520     .\MessageBreak `~\MT@MT' only works with these engines.%
521   \else
522     are using a \MT@engine tex version older than
523 <package>      \MT@engine@minversion
524 <letterspace>  \MT@pdf@or@lua{1.40}{0.62}%
525     .\MessageBreak `~\MT@MT' does not work with this version.%
526     \MessageBreak Please install a newer version of \MT@engine tex.%
527   \fi
528   \MessageBreak I will quit now}
529 \MT@clear@options
530 \endinput\fi
531 </package|letterspace>

```

Still there? Then we can begin: We need the `keyval` package, including the ‘new’ `\KV@sp@def` implementation. For the patch option, we use `etoolbox`, which requires `e-TeX`.

```

532 <package|letterspace>
533 \RequirePackage{keyval}[1997/11/10]
534 <package>
535 ^^X\RequirePackage{etoolbox}
536 \providecommand\IfFormatAtLeastTF{\ifl@t@r\fmtversion}
\MT@toks    We need a token register,
537 \newtoks\MT@toks
\MT@tempbox  our own box,
538 \newbox\MT@tempbox
\ifMT@if@    and a scratch if.

```


539 \newif\ifMT@if@

1.1.4 Declarations

\ifMT@protrusion These are the global switches ...

\ifMT@expansion 540 \newif\ifMT@protrusion
 \ifMT@auto 541 \newif\ifMT@expansion
 \ifMT@selected 542 \newif\ifMT@auto
 \ifMT@selected 543 \newif\ifMT@selected
 \ifMT@noligatures 544 \newif\ifMT@noligatures
 \ifMT@draft 545 \newif\ifMT@draft
 \ifMT@draft 546 \newif\ifMT@draft
 \ifMT@disable 547 \newif\ifMT@spacing
 \ifMT@spacing 548 \newif\ifMT@kerning
 \ifMT@kerning 549 \newif\ifMT@tracking
 \ifMT@tracking 550 \newif\ifMT@babel

 \ifMT@babel [This line intentionally left blank.]
 \MT@pr@level ... and numbers.
 \MT@ex@level 551 \let\MT@pr@level\tw@
 \MT@pr@factor 552 \let\MT@ex@level\tw@
 \MT@ex@factor 553 \let\MT@pr@factor\@m
 \MT@ex@factor 554 \let\MT@ex@factor\@m
 \MT@sp@factor 555 \let\MT@sp@factor\@m
 \MT@kn@factor 556 \let\MT@kn@factor\@m

 \MT@pr@unit Default unit for protrusion settings is character width, for spacing space, for kerning
 \MT@sp@unit (and tracking) 1 em.
 \MT@kn@unit 557 \let\MT@pr@unit\@empty
 558 \let\MT@sp@unit\@m@ne
 559 \def\MT@kn@unit{1em}

\MT@stretch Expansion settings.
 \MT@shrink 560 \let\MT@stretch\@m@ne
 \MT@step 561 \let\MT@shrink \@m@ne
 562 \let\MT@step \@m@ne

\MT@pr@min Minimum and maximum values allowed by pdfTeX.
 \MT@pr@max 563 \def\MT@pr@min{-\@m}
 \MT@ex@min 564 \let\MT@pr@max\@m
 565 \let\MT@ex@min\z@
 \MT@ex@max 566 \let\MT@ex@max\@m
 \MT@sp@min 567 \def\MT@sp@min{-\@m}
 \MT@sp@max 568 \let\MT@sp@max\@m
 \MT@kn@min 569 \def\MT@kn@min{-\@m}
 \MT@kn@max 570 \let\MT@kn@max\@m
 \MT@tr@min 571 */package*
 572 \def\MT@tr@min{-\@m}
 \MT@tr@max 573 \let\MT@tr@max\@m
 574 *(*package)*

\MT@factor@default Default factor.
 575 \def\MT@factor@default{1000 }

\MT@stretch@default Default values for expansion.
 \MT@shrink@default 576 \def\MT@stretch@default{20 }
 577 \def\MT@shrink@default{20 }

\MT@letterspace Default value for letterspacing (in thousandths of 1 em).
 \MT@letterspace@default 578 */package*
 579 \let\MT@letterspace\@m@ne
 580 \def\MT@letterspace@default{100}

```

581 <*package>
\ifMT@document    Our private test whether we're still in the preamble.
582 \newif\ifMT@document
583 </package>
584 </package|letterspace>

```

1.1.5 Auxiliary macros

```

\MT@requires@pdftex    For definitions that depend on a particular pdfTeX resp. LuaTeX version.
\MT@requires@luatex 585 <*pdf-|lua->
586 \def
587 <pdf-> \MT@requires@pdftex%
588 <lua-> \MT@requires@luatex%
589 #1{\ifnum
590 <pdf-> \MT@pdftex@no
591 <lua-> \MT@luatex@no
592 <#1 \expandafter\@secondoftwo\else\expandafter\@firstoftwo\fi}
593 <lua-&debug>\MT@requires@luatex4{\MT@lua{tex.enableprimitives('pdf',{'tracingfonts'})}}\relax
594 <pdf-&debug>\MT@requires@pdftex6{
595 <debug>\pdftracingfonts=1
596 <pdf-&debug>}\relax
597 </pdf-|lua->

```

Some functions are loaded from a dedicated lua file. This avoids character escaping problems and incompatibilities between versions of LuaTeX. Unless running a recent L^AT_EX, we load the luatexbase package.

```
598 <lua->\IfFormatAtLeastTF{2016/01/01}\relax{\RequirePackage{luatexbase}}
```

We load luaotfload, because some of its functions are required in microtype.lua. This eliminates the need for the user to load fontspec before microtype. There will hardly be any LuaTeX documents that don't load this package, anyway. Since 2017/01/01, it is already loaded in the format.

```

599 <lua->\IfFormatAtLeastTF{2017/01/01}\relax{\RequirePackage{luaotfload}}
600 <letterspace>\MT@pdf@or@lua\relax{
601 <letterspace>\ifx\newluafunction\@undefined \input ltuatex \fi
602 <lua-|letterspace>\MT@lua{require("microtype")}
603 <letterspace>}

```

Here it begins. The module was contributed by Élie Roux.

```

604 <*luafile>
605
606 function microtype.info(...)
607   luatexbase.module_info("microtype",...)
608 end
609
610 local find      = string.find
611 local match     = string.match
612 local tex_write = tex.write
613
614 local catpackage
615 if luatexbase.registernumber then
616   catpackage = luatexbase.registernumber("catcodetable@atletter") -- LaTeX
617 else
618   catpackage = luatexbase.catcodetables.CatcodeTableLaTeXAtLetter -- luatexbase
619 end
620 function microtype.sprint (...)
621   tex.sprint(catpackage, ...)
622 end
623

```

We need the function `math.tointeger`, which is missing in older LuaTeX versions,

and ConTeXt (inherited via luaotfload) faultily overwrites its own definition. The following is the (correct) definition from `l-math.lua`.

```
624 if not math.tointeger or not pcall(math.tointeger,0) then
625   math.mininteger=-0x4FFFFFFFFFFFFF
626   math.maxinteger=0x4FFFFFFFFFFFFF
627   local floor=math.floor
628   function math.tointeger(n)
629     local f=floor(n)
630     return f==n and f or nil
631   end
632 end
633
634 </luafile>
```

To be continued, but first back to primitives.

`\MT@glet` Here's the forgotten one (finally implemented in LuaTeX).

```
635 <lua->\MT@requires@luatex6{\let\MT@glet\glet}\relax
636 <*package|letterspace>
637 \def\MT@glet{\global\let}
```

`\MT@exp@cs` Commands to create command sequences. Those that are going to be defined globally should be created inside a group so that the save stack won't explode.

```
638 \def\MT@exp@cs#1#2{\expandafter#1\csname#2\endcsname}
639 <*package>
640 \def\MT@exp@gcs#1#2{\begingroup\expandafter\endgroup\expandafter#1\csname#2\endcsname}
```

`\MT@def@n` This is `\@namedef` and global.

```
\MT@gdef@n 641 \def\MT@def@n{\MT@exp@cs\def}
642 \def\MT@gdef@n{\MT@exp@gcs\gdef}
```

`\MT@edef@n` Its expanding versions.

```
\MT@xdef@n 643 </package>
644 \def\MT@edef@n{\MT@exp@cs\edef}
645 <*package>
646 \def\MT@xdef@n{\MT@exp@gcs\xdef}
```

`\MT@let@nc` `\let` a `\csname` sequence to a command.

```
\MT@glet@nc 647 \def\MT@let@nc{\MT@exp@cs\let}
648 \def\MT@glet@nc{\MT@exp@gcs\MT@glet}
```

`\MT@let@cn` `\let` a command to a `\csname` sequence.

```
649 </package>
650 \def\MT@let@cn#1#2{\expandafter\let\expandafter#1\csname #2\endcsname}
651 <*package>
```

`\MT@let@nn` `\let` a `\csname` sequence to a `\csname` sequence.

```
\MT@glet@nn 652 \def\MT@let@nn{\MT@exp@cs\MT@let@cn}
653 \def\MT@glet@nn{\MT@exp@gcs{\global\expandafter\MT@let@cn}}
```

`\MT@@font` Remove trailing space from the font name.

```
654 \def\MT@@font{\expandafter\string\MT@font}
```

`\MT@exp@one@n` Expand the second token once and enclose it in braces.

```
655 </package>
656 \def\MT@exp@one@n#1#2{\expandafter#1\expandafter{#2}}
```

`\MT@exp@two@c` Expand the next two tokens after `<#1>` once.

```
657 \def\MT@exp@two@c#1{\expandafter\expandafter\expandafter#1\expandafter}
658 <*package>
```

`\MT@exp@two@n` Expand the next two tokens after `<#1>` once and enclose them in braces.

```
659 \def\MT@exp@two@n#1#2#3{%
660   \expandafter\expandafter\expandafter
```

```
661 #1\expandafter\expandafter\expandafter
662 {\expandafter#2\expandafter}\expandafter{#3}}
```

You do not wonder why `\MT@exp@one@c` doesn't exist, do you?

`\MT@ifdefined@c@T` Wrapper for testing whether command resp. `\csname` sequence is defined. If we
`\MT@ifdefined@c@TF` are running e-TeX, we will use its primitives `\ifdefined` and `\ifcsname`, which
`\MT@ifdefined@n@T` decreases memory use substantially.

```
\MT@ifdefined@n@TF 663 \def\MT@ifdefined@c@T#1{%
664 ^^X \ifdefined#1\expandafter\@firstofone\else\expandafter\@gobble\fi
665 ^^Q \ifx#1\@undefined\expandafter\@gobble\else\expandafter\@firstofone\fi
666 }
667 </package>
668 \def\MT@ifdefined@c@TF#1{%
669 ^^X \ifdefined#1\expandafter\@firstoftwo\else\expandafter\@secondoftwo\fi
670 <package>^^Q \ifx#1\@undefined
671 <package>^^Q \expandafter\@secondoftwo\else\expandafter\@firstoftwo\fi
672 }
673 \def\MT@ifdefined@n@T#1{%
674 ^^X \ifcsname#1\endcsname\expandafter\@firstofone\else\expandafter\@gobble\fi
675 <package>^^Q \begingroup\MT@exp@two@c\endgroup\ifx\csname #1\endcsname\relax
676 <package>^^Q \expandafter\@gobble\else\expandafter\@firstofone\fi
677 }
678 \def\MT@ifdefined@n@TF#1{%
679 ^^X \ifcsname#1\endcsname\expandafter\@firstoftwo\else\expandafter\@secondoftwo\fi
680 <package>^^Q \begingroup\MT@exp@two@c\endgroup\ifx\csname #1\endcsname\relax
681 <package>^^Q \expandafter\@secondoftwo\else\expandafter\@firstoftwo\fi
682 }
683 <*package>
```

`\MT@detokenize@n` Translate a macro into a token list. With e-TeX, we can use `\detokenize`. We also
`\MT@detokenize@c` need to remove the last trailing space; and only the last one – therefore the fiddling
`\MT@rem@last@space` (and the `\string` isn't perfect, of course).

```
684 \def\MT@detokenize@n#1{%
685 ^^X \expandafter\MT@rem@last@space\detokenize{#1} \@nil
686 ^^Q \string#1%
687 }
688 \def\MT@detokenize@c#1{%
689 ^^X \MT@exp@one@n\MT@detokenize@n#1%
690 ^^Q \MT@exp@two@c\MT@rem@last@space\strip@prefix\meaning#1 \@nil
691 }
692 \def\MT@rem@last@space#1 #2{#1%
693 \ifx\@nil#2\else \space
694 \expandafter\MT@rem@last@space\expandafter#2\fi
695 }
```

`\MT@ifempty` Test whether argument is empty.

```
696 </package>
697 \begingroup
698 \catcode`\%=12
699 \catcode`\&=14
700 \gdef\MT@ifempty#1{&
701 \if %#1&
702 \expandafter\@firstoftwo
703 \else
704 \expandafter\@secondoftwo
705 \fi
706 }
707 \endgroup
708 <*package>
```

`\MT@ifint` Test whether argument is an integer, using an old trick by Mr. Arseneau, or the latest and greatest from pdfTeX or LuaTeX (which also allows negative numbers, as required by the `letterspace` option).

```

709 </package>
710 </package|letterspace>
711 <pdf-\MT@requires@pdftex6{
712 <letterspace>\MT@pdf@or@lua{
713 <*pdf-|letterspace>
714 \def\MT@ifint#1{%
715   \ifcase\pdfmatch{^-*[0-9]+ *$}{#1}\relax
716   \expandafter\@secondoftwo
717   \else
718     \expandafter\@firstoftwo
719   \fi
720 }
721 }{
722 </pdf-|letterspace>
723 <*pdf-|xe-|letterspace>
724 \def\MT@ifint#1{%
725   \if!\ifnum9<1#1\else?\fi
726   \expandafter\@firstoftwo
727   \else
728     \expandafter\@secondoftwo
729   \fi
730 }
731 </pdf-|xe-|letterspace>
732 <pdf-|letterspace>}
733 <lua-\def\MT@ifint#1{\csname\MT@lua{microtype.if_int([[#1]])}\endcsname}
734 <*luafile>
735 local function if_int(s)
736   if find(s,"^-*[0-9]+ *$") then
737     tex_write("@firstoftwo")
738   else
739     tex_write("@secondoftwo")
740   end
741 end
742 microtype.if_int = if_int
743
744 </luafile>

```

`\MT@ifdimen` Test whether argument is dimension (or number). (nd and nc are new Didot resp. Cicero, added in pdfTEX 1.30; px is a pixel.)

```

745 <*pdf->
746 \MT@requires@pdftex6{
747 \def\MT@ifdimen#1{%
748   \ifcase\pdfmatch{^([0-9]+([.][0-9]+)?|[.][0-9]+)%
749     (em|ex|cm|mm|in|pc|pt|dd|cc|bp|sp|nd|nc|px)? *$}{#1}\relax
750   \expandafter\@secondoftwo
751   \else
752     \expandafter\@firstoftwo
753   \fi
754 }
755 }{
756 </pdf->
757 <*pdf-|xe->
758 \def\MT@ifdimen#1{%
759   \setbox\z@=\hbox{%
760     \MT@count=1#1\relax
761     \ifnum\MT@count=\@ne
762       \aftergroup\@secondoftwo
763     \else
764       \aftergroup\@firstoftwo
765     \fi
766   }%
767 }
768 </pdf-|xe->
769 <pdf->}
770 <lua-\def\MT@ifdimen#1{\csname\MT@lua{microtype.if_dimen([[#1]])}\endcsname}

```

```

771 <luafile>
772 local function if_dimen(s)
773   if (find(s, "^-[0-9]+(%a*) *$") or
774       find(s, "^-[0-9]*[.][0-9]+(%a*) *$")) then
775     tex_write("@firstoftwo")
776   else
777     tex_write("@secondoftwo")
778   end
779 end
780 microtype.if_dimen = if_dimen
781
782 </luafile>

```

`\MT@ifdim` Compare floating point numbers.

```

783 <package>
784 \def\MT@ifdim#1#2#3{%
785   \ifdim #1\p@ #2 #3\p@
786     \expandafter\@firstoftwo
787   \else
788     \expandafter\@secondoftwo
789   \fi
790 }
791 </package>

```

`\MT@ifstreq` Test whether two strings (fully expanded) are equal.

```

792 <pdf-xe->
793 <pdf->\MT@requires@pdftex5{
794 \def\MT@ifstreq#1#2{%
795   \ifnum
796     <pdf-> \pdfstrcmp
797     <xe-> \strcmp
798     {#1}{#2}=\z@
799     \expandafter\@firstoftwo
800   \else
801     \expandafter\@secondoftwo
802   \fi
803 }
804 </pdf-xe->
805 <pdf->
806 }{
807 \def\MT@ifstreq#1#2{%
808   \edef\MT@res@a{#1}%
809   \edef\MT@res@b{#2}%
810   \ifx\MT@res@a\MT@res@b
811     \expandafter\@firstoftwo
812   \else
813     \expandafter\@secondoftwo
814   \fi
815 }
816 }
817 </pdf->
818 <lua->\def\MT@ifstreq#1#2{\csname\MT@lua{microtype.if_str_eq([[#1]],[[#2]])}\endcsname}
819 <luafile>
820 local function if_str_eq(s1, s2)
821   if s1 == s2 then
822     tex_write("@firstoftwo")
823   else
824     tex_write("@secondoftwo")
825   end
826 end
827 microtype.if_str_eq = if_str_eq
828
829 </luafile>

```

`\MT@xadd` Add item to a list.

```

830 < *package >
831 \def\MT@xadd#1#2{%
832   \ifx#1\relax
833     \xdef#1{#2}%
834   \else
835     \xdef#1{#1#2}%
836   \fi
837 }

\MT@xaddb   Add item to the beginning.

838 \def\MT@xaddb#1#2{%
839   \ifx#1\relax
840     \xdef#1{#2}%
841   \else
842     \xdef#1{#2#1}%
843   \fi
844 }
845 < /package >

\MT@map@clist@n   Run < #2 > on all elements of the comma list < #1 >. This and the following is modelled
\MT@map@clist@c   after LATEX3 commands.
\MT@map@clist@ 846 < *package | letterspace >
\MT@clist@function 847 \def\MT@map@clist@n#1#2{%
\MT@clist@break 848   \ifx\@empty#1\else
849     \def\MT@clist@function##1{#2}%
850     \MT@map@clist@#1,\@nil,\@nnil
851   \fi
852 }

853 \def\MT@map@clist@c#1{\MT@exp@one@n\MT@map@clist@n#1}
854 \def\MT@map@clist@c#1,%
855   \ifx\@nil#1%
856     \expandafter\MT@clist@break
857   \fi
858   \MT@clist@function{#1}%
859   \MT@map@clist@
860 }
861 \let\MT@clist@function\@gobble
862 \def\MT@clist@break#1\@nnil{}
863 < *package >

\MT@map@tlist@n   Execute < #2 > on all elements of the token list < #1 >. \MT@tlist@break can be used
\MT@map@tlist@c   to jump out of the loop.
\MT@map@tlist@ 864 \def\MT@map@tlist@n#1#2{\MT@map@tlist@#2#1\@nnil}
\MT@tlist@break 865 \def\MT@map@tlist@c#1#2{\expandafter\MT@map@tlist@\expandafter#2#1\@nnil}
866 \def\MT@map@tlist@#1#2{%
867   \ifx\@nnil#2\else
868     #1{#2}%
869     \expandafter\MT@map@tlist@
870     \expandafter#1%
871   \fi
872 }
873 \def\MT@tlist@break#1\@nnil{\fi}

\ifMT@inlist@   Test whether item < #1 > is in comma list < #2 >. Using \pdfmatch would be slower.
\MT@in@clist 874 \newif\ifMT@inlist@
875 \def\MT@in@clist#1#2{%
876   \def\MT@res@a#1,#1,##2##3\@nnil{%
877     \ifx##2\@empty
878       \MT@inlist@false
879     \else
880       \MT@inlist@true
881     \fi
882   }%
883   \expandafter\MT@res@a\expandafter,#2,#1,\@empty\@nnil

```

```

884 }
\MT@rem@from@clist    Remove item <#1> from comma list <#2>. This is basically \@removeelement from
                      ltcntrl.dtx. Using \pdfmatch and \pdflastmatch here would be really slow!
885 \def\MT@rem@from@clist#1#2{%
886   \def\MT@res@a##1,#1,##2\MT@res@a{##1,##2\MT@res@b}%
887   \def\MT@res@b##1,\MT@res@b##2\MT@res@b{\ifx,##1\@empty\else##1\fi}%
888   \xdef#2{\MT@exp@two@c\MT@res@b\MT@res@a\expandafter,#2,\MT@res@b,#1,\MT@res@a}%
889 }

\MT@in@tlist         Test whether item is in token list. Since this isn't too elegant, I thought that at least
\MT@in@tlist         here, \pdfmatch would be more efficient – however, it turned out to be even slower
                      than this solution.
890 \def\MT@in@tlist#1#2{%
891   \MT@inlist@false
892   \def\MT@res@a{#1}%
893   \MT@map@tlist@c#2\MT@in@tlist@
894 }
895 \def\MT@in@tlist@#1{%
896   \edef\MT@res@b{#1}%
897   \ifx\MT@res@a\MT@res@b
898     \MT@inlist@true
899     \expandafter\MT@tlist@break
900   \fi
901 }

\MT@in@rlist         Test whether size \MT@size is in a list of ranges. Store the name of the list in
\MT@in@rlist         \MT@size@name
\MT@in@rlist@0      902 \def\MT@in@rlist#1{%
\MT@size@name        903   \MT@inlist@false
                      904   \MT@map@tlist@c#1\MT@in@rlist@
                      905 }
                      906 \def\MT@in@rlist@#1{\expandafter\MT@in@rlist@0#1}
                      907 \def\MT@in@rlist@0#1#2#3{%
                      908   \MT@ifdim{#2}=\m@ne{%
                      909     \MT@ifdim{#1}=\MT@size
                      910     \MT@inlist@true
                      911     \relax
                      912   }%
                      913   \MT@ifdim\MT@size<{#1}\relax{%
                      914     \MT@ifdim\MT@size<{#2}%
                      915     \MT@inlist@true
                      916     \relax
                      917   }%
                      918 }%
                      919 \ifMT@inlist@
                      920   \def\MT@size@name{#3}%
                      921   \expandafter\MT@tlist@break
                      922   \fi
                      923 }

\MT@loop             This is the same as LATEX's \loop, which we mustn't use, since this could confuse an
\MT@iterate          outer \loop in the document.
\MT@repeat           924 </package>
                      925 \def\MT@loop#1\MT@repeat{%
                      926   \def\MT@iterate{#1\relax\expandafter\MT@iterate\fi}%
                      927   \MT@iterate \let\MT@iterate\relax
                      928 }
                      929 \let\MT@repeat\fi

\MT@while@num        Execute <#3> from <#1> up to (excluding) <#2> (much faster than LATEX's \@whilenum).
                      930 \def\MT@while@num#1#2#3{%
                      931   \@tempcnta#1\relax
                      932   \MT@loop #3%

```



```

933 \advance\@tempcnta \@ne
934 \ifnum\@tempcnta < #2\MT@repeat
935 }
936 </package|letterspace>

```

`\MT@if@luaotf@font` For fonts loaded by `luaotfload` we query the font's table.

```

937 <letterspace>\MT@pdf@or@lua{\let\MT@if@luaotf@font\@secondoftwo}{
938 <*lua-|letterspace>
939 \def\MT@if@luaotf@font{\csname\MT@lua{%
940 microtype.if_luaotf_font()
941 }\endcsname
942 }
943 </lua-|letterspace>
944 <letterspace>}
945 <*luafile>
946 local function if_luaotf_font()
947 local thefont = font.getfont(font.current())
948 if thefont and ( thefont.format == "opentype" or thefont.format == "truetype" )
949 then tex.write("@firstoftwo")
950 else tex.write("@secondoftwo")
951 end
952 end
953 microtype.if_luaotf_font = if_luaotf_font
954
955 </luafile>

```

`\MT@do@font` Execute `<#1>` 256 times,

```

956 <pdf-|letterspace>\def\MT@do@font{\MT@while@num\z@\@ccclvi}
    resp. for the whole font for LuaTeX, if it's a Unicode font.
957 <*lua-
958 \def\MT@do@font#1{%
959 \MT@if@luaotf@font{%
960 \def\MT@do@font@function{#1}%
961 \MT@lua{microtype.do_font()}%
962 }{\MT@while@num\z@\@ccclvi{#1}}%
963 }
964 </lua-

```

This is the lua function, which is much faster than looping through all glyphs in $\text{T}_\text{E}\text{X}$. Legacy fonts (which this function should never work on) don't contain a `v.index` field. Our test whether `i` is larger than 1114111 may seem strange, but with the HarfBuzz renderer, we are not guaranteed to get a number within the Unicode range.

```

965 <*luafile>
966 local function do_font()
967 local thefont = font.getfont(font.current())
968 if thefont then
969 for i,v in next,thefont.characters do
970 if v.index == nil or ( v.index > 0 and i < 1114112 ) then
971 microtype.sprint([[ \@tempcnta=]]..i..[[\relax\MT@do@font@function]])
972 end
973 end
974 end
975 end
976 microtype.do_font = do_font
977
978 </luafile>

```

The $\text{X}_\text{E}\text{L}_\text{A}\text{T}_\text{E}\text{X}$ variant (it's slow ...!).

```

979 <*xe-
980 \def\MT@do@font#1{%
981 \@tempcnta=\z@
982 \MT@loop

```

```

983 \iffontchar\MT@font\@tempcnta #1\fi
984 \advance\@tempcnta\@ne
985 \ifnum\@tempcnta < \XeTeXlastfontchar\MT@font \MT@repeat
986 }
987 /<xe-
988 <package>

```

`\MT@count` Increment macro $\langle\#1\rangle$ by one. Saves using up too many counters. The e-TeX way is slightly faster.

`\MT@increment`

```

989 \newcount\MT@count
990 \def\MT@increment#1{%
991 ^^X \edef#1{\number\numexpr #1 + 1\relax}%
992 ^^Q \MT@count=#1\relax
993 ^^Q \advance\MT@count \@ne
994 ^^Q \edef#1{\number\MT@count}%
995 }

```

`\MT@scale` Multiply and divide a counter. If we are using e-TeX, we will use its `\numexpr` primitive. This has the advantage that it is less likely to run into arithmetic overflow. The result of the division will be rounded instead of truncated. Therefore, we'll get a different (more accurate) result in about half of the cases.

```

996 \def\MT@scale#1#2#3{%
997 ^^Q \multiply #1 #2\relax
998 \ifnum #3 = \z@
999 ^^X #1=\numexpr #1 * #2\relax
1000 \else
1001 ^^X #1=\numexpr #1 * #2 / #3\relax
1002 ^^Q \divide #1 #3\relax
1003 \fi
1004 }

```

`\MT@abbr@pr` Some abbreviations. Thus, we can have short command names but full-length log output.

`\MT@abbr@ex`

```

1005 \def\MT@abbr@pr{protrusion}
1006 \def\MT@abbr@ex{expansion}
1007 \def\MT@abbr@pr@c{protrusion codes}
1008 \def\MT@abbr@ex@c{expansion codes}
1009 \def\MT@abbr@pr@inh{protrusion inheritance}
1010 \def\MT@abbr@ex@inh{expansion inheritance}
1011 \def\MT@abbr@nl{noligatures}
1012 \def\MT@abbr@sp{spacing}
1013 \def\MT@abbr@sp@c{interword spacing codes}
1014 \def\MT@abbr@sp@inh{interword spacing inheritance}
1015 \def\MT@abbr@kn{kerning}
1016 \def\MT@abbr@kn@c{kerning codes}
1017 \def\MT@abbr@kn@inh{kerning inheritance}
1018 \def\MT@abbr@tr{tracking}
1019 \def\MT@abbr@tr@c{tracking amount}

```

`\MT@abbr@tr`

`\MT@rba@protrusion` These we also need the other way round.

`\MT@abbr@tr@c`

```

1020 \def\MT@rba@protrusion{pr}
1021 \def\MT@rba@expansion{ex}
1022 \def\MT@rba@spacing{sp}
1023 \def\MT@rba@kerning{kn}
1024 \def\MT@rba@tracking{tr}

```

`\MT@features` We can work on these lists to save some guards in the dtx file.

`\MT@features@long`

```

1025 \def\MT@features{pr,ex,sp,kn,tr}
1026 \def\MT@features@long{protrusion,expansion,spacing,kerning,tracking}

```

`\MT@is@feature`

Whenever an optional argument accepts a list of features, we can use this command to check whether a feature exists in order to prevent a rather confusing

‘Missing `\endcsname` inserted’ error message. The feature (long form) must be in $\langle \#1 \rangle$, the type of list to ignore in $\langle \#2 \rangle$, then comes the action.

```

1027 \def\MT@is@feature#1#2{%
1028   \MT@in@clist{#1}\MT@features@long
1029   \ifMT@inlist@
1030     \expandafter\@firstofone
1031   \else
1032     \MT@error{`#1' is not an available micro-typographic\MessageBreak
1033       feature. Ignoring #2}{Available features are: `~\MT@features@long'.}%
1034     \expandafter\@gobble
1035   \fi
1036 }
```

1.1.6 Compatibility

For the record, the following L^AT_EX kernel commands will be modified by `microtype`:

- `\pickup@font`
- `\do@subst@correction`
- `\add@accent` (all in section 1.2.10)
- `\showhyphens` (in section 1.4.6)

The `wordcount` package redefines the font-switching commands, which will break `microtype`. Since `microtype` doesn’t have an effect on the number of words in the document anyway, we will simply disable ourselves.

```

1037 \@ifl@aded{tex}{wordcount}{%
1038   \MT@warning@nl{Detected the `wordcount' utility.\MessageBreak
1039     Disabling `~\MT@MT', since it wouldn't work}%
1040   \MT@clear@options\endinput}\relax
```

The minimal class doesn’t define any size commands other than `\normalsize`, which will result in lots of warnings. Therefore we issue a warning about the warnings.

```

1041 \@ifclassloaded{minimal}{%
1042   \MT@warning@nl{Detected the `minimal' class.\MessageBreak
1043     Expect lots of warnings and some malfunctions.\MessageBreak
1044     You might want to use a proper class instead}%
1045 }\relax
```

`\MT@setup@` The setup is deferred until the end of the preamble. This has a couple of advantages: `\microtypesetup` can be used to change options later on in the preamble, and fonts don’t have to be set up before `microtype`.

```

1046 /package
1047 *package|letterspace
1048 plain\MT@requires@l@texl{
1049 \let\MT@setup@\empty
```

`\MT@addto@setup` We use our private hook to have better control over the timing. This will also work with `eplain`, but not with `miniltx` alone.

```

1050 \def\MT@addto@setup{\g@addto@macro\MT@setup@}
```

Don’t hesitate with `miniltx`.

```

1051 plain}{\let\MT@addto@setup@\@firstofone}
```

`\MT@with@package@T` We almost never do anything if a package is not loaded.

```

1052 \def\MT@with@package@T#1{\@ifpackageloaded{#1}\@firstofone\@gobble}
1053 /package|letterspace
1054 *package
```

`\MT@with@babel@and@T` L^AT_EX’s `\@ifpackagewith` ignores the class options.

```

1055 \def\MT@with@babel@and@T#1{%
1056   \MT@ifdefined@n@T{opt@babel.\@pkgextension}{%
1057     \expandtwoargs\MT@in@clist{#1}
1058     {\curname opt@babel.\@pkgextension\endcsname,\@classoptionslist}%
1059     \ifMT@inlist@expandafter@secondoftwo\else\expandafter@firstofone\fi
1060   }\@gobble
1061 }

```

`\MT@ledmac@setup` The `ledmac` package first saves each paragraph in a box, from which it then splits off the lines one by one. This will destroy character protrusion. (There aren't any problems with the `lineno` package, since it takes a different approach.) — . . . — After much to and fro, the situation has finally settled and there is a fix. Beginning with `pdfTeX` version 1.21b together with `ledpatch.sty` as of 2005/06/02 (v0.4), character protrusion will work at last.

Peter Wilson was so kind to provide the `\l@dunhbox@line` hook in `ledmac` to allow for protrusion. `\leftmargin` and `\rightmargin` are new primitives of `pdfTeX` 1.21b (aka. 1.30.0). They are also part of recent `XYTeX`. The successor packages `eledmac` and `reledmac` are also supported.

```

1062 </package>
1063 <pdf->\MT@requires@pdftex5{
1064 <*pdf-|lua-|xe-
1065   \def\MT@ledmac@setup{%
1066     \ifMT@protrusion
1067     \MT@ifdefined@c@TF\l@dunhbox@line{%

```

`\MT@led@unhbox@line` Hook.

```

1068     \MT@info@n1{Patching ((r)e)ledmac to enable character protrusion}%
1069     \let\MT@led@unhbox@line\l@dunhbox@line
1070     \renewcommand*{\l@dunhbox@line}[1]{%
1071       \ifhbox##1%
1072         \kern\leftmargin##1%
1073         \expandafter\MT@led@unhbox@line\expandafter##1\expandafter
1074         \kern\rightmargin##1%
1075       \fi
1076     }%
1077   }{%
1078     \MT@warning@n1{%
1079       Character protrusion in paragraphs with line\MessageBreak
1080       numbering will only work if you update ledmac,\MessageBreak
1081       or use one of its successors, eledmac or reledmac}%
1082     }%
1083   \fi
1084 }
1085 </pdf-|lua-|xe-
1086 <*pdf-
1087 }{
1088   \def\MT@ledmac@setup{%
1089     \ifMT@protrusion
1090     \MT@warning@n1{%
1091       The pdftex version you are using does not allow\MessageBreak
1092       character protrusion in paragraphs with line\MessageBreak
1093       numbering by the `((r)e)ledmac' package.\MessageBreak
1094       Upgrade pdftex to version 1.30 or later}%
1095     \fi
1096   }
1097 }
1098 </pdf->

```

The `shapepar` package (v2.2) fixes this in a similar manner by itself, so we don't have to bother.

`\MT@restore@p@h` Restore meaning of `\%` and `\#`.

```

1099 {*package|letterspace}
1100 {*package}
1101 \def\MT@restore@p@h{\chardef\%~\% \chardef\#~\# }
```

`\ifMT@fontspec` Two new conditionals for use with X_YTeX or LuaTeX.

```

\ifMT@xunicode 1102 \newif\ifMT@fontspec
1103 \MT@with@package@T{fontspec}\MT@fontspectrue
1104 \newif\ifMT@xunicode
1105 \MT@with@package@T{xunicode}\MT@xunicodetrue
```

We need the correct value of the former for configuration commands inside the preamble (to get the default families right).

```

1106 \IfFormatAtLeastTF{2020/10/01}
1107   {\IfFormatAtLeastTF{2021/11/15}
1108     {\AddToHook{package/fontspec/after}{\MT@fontspectrue}}
1109     {\AddToHook{package/after/fontspec}{\MT@fontspectrue}}}\relax
```

`\MT@maybe@gobble@with@tikz` If `\tikz@expandcount` is greater than zero, we're inside or at the end of a `tikz` node, where we don't want to adjust spacing after letterspacing, lest we disturb `tikz`. This is used in `\MT@afteraftergroup`, and we don't need it for `letterspace`.

```

\MT@tikz@setup 1110 \let\MT@maybe@gobble@with@tikz@\firstofone
1111 \def\MT@tikz@setup{%
1112   \def\MT@maybe@gobble@with@tikz{%
1113     \ifnum\tikz@expandcount>\z@
1114       \expandafter\@gobble
1115     \else
1116       \expandafter\@firstofone
1117     \fi}}
```

`\MT@setupfont@hook` This hook will be executed every time a font is set up (inside a group).

In the preamble, we check for the packages each time a font is set up. Thus, it will work regardless when the packages are loaded.

Even for packages that don't activate any characters in the preamble (like `babel` and `csquotes`), we have to check here, too, in case they were loaded before `microtype`, and a font is loaded `\AtBeginDocument`, before `microtype`. (This is no longer needed, since the complete setup is now deferred until the end of the preamble. However, it is still necessary for `defersetup=false`.)

```

1118 \def\MT@setupfont@hook{%
1119   \MT@if@false
1120   \MT@with@babel@and@T{spanish} \MT@if@true
1121   \MT@with@babel@and@T{galician} \MT@if@true
1122   \MT@with@babel@and@T{mexican} \MT@if@true
1123   \ifMT@if@MT@ifdefined@c@T\percentsign{\let\%percentsign}\fi
```

Using `\@disablequotes`, we can restore the original meaning of all characters made active by `csquotes`. (It would be doable for older versions, too, but we won't bother.)

```

1124 \MT@with@package@T{csquotes}{%
1125   \@ifpackage@later{csquotes}{2005/05/11}\@disablequotes\relax}%
```

`hyperref` redefines `\%` and `\#` inside a `\url`. We restore the original meanings (which we can only hope are correct). Same for `tex4ht` and `mathastext`.

```

1126 \MT@if@false
1127 \MT@with@package@T{hyperref} \MT@if@true
1128 \MT@with@package@T{tex4ht} \MT@if@true
1129 \MT@with@package@T{mathastext}\MT@if@true
```

```

1130 \ifMT@if@MT@restore@p@h\fi
1131 \MT@with@package@T{tikz}\MT@tikz@setup
1132 }

```

Check again at the end of the preamble.

```

1133 </package>
1134 \MT@addto@setup{%
1135 <*package>

```

Our competitor, the pdfcpot package, must not be tolerated!

```

1136 \MT@with@package@T{pdfcpot}{%
1137 \MT@error{Detected the `pdfcpot' package!\MessageBreak
1138 \MT@MT' and `pdfcpot' may not be used together}{%
1139 The `pdfcpot' package provides an interface to character protrusion.\MessageBreak
1140 So does the `MT@MT' package. Using both packages at the same\MessageBreak
1141 time will almost certainly lead to undesired results. Have your choice!}%
1142 }%
1143 \MT@with@package@T {ledmac}\MT@ledmac@setup
1144 \MT@with@package@T {eledmac}\MT@ledmac@setup
1145 \MT@with@package@T{reledmac}\MT@ledmac@setup
1146 \MT@with@package@T{xunicode}\MT@xunicodetrue
1147 \MT@with@package@T{fontspec}\MT@fontspectrue

```

We can clean up \MT@setupfont@hook now.

```

1148 \MT@gl@et\MT@setupfont@hook\@empty

```

microtype is so so loquacious ... Sometimes you just want to silence it when debugging a document.³

```

1149 %\gdef\MT@setupfont@hook{\ifnum\tracingmacros>\z@\tracingnone
1150 % \MT@info{<->Silently doing my `magic' (Mittelbach) for font\MessageBreak->\MT@font}\fi}%
1151 \MT@if@false
1152 \MT@with@babel@and@T{spanish} \MT@if@true
1153 \MT@with@babel@and@T{galician}\MT@if@true
1154 \MT@with@babel@and@T{mexican} \MT@if@true
1155 \ifMT@if@
1156 \g@addto@macro\MT@setupfont@hook{%
1157 \MT@ifdefined@c@T\percentsign{\let\%\percentsign}}%
1158 \fi
1159 \MT@with@package@T{csquotes}{%
1160 \ifpackage@later{csquotes}{2005/05/11}{%
1161 \g@addto@macro\MT@setupfont@hook\@disablequotes

```

For \leftprotrusion, we disable csquotes's tracking of group level and type, because we'll probably be typesetting the opening quotes only.

```

1162 \g@addto@macro\MT@prot@hook{%
1163 \def\csq@bqgroup{\begingroup\leavevmode
1164 \let\MT@csq@eqgroup@endgroup}%
1165 \let\csq@eqgroup@endgroup}%
1166 }{%
1167 \MT@warning@n1{%
1168 Should you receive warnings about unknown slot\MessageBreak
1169 numbers, try upgrading the `csquotes' package}%
1170 }%
1171 }%

```

We disable microtype's additions inside hyperref's \pdfstringdef, which redefines lots of commands. hyperref doesn't work with plain TeX, so in that case we don't bother.

```

1172 \MT@if@false
1173 </package>
1174 <plain> \MT@requires@latex2{
1175 \MT@with@package@T{hyperref}{%

```

3 Cf. <https://www.youtube.com/watch?v=7FQLnggVgDE&t=38m24s>

```

1176   \pdfstringdefDisableCommands{%
1177 <*/package>
1178     \MT@ltx@pickupfont
1179     \let\textmicrotypecontext\@secondoftwo
1180     \let\microtypecontext\@gobble
1181 </package>
1182     \def\lsstyle{\pdfstringdefWarn\lsstyle}%
1183     \def\textls#1#\pdfstringdefWarn\textls}%
1184   }%
1185 <package>   \MT@if@true
1186   }%
1187 <plain>   }\relax
1188 <*/package>
1189   \MT@with@package@T{tex4ht}{%
1190     \def\MT@apply@patch#1{\MT@info{Not applying patch `#1' (for tex4ht)}}%
1191     \def\MT@undo@patch#1{\MT@info{Not undoing patch `#1' (for tex4ht)}}%
1192     \MT@if@true
1193   }%
1194   \MT@with@package@T{mathastext}\MT@if@true
1195   \ifMT@if@vg@addto@macro\MT@setupfont@hook\MT@restore@p@h\fi

```

The listings package makes numbers and letters active,

```

1196   \MT@with@package@T{listings}{%
1197     \g@addto@macro\MT@cfg@catcodes{%
1198       \MT@while@num{"30"}{"3A"}{\catcode\@tempcnta=12\relax}%
1199       \MT@while@num{"41"}{"5B"}{\catcode\@tempcnta=11\relax}%
1200       \MT@while@num{"61"}{"7B"}{\catcode\@tempcnta=11\relax}%
1201     }%

```

... and the backslash (which would lead to problems in \MT@get@slot).

```

1202   \g@addto@macro\MT@setupfont@hook{%
1203     \catcode`\=\z@

```

Inside a listing, \space is redefined.

```

1204   \def\space{ }%

```

When loaded with the extendedchar option, listings will also redefine 8-bit active characters (inputenc). Luckily, this simple redefinition will make them expand to their original definition, so that they could be used in the configuration.

```

1205   \let\lst@ProcessLetter\@empty
1206   }%
1207   }%

```

Of course, using both soul's and microtype's letterspacing mechanisms at the same time doesn't make much sense. But soul can do more, e.g., underlining. The optional argument to \textls may not be used. Also, we have to disable expansion within soul's trial run. Under plain T_EX, soul doesn't register itself the L^AT_EX way, so we just test for its main command.

```

1208 </package>
1209   \ifx\SOULE@\undefined\else
1210     \soulregister\lsstyle 0%
1211     \soulregister\textls 1%
1212     \ifx\XeTeXrevision\undefined
1213       \let\MT@SOULE@doword\SOULE@doword
1214       \def\SOULE@doword{\pdfadjustspacing=\z@ \MT@SOULE@doword}%
1215     \fi
1216   \fi
1217 <*/package>
1218   \MT@with@package@T{tikz}\MT@tikz@setup

```

Compatibility with the pinyin package (from CJK): disable microtype in \py@macron, which loads a different font for the accent. In older versions of pinyin (pre-4.6.0),

`\py@macron` had only one argument.

```

1219 \MT@with@package@T{pinyin}{%
1220 \let\MT@orig@py@macron\py@macron
1221 \@ifpackagelater{pinyin}{2005/08/11}{% 4.6.0
1222 \def\py@macron#1#2{%
1223 \MT@!tx@pickupfont
1224 \MT@orig@py@macron{#1}{#2}%
1225 \MT@MT@pickupfont}%
1226 }{%
1227 \def\py@macron#1{%
1228 \MT@!tx@pickupfont
1229 \MT@orig@py@macron{#1}%
1230 \MT@MT@pickupfont}%
1231 }%
1232 }%

```

The `luainputenc` package makes all characters active, which can lead into problems when the `unicode-math` package is loaded, as the latter doesn't always define characters in LICR-conforming ways. By disabling the following command, we prevent errors; warnings about unknown slots, however, may still occur – but that's one of the unavoidable downsides of using `luainputenc`.

```

1233 \MT@with@package@T{unicode-math}{%
1234 \MT@!et@enc{__um_sub_or_super:n}\relax
1235 }%
1236 </package>
1237 }
1238 <*package>

```

1.1.7 Protrusion patches

`\ifMT@patch@ok` We have to patch some macros to get protrusion right.

```

\MT@patch@info 1239 \newif\ifMT@patch@ok
\MT@patch@warn 1240 \def\MT@patch@info#1{\MT@info{Applying patch `#1'}}
\MT@patch@warn 1241 \def\MT@patch@warn#1{\MT@warning{Unable to apply patch `#1'}}
\MT@patch@undef 1242 \def\MT@patch@undef#1{\MT@warning{Patch `#1' undefined.\MessageBreak Cannot apply it}}
\MT@patch@info@undo 1243 \def\MT@patch@info@undo#1{\MT@info{Reverting patch `#1'}}

```

`\MT@patches@def` Define a patch and add it to the list of patches. The third argument may contain more revert commands, but will mostly be empty.

```

\MT@define@patch
1244 \let\MT@patches@def@gobble
1245 \def\MT@define@patch#1#2#3{%
1246 \MT@ifdefined@n@TF{MT@patch@#1}{%
1247 \MT@warning{Patch `#1' already defined.\MessageBreak Cannot define it}%
1248 }{%
1249 \g@addto@macro\MT@patches@def{,#1}%
1250 \MT@gdef@n{MT@patch@#1}{#2}%
1251 \MT@gdef@n{MT@patch@undo@#1}{#3}%
1252 }%
1253 }

```

`\MT@redefined@patches` We also provide an easier way of redefining patches, which would otherwise be a bit tricky because of the timing (patches are defined *and* executed ABD).

```

\MT@redefine@patch
1254 \let\MT@redefined@patches@empty
1255 \def\MT@redefine@patch#1#2#3{%
1256 \g@addto@macro\MT@redefined@patches{%
1257 \MT@ifdefined@n@TF{MT@patch@#1}{%
1258 \MT@gdef@n{MT@patch@#1}{#2}%
1259 \MT@gdef@n{MT@patch@undo@#1}{#3}%
1260 }{%
1261 \MT@warning{Patch `#1' undefined.\MessageBreak Cannot redefine it}%
1262 }%
1263 }%

```


1264 }

Both macros are only allowed in the preamble.

1265 \@onlypreamble\MT@define@patch

1266 \@onlypreamble\MT@redefine@patch

\MT@append@patch Wrappers around etoolbox commands. We also remember the original command
 \MT@patch@patch to allow unpatching.

```
1267 \def\MT@append@patch#1#2{%
1268   \MT@remember@patch{#1}%
1269   \apptocmd#1{#2}\relax\MT@patch@okfalse
1270 }
1271 \def\MT@patch@patch#1#2#3{%
1272   \MT@remember@patch{#1}%
1273   \patchcmd#1{#2}{#3}\relax\MT@patch@okfalse
1274 }
```

\MT@remember@patch Remember the original definition and add to undo command.

```
1275 \def\MT@remember@patch#1{%
1276   \MT@ifdefined@n@TF{MT@patch@saves@\string#1}\relax
1277   { \MT@let@nc{MT@patch@saves@\string#1}#1%
1278     \MT@exp@cs@g@addto@macro{MT@patch@undo@@\MT@patch@name}%
1279     { \MT@let@cn#1{MT@patch@saves@\string#1}}}%
1280 }
```

\MT@patches@applied Apply a previously defined patch. With some packages, we have to reset catcodes
 \MT@apply@patch (e.g., for the 'item' patch with Spanish babel, which makes '>' active).

```
1281 \let\MT@patches@applied@gobble
1282 \def\MT@apply@patch#1{%
1283   \MT@patch@oktrue
1284   \MT@ifdefined@n@TF{MT@patch@@#1}
1285   { \MT@in@clist{#1}\MT@patches@applied
1286     \ifMT@inlist@
1287       \MT@warning{Patch `#1' has already been applied,\MessageBreak
1288         cannot reapply it}%
1289     \else
1290       \let\MT@restore@catcodes\empty
1291       \MT@with@babel@and@T{spanish} { \MT@fix@catcode{62}{12}}% >
1292       \MT@with@babel@and@T{galician} { \MT@fix@catcode{62}{12}}% >
1293       \def\MT@patch@name{#1}%
1294       \g@addto@macro\MT@patches@applied{,#1}%
1295       \@nameuse{MT@patch@@#1}%
1296       \@nameuse{MT@patch@}\ifMT@patch@ok info\else warn\fi}{#1}%
1297       \MT@restore@catcodes
1298       \fi
1299       { \MT@patch@undef{#1}}%
1300 }
```

\MT@undo@patch Undo a patch (if indeed previously applied).

```
1301 \def\MT@undo@patch#1{%
1302   \MT@in@clist{#1}\MT@patches@applied
1303   \ifMT@inlist@
1304     \MT@rem@from@clist{#1}\MT@patches@applied
1305     \@nameuse{MT@patch@undo@@#1}%
1306     \MT@patch@info@undo{#1}%
1307   \else
1308     \MT@warning{Patch `#1' hasn't been applied,\MessageBreak cannot revert it}%
1309   \fi
1310 }
```

Unfortunately, etoolbox is a bit bitchy with hashes in arguments (but who would blame it), so I currently see no other solution than to temporarily reset the catcode of the # character.

1311 {\catcode`\#=12

```
1312 \MT@addto@setup{%
```

Now for the actual patches:

`item`: `\@item`, which is a kind of catch-all, as it's internally used for most basic environments (e.g., `itemize`, `enumerate`, but also `quote`, `flushleft` etc.). For verse (and probably other environments), we also have to patch `\everypar ...`

- for the base classes

```
1313 \MT@define@patch{item}{%
1314 \MT@append@patch{\@item\leftprotrusion
1315 \MT@patch@patch{\@item{\everypar{}}{\everypar{\leftprotrusion}}%
```

- beamer patches it too

```
1316 \ifclassloaded{beamer}
1317 {\MT@append@patch\beamer@callorigitem\leftprotrusion
1318 \MT@patch@patch\beamer@callorigitem\ignorespaces}\ignorespaces\leftprotrusion}}
```

- the `simplecv` class

```
1319 {\ifclassloaded{simplecv}
1320 {\MT@append@patch\@topic@item\leftprotrusion}
1321 {}}%
1322 }{}%
```

`toc`: TOC and friends

```
1323 \MT@define@patch{toc}{%
1324 \MT@append@patch\numberline\leftprotrusion
```

- for the `memoir` class we also fix the extra leader problem ...

```
1325 \ifclassloaded{memoir}
1326 {\MT@append@patch\booknumberline\leftprotrusion
1327 \MT@append@patch\partnumberline\leftprotrusion
1328 \MT@append@patch\chapternumberline\leftprotrusion
1329 \MT@append@patch\cftbookafterpnum\noprotrusion
1330 \MT@append@patch\cftpartafterpnum\noprotrusion
1331 \MT@append@patch\cftchapterafterpnum\noprotrusion
1332 \MT@append@patch\cftsectionafterpnum\noprotrusion
1333 \MT@append@patch\cftsubsectionafterpnum\noprotrusion
1334 \MT@append@patch\cftsubsubsectionafterpnum\noprotrusion
1335 \MT@append@patch\cftparagraphafterpnum\noprotrusion
1336 \MT@append@patch\cftsubparagraphafterpnum\noprotrusion
1337 \MT@append@patch\cftfigureafterpnum\noprotrusion
1338 \MT@append@patch\cfttableafterpnum\noprotrusion}
1339 {}}%
1340 }{}%
```

- for the KOMA classes (which load the `tocbasic` package) we additionally have to switch protrusion back on; this will re-introduce the risk of getting an extra leader dot, but I currently don't see how to easily add `\noprotrusion`. Therefore, I'll skip this patch for now, saving the joy of wading through `scr` files for later, all the while waiting for somebody who would understand KOMA better than me.

```
1341 % \ifpackageloaded{tocbasic}
1342 % {\MT@define@patch{toc}
1343 % {\MT@append@patch\numberline\leftprotrusion
1344 % \setuptoc{toc}{noprotrusion}%
1345 % \setuptoc{lof}{noprotrusion}%
1346 % \setuptoc{lot}{noprotrusion}}
1347 % {\unsettoc{toc}{noprotrusion}%
1348 % \unsettoc{lof}{noprotrusion}%
1349 % \unsettoc{lot}{noprotrusion}}{}%
```

- (a patch for `titletoc` would also be worthwhile ...)

`eqnum`: equation numbers

- `IEEEtran`

```

1350 \MT@define@patch{eqnum}{%
1351 \ifclassloaded{IEEEtran}
1352 {\MT@patch@patch\theequationdis{()}{\leftprotrusion{()}}%
1353 \MT@patch@patch\theequationdis{()}{\rightprotrusion{()}}}%
1354 \MT@patch@patch\theIEEEsubequationdis{()}{\leftprotrusion{()}}%
1355 \MT@patch@patch\theIEEEsubequationdis{()}{\rightprotrusion{()}}}%
1356 }%

```

- `\eqref` (`amsmath`) relies on `\tagform@`, so we have to have it use the original definition.

```

1357 \ifpackageloaded{amsmath}
1358 {\MT@patch@patch\tagform@{()}{\leftprotrusion{()}}%
1359 \MT@patch@patch\tagform@{()}{\rightprotrusion{()}}}%

```

The command has been made robust in 2022.

```

1360 \MT@ifdefined@n@TF{eqref }
1361 {\MT@exp@cs\MT@patch@patch{eqref }}{\MT@patch@patch\eqref }
1362 {\tagform@}{\@nameuse{MT@patch@saved@string\tagform@}}%

```

- If the user has altered the tags' appearance via `mathtools`'s `\newtagform` interface, our patch won't have any effect. We don't issue a warning because `\(left|right)protrusion` might have been specified appropriately in `\newtagform`. We could also patch the latter command (or, to be more precise, `\MT_define_tagform:nwnn`), but the timing is a bit tricky, so for now info it is.

```

1363 \MT@with@package@T{mathtools}{%
1364 \ifMT@patch@ok@else \MT@patch@oktrue
1365 \MT@info@n1{The `eqnum' patch may not be effective because you are\MessageBreak
1366 using the mathtools package. Make sure to insert\MessageBreak
1367 ` \@backslashchar leftprotrusion' and
1368 ` \@backslashchar rightprotrusion' as\MessageBreak
1369 appropriate in mathtools's ` \@backslashchar newtagform' command}%
1370 \fi}}
1371 {\MT@patch@patch\@eqnnum{()}{\leftprotrusion{()}}%
1372 \MT@patch@patch\@eqnnum{()}{\rightprotrusion{()}}}%
1373 }%

```

`footnote`: footnote text (only visible with block paragraphs)

- `hyperref` also patches this command (but only if `hyperfootnotes=true`, `implicit=true` and `\hyper@nopatch@footnote` is undefined)

```

1374 \MT@define@patch{footnote}{%
1375 \ifpackageloaded{hyperref}
1376 {\MT@if@false
1377 \ifHy@implicit
1378 \ifHy@hyperfootnotes
1379 \MT@ifdefined@c@TF\hyper@nopatch@footnote\relax
1380 \MT@if@true
1381 \fi
1382 \fi
1383 \ifMT@if@expandafter@firstoftwo@else\expandafter@secondoftwo\fi}
1384 \@secondoftwo
1385 {\MT@patch@patch\@footnotetext{\ignorespaces}{\ignorespaces\leftprotrusion}%
1386 \MT@patch@patch\@footnotetext{\@empty\ignorespaces}{\@empty\ignorespaces\leftprotrusion}%
1387 \MT@patch@patch\@mpfootnotetext{\ignorespaces}{\ignorespaces\leftprotrusion}%
1388 \MT@patch@patch\@mpfootnotetext

```

```

1389         {{\expandafter\hyper@@anchor\expandafter
1390          \Hy@footnote@currentHref}{\relax}}\ignorespaces}
1391         {{\expandafter\hyper@@anchor\expandafter
1392          \Hy@footnote@currentHref}{\relax}}\ignorespaces\leftprotrusion}}

```

- memoir additionally allows footnotes in the margins

```

1393         {\ifclassloaded{memoir}
1394          \MT@patch@patch@footnotetext{\foottextfont #1}{\foottextfont\leftprotrusion #1}%
1395          \MT@patch@patch@mpfootnotetext{\foottextfont #1}{\foottextfont\leftprotrusion #1}}

```

- beamer has it its own way, of course

```

1396         {\ifclassloaded{beamer}
1397          \MT@exp@cs\MT@patch@patch{beamerx@string\beamer@framefootnotetext}
1398          \ignorespaces}\ignorespaces\leftprotrusion}%
1399          \MT@exp@cs\MT@patch@patch{beamerx@string\mpfootnotetext}
1400          \ignorespaces}\ignorespaces\leftprotrusion}}

```

- the KOMA classes

```

1401         {\MT@ifdefined@c@TF\KOMAClassName
1402          \MT@patch@patch\scr@saved@footnotetext{\ignorespaces}\ignorespaces\leftprotrusion}}%

```

- the base classes

```

1403         {\MT@patch@patch@footnotetext{\ignorespaces}\ignorespaces\leftprotrusion}}%
1404         \MT@patch@patch@mpfootnotetext{\ignorespaces}\ignorespaces\leftprotrusion}}}%
1405     }{}%

```

`verbatim`: disable all microtypographic extensions in `verbatim` blocks. (This could have been a nice opportunity to use the new \LaTeX hook management, however, the hook here is executed too early – namely, before the `\par` in `\@verbatim`, which may result in spilling the microtypographic settings to the preceding paragraph – so we’re resorting to patching, again.)

- Appending to `\@verbatim` works for, at least, the standard classes, `verbatim` (and `memoir`); the implementations in `fancvrb` and `listings` don’t allow protrusion anyway.

```

1406     \MT@define@patch{verbatim}{%
1407     \MT@append@patch\@verbatim{\microtypesetup{activate=false}}%

```

- package `alltt`

```

1408     \MT@with@package@T{alltt}{\MT@append@patch\alltt{\microtypesetup{activate=false}}}%
1409     }{}

```

Finally, execute any redefinitions.

```

1410     \MT@redefined@patches
1411     }}
1412     </package>
1413     </package|letterspace>

```

1.2 Font setup

We need a font (the `minimal` class doesn’t load one).

```

1414     <package>\expandafter\ifx\the\font\nullfont\normalfont\fi

```

`\MT@setupfont` Setting up a font entails checking for each feature whether it should be applied to the current font (`\MT@font`).

```

1415     <*pdf-|lua-|xe-
1416     \def\MT@setupfont{%

```

With Xe_{La}TeX and Lua_{La}TeX the font may not be actually loaded, hence we might see a wrong font (in `\MT@get@slot`). Therefore, we first load the current font.

```
1417 <xe-|lua- > \MT@font
```

We might have to disable stuff when used together with adventurous packages.

```
1418 \MT@setupfont@hook}
```

This will use a copy of the font (allowing for expansion parameter variation and the use of more than one set of protrusion factors for a font within one paragraph).

```
1419 <pdf- > \MT@requires@pdftex7{
1420 <pdf-|lua- > \g@addto@macro\MT@setupfont\MT@copy@font
1421 <pdf- > \relax
```

The font properties must be extracted from `\MT@font`, since the current value of `\f@encoding` and friends may be wrong!

```
1422 \g@addto@macro\MT@setupfont{%
1423 \MT@exp@two@c\MT@split@name\string\MT@font/\@nil
```

Try to find a configuration file for the current font family.

```
1424 \MT@exp@one@n\MT@find@file\MT@family
1425 \ifx\MT@familyalias\@empty \else
1426 \MT@exp@one@n\MT@find@file\MT@familyalias\fi
```

We have to make sure that `\cf@encoding` expands to the correct value (for later, in `\MT@get@slot`), which isn't the case when `\selectfont` chooses a new encoding (this would be done a second later in `\selectfont`, anyway – three lines, to be exact). (I think, I do not need this anymore – however, I'm too afraid to remove it. ... Oops, I did it. Let's see whether anybody complains.)

```
1427 % \ifx\f@encoding\cf@encoding\else\@enc@update\fi
1428 }
```

Tracking has to come first, since it means actually loading a different font.

```
1429 <pdf- > \MT@requires@pdftex6
1430 <lua- > \MT@requires@luatex3
1431 <pdf-|lua- > {\g@addto@macro\MT@setupfont\MT@tracking}\relax
1432 \g@addto@macro\MT@setupfont{%
1433 \MT@check@font
1434 \ifMT@inlist@
1435 <debug > \MT@show@pdfannot2%
1436 \else
1437 \MT@vinfo{Setting up font ` \MT@font' \on@line}%
1438 \MT@info@nottracking
```

Now we can begin setting up the font for all features that the current pdfTeX provides. The following commands are `\let` to `\relax` if the respective feature is disabled via package options.

For versions older than 1.20, protrusion has to be set up first, beginning with 1.20, the order doesn't matter.

```
1439 \MT@protrusion
1440 <pdf-|lua- > \MT@expansion
1441 }
```

Interword spacing and kerning (pdfTeX 1.40).

```
1442 <*pdf- >
1443 \MT@requires@pdftex6{
1444 \g@addto@macro\MT@setupfont{\MT@spacing\MT@kerning}
1445 }\relax
1446 </pdf- >
```

Disable ligatures (pdfTeX 1.30).

```
1447 <pdf- > \MT@requires@pdftex5{
```

```

1448 <pdf-|lua->\g@addto@macro\MT@setupfont\MT@noligatures
1449 <pdf->}\relax
1450 \g@addto@macro\MT@setupfont{%

```

Debugging.

```
1451 <debug>\MT@showpdfannot1%
```

Finally, register the font so that we don't set it up anew each time.

```

1452 \MT@register@font
1453 \fi
1454 }
1455 </pdf-|lua-|xe-

```

`\MT@copy@font` The new (1.40.4) `\pdfcopyfont` command allows expanding a font with different parameters, or to use more than one set of protrusion factors for a given font within one paragraph. It will be used when we find a context for `\SetProtrusion` or `\SetExpansion` in the preamble, or when the package has been loaded with the `copyfont`s option.

```

1456 <*pdf-|lua->
1457 \let\MT@copy@font\relax
1458 <pdf->\MT@requires@pdftex7{
1459 \def\MT@copy@font@{%

```

`\MT@font@copy` For every new protrusion and expansion context, we create a new copy.

```

1460 \xdef\MT@font@copy{\csname\MT@@font/\MT@pr@context/\MT@ex@context\endcsname}%
1461 \expandafter\ifx\MT@font@copy\relax

```

`\MT@font@orig` pdfTeX doesn't allow copying a font that has already been copied and expanded/letterspaced. Hence, we have to get the original.

```

1462 \edef\MT@font@orig{\csname\expandafter\string\font@name @orig\endcsname}%
1463 \expandafter\ifx\MT@font@orig\relax
1464 \MT@exp@two@c\MT@gl@et\MT@font@orig\font@name
1465 \else
1466 \MT@exp@two@c\let\font@name\MT@font@orig
1467 \fi
1468 <pdf-> \global\MT@exp@two@c\pdfcopyfont\MT@font@copy\font@name

```

Even though LuaTeX also provides the primitive from pdfTeX (even renamed to `\copyfont`, that is, 'promoted' as per the LuaTeX manual), it is seriously crippled in that OpenType features will be lost. Therefore, we do not copy the font but load it anew.

```

1469 <lua-> \MT@exp@two@c\MT@lua@copyfont\meaning\font@name\@nil
1470 <debug>\MT@dinfo1{creating new copy: \MT@font@copy}%

```

Since it's a new font, we have to remove it from the context lists.

```

1471 \MT@map@clist@c\MT@active@features{%
1472 \MT@exp@cs\ifx\MT@\@nameuse\MT@abbr@##1}\relax\else
1473 \def\@tempa{##1}%
1474 \MT@exp@cs\MT@map@tlist@c\MT@##1@doc@contexts}\MT@rem@from@list
1475 \fi
1476 }%
1477 \fi
1478 \MT@exp@two@c\let\MT@font\MT@font@copy

```

We only need the font identifier for letterspacing.

```
1479 \let\font@name\MT@font@copy
```

But we have to properly substitute the font after we're done.

```

1480 \aftergroup\let\aftergroup\font@name\aftergroup\MT@font@copy
1481 }

```

`\MT@rem@from@list`

```

1482 \def\MT@rem@from@list#1{%
1483   \MT@exp@cs@ifx{MT@\@tempa @#1font@list}\relax\else
1484     \expandafter\MT@exp@one@\expandafter\MT@rem@from@clist\expandafter
1485       \MT@font \csname MT@\@tempa @#1font@list\endcsname
1486   \fi
1487 }
1488 \pdf-}\relax

```

\MT@lua@copy@font ⟨#1⟩ and ⟨#2⟩ are ‘select’ and ‘font’, respectively, ⟨#3⟩ is the font spec.

```

1489 \lua-}\def\MT@lua@copyfont #1 #2 #3\nil{%
1490 \lua-} \global\expandafter\font\MT@font@copy=#3\relax}
1491 \pdf-|lua-}

```

Here’s the promised dirty trick for users of older pdfTeX versions, which works around the problem that the use of the same font with different expansion parameters is prohibited. If you do not want to create a clone of the font setup (this would require duplicating the tfm/vf files under a new name, and writing new fd files and map entries), you can load a minimally larger font for the paragraph in question. E.g., for a document typeset in 10 pt:

```

\SetExpansion
[ stretch = 30,
  shrink  = 60,
  step    = 5 ]
{ encoding = *,
  size = 10.001 }
{ }
\newcommand{\expandpar}[1]{%
  \fontsize{10.001}{\baselineskip}\selectfont #1\par}
% ...
\expandpar{This paragraph contains an ‘unnecessary’ widow.}

```

Note that the `\expandpar` command can only be applied to complete paragraphs. If you are using Computer Modern Roman, you have to load the `fix-cm` package to be able to select fonts in arbitrary sizes. Finally, the reason I suggest to use a larger font, and not a smaller one, is to prevent a different design size being selected.

\MT@fix@fontdimen@six
\MT@dimen@six

If `\fontdimen 6` is zero, character protrusion, spacing, kerning and tracking won’t work, and we could skip the settings (for example, the `dsfont` fonts don’t specify this dimension; this is probably a bug – the `fourier` and `newpx/newtx` packages have been fixed in the meantime). However, we can fix it ourselves (and since pdfTeX 1.40.23, this also works for `\letterspacefont`). XeTeX doesn’t provide an equivalent to `\pdffontsize`, so we use the nominal size instead.

```

1492 \pdf-|lua-|xe-}
1493 \def\MT@fix@fontdimen@six{%
1494   \ifnum\fontdimen6\MT@font=\z@
1495     \fontdimen6\MT@font=%
1496     \pdffontsize\MT@font
1497   \lua-} \MT@requires@luatex4{\pdffeedback fontsize}{\pdffontsize}\MT@font
1498   \xe-} \MT@size pt
1499   \MT@info{Fixing zero \backslashchar fontdimen 6 for font \MT@font'\MessageBreak
1500     (new value: \the\fontdimen6\MT@font)}%
1501 \pdf-} \MT@requires@pdftex8\relax{\MT@glet@nc{\MT@font-fake6}\@empty}%
1502 \fi
1503 \edef\MT@dimen@six{\number\fontdimen6\MT@font}%
1504 }
1505 \pdf-|lua-|xe-}

```

\MT@split@name Split up the font name (⟨#6⟩ may be a protrusion/expansion context and/or a
\MT@encoding letterspacing amount). With `fontspec` we also need to remove its internal instance
\MT@family
\MT@series
\MT@shape
\MT@size

counter.

```

1506 (*package)
1507 \def\MT@split@name#1/#2/#3/#4/#5/#6\@nil{%
1508   \def\MT@encoding{#1}%
1509   \ifMT@fontspec
1510     \edef\MT@family{\MT@scrubfeature#2()\relax}%
1511   \else
1512     \def\MT@family{#2}%
1513   \fi
1514   \def\MT@series  {#3}%
1515   \def\MT@shape   {#4}%
1516   \def\MT@size    {#5}%
1517   \MT@fix@fontdimen@six

```

\MT@familyalias Alias family?

```

1518   \MT@ifdefined@n@TF{MT@\MT@family @alias}%
1519   {\MT@let@cn\MT@familyalias{MT@\MT@family @alias}}%
1520   {\let\MT@familyalias\@empty}%
1521 }

```

\MT@scrubfeature Remove one resp. all feature counters (fontspec).

```

\MT@scrubfeatures 1522 \def\MT@scrubfeature#1(#2)#3\relax{#1}
1523 \def\MT@scrubfeatures#1(#2)#3\relax{%
1524   #1%
1525   \ifx\relax#3\relax\else
1526     \MT@scrubfeatures#3\relax
1527   \fi
1528 }

```

\ifMT@do We check all features of the current font against the lists of the currently active font set, and set \ifMT@do accordingly.

```

\MT@maybe@do 1529 \newif\ifMT@do
1530 \def\MT@maybe@do#1{%

```

(but only if the feature isn't globally set to false)

```

1531   \csname ifMT@\csname MT@abbr@#1\endcsname\endcsname

```

Begin with setting micro-typography to true for this font. The \MT@checklist@... tests will set it to false if the property is not in the list. The first non-empty list that does not contain a match will stop us (except for font).

```

1532   \MT@dotrue
1533   \edef\@tempa{\csname MT@#1@setname\endcsname}%
1534   \MT@map@clist@n{font,encoding,family,series,shape,size}{%
1535     \MT@ifdefined@n@TF{MT@checklist@#1}%
1536     {\csname MT@checklist@#1\endcsname}%
1537     {\MT@checklist@{#1}}}%
1538     {#1}%
1539   }%
1540   \else
1541     \MT@dofalse
1542   \fi
1543   \ifMT@do

```

\MT@feat stores the current feature.

```

1544   \def\MT@feat{#1}%
1545   \csname MT@set@#1@codes\endcsname
1546   \else
1547     \MT@ifstreq{#1}{tr}%
1548     {\let\MT@info@nottracking\MT@info@nottracking@}%
1549     {\MT@vinfo{... No \@nameuse{MT@abbr@#1}}}%
1550   \fi
1551 }

```



```

\MT@info@nottracking    To defer the message to after the font has actually been logged.
\MT@info@nottracking@ 1552 \let\MT@info@nottracking\relax
                        1553 \def\MT@info@nottracking@{\MT@info{... No tracking}}

\MT@info@list
1554 <debug>\def\MT@info@list#1#2#3{\MT@info@n1{1}{\@nameuse{MT@abbr@#1}: #2
1555 <debug> \ifx\#3\list empty\else \@nameuse{MT@#2}' #3 list\fi}}

\MT@checklist@    The generic test (<#1> is the axis, <#2> the feature, \@tempa contains the set name).
1556 \def\MT@checklist@#1#2{%
1557 <!debug> \MT@ifdefined@n@T
1558 <debug> \MT@ifdefined@n@TF
1559     {MT@#2list@#1@\@tempa}{%

    Begin a (neatly masqueraded) \expandafter orgy to test whether the font attribute
    is in the list.

1560     \expandafter\MT@exp@one@n\expandafter\MT@in@clist
1561     \csname MT@#1\expandafter\endcsname
1562     \csname MT@#2list@#1@\@tempa\endcsname
1563     \ifMT@inlist@
1564 <debug>\MT@info@list{#2}{#1}{in}%
1565     \MT@dotrue
1566     \else
1567 <debug>\MT@info@list{#2}{#1}{not in}%
1568     \MT@dofalse
1569     \expandafter\MT@clist@break
1570     \fi
1571 }%

    If no limitations have been specified, i.e., the list for a font attribute has not been
    defined at all, the font should be set up.

1572 <debug> {\MT@info@list{#2}{#1}{}}%
1573 }

\MT@checklist@family    Also test for the alias font, if the original font is not in the list.
1574 \def\MT@checklist@family#1{%
1575 <!debug> \MT@ifdefined@n@T
1576 <debug> \MT@ifdefined@n@TF
1577     {MT@#1list@family@\@tempa}{%
1578     \MT@exp@two@n\MT@in@clist
1579     \MT@family{\csname MT@#1list@family@\@tempa\endcsname}%
1580     \ifMT@inlist@
1581 <debug>\MT@info@list{#1}{family}{in}%
1582     \MT@dotrue
1583     \else
1584 <debug>\MT@info@list{#1}{family}{not in}%
1585     \MT@dofalse
1586     \ifx\MT@familyalias\empty \else
1587     \MT@exp@two@n\MT@in@clist
1588     \MT@familyalias{\csname MT@#1list@family@\@tempa\endcsname}%
1589     \ifMT@inlist@
1590 <debug> \MT@info@list{#1}{family alias}{in}%
1591     \MT@dotrue
1592 <debug>\else\MT@info@list{#1}{family alias}{not in}%
1593     \fi
1594     \fi
1595     \fi
1596     \ifMT@do \else
1597     \expandafter\MT@clist@break
1598     \fi
1599 }%
1600 <debug> {\MT@info@list{#1}{family}{}}%
1601 }

```

`\MT@checklist@size` Test whether font size is in list of size ranges.

```

1602 \def\MT@checklist@size#1{%
1603 <!debug> \MT@ifdefined@n@T
1604 <debug> \MT@ifdefined@n@TF
1605     {MT#1list@size@\@tempa}{%
1606     \MT@exp@cs\MT@in@rlist{MT#1list@size@\@tempa}%
1607     \ifMT@inlist@
1608 <debug>\MT@info@list{#1}{size}{in}%
1609     \MT@dotrue
1610     \else
1611 <debug>\MT@info@list{#1}{size}{not in}%
1612     \MT@dofalse
1613     \expandafter\MT@clist@break
1614     \fi
1615     }%
1616 <debug> {\MT@info@list{#1}{size}{}}%
1617 }

```

`\MT@checklist@font` If the font matches, we skip the rest of the test.

```

1618 \def\MT@checklist@font#1{%
1619 <!debug> \MT@ifdefined@n@T
1620 <debug> \MT@ifdefined@n@TF
1621     {MT#1list@font@\@tempa}{%

```

Since `\MT@font` may be appended with context and/or letterspacing specs, we construct the name from the font characteristics.

```

1622     \edef\@tempb{\MT@encoding/\MT@family/\MT@series/\MT@shape/\MT@size}%
1623     \expandafter\MT@exp@one@n\expandafter\MT@in@clist\expandafter
1624     \@tempb \csname MT#1list@font@\@tempa\endcsname
1625     \ifMT@inlist@
1626 <debug>\MT@info@list{#1}{font}{in}%
1627     \expandafter\MT@clist@break
1628     \else
1629 <debug>\MT@info@list{#1}{font}{not in}%
1630     \MT@dofalse
1631     \fi
1632     }%
1633 <debug> {\MT@info@list{#1}{font}{}}%
1634 }

```

1.2.1 Protrusion

`\ifMT@nofamily` Info for settings that are not family-specific. (Warnings seem to be too irritating.) The switch is set in `\MT@next@listname`.

```
1635 \newif\ifMT@nofamily
```

`\MT@protrusion` Set up for protrusion?

```

1636 \def\MT@protrusion{\MT@maybe@do{pr}}
1637 </package>

```

`\MT@set@pr@codes` This macro is called by `\MT@setupfont`, and does all the work for setting up a font for protrusion.

```

1638 <*pdf-|lua-|xe-|show>
1639 <show>\def\MTS@show@pr
1640 <pdf-|lua-|xe-|\def\MT@set@pr@codes
1641     {%
1642 <pdf-|lua-|xe-| \MT@nofamilyfalse

```

Check whether and if, which list should be applied to the current font. If family-specific settings don't exist, we write it to the log (for each encoding).

```

1643 <show> \MTS@printtext{Protrusion settings for font `\'texttt{\MT@font}':}\
1644     \MT@if@list@exists{%

```

```

1645 <*pdf-|lua-|xe-
1646   \ifMT@nofamily
1647     \MT@ifdefined@TF{\MT@encoding-\MT@family-settings}\relax{%
1648       \MT@info@n1{Loading generic protrusion settings for font family\MessageBreak
1649         '\MT@family' (encoding: \MT@encoding).\MessageBreak
1650         For optimal results, create family-specific settings.\MessageBreak
1651         See the microtype manual for details}%
1652       \MT@gl@et@nc{\MT@encoding-\MT@family-settings}\@empty
1653     }%
1654   \fi
1655 </pdf-|lua-|xe-
1656 <show> \MTS@printtext{First matching list is for '\texttt{\@tempa}':\texttt{\MT@pr@c@name}}%
1657 \MT@get@opt
1658 \MT@reset@pr@codes

```

Get the name of the inheritance list and parse it.

```
1659 \MT@get@inh@list
```

Set an input encoding?

```
1660 \MT@set@inputenc{c}%

```

Load additional lists?

```
1661 \MT@load@list\MT@pr@c@name
1662 \MT@set@listname

```

Load the main list.

```

1663 \MT@let@cn\@tempc{\MT@pr@c@\MT@pr@c@name}%
1664 \expandafter\MT@set@codes\@tempc,\relax,%
1665 <show> \vrule width 4cm height .5pt \
1666 <show> \MTS@printtext{End of list '\texttt{\MT@pr@c@name}'}\texttt{.5em}
1667 <show> \MT@ifdefined@c@T\MT@pr@inh@name{%
1668 <show> \MT@ifdefined@n@T{\MT@inh@\MT@pr@inh@name @prefixes}}%
1669 <show> \par \MTS@printtext{(with prefixes:)}%
1670 <show> \@tempcntb=\z@

```

Set unconditional heirs.

```

1671 \MT@set@pr@prefixheirs
1672 <show> }%
1673 <show> \ifShowMissingGlyphs\MTS@show@missing\fi
1674 }%
1675 <show> {\MTS@printtext{NOT DEFINED}}%
1676 \MT@reset@pr@codes
1677 <show> }\par
1678 }

```

`\MT@set@all@pr` Set all protrusion codes of the font.

```

1679 <*pdf-|lua-|xe-
1680 \def\MT@set@all@pr#1#2{%
1681 <debug>\MT@info@n1{3}{-- lp/rp: setting all to #1/#2}%
1682 \let\MT@temp\@empty
1683 \MT@ifempty{#1}\relax{\g@addto@macro\MT@temp{\lcode\MT@font\@tempcnta=#1}}%
1684 \MT@ifempty{#2}\relax{\g@addto@macro\MT@temp{\rcode\MT@font\@tempcnta=#2}}%
1685 \MT@do@font\MT@temp
1686 }

```

`\MT@reset@pr@codes@` All protrusion codes are zero for new fonts. However, if we have to reload the font due to different contexts, we have to reset them. This command will be changed by `\microtypecontext` if necessary.

```

1687 \def\MT@reset@pr@codes@\MT@set@all@pr\z@
1688 \let\MT@reset@pr@codes\relax

```

`\MT@the@pr@code@tr` If the font is letterspaced, we have to add half the letterspacing amount to the margin kerns. This will be activated in `\MT@set@tr@codes`.

```
1689 \def\MT@the@pr@code{\@tempcntb}
```

```

1690 <pdf-|lua- >
1691 <pdf- >\MT@requires@pdftex6
1692 <lua- >\MT@requires@luatex3
1693 {\def\MT@the@pr@code@tr{%
1694   \numexpr\@tempcntb+\MT@letterspace@/2\relax
1695 }
1696 }\relax
1697 </pdf-|lua- >

```

`\MT@set@codes` Split up the values and set the codes.

```

1698 \def\MT@set@codes#1,{%
1699   \ifx\relax#1\@empty\else
1700     \MT@split@codes #1==\relax
1701     \expandafter\MT@set@codes
1702   \fi
1703 }

```

`\MT@split@codes` The `keyval` package would remove spaces here, which we needn't do since `\SetProtrusion` ignores spaces in the protrusion list anyway. `\MT@get@char@unit` may mean different things.

```

1704 \def\MT@split@codes#1=#2=#3\relax{%
1705   \def\@tempa{#1}%
1706   \ifx\@tempa\@empty \else
1707     \MT@get@slot
1708     <pdf-|lua- > \ifnum\MT@char > \m@ne
1709     <xe- > \ifx\MT@char\@empty \else
1710       \MT@get@char@unit
1711       \csname MT@\MT@feat @split@val\endcsname#2\relax
1712     \fi
1713   \fi
1714 }

```

`\MT@pr@split@val`

```

1715 \def\MT@pr@split@val#1,#2\relax
1716 </pdf-|lua-|xe- >
1717 <show >\def\MTS@pr@split@val#1,#2\relax
1718   {\def\@tempb{#1}%
1719   \MT@ifempty\@tempb
1720   <pdf-|lua-|xe- > \relax
1721   <show > {\MTS@lp@=\z@ \let\MTS@lpcode\@empty}%
1722   {\MT@scale@to@em
1723   <pdf-|lua-|xe- > \lpcode\MT@font\MT@char=\MT@the@pr@code
1724   <show > \MTS@lp@=\dimexpr\@tempcntb em/1000\relax\relax
1725   <show > \edef\MTS@lpcode{[\@tempb] \the\@tempcntb/\the\MTS@lp@}%
1726   <debug >\MT@dinfo@n1{4}{;;; lp (\MT@char): \number\lpcode\MT@font\MT@char: [#1]}%
1727   }%
1728   \def\@tempb{#2}%
1729   \MT@ifempty\@tempb
1730   <pdf-|lua-|xe- > \relax
1731   <show > {\MTS@rp@=\z@ \let\MTS@rpcode\@empty}%
1732   {\MT@scale@to@em
1733   <pdf-|lua-|xe- > \rpcode\MT@font\MT@char=\MT@the@pr@code
1734   <show > \MTS@rp@=\dimexpr\@tempcntb em/1000\relax\relax
1735   <show > \edef\MTS@rpcode{[\@tempb] \the\@tempcntb/\the\MTS@rp@}%
1736   <debug >\MT@dinfo@n1{4}{;;; rp (\MT@char): \number\rpcode\MT@font\MT@char: [#2]}%
1737   }%
1738   <show > \llap{\MTS@show@char@pr\MT@char\quad}%
1739   <show > \parbox[b]{}[b]{3.5cm}{\MTS@printtext}%
1740   <show > \footnotesize\makebox[.4cm][l]{L:} \MT@ifempty{\MTS@lpcode}{---}{\MTS@lpcode}\ \
1741   <show > \makebox[.4cm][r]{R:} \MT@ifempty{\MTS@rpcode}{---}{\MTS@rpcode}}%
1742   <show > \parbox[t]{}[t]{\dimexpr\textwidth-3.5cm}%

```

Now we can set the values for the inheriting characters. Their slot numbers are saved in the macro `\MT@inh@<list name>@<slot number>@`.

```

1743 \MT@ifdefined@c@T\MT@pr@inh@name{%
1744 \MT@ifdefined@n@T{MT@inh@MT@pr@inh@name @\MT@char @}{%
1745 \MT@exp@cs\MT@map@tlist@c
1746 {MT@inh@MT@pr@inh@name @\MT@char @}%
1747 <pdf-|lua-|xe-> \MT@set@pr@heirs
1748 <show> \MTS@show@char@pr
1749 }%
1750 }%
1751 <show> }\newline
1752 }
1753 <*pdf-|lua-|xe->

```

`\MT@scale@to@em` Since pdfTeX version 0.14h, we have to adjust the protrusion factors (i.e., convert numbers from thousandths of character width to thousandths of an em of the font). We have to do this *before* setting the inheriting characters, so that the latter inherit the absolute value, not the relative one if they have a differing width (e.g., the ‘ff’ ligature). Unlike `protcode.tex` and `pdfcprot`, we do not calculate with `\lpcode` resp. `\rptide`, since this would disallow protrusion factors larger than the character width (since `\[1r]pcode`’s limit is 1000). Now, the maximum protrusion is 1 em of the font.

The unit is in `\MT@count`, the desired factor in `\@tempb`, and the result will be returned in `\@tempcntb`.

```

1754 <pdf->\MT@requires@pdftex3{
1755 \def\MT@scale@to@em{%
1756 \@tempcntb=\MT@count\relax

```

For really huge fonts (100 pt or so), an arithmetic overflow could occur with vanilla TeX. Using e-TeX, this can’t happen, since the intermediate value is 64 bit, which could only be reached with a character width larger than `\maxdimen`.

```

1757 \MT@scale\@tempcntb \@tempb \MT@dimen@six
1758 \ifnum\@tempcntb=\z@ \else
1759 \MT@scale@factor
1760 \fi
1761 }

```

`\MT@get@charwd` Get the width of the character. When using e-TeX, we can employ `\fontcharwd` instead of building scratch boxes.

```

1762 \def\MT@get@charwd{%
1763 <*pdf->
1764 ^^X \MT@count=\fontcharwd\MT@font\MT@char\relax
1765 ^^Q \setbox\z@=\hbox{\MT@font \char\MT@char}%
1766 ^^Q \MT@count=\wd\z@
1767 </pdf->
1768 <lua-> \MT@count=\fontcharwd\MT@font\MT@char\relax

```

`\MT@char` contains a slot number (legacy fonts), a Unicode number, or a glyph name (if `\MT@char@` is negative).

```

1769 <*xe->
1770 \ifnum\MT@char@<\z@
1771 \setbox\z@=\hbox{\MT@font \XeTeXglyph-\MT@char@}%
1772 \MT@count=\wd\z@
1773 \else
1774 \MT@count=\fontcharwd\MT@font\MT@char@\relax
1775 \fi
1776 </xe->
1777 \ifnum\MT@count=\z@ \MT@info@missing@char \fi
1778 }

```

For letterspaced fonts, we have to subtract the letterspacing amount from the characters’ widths. The protrusion amounts will be adjusted in `\MT@set@pr@codes`.

The letterspaced font is already loaded so that $1\text{em} = \text{\fontdimen 6}$.

```
1779 <pdf-
1780 \MT@requires@pdfTeX6{
1781   \g@addto@macro\MT@get@charwd{%
1782     \MT@ifdefined@T\MT@letterspace@
1783     {\advance\MT@count -\dimexpr\MT@letterspace@ sp * \dimexpr 1em/1000\relax}%
1784   }
1785 } \relax
1786 }{
```

No adjustment with versions 0.14f and 0.14g.

```
1787 \def\MT@scale@to@em{%
1788   \MT@count=\@tempb\relax
1789   \ifnum\MT@count=\z@ \else
1790     \MT@scale@factor
1791   \fi
1792 }
```

We need this in `\MT@warn@code@too@large` (neutralised).

```
1793 \def\MT@get@charwd{\MT@count=\MT@dimen@six}
1794 }
1795 </pdf-
1796 </pdf-|lua-|xe-
1797 </pdf-|lua-|xe-|show
```

`\MT@get@font@dimen` For the space unit.

```
1798 <package
1799 \def\MT@get@font@dimen#1{%
1800   \ifnum\fontdimen#1\MT@font=\z@
1801     \MT@warning@n1{Font '\MT@font' does not specify its\MessageBreak
1802       \@backslashchar fontdimen #1 (it's zero)! \MessageBreak
1803       You should use a different `unit' for \MT@curr@list@name}%
1804   \else
1805     \MT@count=\fontdimen#1\MT@font
1806   \fi
1807 }
```

`\MT@info@missing@char` Info about missing characters, or characters with zero width.

```
1808 \def\MT@info@missing@char{%
1809   \MT@info@n1{Character '\the\MT@toks'
1810   ^^X   \ifnum\MT@char<\z@ is missing\else
1811   ^^X     \iffontchar\MT@font\MT@char@
1812           has a width of 0pt
1813   ^^X     \else is missing\fi\fi
1814   ^^Q   \MessageBreak (it's probably missing)
1815   \MessageBreak in font '\MT@font'. \MessageBreak
1816   Ignoring protrusion settings for this character}%
1817 }
```

`\MT@scale@factor` Furthermore, we might have to multiply with a factor.

```
1818 \def\MT@scale@factor{%
1819   \ifnum\csname MT@\MT@feat @factor@\endcsname=\@m \else
1820     \expandafter\MT@scale\expandafter \@tempcntb
1821     \csname MT@\MT@feat @factor@\endcsname \@m
1822   \fi
1823   \ifnum\@tempcntb>\csname MT@\MT@feat @max@\endcsname\relax
1824     \MT@exp@cs\MT@warn@code@too@large{MT@\MT@feat @max}%
1825   \else
1826     \ifnum\@tempcntb<\csname MT@\MT@feat @min@\endcsname\relax
1827       \MT@exp@cs\MT@warn@code@too@large{MT@\MT@feat @min}%
1828     \fi
1829   \fi
1830 }
```

`\MT@warn@code@too@large` Type out a warning if a chosen protrusion factor is too large after the conversion.

As a special service, we also type out the maximum amount that may be specified in the configuration.

```

1831 \def\MT@warn@code@too@large#1{%
1832   \@tempcnta=#1\relax
1833   \ifnum\csname MT@MT@feat @factor@\endcsname=\@m \else
1834     \expandafter\MT@scale\expandafter\@tempcnta\expandafter
1835     \@m \csname MT@MT@feat @factor@\endcsname
1836   \fi
1837   \MT@scale\@tempcnta \MT@dimen@six \MT@count
1838   \MT@warning@n1{The \@nameuse{MT@abbr@MT@feat} code \@temp\space
1839     is too large for character\MessageBreak
1840     `the\MT@toks' in \MT@curr@list@name.\MessageBreak
1841     Setting it to the maximum of \number\@tempcnta}%
1842   \@tempcntb=#1\relax
1843 }

```

\MT@get@opt The optional argument to the configuration commands (except for `\SetExpansion` and `\SetTracking`, which are being dealt with in `\MT@get@ex@opt` and `\MT@get@tr@opt`, resp.).

```

1844 \def\MT@get@opt{%
1845   \MT@set@listname

```

\MT@pr@factor@ Apply a factor?

```

\MT@sp@factor@ 1846 \MT@ifdefined@n@TF{MT@MT@feat @c@\csname MT@MT@feat @c@name\endcsname @factor}{%
\MT@kn@factor@ 1847   \MT@let@nn{MT@MT@feat @factor@}
1848   {MT@MT@feat @c@\csname MT@MT@feat @c@name\endcsname @factor}%
1849   \MT@vinfo{... : Multiplying \@nameuse{MT@abbr@MT@feat} codes by
1850     \number\csname MT@MT@feat @factor@\endcsname/1000}%
1851 }{%
1852   \MT@let@nn{MT@MT@feat @factor@}{MT@MT@feat @factor}%
1853 }%

```

\MT@pr@unit@ The unit can only be evaluated here, since it might be font-specific. If it's `\@empty`, it's relative to character widths, if it's `-1`, relative to space dimensions.

```

\MT@sp@unit@
\MT@kn@unit@ 1854 \MT@ifdefined@n@TF{MT@MT@feat @c@\csname MT@MT@feat @c@name\endcsname @unit}{%
1855   \MT@let@nn{MT@MT@feat @unit@}%
1856   {MT@MT@feat @c@\csname MT@MT@feat @c@name\endcsname @unit}%
1857   \MT@exp@cs@ifx{MT@MT@feat @unit@}\@empty
1858   \MT@vinfo{... : Setting \@nameuse{MT@abbr@MT@feat} codes
1859     relative to character widths}%
1860   \else
1861     \MT@exp@cs@ifx{MT@MT@feat @unit@}\m@ne
1862     \MT@vinfo{... : Setting \@nameuse{MT@abbr@MT@feat} codes
1863       relative to width of space}%
1864   \fi
1865   \fi
1866 }{%
1867   \MT@let@nn{MT@MT@feat @unit@}{MT@MT@feat @unit}%
1868 }%

```

\MT@get@space@unit The codes are either relative to character widths, or to a fixed width. For spacing and kerning lists, they may also be relative to the width of the interword glue. Only the setting from the top list will be taken into account.

```

1869 \let\MT@get@char@unit\relax
1870 \let\MT@get@space@unit\@gobble
1871 \MT@exp@cs@ifx{MT@MT@feat @unit@}\@empty
1872 \let\MT@get@char@unit\MT@get@charwd
1873 \else
1874 \MT@exp@cs@ifx{MT@MT@feat @unit@}\m@ne
1875 \let\MT@get@space@unit\MT@get@font@dimen
1876 \else
1877 \MT@exp@cs\MT@get@unit{MT@MT@feat @unit}%
1878 \fi

```

1879 \fi

Preset all characters? If so, we surely don't need to reset, too.

```
1880 \MT@ifdefined@n@T{MT@MT@feat @c@csname MT@MT@feat @c@name\endcsname @preset}{%
1881 \csname MT@preset@MT@feat\endcsname
1882 \MT@let@nc{MT@reset@MT@feat @codes}\relax
1883 }%
1884 }
```

\MT@get@unit If unit contains an em or ex, we use the corresponding \fontdimen to obtain the real size. Simply converting the em into points might give a wrong result, since the font probably isn't set up yet, so that these dimensions haven't been updated, either.

```
1885 \def\MT@get@unit#1{%
1886 \expandafter\MT@get@unit@#1 e!\@nil
1887 \ifx\x\@empty\else\let#1\x\fi
1888 \@defaultunits\@tempdima#1 pt\relax\@nnil
1889 \ifdim\@tempdima=\z@
1890 \MT@warning@n1{%
1891 Cannot set \@nameuse{MT@abbr@MT@feat} factors relative to zero\MessageBreak
1892 width. Setting factors of list \@nameuse{MT@MT@feat @c@name}'\MessageBreak
1893 relative to character widths instead}%
1894 \let#1\@empty
1895 \let\MT@get@char@unit\MT@get@charwd
1896 \else
1897 \MT@vinfo{... : Setting \@nameuse{MT@abbr@MT@feat} factors relative
1898 to \the\@tempdima}%
1899 \MT@count=\@tempdima\relax
1900 \fi
1901 }
1902 \def\MT@get@unit@#1e#2#3\@nil{%
1903 \ifx\#3\@empty\else
1904 \if m#2%
1905 \edef\x{#1\fontdimen6\MT@font}%
1906 \else
1907 \if x#2%
1908 \edef\x{#1\fontdimen5\MT@font}%
1909 \fi
1910 \fi
1911 \fi
1912 }
```

\MT@set@inputenc The configurations may be under the regime of an input encoding.

```
1913 \def\MT@set@inputenc#1{%
```

\MT@cat We remember the current category (c or inh), in case of warnings later.

```
1914 \def\MT@cat{#1}%
1915 \edef\@tempa{MT@MT@feat @#1@csname MT@MT@feat @#1@name\endcsname @inputenc}%
1916 \MT@ifdefined@n@T\@tempa\MT@set@inputenc@
1917 }
```

\MT@set@inputenc@ More recent versions of inputenc remember the current encoding, so that we can test whether we really have to load the encoding file.

```
1918 \MT@addto@setup{%
1919 \ifpackageloaded{inputenc}{%
1920 \@ifpackagelater{inputenc}{2006/02/22}{%
1921 \def\MT@set@inputenc@{%
1922 \MT@ifstreq\inputencodingname{csname\@tempa\endcsname}\relax
1923 \MT@load@inputenc
1924 }%
1925 }{%
1926 \let\MT@set@inputenc@\MT@load@inputenc
1927 }%
}
```



```

1928 }%
1929 \def\MT@set@inputenc{%
1930   \MT@warning@n1{Key `inputenc' used in \MT@curr@list@name, but the `inputenc'
1931     \MessageBreak package isn't loaded. Ignoring input encoding}%
1932 }%
1933 }%
1934 }

```

`\MT@load@inputenc` Set up normal catcodes, since, e.g., listings would otherwise want to actually typeset the `inputenc` file when it is being loaded inside a listing.

```

1935 \def\MT@load@inputenc{%
1936   \MT@cfg@catcodes
1937   <debug>\MT@dinfnl{1}{loading input encoding: \@nameuse{\@tempa}}%
1938   \inputencoding{\@nameuse{\@tempa}}%
1939 }

```

`\MT@set@pr@heirs` Set the inheriting characters.

```

1940 \def\MT@set@pr@heirs#1{%
1941   \lcode\MT@font #1=\lcode\MT@font\MT@char\relax
1942   \rcode\MT@font #1=\rcode\MT@font\MT@char\relax
1943   <debug>\MT@dinfnl{2}{-- heir of \MT@char: #1}%
1944   <debug>\MT@dinfnl{4}{;;; lp/rp (#1): \number\lcode\MT@font\MT@char/%
1945     <debug> \number\rcode\MT@font\MT@char}%
1946 }

```

`\MT@set@pr@prefixheirs` Inheriting characters that have been specified in a prefixed list.

```

1947 \def\MT@set@pr@prefixheirs{%
1948   \MT@ifdefined@c@T\MT@pr@inh@name{%
1949     \MT@ifdefined@nT\MT@inh@\MT@pr@inh@name @prefixes}{%
1950       \MT@exp@cs\MT@map@tlist@c
1951       {\MT@inh@\MT@pr@inh@name @prefixes}%
1952       \MT@set@pr@prefixes
1953     }%
1954   }%
1955 }
1956 </package>

```

`\MT@set@pr@prefixes` Add `charwidth(inheriting char) - charwidth(base char)` to either left or right side or half the amount to both sides. For \TeX , we may have to translate to glyph numbers because `\fontcharwd` doesn't have the nice feature of understanding the 'U' or '/' prefixes.

`\MT@set@pr@prefixes@`

```

1957 <pdf-|lua-|xe-|show>
1958 <pdf-|lua-|xe-|show>\def\MT@set@pr@prefixes#1{\MT@set@pr@prefixes@#1}
1959 <pdf-|lua-|xe-|show>\def\MT@set@pr@prefixes@#1#2#3#4%
1960 <show>\def\MTS@set@pr@prefixes@#1#2#3#4%
1961 {%
1962 <show> \MTS@lp@=\z@ \MTS@rp@=\z@
1963 <show> \ifnum#1=\@tempcntb \else
1964 <show> \par\leavevmode
1965 <show> \llap{\MTS@show@char@pr{#1} \MTS@printtext{=} }%
1966 <show> \fi
1967 <xe-|show>
1968 \edef\@tempa{\expandafter\ifx\@car#1\@nil U\@gobble#1\else\number\XeTeXglyphindex"#1" \fi}%
1969 \edef\@tempb{\expandafter\ifx\@car#2\@nil U\@gobble#2\else\number\XeTeXglyphindex"#2" \fi}%
1970 </xe-|show>
1971 \@tempcnta=\z@
1972 \ifnum#3>\z@
1973 \@tempcnta=\numexpr
1974 <pdf-|lua-|show> (\fontcharwd\MT@font#2-\fontcharwd\MT@font#1)%
1975 <xe-|show> (\fontcharwd\MT@font\@tempb-\fontcharwd\MT@font\@tempa)%
1976 *#3/\MT@dimen@six\relax
1977 \fi
1978 <pdf-|lua-|xe-|show> \lcode\MT@font #2=\numexpr\lcode\MT@font#1+\@tempcnta\relax
1979 <show> \MTS@lp@=\dimexpr\numexpr\lcode\MT@font#1+\@tempcnta\relax em/1000\relax

```

```

1980 \tempcnta=\z@
1981 \ifnum#4>\z@
1982 \tempcnta=numexpr
1983 <pdf-|lua-|show> (\fontcharwd\MT@font#2-\fontcharwd\MT@font#1)%
1984 <xe-> (\fontcharwd\MT@font\@tempb-\fontcharwd\MT@font\@tempa)%
1985 *#4/\MT@dimen@six\relax
1986 \fi
1987 <pdf-|lua-|xe-> \rpxcode\MT@font #2=numexpr\rpxcode\MT@font#1+\@tempcnta\relax
1988 <show> \MTS@rp@=\dimexpr\numexpr\rpxcode\MT@font#1+\@tempcnta\relax em/1000\relax
1989 <debug>\MT@dinfoln{2}{-- (prefix) heir of #1: #2}%
1990 <debug>\MT@dinfoln{4}{;;; lp/rp (#2): \number\lpxcode\MT@font#2/%
1991 <debug> \number\rpxcode\MT@font#2}%
1992 <show> \MTS@show@char@pr{#2}%
1993 <show> \@tempcntb=#1\relax
1994 }
1995 </pdf-|lua-|xe-|show>

```

`\MT@preset@pr` Preset characters. Presetting them relative to their widths is not allowed.

```

\MT@preset@pr@ 1996 <*package>
1997 \def\MT@preset@pr{%
1998 \expandafter\expandafter\expandafter\MT@preset@pr@
1999 \csname MT@pr@c@\MT@pr@c@name @preset\endcsname\@nil
2000 }
2001 \def\MT@preset@pr@#1,#2\@nil{%
2002 \ifx\MT@pr@unit@\@empty
2003 \MT@warn@preset@tewidth{pr}%
2004 \let\MT@preset@aux\MT@preset@aux@factor
2005 \else
2006 \def\MT@preset@aux{\MT@preset@aux@space2}%
2007 \fi
2008 \MT@ifempty{#1}{\let\@tempa\@empty}{\MT@preset@aux{#1}\@tempa}%
2009 \MT@ifempty{#2}{\let\@tempb\@empty}{\MT@preset@aux{#2}\@tempb}%
2010 \MT@set@all@pr\@tempa\@tempb
2011 }

```

`\MT@preset@aux` Auxiliary macro for presetting. Store value `<#1>` in macro `<#2>`.

```

\MT@preset@aux@factor 2012 \def\MT@preset@aux@factor#1#2{%
\MT@preset@aux@space 2013 \@tempcntb=#1\relax
2014 \MT@scale@factor
2015 \edef#2{\number\@tempcntb}%
2016 }
2017 \def\MT@preset@aux@space#1#2#3{%
2018 \def\@tempb{#2}%
2019 \MT@get@space@unit#1%
2020 \MT@scale@to@em
2021 \edef#3{\number\@tempcntb}%
2022 }

```

`\MT@warn@preset@tewidth`

```

2023 \def\MT@warn@preset@tewidth#1{%
2024 \MT@warning@nl{%
2025 Cannot preset characters relative to their widths\MessageBreak
2026 for \@nameuse{MT@abbr@#1} list \@nameuse{MT@#1@c@name}'.
2027 Presetting them\MessageBreak relative to lem instead}%
2028 }

```

1.2.2 Manual protrusion

`\noprotusion` This command may be used to inhibit protrusion on either side. It's part of L^AT_EX since 2018-12-01. We provide it for older releases.

```

2029 \MT@ifdefined@c@TF\noprotusion\relax{
2030 \DeclareRobustCommand\noprotusion{\leavevmode\kern-\lp@\kern\p@}
2031 }

```

- `\noptrusionifhmode` Same, but only if we're already in `hmode`.
- ```
2032 \DeclareRobustCommand\noptrusionifhmode{\relax\ifhmode\kern-\p@\kern\p@\fi}
```
- `\leftprotrusion` This command may be used to add protrusion on the left hand side. We try to reconstruct the next glyph (possibly a ligature).<sup>4</sup>
- ```
2033 \DeclareRobustCommand\leftprotrusion{%
2034   \MT@toks{ }%
2035   \MT@prot@toks{ }%
2036   \let\MT@prot@l\MT@prot@l@
2037   \let\MT@maybe@textcmd\@firstofone
2038   \MT@prot@get@firstgroup
2039 }
```
- `\MT@prot@l@` This probably doesn't need to be `\long` any longer.
- ```
2040 \def\MT@prot@l@#1{%
2041 \MT@get@prot{#1}{left}%
2042 #1%
2043 }
```
- `\MT@prot@toks` If `\leftprotrusion` is followed by a text command, we trial-typeset only the first glyph, then actually typeset the whole argument, which we've saved in `\MT@prot@l@tc` and finally gobble anything that might still be left in the input stream (see `\MT@prot@check@F` below).
- ```
2044 \newtoks\MT@prot@toks
2045 \def\MT@prot@l@tc#1{%
2046   \MT@get@prot{\MT@maybe@textcmd{#1}}{left}%
2047   \the\MT@prot@toks
2048   \MT@gobble@to@nil
2049 }
2050 \def\MT@gobble@to@nil#1\MT@nil{ }
```
- `\rightprotrusion` Unfortunately, there's no way to retrieve anything that's already been typeset, so the counterpart cannot be defined symmetrically.
- ```
2051 \DeclareRobustCommand\rightprotrusion{\MT@prot@r}
2052 \def\MT@prot@r#1{%
2053 {#1}%
2054 \MT@get@prot{#1}{right}%
2055 }
```
- `\MT@get@prot` Typeset the text inside a box and get the left and right margin kerns. We add an extra `\vbox` in case we're inside a tabular. `\@newlistfalse` is meant to make `\work` in centering etc. We set various penalties to zero to allow linebreaking, and don't bother if the split box is overfull (but shouldn't we? – after all, that's how the penalties bug was discovered ...). (We no longer reset counters etc., since we don't typeset groups anymore.)
- `\MT@prot@hook` Furthermore, we have a hook for compatibility fixes (currently used for `csquotes` only),
- `\MT@csq@eqgroup` and a dedicated command to end `csquotes`'s group (because we actually typeset the quote character, instead of disabling quotes altogether (as we suggested for [issue #1], which was wrong)). Compatibility with `csquotes` is also the reason for the extra `\relax` after `<#1>`.
- `\MT@noindent` Finally, L<sup>A</sup>T<sub>E</sub>X's new paragraph hooks require special attention, as they're (currently?) unable to distinguish between real typesetting and trial runs. In our case,
- 4 Lua<sub>T</sub>E<sub>X</sub> offers the command `\protrusionboundary`, which could potentially be very helpful here, but it doesn't seem to do what it promises (not even the example from the manual works as advertised). Maybe *Marcel Krüger*'s attempt at a `betterprotrusionboundary` (<https://tex.stackexchange.com/a/629080>) could be an option.

fortunately, we really don't want to trigger the hooks.<sup>5</sup> Also, as far as I can tell, we don't need a `\RawParEnd` at the end (as suggested in `ltpara`), because none of our commands are `\long` anymore.

```

2056 \let\MT@prot@hook\empty
2057 \let\MT@csq@eqgroup\relax
2058 \IfFormatAtLeastTF{2021/11/15}
2059 {\let\MT@noindent\RawNoindent}
2060 {\let\MT@noindent\noindent}
2061 \def\MT@get@prot#1#2{%
2062 \begingroup
2063 \setbox\MT@tempbox\vbox{%
2064 \everypar{}%
2065 \parfillskip=\z@skip
2066 \hbadness\@M
2067 \clubpenalty\z@
2068 \widowpenalty\z@
2069 \interlinepenalty\z@
2070 \@newlistfalse
2071 \MT@prot@hook
2072 \MT@noindent #1\relax\MT@csq@eqgroup}%
2073 \vbadness=\@M
2074 \splittopskip=\z@
2075 \vfuzz=\maxdimen
2076 \setbox\MT@tempbox\vbox{%
2077 \ifvbox\MT@tempbox
2078 \global\setbox\MT@tempbox=\vsplit\MT@tempbox to \normalbaselineskip
2079 \unvbox\MT@tempbox
2080 \global\setbox\MT@tempbox=\lastbox
2081 \fi
2082 }%
2083 \endgroup
2084 \ifhbox\MT@tempbox
2085 \@tempdima=\@nameuse{#2margin kern}\MT@tempbox\relax
2086 \expandafter\ifdim\@tempdima=\z@ \else
2087 \leavevmode
2088 \MT@vinfo{<< adding #2 margin kern for `#1':\MessageBreak
2089 \the\@tempdima \on@line}%
2090 \kern\@tempdima
2091 <debug>%\vbox to0pt{\vss\llap{\fbox{%
2092 <debug>% \MT@ifstreq{#2}{left}{\kern\@tempdima}\relax
2093 <debug>% \kern-\fboxsep\unhbox\MT@tempbox\kern-\fboxsep
2094 <debug>% \MT@ifstreq{#2}{right}{\kern\@tempdima}\relax}\hskip\marginparsep}}%
2095 \fi
2096 \fi
2097 }

```

`\MT@prot@ifx` Test next token.

```

2098 \def\MT@prot@ifx#1{%
2099 \ifx\MT@prot@next#1\expandafter\@firstoftwo\else\expandafter\@secondoftwo\fi
2100 }

```

`\MT@prot@ifcat` Test catcode of next token.

```

2101 \def\MT@prot@ifcat#1{%
2102 \ifcat#1\noexpand\MT@prot@next\expandafter\@firstoftwo\else\expandafter\@secondoftwo\fi
2103 }

```

`\MT@prot@ifmacro` Test whether `<#1>` is a macro or an active character that does not take an argument.  
`\MT@prot@ifmacro@` As we're using `etoolbox` here, this only works with e-TeX.

```

2104 ^^X\def\MT@prot@ifmacro@{%
2105 ^^X \ifdefmacro\MT@prot@next{\ifdefparam\MT@prot@next\@gobble\@firstofone}\@gobble}
2106 ^^Q\let\MT@prot@ifmacro\@gobble

```

<sup>5</sup> Well, in some cases we do, but this indeed 'needs further analysis' (cf. <https://github.com/latex3/latex2e/issues/880>).

```

\MT@prot@iffirstcmd Test whether the first token in \MT@prot@next (once expanded) is the command
 <#1>. Since \MT@prot@next may also be user-defined (or whatever), we have to use
 our own, \long version of \@car.
2107 \def\MT@prot@iffirstcmd#1{%
2108 \ifx\relax#1\expandafter\@secondoftwo\else
2109 \MT@exp@two@c\ifx\MT@car\MT@prot@next\relax\@nil#1%
2110 \expandafter\expandafter\expandafter\@firstoftwo
2111 \else
2112 \expandafter\expandafter\expandafter\@secondoftwo
2113 \fi
2114 \fi
2115 }

\MT@car A long car.
2116 \long\def\MT@car#1#2\@nil{#1}

\MT@prot@iflicrcmd Fun with LICR: If we have an encoding command, test if the first command of the
 third command (e.g., \T1\") is \@text@composite, in which case also grab the next
 token, otherwise it should be a text command.
2117 \def\MT@getthird#1#2#3#4\@nil{#3}
2118 \def\MT@prot@iflicrcmd{%
2119 \MT@prot@iffirstcmd\@current@cmd\@secondoftwo\@firstofone
2120 {\MT@prot@iffirstcmd\@changed@cmd\@firstofone\@gobble}%
2121 {\expandafter\expandafter\expandafter\let
2122 \expandafter\expandafter\expandafter\@tempa
2123 \expandafter\MT@getthird\MT@prot@next\relax\@nil
2124 \MT@exp@two@c\ifx\@car\@tempa\relax\@nil\@text@composite
2125 \def\MT@temp*##1##2{\MT@exp@one@n\MT@prot@1{\the\MT@toks##1##2}}%
2126 \else
2127 \def\MT@temp*##1{\MT@exp@one@n\MT@prot@1{\the\MT@toks##1}}%
2128 \fi
2129 }%
2130 }

\MT@prot@addgroup If we have a group, we inject \MT@prot@get@firstgroup again at the beginning and
 don't bother about the rest. This still allows, e.g., \verb, verbatim or lstlistings
 material. The downside of being this cautious is that we'll miss lots of cases.
2131 \def\MT@prot@addgroup{\bgroup\afterassignment\MT@prot@get@firstgroup\let\MT@temp= }

\MT@prot@get@firstgroup Scan token by token.
\MT@prot@get@firstgroup@tc 2132 \def\MT@prot@get@firstgroup{\futurelet\MT@prot@next\MT@prot@get@first@group}
\MT@prot@get@firsttoken 2133 \def\MT@prot@get@firstgroup@tc{\futurelet\MT@prot@next\MT@prot@get@first@group@tc}
\MT@prot@get@nexttoken 2134 \def\MT@prot@get@firsttoken{\futurelet\MT@prot@next\MT@prot@get@first@token}
2135 \def\MT@prot@get@nexttoken{\futurelet\MT@prot@next\MT@prot@get@next@token}

\MT@prot@check We map through a list of commands that should be copied into the toks. <#3> will
\MT@prot@check@ be \relax by default, but can also indicate a replacement command.
2136 \def\MT@prot@check#1{\MT@prot@check@#1\relax\@nil}
2137 \def\MT@prot@check@#1#2#3\@nil{%
2138 \ifx\MT@prot@next#2%
2139 \csname MT@prot@check@#1\endcsname #3%
2140 \let\MT@prot@ifmacro\@gobble
2141 \expandafter\MT@tlist@break
2142 \fi
2143 }

 Beware that the following nomenclature is rather arcane.
\MT@prot@check@I • This is for commands to be Ignored.
2144 \def\MT@prot@check@I{%
2145 \def\MT@temp*##1{\MT@prot@get@firstgroup}%
2146 }

```

`\MT@prot@check@S` • Add a Single command (without an argument).

```
2147 \def\MT@prot@check@S{%
2148 \def\MT@temp*##1{\MT@toks\expandafter{\the\MT@toks##1}\MT@prot@get@firstgroup}%
2149 }
```

`\MT@prot@check@X` • Add a command with One argument.

```
2150 \def\MT@prot@check@X{%
2151 \def\MT@temp*##1##2{\MT@toks\expandafter{\the\MT@toks##1{##2}}\MT@prot@get@firstgroup}%
2152 }
```

`\MT@prot@check@T` • Add a command with Two arguments.

```
2153 \def\MT@prot@check@T{%
2154 \def\MT@temp*##1##2##3{\MT@toks\expandafter{\the\MT@toks##1{##2}{##3}}\MT@prot@get@firstgroup}%
2155 }
```

`\MT@prot@check@E` • This is for commands that Enclose their argument in something, e.g., in braces, and which we trial-typeset without any contents.

```
2156 \def\MT@prot@check@E{%
2157 \the\MT@toks
2158 \def\MT@temp*##1{\MT@prot@l{##1}}%
2159 }
```

`\MT@prot@check@e` • Same for starred commands (the main candidate here is `csquotes's \enquote`).

```
2160 \def\MT@prot@check@e{%
2161 \the\MT@toks
2162 \def\MT@temp*##1{\ifstar{\MT@prot@l{##1*}}{\MT@prot@l{##1}}}%
2163 }
```

`\MT@prot@check@eX` • Here we replace the ‘integrated interface’ (`csquotes`) with the regular one.

```
2164 \def\MT@prot@check@eX#1{%
2165 \the\MT@toks
2166 \def\MT@temp*##1{\ifstar
2167 {\MT@get@prot{#1*}{left}##1*}
2168 {\MT@get@prot{#1}{left}##1}}%
2169 }
```

`\MT@prot@check@l` • `csquotes` provides a couple of commands for quotations in foreign languages (lowercase, because it may be starred), whose first argument (the language) we also have to evaluate before trial typesetting.

```
2170 \def\MT@prot@check@l{%
2171 \def\MT@temp*##1{\ifstar{\MT@prot@check@l@{##1*}}{\MT@prot@check@l@{##1}}}%
2172 }
2173 \def\MT@prot@check@l@#1#2{%
2174 \the\MT@toks
2175 \MT@prot@l{#1{#2}}%
2176 }
```

`\MT@prot@check@lX` • Another macro for `csquotes` commands: replace integrated language-switching commands with their regular variants.

```
2177 \def\MT@prot@check@lX#1{%
2178 \def\MT@temp*##1{\ifstar
2179 {\def\MT@temp{##1*}\MT@prot@check@lX@{##1*}}
2180 {\def\MT@temp{##1}\MT@prot@check@lX@{##1}}}%
2181 }
2182 \def\MT@prot@check@lX@#1#2{%
2183 \the\MT@toks
```

```
2184 \MT@get@prot{#1{#2}}{left}\MT@temp{#2}%
2185 }
```

- \MT@prot@check@F • Here we deal with Font switching commands (i.e., text commands, which take an argument). We (a) remember the text command, (b) save the full text, and then (c) continue inspecting the contents of the argument. We also have to execute (and empty) \MT@toks, because it might already contain other commands. Nested text commands still don't work.

```
2186 \def\MT@prot@check@F{%
2187 \ifx\MT@prot@1\MT@prot@1etc
2188 \def\MT@temp*{\MT@exp@one@n\MT@prot@1{\the\MT@toks}}%
2189 \else
2190 \let\MT@prot@1\MT@prot@1etc
2191 \def\MT@temp*##1##2{%
2192 \let\MT@maybe@textcmd##1%
2193 \the\MT@toks
2194 \MT@toks}%
2195 \MT@prot@toks{##1{##2}}%
2196 \MT@prot@get@firstgroup@tc##2\MT@nil
2197 }%
2198 \fi
2199 }
```

\MT@prot@check@cmds And here's the list of commands that we can deal with.

```
2200 \def\MT@prot@check@cmds{%
2201 {I\ignorespaces}{I\relax}{I\@empty}%
2202 {S\rmfamily}{S\sffamily}{S\ttfamily}{S\mdseries}{S\bfseries}%
2203 {S\upshape}{S\itshape}{S\slshape}{S\scshape}{S\em}%
2204 {S\normalfont}{S\selectfont}%
2205 {S\lsstyle}%
2206 {S\tiny}{S\scriptsize}{S\footnotesize}{S\small}{S\normalsize}%
2207 {S\large}{S\Large}{S\LARGE}{S\huge}{S\Huge}%
2208 {O\fontencoding}{O\fontfamily}{O\fontseries}{O\fontshape}%
2209 {O\microtypesetup}{O\microtypecontext}%
2210 {T\fontsize}%
2211 {F\textrm}{F\textsf}{F\texttt}{F\textnormal}%
2212 {F\textbf}{F\textmd}{F\textit}{F\textsl}{F\textsc}{F\textup}{F\emph}%
2213 {F\MakeUppercase}{F\MakeLowercase}%
2214 }
```

L<sup>A</sup>T<sub>E</sub>X 2020/02/02 introduced some more text commands (adopted from fontaxes, which provides some more, see below).

```
2215 \IfFormatAtLeastTF{2020/02/02}
2216 {\g@addto@macro\MT@prot@check@cmds{%
2217 {S\swshape}{S\ulcshape}{S\sscshape}{S\normalshape}%
2218 {F\textulc}{F\textsw}{F\textssc}%
2219 {O\fontseriesforce}{O\fontshapeforce}}
2220 \relax
2221 \IfFormatAtLeastTF{2022/11/01}
2222 {\g@addto@macro\MT@prot@check@cmds{{F\MakeTitlecase}}}\relax
```

The ltxdoc class and the doc package provide some abbreviations. Unfortunately, the \cmd command doesn't work.

```
2223 \@ifclassloaded{ltxdoc}
2224 {\g@addto@macro\MT@prot@check@cmds{{E\enquote}{E\marg}{E\oarg}{E\parg}{E\cs}}}\relax
2225 \MT@addto@setup{%
2226 \MT@with@package@T{doc}
2227 {\g@addto@macro\MT@prot@check@cmds{{E\meta}}}%
```

The additional fontaxes commands.

```
2228 \MT@with@package@T{fontaxes}
2229 {\g@addto@macro\MT@prot@check@cmds{%
```

```

2230 {S\txfigures}{S\lfigures}{S\tbfigures}{S\prfigures}%
2231 {O\fontfigurestyle}{O\fontfigurealignment}{O\fontbasefamily}%
2232 {O\figureversion}%
2233 {F\textsw}{F\textssc}{F\textulc}%
2234 {F\textfigures}{F\liningfigures}{F\tabularfigures}{F\proportionalfigures}}%
2235 \IfFormatAtLeastTF{2020/02/02}\relax
2236 {\g@addto@macro\MT@prot@check@cmds{%
2237 {S\swshape}{S\ulcshape}{S\sscshape}%
2238 {F\textulc}{F\textsw}{F\textssc}}}}

```

The `nfssect-cfr` package (an extension of the `nfssect` package, which is part of Philipp Lehman's font installation guide but was never publicised separately as far as I can tell) adds many more commands on top of the NFSS.

```

2239 \MT@with@package@T{nfssect-cfr}
2240 {\g@addto@macro\MT@prot@check@cmds{%
2241 {S\tistyle}{S\lststyle}{S\ofstyle}{S\altstyle}{S\regstyle}{S\embossstyle}%
2242 {S\ornamentalstyle}{S\qtstyle}{S\shstyle}{S\tmstyle}{S\tvstyle}{S\swashstyle}%
2243 {S\lstyle}{S\osstyle}{S\instyle}{S\sustyle}{S\lstyle}{S\ostyle}%
2244 {S\pstyle}{S\style}{S\plstyle}{S\postyle}{S\lstyle}{S\ostyle}%
2245 {S\scolshape}{S\olshape}{S\sisshape}{S\ushape}{S\scushape}%
2246 {S\uishape}{S\rishape}{S\dfshape}{S\swstyle}%
2247 {S\nwidth}{S\cdwidth}{S\ecwidth}{S\ucwidth}%
2248 {S\etwidth}{S\epwidth}{S\exwidth}{S\uxwidth}{S\regwidth}%
2249 {S\mbweight}{S\dbweight}{S\sbweight}{S\ebweight}%
2250 {S\ubweight}{S\lgweight}{S\elweight}{S\ulweight}%
2251 {F\textti}{F\textlt}{F\textof}{F\textalt}{F\textreg}{F\emboss}%
2252 {F\textorn}{O\ornament}{F\textqt}{F\textsh}{F\texttm}{F\texttv}{F\textswash}%
2253 {F\textln}{F\textos}{F\textin}{F\textsu}{F\textl}{F\texto}%
2254 {F\textp}{F\textt}{F\textpl}{F\textpo}{F\texttl}{F\textto}%
2255 {F\textol}{F\textsi}{F\textu}{F\textscu}%
2256 {F\textui}{F\textri}{F\textdf}%
2257 {F\textnw}{F\textcd}{F\textec}{F\textuc}%
2258 {F\textet}{F\textep}{F\textex}{F\textux}{F\textrw}%
2259 {F\textmb}{F\textdb}{F\textsb}{F\texteb}%
2260 {F\textub}{F\textlg}{F\textel}{F\textul}}%
2261 \IfFormatAtLeastTF{2020/02/02}\relax
2262 {\g@addto@macro\MT@prot@check@cmds{{S\swshape}{F\textsw}}}}

```

If `yfonts` is loaded, we add the relevant commands.

```

2263 \MT@with@package@T{yfonts}
2264 {\g@addto@macro\MT@prot@check@cmds{%
2265 {S\frakfamily}{S\swabfamily}{S\gothfamily}%
2266 {F\textfrak}{F\textswab}{F\textgoth}}}%

```

`csquotes`'s `\enquote` command. It would take precedence over the one provided by `ltxdoc`.

```

2267 \MT@with@package@T{csquotes}
2268 {\ifclassloaded{ltxdoc}
2269 {\patchcmd\MT@prot@check@cmds{E\enquote}{e\enquote}\relax\relax}
2270 {\g@addto@macro\MT@prot@check@cmds{{e\enquote}}}%
2271 \g@addto@macro\MT@prot@check@cmds{{e\textquote}%
2272 {l\foreignquote}{l\hyphenquote}{l\foreigntextquote}{l\hyphentextquote}%
2273 {{eX}\textcquote\textquote}%
2274 {{lX}\foreigntextcquote\foreigntextquote}%
2275 {{lX}\hyphentextcquote\hyphentextquote}}}%
2276 }

```

`\MT@prot@get@first@group` If next char is `{`, start a group and try again, else continue until we find a beginning char.

```

2277 \def\MT@prot@get@first@group{%
2278 \MT@prot@ifcat\bgroup{%
2279 \def\MT@temp*{\MT@prot@addgroup}%
2280 }%
2281 \def\MT@temp*{\MT@prot@get@first@token}%

```



```

2282 }%
2283 \MT@temp*%
2284 }

```

`\MT@prot@get@first@group@tc` The variant for text commands (in case they start with another group).

```

2285 \def\MT@prot@get@first@group@tc{%
2286 \MT@prot@ifcat\bgroup{%
2287 \def\MT@temp*##1##2\MT@nil{\MT@ifempty{##1}\relax
2288 {\MT@prot@get@first@group@tc##1\MT@nil}}}%
2289 }{%
2290 \def\MT@temp*{\MT@prot@get@first@token}%
2291 }%
2292 \MT@temp*%
2293 }

```

`\MT@prot@get@first@token` This can be called repeatedly. We add a letter or other character, ...

```

2294 \def\MT@prot@get@first@token{%
2295 \def\MT@temp*{\MT@exp@one@n\MT@ifempty{\the\MT@toks
2296 {\MT@exp@one@n\MT@ifempty{\the\MT@prot@toks}\relax{\the\MT@prot@toks\MT@gobble@to@nil}}
2297 {\MT@exp@one@n\MT@prot@l{\the\MT@toks}}}%
2298 \MT@prot@ifcat{a}{%
2299 \def\MT@temp*{\MT@prot@addtoken@first}%
2300 }{%
2301 \MT@prot@ifcat{!}{%
2302 \def\MT@temp*{\MT@prot@addtoken@first}%
2303 }%

```

a space character, ...

```

2304 \MT@prot@ifx\@sptoken{%
2305 \def\MT@temp* {\MT@prot@get@first@group}%
2306 }{%

```

commands, ...

```

2307 \let\MT@prot@ifmacro\MT@prot@ifmacro@
2308 \MT@map@tlist@c\MT@prot@check@cmds\MT@prot@check

```

... or a command/active char whose first command is one of the following:

```

2309 \MT@prot@ifmacro{%
2310 \MT@prot@iffirstcmd\UTFviii@two@octets{%
2311 \def\MT@temp*##1##2{\MT@exp@one@n\MT@prot@l{\the\MT@toks##1##2}}}%
2312 }{%
2313 \MT@prot@iffirstcmd\UTFviii@three@octets{%
2314 \def\MT@temp*##1##2##3{\MT@exp@one@n\MT@prot@l{\the\MT@toks##1##2##3}}}%
2315 }{%
2316 \MT@prot@iffirstcmd\UTFviii@four@octets{%
2317 \def\MT@temp*##1##2##3##4{\MT@exp@one@n\MT@prot@l{\the\MT@toks##1##2##3##4}}}%
2318 }%

```

(this is for chars made active by `csquotes`, via `\MakeAutoQuote` or `\MakeOuterQuote`)

```

2319 \MT@prot@iffirstcmd\csqq{\def\MT@temp*##1{\MT@exp@one@n\MT@prot@l{\the\MT@toks##1}}}%

```

or, finally, a LICR command.

```

2320 \MT@prot@iflicrcmd
2321 }%
2322 }%
2323 }%
2324 }%
2325 }%
2326 }%
2327 }%
2328 }%
2329 \MT@temp*%
2330 }

```

`\MT@prot@addtoken@first` Begin filling toks.

```

2331 \def\MT@prot@addtoken@first#1{%
2332 \MT@toks\expandafter{\the\MT@toks#1}%
2333 \MT@prot@get@next@token
2334 }

```

`\MT@prot@get@next@token` Continue if letter or other.

```

2335 \def\MT@prot@get@next@token{%
2336 \def\MT@temp*{\MT@prot@addtoken@next}%
2337 \MT@prot@ifcat{a}\relax{%
2338 \MT@prot@ifcat{!}\relax{%
2339 \def\MT@temp*{\MT@exp@one@n\MT@prot@1{\the\MT@toks}}%
2340 }%
2341 }%
2342 \MT@temp*%
2343 }
2344 </package>

```

`\MT@prot@addtoken@next` Add token to our toks and test whether we've seen enough (ligature completed). For luatex, we have to jump through another hoop (i.e., box), because, contrary to the manual, `\lastnodetype` isn't really compatible.

```

2345 <*pdf-|lua-|xe-
2346 \def\MT@prot@addtoken@next#1{%
2347 \MT@toks\expandafter{\the\MT@toks#1}%
2348 \setbox\MT@tempbox\hbox{%

```

We disable italic correction, which would prevent us from seeing the ligature (with text commands).

```

2349 \let\maybe@ic\relax
2350 \MT@exp@one@n\MT@maybe@textcmd{\the\MT@toks}%
2351 <pdf-|xe-
2352 <lua-
2353 \ifnum\lastnodetype=7 \aftergroup\@firstoftwo\else\aftergroup\@secondoftwo\fi}%
2354 \MT@prot@get@next@token
2355 {\MT@exp@one@n\MT@prot@1{\the\MT@toks}}%
2356 }
2357 </pdf-|lua-|xe-

```

### 1.2.3 Expansion

`\MT@expansion` Set up for expansion?

```

2358 <*pdf-|lua-
2359 \def\MT@expansion{\MT@maybe@do{ex}}

```

`\MT@set@ex@codes@` Setting up font expansion is a bit different because of the selected option. There are two versions of this macro.

If `selected=true`, we only apply font expansion to those fonts for which a list has been declared (i.e., like for protrusion).

```

2360 \def\MT@set@ex@codes@{%
2361 \MT@if@list@exists{%
2362 \MT@get@ex@opt
2363 \let\MT@get@char@unit\relax
2364 \MT@reset@ef@codes
2365 \MT@get@inh@list
2366 \MT@set@inputenc{c}%
2367 \MT@load@list\MT@ex@cc@name
2368 \MT@set@listname
2369 \MT@let@cn@tempc{\MT@ex@cc@\MT@ex@cc@name}%
2370 \expandafter\MT@set@codes@\tempc,\relax,%
2371 \MT@expandfont
2372 }\relax
2373 }
2374 </pdf-|lua-

```

`\MT@set@ex@codes@n` If, on the other hand, all characters should be expanded by the same amount, we only take the first optional argument to `\SetExpansion` into account.

`\ifMT@nonselected` We need this boolean in `\MT@if@list@exists` so that no warning for missing lists will be issued.

```
2375 <package>\newif\ifMT@nonselected
2376 <*pdf-|lua->
2377 \def\MT@set@ex@codes@n{%
2378 \MT@nonselectedtrue
2379 \MT@if@list@exists
2380 \MT@get@ex@opt
2381 {%
2382 \let\MT@stretch@ \MT@stretch
2383 \let\MT@shrink@ \MT@shrink
2384 \let\MT@step@ \MT@step
2385 \let\MT@auto@ \MT@auto
2386 \let\MT@ex@factor@ \MT@ex@factor
2387 }%
2388 \MT@reset@ef@codes
2389 \MT@expandfont
2390 \MT@nonselectedfalse
2391 }
```

`\MT@set@ex@codes` Default is non-selected. It can be changed in the package options.

```
2392 \let\MT@set@ex@codes\MT@set@ex@codes@n
```

`\MT@expandfont` Expand the font. For some reason, older LuaTeX versions freeze if the `autoexpand` modifier is missing. Can't be bothered to find out why. For newer versions, we could also use the function `font.setexpansion`, or, in the future, `luaotfload`'s `expansionfont` feature.

```
2393 <*lua->
2394 \MT@requires@luatex3{
2395 \MT@requires@luatex4{\let\pdffontexpand\expandglyphsinfont}\relax
2396 \ifnum\luatexversion<79
2397 \def\MT@expandfont{%
2398 \pdffontexpand\MT@font \MT@stretch@ \MT@shrink@ \MT@step@ autoexpand\relax
2399 }
2400 \else
2401 \def\MT@expandfont{%
2402 \pdffontexpand\MT@font \MT@stretch@ \MT@shrink@ \MT@step@\relax
2403 }
2404 \fi
2405 }{
2406 </lua->
2407 \def\MT@expandfont{%
2408 \pdffontexpand\MT@font \MT@stretch@ \MT@shrink@ \MT@step@ \MT@auto@\relax
2409 }
2410 <lua->}}
```

`\MT@set@all@ex` At first, all expansion factors for the characters will be set to 1000 (respectively the factor of this font).

```
2411 \def\MT@set@all@ex#1{%
2412 <debug>\MT@info@n1{3}{-- ex: setting all to \number#1}%
2413 \MT@do@font{\efcode\MT@font\@tempcnta=#1\relax}%
2414 }
2415 \def\MT@reset@ef@codes@{\MT@set@all@ex\MT@ex@factor@}
```

`\MT@reset@ef@codes` However, this is only necessary for pdfTeX versions prior to 1.20, or LuaTeX < 0.90 (actually, I think, 0.87).

```
2416 <pdf->\MT@requires@pdftex4
2417 <lua->\MT@requires@luatex5
2418 {
2419 \def\MT@reset@ef@codes{%
```

```

2420 \ifnum\MT@ex@factor@=\@m \else
2421 \MT@reset@ef@codes@
2422 \fi
2423 }
2424 }{
2425 \let\MT@reset@ef@codes\MT@reset@ef@codes@
2426 }

```

`\MT@ex@split@val` There's only one number per character.

```

2427 \def\MT@ex@split@val#1\relax{%
2428 \@tempcntb=#1\relax

```

Take an optional factor into account.

```

2429 \ifnum\MT@ex@factor@=\@m \else
2430 \MT@scale\@tempcntb \MT@ex@factor@ \@m
2431 \fi
2432 \ifnum\@tempcntb > \MT@ex@max
2433 \MT@warn@ex@too@large\MT@ex@max
2434 \else
2435 \ifnum\@tempcntb < \MT@ex@min
2436 \MT@warn@ex@too@large\MT@ex@min
2437 \fi
2438 \fi
2439 \efcode\MT@font\MT@char=\@tempcntb
2440 (debug)\MT@dinfo@n1{4}{::: ef (\MT@char): \number\efcode\MT@font\MT@char: [#1]}%

```

Heirs, heirs, I love thy heirs.

```

2441 \MT@ifdefined@c@T\MT@ex@inh@name{%
2442 \MT@ifdefined@n@T\MT@inh@\MT@ex@inh@name @\MT@char @}{%
2443 \MT@exp@cs\MT@map@tlist@c{\MT@inh@\MT@ex@inh@name @\MT@char @}\MT@set@ex@heirs
2444 }%
2445 }%
2446 }

```

`\MT@warn@ex@too@large`

```

2447 \def\MT@warn@ex@too@large#1{%
2448 \MT@warning@n1{Expansion factor \number\@tempcntb\space too large for
2449 character\MessageBreak `the\MT@toks' in \MT@curr@list@name.\MessageBreak
2450 Setting it to the maximum of \number#1}%
2451 \@tempcntb=#1\relax
2452 }

```

`\MT@get@ex@opt` Apply different values to this font?

```

\MT@ex@factor@ 2453 \def\MT@get@ex@opt{%
\MT@stretch@ 2454 \MT@set@listname
2455 \MT@ifdefined@n@TF\MT@ex@c@\MT@ex@c@name @factor}{%
\MT@shrink@ 2456 \MT@let@cn\MT@ex@factor@\MT@ex@c@\MT@ex@c@name @factor}%
\MT@step@ 2457 \MT@vinfo{... : Multiplying expansion factors by \number\MT@ex@factor@/1000}%
\MT@auto@ 2458 }%
2459 \let\MT@ex@factor@\MT@ex@factor
2460 }%
2461 \MT@get@ex@opt@{stretch}{Setting stretch limit to \number\MT@stretch@}%
2462 \MT@get@ex@opt@{shrink}{Setting shrink limit to \number\MT@shrink@}%
2463 \MT@get@ex@opt@{step}{Setting expansion step to \number\MT@step@}%
2464 (lua-) \MT@requires@luatex3\relax%
2465 \MT@get@ex@opt@{auto}{\MT@ifstreq{\MT@auto@}{autoexpand}{En}{Dis}abling automatic expansion}%
2466 (lua-) }%
2467 \MT@ifdefined@n@T\MT@ex@c@\MT@ex@c@name @preset}{%
2468 \MT@preset@ex
2469 \let\MT@reset@ef@codes\relax
2470 }%
2471 }

```

`\MT@get@ex@opt@`

```

2472 \def\MT@get@ex@opt@#1#2{%

```

```

2473 \MT@ifdefined@n@TF{MT@ex@c@MT@ex@c@name @#1}{%
2474 \MT@let@nn{MT@#1@}{MT@ex@c@MT@ex@c@name @#1}%
2475 \MT@vinfo{... : #2}%
2476 }{%
2477 \MT@let@nn{MT@#1@}{MT@#1}%
2478 }%
2479 }

```

`\MT@set@ex@heirs`

```

2480 \def\MT@set@ex@heirs#1{%
2481 \efcode\MT@font#1=\efcode\MT@font\MT@char
2482 <debug>\MT@dinfoln{2}{-- heir of \MT@char: #1}%
2483 <debug>\MT@dinfoln{4}{::: ef (#1) \number\efcode\MT@font\MT@char}%
2484 }

```

`\MT@preset@ex`

```

2485 \def\MT@preset@ex{%
2486 \@tempcntb=\csname MT@ex@c@MT@ex@c@name @preset\endcsname\relax
2487 \MT@scale@factor
2488 \MT@set@all@ex\@tempcntb
2489 }
2490 </pdf-|lua-|

```

### 1.2.4 Interword spacing (glue)

`\MT@spacing` Adjustment of interword spacing? Only works with pdfTeX.

```

2491 <*pdf-|
2492 \MT@requires@pdftex6{
2493 \def\MT@spacing{\MT@maybe@do{sp}}

```

`\MT@set@sp@codes` This is all the same.

```

2494 \def\MT@set@sp@codes{%
2495 \MT@if@list@exists{%
2496 \MT@get@opt
2497 \MT@reset@sp@codes
2498 \MT@get@inh@list
2499 \MT@set@inputenc{c}%
2500 \MT@load@list\MT@sp@c@name
2501 \MT@set@listname
2502 \MT@let@cn\@tempc{MT@sp@c@MT@sp@c@name}%
2503 \expandafter\MT@set@codes\@tempc,\relax,%
2504 }\MT@reset@sp@codes
2505 }

```

`\MT@sp@split@val` If `unit=space`, `\MT@get@space@unit` will be defined to fetch the corresponding fontdimen (2 for the first, 3 for the second and 4 for the third argument).

```

2506 \def\MT@sp@split@val#1,#2,#3\relax{%
2507 \def\@tempb{#1}%
2508 \MT@ifempty\@tempb\relax{%
2509 \MT@get@space@unit2%
2510 \MT@scale@to@em
2511 \knbscode\MT@font\MT@char=\@tempcntb
2512 <debug>\MT@dinfoln{4}{;;; knbs (\MT@char): \number\knbscode\MT@font\MT@char: [#1]}%
2513 }%
2514 \def\@tempb{#2}%
2515 \MT@ifempty\@tempb\relax{%
2516 \MT@get@space@unit3%
2517 \MT@scale@to@em
2518 \stbscode\MT@font\MT@char=\@tempcntb
2519 <debug>\MT@dinfoln{4}{;;; stbs (\MT@char): \number\stbscode\MT@font\MT@char: [#2]}%
2520 }%
2521 \def\@tempb{#3}%
2522 \MT@ifempty\@tempb\relax{%

```

```

2523 \MT@get@space@unit4%
2524 \MT@scale@to@em
2525 \shbscode\MT@font\MT@char=\@tempcntb
2526 (debug)\MT@dinfoln{4}{;;; shbs (\MT@char): \number\shbscode\MT@font\MT@char: [#3]}%
2527 }%
2528 \MT@ifdefined@c@T\MT@sp@inh@name{%
2529 \MT@ifdefined@nT\MT@inh@\MT@sp@inh@name @\MT@char @}{%
2530 \MT@exp@cs\MT@map@tlist@c\MT@inh@\MT@sp@inh@name @\MT@char @}\MT@set@sp@heirs
2531 }%
2532 }%
2533 }

\MT@set@sp@heirs

2534 \def\MT@set@sp@heirs#1{%
2535 \knbscode\MT@font#1=\knbscode\MT@font\MT@char
2536 \stbscode\MT@font#1=\stbscode\MT@font\MT@char
2537 \shbscode\MT@font#1=\shbscode\MT@font\MT@char
2538 (debug)\MT@dinfoln{2}{-- heir of \MT@char: #1}%
2539 (debug)\MT@dinfoln{4}{;;; knbs/stbs/shbs (#1): \number\knbscode\MT@font\MT@char/%
2540 (debug) \number\stbscode\MT@font\MT@char/\number\shbscode\MT@font\MT@char}%
2541 }

\MT@set@all@sp

\MT@reset@sp@codes 2542 \def\MT@set@all@sp#1#2#3{%
\MT@reset@sp@codes@ 2543 (debug)\MT@dinfoln{3}{-- knbs/stbs/shbs: setting all to #1/#2/#3}%
2544 \let\MT@temp@empty
2545 \MT@ifempty{#1}\relax{\g@addto@macro\MT@temp{\knbscode\MT@font\@tempcnta=#1\relax}}%
2546 \MT@ifempty{#2}\relax{\g@addto@macro\MT@temp{\stbscode\MT@font\@tempcnta=#2\relax}}%
2547 \MT@ifempty{#3}\relax{\g@addto@macro\MT@temp{\shbscode\MT@font\@tempcnta=#3\relax}}%
2548 \MT@do@font\MT@temp
2549 }
2550 \def\MT@reset@sp@codes@\MT@set@all@sp\z@\z@\z@
2551 \let\MT@reset@sp@codes\relax

\MT@preset@sp

\MT@preset@sp@ 2552 \def\MT@preset@sp{%
2553 \expandafter\expandafter\expandafter\MT@preset@sp@
2554 \csgname \MT@sp@c@\MT@sp@c@name @preset\endcsname\@nil
2555 }
2556 \def\MT@preset@sp@#1.#2.#3\@nil{%
2557 \ifx\MT@sp@unit@\@empty
2558 \MT@warn@preset@t@width{sp}%
2559 \MT@ifempty{#1}{\let\@tempa\@empty}{\MT@preset@aux@factor{#1}\@tempa}%
2560 \MT@ifempty{#2}{\let\@tempc\@empty}{\MT@preset@aux@factor{#2}\@tempc}%
2561 \MT@ifempty{#3}{\let\@tempb\@empty}{\MT@preset@aux@factor{#3}\@tempb}%
2562 \else
2563 \MT@ifempty{#1}{\let\@tempa\@empty}{\MT@preset@aux@space2{#1}\@tempa}%
2564 \MT@ifempty{#2}{\let\@tempc\@empty}{\MT@preset@aux@space3{#2}\@tempc}%
2565 \MT@ifempty{#3}{\let\@tempb\@empty}{\MT@preset@aux@space4{#3}\@tempb}%
2566 \fi
2567 \MT@set@all@sp@\@tempa\@tempc\@tempb
2568 }
2569 }\relax

```

### 1.2.5 Additional kerning

`\MT@kerning` Again, only check for additional kerning for new versions of pdfTeX.

```

2570 \MT@requires@pdftex6{
2571 \def\MT@kerning{\MT@maybe@do{kn}}

```

`\MT@set@kn@codes` It's getting boring, I know.

```

2572 \def\MT@set@kn@codes{%
2573 \MT@if@list@exists{%

```

```

2574 \MT@get@opt
2575 \MT@reset@kn@codes
2576 \MT@get@inh@list
2577 \MT@set@inputenc{c}%
2578 \MT@load@list\MT@kn@c@name
2579 \MT@set@listname
2580 \MT@let@cn\@tempc{\MT@kn@c@\MT@kn@c@name}%
2581 \expandafter\MT@set@codes\@tempc,\relax,%
2582 }\MT@reset@kn@codes
2583 }

```

\MT@kn@split@val Again, the unit may be measured in the space dimension; this time only \fontdimen 2.

```

2584 \def\MT@kn@split@val#1,#2\relax{%
2585 \def\@tempb{#1}%
2586 \MT@ifempty\@tempb\relax{%
2587 \MT@get@space@unit2%
2588 \MT@scale@to@em
2589 \knbcode\MT@font\MT@char=\@tempcntb
2590 <debug>\MT@dinfoln{4}{;;; knbc (\MT@char): \number\knbcode\MT@font\MT@char: [#1]}%
2591 }%
2592 \def\@tempb{#2}%
2593 \MT@ifempty\@tempb\relax{%
2594 \MT@get@space@unit2%
2595 \MT@scale@to@em
2596 \knacode\MT@font\MT@char=\@tempcntb
2597 <debug>\MT@dinfoln{4}{;;; knac (\MT@char): \number\knacode\MT@font\MT@char: [#2]}%
2598 }%
2599 \MT@ifdefined@c@T\MT@kn@inh@name{%
2600 \MT@ifdefined@nT\MT@inh@\MT@kn@inh@name @\MT@char @}%
2601 \MT@exp@cs\MT@map@tlist@c{\MT@inh@\MT@kn@inh@name @\MT@char @}\MT@set@kn@heirs
2602 }%
2603 }%
2604 }

```

\MT@set@kn@heirs

```

2605 \def\MT@set@kn@heirs#1{%
2606 \knbcode\MT@font#1=\knbcode\MT@font\MT@char
2607 \knacode\MT@font#1=\knacode\MT@font\MT@char
2608 <debug>\MT@dinfoln{2}{-- heir of \MT@char: #1}%
2609 <debug>\MT@dinfoln{4}{;;; knbc (#1): \number\knbcode\MT@font\MT@char/%
2610 <debug> \number\knacode\MT@font\MT@char}%
2611 }

```

\MT@set@all@kn

```

\MT@reset@kn@codes 2612 \def\MT@set@all@kn#1#2{%
\MT@reset@kn@codes@ 2613 <debug>\MT@dinfoln{3}{-- knac/knbc: setting all to #1/#2}%
2614 \let\MT@temp\@empty
2615 \MT@ifempty{#1}\relax{\g@addto@macro\MT@temp{\knbcode\MT@font\@tempcnta=#1\relax}}%
2616 \MT@ifempty{#2}\relax{\g@addto@macro\MT@temp{\knacode\MT@font\@tempcnta=#2\relax}}%
2617 \MT@do@font\MT@temp
2618 }
2619 \def\MT@reset@kn@codes@\MT@set@all@kn\z@\z@
2620 \let\MT@reset@kn@codes\relax

```

\MT@preset@kn

```

\MT@preset@kn 2621 \def\MT@preset@kn{%
2622 \expandafter\expandafter\expandafter\MT@preset@kn@
2623 \csname MT@kn@c@\MT@kn@c@name @preset\endcsname\@nil
2624 }
2625 \def\MT@preset@kn@#1,#2\@nil{%
2626 \ifx\MT@kn@unit@\@empty
2627 \MT@warn@preset@twidth{kn}%
2628 \let\MT@preset@aux\MT@preset@aux@factor
2629 \else
2630 \def\MT@preset@aux{\MT@preset@aux@space2}%

```

```

2631 \fi
2632 \MT@ifempty{#1}{\let\@tempa\@empty}{\MT@preset@aux{#1}\@tempa}%
2633 \MT@ifempty{#2}{\let\@tempb\@empty}{\MT@preset@aux{#2}\@tempb}%
2634 \MT@set@all@kn\@tempa\@tempb
2635 }
2636 }\relax
2637 </pdf-

```

### 1.2.6 Tracking

This only works with pdfTeX 1.40 or LuaTeX 0.62.

```

2638 <*pdf-|lua-
2639 <pdf-)\MT@requires@pdftex6
2640 <lua-)\MT@requires@luatex3
2641 {

```

`\MT@tracking` We only check whether a font should not be letterspaced at all, not whether we've already done that (because we have to do it again).

```

\MT@tr@font@list 2642 \let\MT@tr@font@list\@empty
2643 \def\MT@tracking@{%
2644 \MT@exp@one@n\MT@in@cl@list\MT@font\MT@tr@font@list
2645 \ifMT@in@list\else
2646 \MT@maybe@do{tr}%
2647 \ifMT@do\else
2648 \xdef\MT@tr@font@list{\MT@tr@font@list\MT@font,}%
2649 \fi
2650 \fi
2651 }
2652 </pdf-|lua-
2653 <pdf-|lua-|letterspace)\let\MT@tracking
2654 <pdf-|lua- \MT@tracking@
2655 <letterspace \relax

```

`\MT@set@tr@codes` The tracking amount is determined by the optional argument to `\textls`, settings from `\SetTracking`, or the global `letterspace` option, in this order.

Tracking won't work with older pdfTeX versions (< 1.40.23) if the original font's `\fontdimen 6` is zero, in which case we issue a warning (once for every font).

```

2656 <*pdf-|lua-|letterspace
2657 \def\MT@set@tr@codes{%
2658 <*pdf-|lua-
2659 \MT@vinfo{Tracking font `\'MT@@font'\on@line}%
2660 <*pdf-
2661 \MT@requires@pdftex8\@firstofone{%
2662 \MT@ifdefined@nTF{\MT@@font-fake6}{%
2663 \MT@exp@cs\ifx{\MT@@font-fake6}\@empty
2664 \MT@warning@n1{%
2665 Font `\'MT@@font' does not specify its\MessageBreak
2666 \@backslashchar fontdimen 6 (width of an `em')! Therefore,\MessageBreak
2667 tracking will not work with this font}%
2668 \MT@gl@et@nc{\MT@@font-fake6}\relax
2669 \fi
2670 }%
2671 }%
2672 </pdf-
2673 \MT@if@list@exists
2674 \MT@get@tr@opt
2675 \relax
2676 </pdf-|lua-
2677 \MT@ifdefined@c@TF\MT@letterspace@\relax{\let\MT@letterspace\MT@letterspace}%
2678 \ifnum\MT@letterspace=@z@

```

Zero tracking requires special treatment.

```

2679 \MT@set@tr@zero

```



```
2680 \else
2681 <pdf-|lua- > \MT@vinfo{... Tracking by \number\MT@letterspace@}%
```

Letterspacing only works in PDF mode.

```
2682 \MT@warn@tracking@DVI
```

\MT@lsfont The letterspaced font instances are saved in macros `\(font name)/(letterspacing amount)ls`.

In contrast to `\MT@font`, which may reflect the font characteristics more accurately (taking substitutions into account), `\font@name` is guaranteed to correspond to an actual font identifier.

```
2683 \xdef\MT@lsfont{\csname\expandafter\string\font@name
2684 \number\MT@letterspace@ls\endcsname}%
2685 \expandafter\ifx\MT@lsfont\relax
2686 <debug>\MT@dinfo@n1{1}{... new letterspacing instance}%
```

In case of nested letterspacing with different amounts, we have to extract the base font again.

```
2687 \MT@get@ls@basefont
```

`\luaotfload` provides the faux font feature `kernfactor`, which we will use when dealing with non-legacy fonts, as it is less problematic and faster than the pdfTeX primitive `\letterspacefont`.

```
2688 <*lua-|letterspace>
2689 \MT@if@luaotf@font{%
2690 <lua-&debug>\MT@dinfo@n1{1}{... luaotf font: \MessageBreak
2691 <lua-&debug> \expandafter\fontname\font@name}%
2692 \global\expandafter\font\MT@lsfont=\MT@ls@fontspec@font
2693 }{%
2694 </lua-|letterspace>
2695 <lua-&debug>\MT@dinfo@n1{1}{... legacy font}%
2696 \global\expandafter\letterspacefont\MT@lsfont\font@name\MT@letterspace@
2697 <lua-|letterspace> }%
```

Scale interword spacing (not configurable in letterspace).

```
2698 <*pdf-|lua- >
2699 \MT@ifdefined@c@TF\MT@tr@ispace
2700 {\let\@tempa\MT@tr@ispace}%
2701 {\edef\@tempa{\MT@letterspace@*,,}}%
2702 \MT@ifdefined@c@TF\MT@tr@ospace
2703 {\edef\@tempa{\@tempa,\MT@tr@ospace}}%
2704 {\edef\@tempa{\@tempa,,}}%
2705 \expandafter\MT@tr@set@space\@tempa,%
2706 </pdf-|lua- >
2707 <*letterspace>
2708 % spacing = {<letterspace amount>*,,}
2709 \fontdimen2\MT@lsfont=\dimexpr\numexpr 1000+\MT@letterspace@\relax sp
2710 * \fontdimen2\MT@lsfont/1000\relax
2711 </letterspace>
```

Adjust outer kerning (microtype only).

```
2712 <*pdf-|lua- >
2713 \MT@ifdefined@c@TF\MT@tr@okern{\let\@tempa\MT@tr@okern}{\def\@tempa{*,*}}%
2714 \expandafter\MT@tr@set@okern\@tempa,%
```

Disable ligatures (not configurable in letterspace).

```
2715 \MT@ifdefined@c@T\MT@tr@ligatures\MT@tr@noligatures
2716 </pdf-|lua- >
2717 <*letterspace>
2718 % no ligatures = {f}
2719 \tagcode\MT@lsfont`f=\m@ne
2720 </letterspace>
```

Adjust protrusion values now, and maybe later (in `\MT@pr@split@val`) (not for LuaTeX, though, where letterspacing does not interfere with protrusion).

```

2721 <lua-|letterspace> \MT@if@luaotf@font\relax{%
2722 <debug>\MT@info@n1{2}{... compensating for tracking (\number\MT@letterspace@)}%
2723 \MT@do@font{\lcode\MT@font\@tempcnta=\numexpr\MT@letterspace@/2\relax
2724 \rcode\MT@font\@tempcnta=\numexpr\MT@letterspace@/2\relax}%
2725 \let\MT@the@pr@code\MT@the@pr@code@tr
2726 <lua-|letterspace> }%
2727 \fi

```

Finally, let the letterspaced font propagate. With LuaTeX, we also need to load.

```

2728 \aftergroup\MT@set@font
2729 <pdf-|lua-|> \let\MT@font\MT@font
2730 <lua-|> \MT@if@luaotf@font\MT@font\relax

```

`\MT@set@curr@ls` We need to remember the current letterspacing amount (for `\slig`).

```

\MT@curr@ls 2731 \xdef\MT@set@curr@ls{\def\noexpand\MT@curr@ls{\MT@letterspace@}}%
2732 \aftergroup\MT@set@curr@ls

```

Adjust surrounding spacing and kerning.

`\MT@set@curr@os` We get the current outer spacing and adjust it, then, after the end of the current outer group, set the current outer spacing, again, and adjust.

```

2733 <*pdf-|lua-|>
2734 \MT@outer@space=\csname MT@outer@space\expandafter\string\font@name\endcsname\relax
2735 \xdef\MT@set@curr@os{\MT@outer@space=\the\MT@outer@space\relax}%
2736 \MT@tr@outer@l
2737 </pdf-|lua-|>

```

If `\MT@ls@adjust` is empty, it's the starred version of `\textls`. Use scaling to avoid a 'Dimension too large'.

```

2738 \ifx\MT@ls@adjust\@empty
2739 <letterspace> % \textls : outer kerning = {*,*} ; \textls* : outer kerning = {0,0}
2740 \MT@outer@kern=-\dimexpr\MT@letterspace@ sp * \fontdimen6\font@name/2000\relax
2741 \MT@ls@outer@k

```

Otherwise, get the current outer kerning and adjust it, for left and right side (microtype only).

```

2742 <*pdf-|lua-|>
2743 \else
2744 \MT@outer@kern=\expandafter\expandafter\expandafter\@firstoftwo
2745 \csname MT@outer@kern\expandafter\string\font@name\endcsname\relax
2746 \ifdim\MT@outer@kern=z@ \else \MT@ls@outer@k \fi
2747 \MT@outer@kern=\expandafter\expandafter\expandafter\@secondoftwo
2748 \csname MT@outer@kern\expandafter\string\font@name\endcsname\relax
2749 </pdf-|lua-|>
2750 <*letterspace>
2751 \xdef\MT@set@curr@ok{\MT@outer@kern=\the\MT@outer@kern\relax}%
2752 \MT@afteraftergroup{%
2753 \MT@set@curr@ok
2754 \noexpand\MT@ls@outer@k
2755 }%
2756 </letterspace>
2757 \fi
2758 <*pdf-|lua-|>

```

`\MT@set@curr@ok` Carry the outer kerning amount to outside the next group, then set outer spacing (which will set kerning, if no space follows).

```

2759 \xdef\MT@set@curr@ok{\MT@outer@kern=\the\MT@outer@kern\relax}%

```

Stuff to be done after the letterspace group. The letterspace package only adjusts the kerning.

```

2760 \MT@afteraftergroup{%
2761 \MT@set@curr@os

```

```

2762 \MT@set@curr@ok
2763 \noexpand\MT@tr@outer@r
2764 }%
2765 </pdf-|lua-|
2766 \fi
2767 </pdf-|> }%
2768 }

```

`\MT@afteraftergroup` This helper macro carries stuff outside of the current group to the end of the next group, but will then respect grouping, which is crucial for nested letterspacing. (Following an idea of Will Robertson.)

```

2769 \def\MT@afteraftergroup#1{%
2770 <|letterspace> \MT@maybe@gobble@with@tikz{%
2771 \MT@ifdefined@n@TF{MT@aftergroup@number\currentgrouplevel}\relax{%
2772 \MT@exp@cs\xdef{MT@aftergroup@number\currentgrouplevel}%
2773 {\MT@exp@cs\MT@gl@et{MT@aftergroup@number\currentgrouplevel}\noexpand\@undefined#1}%
2774 \expandafter\aftergroup\expandafter\aftergroup\MT@exp@cs\aftergroup
2775 {MT@aftergroup@number\currentgrouplevel}%
2776 }%
2777 <|letterspace> }%
2778 }
2779 </pdf-|lua-|letterspace>

```

`\MT@ls@fontspec@font` Add the kernfactor feature to a font loaded by fontspec.

```

2780 <*lua-|letterspace>
2781 \def\MT@ls@fontspec@font{%
2782 \MT@lua{microtype.add_ls([[\MT@letterspace@]])}%
2783 }
2784 </lua-|letterspace>
2785 <*luafile>
2786 local function add_ls(k)
2787 local f = tex.fontname(font.current())
2788 local spec,size = match(f,'^(.+)(at .+)$')
2789 if not spec then spec = f end
2790 local a,b,c = match(spec,'^[^:]+):?([^\:]*):?(.*)$')
2791 local ls = "kernfactor=" .. k/1000 .. ';'
2792 microtype.sprint(a..':')
2793 if (a == "name" or a == "file") then
2794 microtype.sprint(b..'!:'..ls..c)
2795 else
2796 microtype.sprint(ls..b)
2797 end
2798 if size then
2799 microtype.sprint(size)
2800 end
2801 end
2802 microtype.add_ls = add_ls
2803
2804 </luafile>

```

`\MT@get@tr@opt` Various settings (only for the microtype version).

```

2805 <*pdf-|lua-|
2806 \def\MT@get@tr@opt{%
2807 \MT@set@listname
2808 \let\MT@tr@factor@\m

```

`\MT@tr@unit@` Different unit (for letterspace and/or (outer)spacing)?

```

2809 \MT@ifdefined@n@T{MT@tr@c@MT@tr@c@name @unit}{%
2810 \MT@let@cn\MT@tr@unit@{MT@tr@c@MT@tr@c@name @unit}%
2811 \ifdim\MT@tr@unit@=1em
2812 \let\MT@tr@unit@\undefined
2813 \else
2814 \MT@get@unit\MT@tr@unit@
2815 \fi

```

```

2816 }%
2817 \MT@ifdefined@n@T{MT@tr@cc@MT@tr@cc@name}{%
2818 \MT@let@cn\MT@letterspace{MT@tr@cc@MT@tr@cc@name}%
2819 \MT@ifdefined@c@T\MT@tr@unit@{%
2820 \let\@tempb\MT@letterspace
2821 \MT@scale@to@em
2822 \edef\MT@letterspace{\number\@tempcntb}%
2823 }%
2824 }%

\MT@tr@ispace Adjust interword spacing.
\MT@tr@ospace 2825 \MT@get@tr@opt@{spacing} {ispace}%
2826 \MT@get@tr@opt@{outerspacing}{ospace}%

\MT@tr@okern Adjust outer kerning.
2827 \MT@get@tr@opt@{outerkerning}{okern}%

\MT@tr@ligatures Which ligatures should we disable (empty means all, undefined none)?
2828 \MT@get@tr@opt@{noligatures} {ligatures}%
2829 }

\MT@get@tr@opt@
2830 \def\MT@get@tr@opt@#1#2{%
2831 \MT@ifdefined@n@T{MT@tr@cc@MT@tr@cc@name @#1}%
2832 {\MT@let@nn{MT@tr@#2}{MT@tr@cc@MT@tr@cc@name @#1}}%
2833 }
2834 /pdf-|lua-

\MT@set@lsfont Redefine \font@name, which will be called a second later (in \selectfont).
2835 <*pdf-|lua-|letterspace
2836 (plain)\MT@requires@latex2{
2837 \def\MT@set@lsfont{\MT@exp@two@c\let\font@name\MT@lsfont}

\lsstyle Disable the tests whether the font should be letterspaced, then trigger the setup.
Only \textls can be used in math mode (\lsstyle may be used inside another
text switch, of course). Still, we have to ensure that math fonts are set up again.
Setting \gls@currsiz globally to \empty (our previous solution) could throw us
into an infinite loop (e.g., with the psnfss packages, via \every@math@size), so
we issue \gls@settings instead. However, in certain situations, we may still miss
some math fonts, so let's try to also enforce it by emptying \gls@currsiz, fingers
crossed. The overhead seems small.

2838 \DeclareRobustCommand\lsstyle{%
2839 \not@math@alphabet\lsstyle\textls
2840 \let\gls@currsiz\empty
2841 (pdf-|lua-) \MT@maybe@gobble@with@tikz{\aftergroup\gls@settings}%
2842 (pdf-|lua-) \def\MT@feat{tr}%
2843 \let\MT@tracking\MT@set@tr@codes
2844 \selectfont
2845 }

Now the definitions for the letterspace package with plain TEX.

2846 <*plain
2847 }{
2848 \def\MT@set@lsfont{\MT@lsfont}
2849 \def\lsstyle{%
2850 \begingroup
2851 \escapechar\m@ne
2852 \xdef\font@name{\csname\expandafter\string\the\font\endcsname}%
2853 \MT@set@tr@codes
2854 \endgroup
2855 }
2856 \let\textls\undefined

```

```

2857 \let\lslig\@undefined
2858 }
2859 </plain>

```

`\lslig` For Fraktur fonts, some ligatures shouldn't be broken up. This command will temporarily select the base font (making sure to really select the current font) and insert the correct kerning.

```

2860 \DeclareRobustCommand\lslig[1]{%
2861 {\MT@ifdefined@c@TF\MT@curr@ls{%
2862 \escapechar\m@ne
2863 <plain> \MT@requires@latex2{%
2864 \xdef\font@name{\csname\curr@fontshape/\f@size\endcsname}%
2865 <plain> } \relax%
2866 \MT@get@ls@basefont
2867 \MT@outer@kern=\dimexpr\MT@curr@ls sp * \fontdimen6\font@name/2000\relax
2868 \kern\MT@outer@kern
2869 \font@name #1%
2870 \kern\MT@outer@kern
2871 }#1}%
2872 }

```

`\MT@ls@basefont` pdfTeX cannot letterspace fonts that already are letterspaced. Therefore, we have to save the base font in `\font name@base`.

The previous solution (checking the macro's meaning with `\pdfmatch`), where we were loading the base font via the `\font` primitive again, would destroy all previously set up micro-typographic features of the font.

```

2873 \def\MT@get@ls@basefont{%
2874 \xdef\MT@ls@basefont{\csname\expandafter\string\font@name @base\endcsname}%
2875 \expandafter\ifx\MT@ls@basefont\relax
2876 \MT@exp@two@c\MT@gl@et\MT@ls@basefont\font@name
2877 \else
2878 <debug>\MT@info@n1{1}{... fixing base font}%
2879 \MT@set@ls@basefont
2880 \fi
2881 }

```

`\MT@set@ls@basefont` If tracking is switched off in the middle of the document, or if `\textls` is called with a zero letterspacing amount, we have to retrieve the base font and select it.

`\MT@set@tr@zero`

```

2882 \def\MT@set@ls@basefont{\MT@exp@two@c\let\font@name\MT@ls@basefont}
2883 \def\MT@set@tr@zero{%
2884 <debug>\MT@info@n1{1}{... zero tracking}%
2885 \xdef\MT@ls@basefont{\csname\expandafter\string\font@name @base\endcsname}%
2886 \expandafter\ifx\MT@ls@basefont\relax \else
2887 <debug>\MT@info@n1{1}{... fixing base font}%
2888 \aftergroup\MT@set@ls@basefont
2889 \fi
2890 }
2891 </pdf-|lua-|letterspace>

```

`\MT@tr@noligatures` pdfTeX 1.40.0–1.40.3 disabled all ligatures in letterspaced fonts.

```

2892 <*pdf-|lua->
2893 <pdf->\MT@requires@pdftex7{
2894 \def\MT@tr@noligatures{%
2895 \ifx\MT@tr@ligatures\@empty
2896 \MT@noligatures@\MT@lsfont\@undefined
2897 \else
2898 \MT@noligatures@\MT@lsfont\MT@tr@ligatures
2899 \fi
2900 }
2901 <*pdf->
2902 }{
2903 \def\MT@tr@noligatures{%
2904 \MT@warning@n1{%

```

```

2905 Disabling selected ligatures is only possible since\MessageBreak
2906 pdfTeX 1.40.4. Disabling all ligatures instead}%
2907 \MT@gllet\MT@tr@noligatures\relax
2908 }
2909 }
2910 </pdf-

```

\MT@outer@space A new skip for outer spacing.

```
2911 \newskip\MT@outer@space
```

\MT@tr@set@space Adjust interword spacing (`\fontdimen 2,3,4`) for inner and outer space. For inner spacing, the font dimensions will be adjusted, the settings for outer spacing will be remembered in a macro.

```

2912 \def\MT@tr@set@space#1,#2,#3,#4,#5,#6,{%
2913 <debug>\MT@dinfnl2{... orig. space: \the\fontdimen2\MT@lsfont,
2914 <debug> \the\fontdimen3\MT@lsfont, \the\fontdimen4\MT@lsfont
2915 <debug> \MessageBreak... (#1,#2,#3) (#4,#5,#6)}%
2916 \let\MT@temp\empty
2917 \MT@tr@set@space@{#1}{#4}{2}\empty
2918 \MT@tr@set@space@{#2}{#5}{3}\@pplus
2919 \MT@tr@set@space@{#3}{#6}{4}\@minus
2920 \MT@gllet@nc\MT@outer@space\expandafter\string\font@name\MT@temp
2921 <debug>\MT@dinfnl2{... inner space: \the\fontdimen2\MT@lsfont,
2922 <debug> \the\fontdimen3\MT@lsfont, \the\fontdimen4\MT@lsfont}%
2923 <debug>\MT@dinfnl2{... outer space: \MT@temp}%
2924 }

```

\MT@tr@set@space@ If settings for outer spacing (`#2`) don't exist, they will be inherited from the inner spacing settings (`#1`).

```

2925 \def\MT@tr@set@space@#1#2#3#4{%
2926 \MT@ifempty{#2}{%
2927 \MT@ifempty{#1}\relax{%
2928 \MT@tr@set@space@@{#1}{#3}{1000}%
2929 \fontdimen#3\MT@lsfont=\@tempdima
2930 }%
2931 \edef\MT@temp{\MT@temp#4\the\fontdimen#3\MT@lsfont}%
2932 }{%
2933 \MT@tr@set@space@@{#2}{#3}{2000}%
2934 \edef\MT@temp{\MT@temp#4\the\@tempdima}%
2935 \MT@ifempty{#1}\relax{%
2936 \MT@tr@set@space@@{#1}{#3}{1000}%
2937 \fontdimen#3\MT@lsfont=\@tempdima
2938 }%
2939 }%
2940 }

```

\MT@tr@set@space@@ If the value is followed by an asterisk, the fontdimen will be scaled by the respective amount, otherwise the value denotes the desired dimension in the respective unit.

```

2941 \def\MT@tr@set@space@@#1#2#3{%
2942 \MT@test@ast#1*\@nil{%
2943 \MT@ifdefined@cTF\MT@tr@unit@
2944 {\edef\@tempb{#1}\MT@scale@to@em}
2945 {\@tempcntb=#1\relax}%
2946 \@tempdima=\dimexpr\@tempcntb sp*\MT@dimen@six/1000\relax

```

For `\fontdimen 2`, we also have to subtract the kerning that letterspacing adds to each side of the characters (only half if it's for outer spacing).

```

2947 \ifnum#2=\tw@
2948 \advance\@tempdima -\dimexpr\MT@letterspace@ sp*\MT@dimen@six/#3\relax
2949 \fi
2950 }{%
2951 \MT@ifempty\@tempa{\let\@tempa\MT@letterspace@}\relax
2952 \@tempdima=\dimexpr \numexpr1000+\@tempa sp *\fontdimen#2\MT@lsfont/1000\relax
2953 }%

```

```
2954 <debug>\MT@dinfol3{... : font dimen #2 (#1): \the\@tempdima}%
2955 }
```

`\MT@tr@outer@l` Recall the last skip (must really be an interword space, not just a marker, nor a ‘hard’ space, i.e., one that doesn’t contain stretch or shrink parts).

```
2956 \def\MT@tr@outer@l{%
2957 \ifhmode
2958 \ifdim\lastskip>5sp
2959 \edef\x{\the\lastskip minus 0pt}%
2960 \setbox\z@\hbox{\MT@outer@space=\x}%
2961 \ifdim\wd\z@>\z@
2962 <debug>\MT@dinfol2{[[[adjusting pre space: \the\MT@outer@space}%
2963 \unskip \hskip\MT@outer@space\relax
```

Disable left outer kerning.

```
2964 \let\MT@ls@outer@k\relax
2965 \else
```

The ragged2e package sets `\spaceskip` without glue.

```
2966 \ifdim\lastskip=%
2967 \ifnum\spacefactor<2000
2968 \spaceskip
2969 \else
2970 \ifdim\xspaceskip=\z@
2971 \dimexpr\spaceskip+\fontdimen7\font@name\relax
2972 \else
2973 \xspaceskip
2974 \fi
2975 \fi
2976 <debug>\MT@dinfol2{[[[adjusting pre space (skip): \the\MT@outer@space}%
2977 \unskip \hskip\MT@outer@space\relax
2978 \let\MT@ls@outer@k\relax
2979 \fi
2980 \fi
2981 \fi
2982 \fi
2983 }
```

`\MT@tr@outer@next` microtype also adjusts spacing. The following is borrowed from `soul`. I’ve added the cases for italic correction, since tracking may also be triggered by text commands (e.g., `\textsc`).

```
2984 \def\MT@tr@outer@r{%
2985 \futurelet\MT@tr@outer@next\MT@tr@outer@r@
2986 }
```

`\MT@if@outer@next` We avoid using `\ifx` tests, in case `\MT@tr@outer@next` is `\let` to `\fi` etc.

```
2987 \def\MT@if@outer@next#1{%
2988 \ifx\MT@tr@outer@next#1\expandafter\@firstoftwo\else\expandafter\@secondoftwo\fi
2989 }
```

`\MT@tr@outer@r@`

```
2990 \def\MT@tr@outer@r@{%
2991 \def\MT@temp*{}}%
```

Don’t adjust in math mode. There was a tricky bug when `\textls` was the last command in a `\mathchoice` group.

```
2992 \ifmmode \else
```

A similar bug occurred when adjustment would happen inside a discretionary group, which we prevent here. This only works with e-TeX (which we know is available).

```
2993 \ifnum\currentgrouptype=10 \else
2994 \def\MT@temp*##1{\ifhmode\hskip\MT@outer@space
```

```

2995 (debug)\MT@dinfo2{[]]} adjusting post space (1): \the\MT@outer@space}%
2996 \fi}%
2997 \expandafter\ifcat\expandafter\noexpand\csname MT@tr@outer@next\endcsname\egroup

2998 \ifhmode\unkern\fi\egroup
2999 \MT@set@curr@ok \MT@set@curr@os
3000 \def\MT@temp*{\afterassignment\MT@tr@outer@r\let\MT@temp=}%
3001 \else

```

If the next token is `\maybe@ic` (from an enclosing text command), we gobble it, read the next one, feed it to `\maybe@ic@` (via `\MT@tr@outer@icr`) and then call ourselves again.

```

3002 \MT@if@outer@next\maybe@ic{%
3003 \MT@set@curr@ok \MT@set@curr@os
3004 \def\MT@temp*{\afterassignment\MT@tr@outer@icr\let\MT@temp=}%
3005 }%

```

If the next token is `\check@icr` (from an inner text command), we insert ourselves just before it. This will then call `\maybe@ic` again the next round (which however will always insert an italic correction, since it doesn't read beyond our group).

```

3006 \MT@if@outer@next\check@icr{%
3007 \def\MT@temp*{\aftergroup\MT@tr@outer@r\check@icr\let\MT@temp=}%
3008 }%
3009 \MT@if@outer@next\@sptoken{%
3010 \def\MT@temp* {\ifhmode\hskip\MT@outer@space
3011 (debug)\MT@dinfo2{[]]} adjusting post space (2): \the\MT@outer@space}%
3012 \fi}%
3013 }%
3014 \MT@if@outer@next~{%
3015 \def\MT@temp*~{\nobreak\hskip\MT@outer@space
3016 (debug)\MT@dinfo2{[]]} adjusting post space (3): \the\MT@outer@space}%
3017 }%
3018 }%
3019 \MT@if@outer@next \relax{%
3020 \MT@if@outer@next\space\relax{%
3021 \MT@if@outer@next\@xobeysp\relax{%

```

`xspace` requires special treatment.

```

3022 \MT@if@outer@next\xspace{%
3023 \def\MT@temp*\xspace{\MT@xspace}%
3024 }%

```

If there's no outer spacing, there may be outer kerning.

```

3025 \def\MT@temp*{\ifdim\MT@outer@kern=\z@else\MT@ls@outer@k
3026 (debug)\MT@dinfo2{--- adjusting post kern: \the\MT@outer@kern}%
3027 \fi}%
3028 \MT@let@nc{\MT@tr@outer@next}\relax
3029 }}}}]]\fi
3030 \fi\fi
3031 \MT@temp*%
3032 }

```

`\MT@tr@outer@icr` Helper macros for the italic correction mess.

```

\MT@tr@outer@icr@ 3033 \def\MT@tr@outer@icr{\afterassignment\MT@tr@outer@icr@\MT@tr@outer@r}
3034 \def\MT@tr@outer@icr@{%
3035 \let\@let@token= \MT@tr@outer@next
3036 \maybe@ic@
3037 }

```

`\MT@xspace` If the group is followed by `\xspace`, we first feed `\xspace` with the next token, then check whether it has inserted a space. `\@let@token` might be something evil, so it should be encapsulated here.

```

3038 \def\MT@xspace{\futurelet\@let@token\MT@xspace@}

```



```

3039 \def\MT@xspace@{\@xspace@firsttrue\@xspace
3040 \ifdim\lastskip>5sp
3041 \unskip \hskip\MT@outer@space
3042 \else
3043 \ifdim\MT@outer@kern=\z@ \else\MT@ls@outer@k \fi
3044 \fi
3045 }

```

For older pdf<sub>T</sub>E<sub>X</sub> versions and Lua<sub>T</sub>E<sub>X</sub>, throw an error.

```

3046 }{
3047 \DeclareRobustCommand\lsstyle{%
3048 \MT@error{Letterspacing only works with \MT@engine tex version
3049 pdf- 1.40%
3050 lua- 0.62%
3051 \MessageBreak or newer}
3052 {Upgrade \MT@engine tex, or try the `soul' package instead.}%
3053 \MT@glet\lsstyle\relax
3054 }
3055 }

```

And for X<sub>Y</sub><sub>T</sub>E<sub>X</sub>, too.

```

3056 pdf- lua-
3057 *xe-
3058 \DeclareRobustCommand\lsstyle{%
3059 \MT@error{Letterspacing currently doesn't work with xetex}
3060 {Run pdftex or luatex, or use the `soul' package instead.}%
3061 \MT@glet\lsstyle\relax
3062 }
3063 xe-

```

`\textls` This command may be used like the other text commands. The starred version  
`\MT@ls@adjust@` removes kerning on the sides. The optional argument changes the letterspacing  
factor.

```

3064 package | letterspace
3065 \DeclareRobustCommand\textls{%
3066 \@ifstar{\let\MT@ls@adjust@\MT@ls@adjust@empty\MT@textls}%
3067 {\let\MT@ls@adjust@\MT@ls@adjust@relax\MT@textls}%
3068 }

```

`\MT@textls` This is now almost L<sup>A</sup>T<sub>E</sub>X's `\DeclareTextFontCommand`, with the difference that we  
`\MT@letterspace@` adjust the outer spacing and kerning also for `\lsstyle`, while L<sup>A</sup>T<sub>E</sub>X's text *switches*  
don't bother about italic correction.

```

3069 \newcommand\MT@textls[2] [] {%
3070 \ifmmode
3071 \nfss@text{\MT@ls@set@ls{#1}\lsstyle#2}%
3072 \else
3073 \hmode@bgroup
3074 \MT@ls@set@ls{#1}%
3075 \lsstyle #2%
3076 \expandafter
3077 \egroup
3078 \fi
3079 }

```

`\MT@ls@adjust` Set current letterspacing amount and outer kerning. This has to be done inside the  
`\MT@ls@adjust@empty` same group as the letterspacing command.

```

\MT@ls@adjust@relax 3080 \def\MT@ls@adjust@empty{\let\MT@ls@adjust@empty}
\MT@ls@set@ls 3081 \def\MT@ls@adjust@relax{\let\MT@ls@adjust@relax}
3082 \def\MT@ls@set@ls#1{%
3083 \MT@ifempty{#1}%
3084 {\let\MT@letterspace@ \@undefined}%
3085 {\KV@sp@def\MT@letterspace@{#1}%
3086 \edef\MT@letterspace@{\number\MT@letterspace@}%
3087 \MT@ls@too@large\MT@letterspace@}%

```

```

3088 \MT@ls@adjust@
3089 }

\MT@ls@too@large Test whether letterspacing amount is too large.

3090 \def\MT@ls@too@large#1{%
3091 \ifnum#1>\MT@tr@max
3092 \MT@warning{Maximum for option `letterspace' is \number\MT@tr@max}%
3093 \edef#1{\number\MT@tr@max}%
3094 \else
3095 \ifnum#1<\MT@tr@min
3096 \MT@warning{Minimum for option `letterspace' is \number\MT@tr@min}%
3097 \edef#1{\number\MT@tr@min}%
3098 \fi
3099 \fi
3100 }

\MT@outer@kern This dimen is used for the starred version of \textls, for \lslig and for adjusted
\MT@tr@set@okern outer kerning.

3101 \newdimen\MT@outer@kern
3102 /package|letterspace
3103 (*pdf-|lua-)
3104 \def\MT@tr@set@okern#1,#2,{%
3105 \let\MT@temp@empty
3106 \MT@ifempty{#1}{\MT@tr@set@okern@{*}}{\MT@tr@set@okern@{#1}}%
3107 \MT@ifempty{#2}{\MT@tr@set@okern@{*}}{\MT@tr@set@okern@{#2}}%
3108 \MT@gl@et@nc{\MT@outer@kern\expandafter\string\font@name}\MT@temp
3109 (debug)\MT@din@fo@n12{... outer kerning: (#1,#2)
3110 (debug) = \@nameuse{\MT@outer@kern\expandafter\string\font@name}}%
3111 }

\MT@tr@set@okern@

3112 \def\MT@tr@set@okern@#1{%
3113 \MT@test@ast#1*\@nil{%
3114 \MT@ifdefined@ccTF\MT@tr@unit@
3115 {\edef\@tempb{#1}\MT@scale@to@em}
3116 {\@tempcntb=#1\relax}%
3117 \@tempdima=\dimexpr \@tempcntb sp * \MT@dimen@six/1000\relax
3118 }{%
3119 \MT@ifempty\@tempa{\let\@tempa\@m}\relax
3120 \@tempdima=\dimexpr \numexpr\@tempa*\MT@letterspace@/1000\relax
3121 * \fontdimen6\MT@lsfont/2000\relax
3122 }%
3123 \advance\@tempdima -\dimexpr \MT@letterspace@ sp
3124 * \fontdimen6\MT@lsfont/2000\relax
3125 \edef\MT@temp{\MT@temp{\the\@tempdima}}%
3126 }
3127 /pdf-|lua-

\MT@ls@outer@k Adjust outer kerning. We additionally add a marker (\kern3sp\kern-3sp) for cases
 of nested letterspacing without anything actually printed.

3128 (*pdf-|lua-|letterspace)
3129 \def\MT@ls@outer@k{%
3130 \ifhmode
3131 \ifdim\lastkern=-3sp \unkern
3132 \ifdim\lastkern=3sp \kern-3sp
3133 \expandafter\expandafter\expandafter\@gobble
3134 \else \unkern
3135 \expandafter\expandafter\expandafter\@firstofone
3136 \fi
3137 \else
3138 \expandafter\@firstofone
3139 \fi
3140 {\kern\MT@outer@kern\kern3sp\kern-3sp\relax}%
3141 }

```

```

3142 }
3143 </pdf-|lua-|letterspace>

```

### 1.2.7 Disabling ligatures

`\MT@noligatures` The possibility to disable ligatures is a new features of pdf $\TeX$  1.30, and also works with Lua $\TeX$ .

```

3144 <*pdf-|lua->
3145 <pdf->\MT@requires@pdftex5{
3146 \def\MT@noligatures{%
3147 \MT@dotrue
3148 \let\@tempa\MT@n1@setname
3149 \MT@map@clist@n{font,encoding,family,series,shape,size}{%
3150 \MT@ifdefined@n@TF{MT@checklist@##1}%
3151 {\csname MT@checklist@##1\endcsname}%
3152 {\MT@checklist@{##1}}%
3153 {n1}}%
3154 }%
3155 \ifMT@do
3156 \MT@noligatures@\MT@font\MT@n1@ligatures
3157 \fi
3158 }

```

`\MT@noligatures@` This is also used by `\MT@set@tr@codes`.

```

3159 <lua->\MT@requires@luatex4{\let\pdfnoligatures\ignoreligaturesinfont}\relax
3160 \def\MT@noligatures@#1#2{%
3161 \MT@ifdefined@c@TF#2{%

```

Early MiK $\TeX$  versions (before 2.5.2579) didn't know `\tagcode`.

```

3162 \MT@ifdefined@c@TF\tagcode{%

```

No 'inputenc' key.

```

3163 \let\MT@warn@maybe@inputenc@empty
3164 \def\MT@curr@list@name{\@backslashchar DisableLigatures}%
3165 \MT@map@clist@c#2{%
3166 \KV@sp@def\@tempa{##1}\MT@get@slot
3167 \ifnum\MT@char>\m@ne
3168 \tagcode#1\MT@char=\m@ne

```

With Lua $\TeX$ , we additionally register the ligatures that should be inhibited in a table (used by the `luaotfload` function `keepligature`).

```

3169 <lua-> \MT@if@luaotf@font
3170 <lua-> {\MT@lua{microtype.noligatures([[#1]],[[\MT@char]])}}\relax
3171 \fi
3172 }%
3173 \MT@vinfo{... Disabling ligatures for characters: #2}%
3174 }{%
3175 \pdfnoligatures#1%
3176 \MT@warning{Cannot disable selected ligatures (pdftex doesn't\MessageBreak
3177 know \@backslashchar tagcode). Disabling all ligatures of\MessageBreak
3178 the font instead}%
3179 }%
3180 }{%
3181 \pdfnoligatures#1%
3182 <lua-> \MT@if@luaotf@font
3183 <lua-> {\MT@lua{microtype.noligatures([[#1]],"_all_")}}\relax
3184 \MT@vinfo{... Disabling all ligatures}%
3185 }%
3186 }
3187 <pdf->\relax
3188 </pdf-|lua->

```

For each potential ligature, `luaotfload` will call the `keepligature` function, which

expects the first node of the ligature, to check whether they should be kept or inhibited. Here's our concoction of this function. The table `microtype.ligs` will be populated in `\MT@noligatures@`.

```

3189 (*luafile)
3190 microtype.ligs = microtype.ligs or { }
3191
3192 local function noligatures(fontcs,liga)
3193 local fontcs = match(fontcs,"([^\]+)")
3194 microtype.ligs[fontcs] = microtype.ligs[fontcs] or { }
3195 table.insert(microtype.ligs[fontcs],liga)
3196 end
3197 microtype.noligatures = noligatures
3198
3199 local function keepligature(c)
3200 local nodedirect = node.direct
3201 local getfield = nodedirect.getfield
3202 local getfont = nodedirect.getfont
3203 local f,ch
3204 if type(c) == "userdata" then -- in older luaotfload versions, c was a node
3205 f = c.font
3206 ch = c.components.char
3207 else -- since 2.6, c is a (direct node) number
3208 f = getfont(c)
3209 ch = getfield(getfield(c,"components"),"char")
3210 end
3211 -- if ch then -- should always be true
3212 local ligs = microtype.ligs[match(tex.fontidentifier(f),"\\([^\]+)")]
3213 if ligs then
3214 for _,lig in pairs(ligs) do
3215 if lig == "_all_" or tonumber(lig) == ch then
3216 return false
3217 end
3218 end
3219 end
3220 return true
3221 -- end
3222 end
3223
3224 if luaotfload and luaotfload.letterspace then
3225 if luaotfload.letterspace.keepligature then
3226 microtype.info("overwriting function `keepligature'")
3227 end
3228 luaotfload.letterspace.keepligature = keepligature
3229 end
3230
3231 (/luafile)

```

### 1.2.8 Loading the configuration

`\MT@load@list` Recurse through the lists to be loaded.

```

3232 (*package|show)
3233 (package)\def\MT@load@list#1%
3234 (show)\def\MTS@load@list#1%
3235 {\edef\@tempa{#1}%
3236 \MT@let@cn\@tempb{MT@\MT@feat @c@\@tempa @load}%
3237 \MT@ifstreq\@tempa\@tempb{%
3238 \MT@error{\@nameuse{MT@abbr@\MT@feat} list `@\@tempa' cannot load itself}{}%
3239 }%
3240 \ifx\@tempb\relax
3241 (show) :\par\medskip\leavevmode
3242 \else
3243 \MT@ifdefined@n@TF{MT@\MT@feat @c@\@tempb}{%
3244 (show) \MTS@printtext{, loading \texttt{\@tempb}}%

```

```

3245 \MT@vinfo{... : First loading \@nameuse{MT@abbr@MT@feat} list ` \@tempb' }%
3246 \begingroup
3247 \MT@load@list \@tempb
3248 \endgroup
3249 \edef\MT@curr@list@name{%
3250 (package) \@nameuse{MT@abbr@MT@feat} list \noexpand\MessageBreak
3251 ` \@tempb' }%
3252 \MT@let@cn@tempc{MT@MT@feat @c@ \@tempb}%
3253 \expandafter\MT@set@codes \@tempc, \relax,%
3254 (show) \vrule width 4cm height .5pt \
3255 (show) \MTS@printtext{End of list \texttt{\MT@curr@list@name}}%
3256 (show) \par\medskip\leavevmode
3257 }{%
3258 \MT@error{\@nameuse{MT@abbr@MT@feat} list ` \@tempb' undefined.\MessageBreak
3259 Cannot load it from list ` \@tempa' }{%
3260 }%
3261 \fi
3262 }%
3263 }
3264 (/package|show)

```

\MT@find@file    Micro-typographic settings may be written into a file *mt-(font family).cfg*.

\MT@file@list    We must also record whether we've already loaded the file.

```

3265 (*package)
3266 \let\MT@file@list@empty
3267 \def\MT@find@file#1{%

```

Check for existence of the file only once.

```

3268 \MT@in@clist{#1}\MT@file@list
3269 \ifMT@inlist@ \else

```

Don't forget that because reading the files takes place inside a group, all commands that may be used there have to be defined globally.

```

3270 \MT@begin@catcodes
3271 \let\MT@begin@catcodes\relax
3272 \let\MT@end@catcodes\relax
3273 \MT@xadd\MT@file@list{#1,}%
3274 \InputIfFileExists{\MT@cfg@prefix-#1.cfg}{%
3275 \edef\MT@curr@file{\MT@cfg@prefix-#1.cfg}%
3276 \MT@vinfo{... Loading configuration file \MT@curr@file}%
3277 }{%
3278 \MT@get@basefamily#1@empty@empty@empty@empty@nil
3279 \MT@exp@one@n\MT@in@clist@tempa\MT@file@list
3280 \ifMT@inlist@ \else
3281 \InputIfFileExists{\MT@cfg@prefix-\@tempa.cfg}{%
3282 \edef\MT@curr@file{\MT@cfg@prefix-\@tempa.cfg}%
3283 \MT@vinfo{... Loading configuration file \MT@curr@file}%
3284 \MT@xadd\MT@file@list{\@tempa,}%
3285 }{%
3286 \MT@vinfo{... No configuration file \MT@cfg@prefix-#1.cfg}%
3287 }%
3288 \fi
3289 }%
3290 \endgroup
3291 \fi
3292 }

```

\MT@cfg@catcodes    We have to make sure that all characters have the correct category code. Especially, new lines and spaces should be ignored, since files might be loaded in the middle of the document. This is basically `\nfss@catcodes` (from the  $\LaTeX$  kernel). I've added: & (in tabulars), !, ?, ;, : (french), ,, \$, -, ~, and = (Turkish babel).

OK, now all printable characters up to 127 are 'other'. We hope that letters are always letters and numbers other. (`listings` makes them active, see section 1.1.6.)

We leave ^ at catcode 7, so that stuff like ‘^^f’ remains possible.

```

3293 \def\MT@cfg@catcodes{%
3294 \makeatletter
3295 \catcode`\^7%
3296 \catcode`\ 9%
3297 \catcode`\^^I9%
3298 \catcode`\^^M9%
3299 \catcode`\z@
3300 \catcode`\{@ne
3301 \catcode`\}\tw@
3302 \catcode`\#6%
3303 \catcode`\%14%
3304 \MT@map@tlist@n
3305 {!\!"\$\&'\(\)*\+,\-\.\/\:\;\<=\>|\?\[]_-\`|\-}%
3306 \@makeoother
3307 }

```

`\MT@begin@catcodes` This will be used before reading the files as well as in all configuration commands, so that catcodes are also harmless when these commands are used outside the configuration files.

```

3308 \def\MT@begin@catcodes{%
3309 \begingroup
3310 \MT@cfg@catcodes
3311 }

```

`\MT@end@catcodes` End group if outside configuration file (otherwise relax).

```

3312 \let\MT@end@catcodes\endgroup

```

`\MT@get@basefamily` The family name might have a suffix e.g., for expert set (x), old style numbers (j) swash capitals (w) etc. We mustn’t simply remove the last letter, as this would make for instance cms out of cms*s* and cmsy (OK, cmex will still become cme . . .).

We only work on the font name if it is longer than three characters.

```

3313 \def\MT@get@basefamily#1#2#3#4\@nil{%
3314 \ifx\@empty#4%
3315 \def\@tempa{#1#2#3}%
3316 \else
3317 \let\@tempa\@empty
3318 \edef\@tempb{#1#2#3#4}%
3319 \expandafter\MT@get@basefamily@\@tempb\@nil
3320 \fi
3321 }

```

`\MT@get@basefamily@` This will only remove one suffix (the longest match), so that *combinations* of suffixes would have to be added manually (e.g., `\DeclareMicrotypeVariants*{aw}`). But otherwise, something like ‘pplx’ would be truncated to ‘p’.

```

3322 \def\MT@get@basefamily@#1#2\@nil{%
3323 \edef\@tempa{\@tempa#1}%
3324 \ifx\#2\@expandafter\@gobble\else\expandafter\@firstofone\fi
3325 {\MT@in@tlist{#2}\MT@variants
3326 \ifMT@inlist\else\MT@get@basefamily@#2\@nil\fi}%
3327 }

```

`\MT@listname` Try all combinations of font family, series, shape and size to get a list for the current font.

```

\MT@get@listname@
\MT@get@listname@
3328 \def\MT@get@listname#1{%
3329 debug\MT@dinfol{1}{trying to find \@nameuse{MT@abbr@#1} list for font '\MT@font'}%
3330 \let\MT@listname\@undefined
3331 \def\@tempb{#1}%
3332 \MT@map@tlist@c\MT@try@order\MT@get@listname@
3333 }
3334 \def\MT@get@listname@#1{%
3335 \expandafter\MT@next@listname#1%

```

Table 1:

|                                    | 1.       | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | 14. | 15. | 16. |
|------------------------------------|----------|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|
| Order for matching font attributes | Encoding | •  | •  | •  | •  | •  | •  | •  | •  | •   | •   | •   | •   | •   | •   | •   |
|                                    | Family   | •  | •  | •  | •  | •  | •  | •  | -  | -   | -   | -   | -   | -   | -   | -   |
|                                    | Series   | •  | •  | •  | •  | -  | -  | -  | •  | •   | •   | •   | -   | -   | -   | -   |
|                                    | Shape    | •  | •  | -  | -  | •  | •  | -  | -  | •   | •   | -   | -   | •   | •   | -   |
|                                    | Size     | •  | -  | •  | -  | •  | -  | •  | -  | •   | -   | •   | -   | •   | -   | -   |

```

3336 \ifx\MT@listname\undefined \else
3337 \expandafter\MT@tlist@break
3338 \fi
3339 }

```

`\MT@try@order` Beginning with version 1.7, we always check for the font size. Since the matching order has become more logical now, it can be described in words, so that we don't need table 1 in the documentation part any longer and can cast it off here.

```

3340 \def\MT@try@order{%
3341 {1111}{1110}{1101}{1100}{1011}{1010}{1001}{1000}%
3342 {0111}{0110}{0101}{0100}{0011}{0010}{0001}{0000}%
3343 }

```

`\MT@next@listname` The current context is added to the font attributes. That is, the context must match.

```

3344 \def\MT@next@listname#1#2#3#4{%
3345 \ifnum#1=\z@\MT@nofamilytrue\fi
3346 \edef\@tempa{\MT@encoding
3347 /\ifnum#1=\@ne \MT@family \fi
3348 /\ifnum#2=\@ne \MT@series \fi
3349 /\ifnum#3=\@ne \MT@shape \fi
3350 /\ifnum#4=\@ne *\fi
3351 \MT@context}%
3352 <debug>\MT@dinfo@n1{1}{trying \@tempa}%
3353 \MT@ifdefined@n@TF{MT@\@tempb @\@tempa}{%
3354 \MT@next@listname@#4%
3355 }{%

```

Also try with an alias family.

```

3356 \ifnum#1=\@ne
3357 \ifx\MT@familyalias\empty \else
3358 \edef\@tempa{\MT@encoding
3359 /\MT@familyalias
3360 /\ifnum#2=\@ne \MT@series\fi
3361 /\ifnum#3=\@ne \MT@shape\fi
3362 /\ifnum#4=\@ne *\fi
3363 \MT@context}%
3364 <debug>\MT@dinfo@n1{1}{(alias) \@tempa}%
3365 \MT@ifdefined@n@TF{MT@\@tempb @\@tempa}{%
3366 \MT@next@listname@#4%
3367 }%
3368 \fi
3369 \fi
3370 }%
3371 }

```

`\MT@next@listname@` If size is to be evaluated, do that, otherwise use the current list.

```

3372 \def\MT@next@listname#1{%
3373 \ifnum#1=\@ne
3374 \MT@exp@cs\MT@in@rlist{MT@\@tempb @\@tempa @sizes}%
3375 \ifMT@in@rlist@
3376 \let\MT@listname\MT@size@name
3377 \fi
3378 \else

```

```

3379 \MT@let@cn\MT@listname{MT@\@tempb @\@tempa}%
3380 \fi
3381 }

```

\MT@if@list@exists

```

\MT@context 3382 \def\MT@if@list@exists{%
3383 \MT@let@cn\MT@context{MT@\MT@feat @context}%
3384 \MT@ifstreq{@}\MT@context{\let\MT@context\@empty}\relax
3385 \MT@get@listname{\MT@feat @c}%
3386 \MT@ifdefined@c@TF\MT@listname{%
3387 \MT@edef@n{MT@\MT@feat @c@name}{\MT@listname}%
3388 \ifMT@nonselected
3389 \MT@vinfo{... Applying non-selected expansion (list '\MT@listname')}%
3390 \else
3391 \MT@vinfo{... Loading \@nameuse{MT@abbr@\MT@feat} list '\MT@listname'}%
3392 \fi
3393 \@firstoftwo
3394 }%

```

Since the name cannot be \@empty, this is a sound proof that no matching list exists.

```

3395 \MT@let@nc{MT@\MT@feat @c@name}\@empty

```

Don't warn if selected=false.

```

3396 \ifMT@nonselected
3397 \MT@vinfo{... Applying non-selected expansion (no list)}%
3398 \else

```

Tracking doesn't require a list, either.

```

3399 \MT@ifstreq\MT@feat{tr}\relax{%
3400 \MT@warning{I cannot find a \@nameuse{MT@abbr@\MT@feat} list
3401 for font\MessageBreak'\MT@font'%
3402 \ifx\MT@context\@empty\else\space(context: '\MT@context')\fi.
3403 Switching off\MessageBreak\@nameuse{MT@abbr@\MT@feat} for this font}%
3404 }%
3405 \fi
3406 \@secondoftwo
3407 }%
3408 }

```

\MT@get@inh@list The inheritance lists are global (no context).

```

\MT@context 3409 \def\MT@get@inh@list{%
3410 \let\MT@context\@empty
3411 \MT@get@listname{\MT@feat @inh}%
3412 \MT@ifdefined@c@TF\MT@listname{%
3413 \MT@edef@n{MT@\MT@feat @inh@name}{\MT@listname}%
3414 (debug)\MT@dinfo@n1{1}{... Using \@nameuse{MT@abbr@\MT@feat} inheritance list
3415 (debug) '\MT@listname'}%
3416 \MT@let@cn\@tempc{MT@\MT@feat @inh@\MT@listname}%

```

If the list is \@empty, it has already been parsed.

```

3417 \ifx\@tempc\@empty \else
3418 (debug)\MT@dinfo@n1{1}{parsing inheritance list ...}%

```

The group is only required in case an input encoding is given.

```

3419 \begingroup
3420 \edef\MT@curr@list@name{inheritance list\noexpand\MessageBreak'\MT@listname'}%
3421 \MT@set@inputenc{inh}%
3422 \expandafter\MT@inh@do\@tempc,\relax,%
3423 \MT@gl@et@nc{MT@\MT@feat @inh@\MT@listname}\@empty
3424 \endgroup
3425 \fi
3426 }%
3427 \MT@let@nc{MT@\MT@feat @inh@name}\@undefined

```



```
3428 }%
3429 }
```

### 1.2.9 Translating characters into slots

Get the slot number of the character in the current encoding.

`\MT@get@slot` There are lots of possibilities how a character may be specified in the configuration files, which makes translating them into slot numbers quite expensive. Also, we want to have this as robust as possible, so that the user does not have to solve a sphinx's riddle if anything goes wrong.

`\MT@char` The character is in `\@tempa`, we want its slot number in `\MT@char`.

```
\MT@char@ 3430 \def\MT@get@slot{%
3431 \escapechar~\
3432 \let\MT@char@m@ne
3433 \MT@noresttrue
```

Save unexpanded string in case we need to issue a warning message.

```
3434 \MT@toks=\expandafter{\@tempa}%
```

It might be an active character, i.e., an 8-bit character defined by `inputenc`. If so, we will expand it here to its LICR form.

```
3435 \MT@exp@two@c\MT@is@active\string\@tempa\@nil
```

Now, let's walk through (hopefully) all possible cases.

- It's a letter, a character or a number.

```
3436 \expandafter\MT@is@letter\@tempa\relax\relax
3437 \ifnum\MT@char@ < \z@
```

- OK, so it must be a macro. We do not allow random commands but only those defined in L<sup>A</sup>T<sub>E</sub>X's idiosyncratic font encoding scheme:

If `\{encoding}\{command}` (that's *one* command) is defined, we try to extract the slot number.

We must be cautious not to stumble over accented characters consisting of two commands, like `\'i` or `\U\CYRI`, hence, `\string` wouldn't be safe enough.

```
3438 \MT@i@defined@n@TF{\MT@encoding\MT@detokenize@c\@tempa}%
3439 \MT@is@symbol
```

- Now, we'll catch the rest, which hopefully is an accented character (e.g. `\"a`).

```
3440 {\expandafter\MT@is@composite\@tempa\relax\relax}%
3441 \ifnum\MT@char@ < \z@
```

- It could also be a `\chardefed` command (e.g., the percent character). This seems the least likely case, so it's last.

```
3442 \expandafter\MT@exp@two@c\expandafter\MT@is@char\expandafter
3443 \meaning\expandafter\@tempa\MT@charstring\relax\relax\relax
3444 \fi
3445 \fi

3446 \let\MT@char\MT@char@
3447 \MT@get@slot@
3448 \escapechar@m@ne
3449 }
3450 </package>
```

`\MT@get@slot@`

```
3451 (*pdf-|lua-|xe-)
3452 \def\MT@get@slot@{%
```

If it's a legacy (i.e., TFM) font, proceed as usual.

```
3453 (xe-) \ifnum\XeTeXfonttype\MT@font=\z@
3454 \ifnum\MT@char > \m@ne
```

In LuaT<sub>E</sub>X, it may also be a glyph name, prefixed with ‘/’.

```
3455 (*lua-)
3456 \ifnum\MT@char=47\relax
3457 \ifMT@noest \else
3458 \@tempcnta=\MT@lua{
3459 local glyph = microtype.name_to_slot([[\expandafter\@gobble\@tempa]],true)
3460 if glyph then tex.write(glyph)
3461 else tex.write(-1)
3462 end
3463 } \relax
3464 \ifnum\@tempcnta<\z@
3465 \MT@warn@unknown
3466 \let\MT@char\m@ne
3467 \else
3468 \edef\MT@char{\the\@tempcnta}%
3469 (debug)\MT@info@n1{3}{> ` \the\MT@toks' is a glyph name (\the\@tempcnta)}%
3470 \fi
3471 \fi
3472 \else
3473 (/lua-)
```

If the user has specified something like ‘fi’, or wanted to define a number but forgot to use three digits, we’ll have something left of the string. In this case, we issue a warning and forget the complete string.

```
3474 \ifMT@noest \else
3475 \MT@warn@rest
3476 (pdf-|lua-) \let\MT@char\m@ne
3477 (xe-) \let\MT@char\@empty
3478 \fi
3479 (lua-) \fi
3480 \else
3481 \MT@warn@unknown
3482 (xe-) \let\MT@char\@empty
3483 \fi
3484 (*xe-)
3485 \else
```

There are more possibilities for X<sub>Ǝ</sub>T<sub>E</sub>X: It may be a Unicode codepoint (prefixed with ‘U’) or a glyph name (prefixed with ‘/’).<sup>6</sup> We indicate glyph names to `\MT@get@charwd` by reversing the sign of `\MT@char@`.

```
3486 \ifnum\MT@char=47\relax
3487 \ifMT@noest \edef\MT@char{U47}%
3488 \else
3489 \@tempcnta=\XeTeXglyphindex" \expandafter\@gobble\@tempa" \relax
3490 \ifnum\@tempcnta=\z@
3491 \MT@warn@unknown
3492 \let\MT@char\@empty
3493 \else
3494 \edef\MT@char{\@tempa\space}%
3495 \edef\MT@char@{-\the\@tempcnta}%
3496 (debug)\MT@info@n1{3}{> ` \the\MT@toks' is a glyph name (\the\@tempcnta)}%
3497 \fi
3498 \fi
```

<sup>6</sup> This doesn't seem to be documented anywhere, but it has been announced here: <https://tug.org/pipermail/xetex/2010-May/016531.html>

```

3499 \else
3500 \ifnum\MT@char > \m@ne
3501 \ifMT@norest

```

Or, it's a Unicode number, which we mustn't translate into a glyph number, since the latter is font-specific. But we add the 'U' prefix.

```

3502 \@tempcnta=\XeTeXcharglyph\MT@char\relax
3503 \ifnum\@tempcnta=\z@
3504 \MT@info@missing@char
3505 \let\MT@char\@empty
3506 \else
3507 <debug>\MT@info@n1{3}{> (glyph number: \the\@tempcnta,
3508 <debug> glyph name: \XeTeXglyphname\MT@font\@tempcnta)}%
3509 \edef\MT@char{U\MT@char}%
3510 \fi
3511 \else
3512 \MT@warn@rest
3513 \let\MT@char\@empty
3514 \fi
3515 \else
3516 \MT@warn@unknown
3517 \let\MT@char\@empty
3518 \fi
3519 \fi
3520 \fi
3521 </xe- >
3522 }
3523 </pdf-|lua-|xe- >

```

This is the lua function to translate glyph name into slot number. Beginning with v2.2, luaotfload provides this function in its API, which we use if available, but (for now, at least) keep the old code for backward compatibility. With HarfBuzz, the return value is not guaranteed to be inside the Unicode range, so we have to guard against this case as well (same as in `do_font`). Also, older versions of luaotfload (until v3.18) returned the numbers as floats.

```

3524 <luafile >
3525 if luaotfload and luaotfload.aux and luaotfload.aux.slot_of_name then
3526 local slot_of_name = luaotfload.aux.slot_of_name
3527 microtype.name_to_slot = function(name, unsafe)
3528 local n = slot_of_name(font.current(), name, unsafe)
3529 if not n then return -1 end
3530 if n > 1114111 then return -1 end
3531 return math.tointeger(n)
3532 end
3533 else
3534 -- we dig into internal structure (should be avoided)
3535 local function name_to_slot(name, unsafe)
3536 if fonts then
3537 local unicodes
3538 if fonts.ids then -- legacy luaotfload
3539 local tfmdata = fonts.ids[font.current()]
3540 if not tfmdata then return end
3541 unicodes = tfmdata.shared.otfdata.luaotex.unicodes
3542 else -- new location
3543 local tfmdata = fonts.hashes.identifiers[font.current()]
3544 if not tfmdata then return end
3545 unicodes = tfmdata.resources.unicodes
3546 end
3547 local unicode = unicodes[name]
3548 if unicode then -- does the 'or' branch actually exist?
3549 return type(unicode) == "number" and unicode or unicode[1]
3550 end
3551 end

```

```

3552 end
3553 microtype.name_to_slot = name_to_slot
3554 end
3555
3556 (/luafile)

\MT@is@letter Input is a letter, a character or a number.
\MT@max@char Warning if resulting character or slot number is too large.
\MT@max@slot 3557 (*pdf-|lua-|xe-)
3558 \def\MT@max@char
3559 (pdf-) {127 }
3560 (lua-|xe-) {1114111 }
3561 \def\MT@max@slot
3562 (pdf-) {255 }
3563 (lua-|xe-) {1114111 }
3564 (/pdf-|lua-|xe-)

\ifMT@norest Test whether all of the string has been used up.
3565 (*package)
3566 \newif\ifMT@norest

3567 \def\MT@is@letter#1#2\relax{%
3568 \ifcat a\noexpand#1\relax
3569 \edef\MT@char@{\number`#1}%
3570 \ifx\#2\%
3571 (debug)\MT@info@n1{3}{> `the\MT@toks' is a letter (\MT@char@)}%
3572 \else
3573 \MT@norestfalse
3574 \fi
3575 \else
3576 \ifcat !\noexpand#1\relax
3577 \edef\MT@char@{\number`#1}%
3578 (debug)\MT@info@n1{3}{> `the\MT@toks' is a character (\MT@char@)}%
3579 \ifx\#2\%
3580 \ifnum\MT@char@ > \MT@max@char \MT@warn@ascii \fi
3581 \else
3582 \MT@norestfalse
3583 \expandafter\MT@is@number#1#2\relax\relax
3584 \fi
3585 \fi
3586 \fi
3587 }

\MT@is@number Numbers may be specified as a three-digit decimal number (029), as a hexadecimal
 number (prefixed with ": "1D) or as an octal number (prefixed with ': '35). They
 must consist of at least three characters (including the prefix), that is, "F is not
 permitted.
3588 \def\MT@is@number#1#2#3\relax{%
3589 \ifx\relax#3\relax \else
3590 \ifx\relax#2\relax \else
3591 \MT@noresttrue
3592 \if#1"\relax
3593 \def\x{\uppercase{\edef\MT@char@{\number#1#2#3}}}\x
3594 (debug)\MT@info@n1{3}{> ... a hexadecimal number: \MT@char@}%
3595 \else
3596 \if#1'\relax
3597 \def\MT@char@{\number#1#2#3}%
3598 (debug)\MT@info@n1{3}{> ... an octal number: \MT@char@}%
3599 \else
3600 \MT@ifint{#1#2#3}{%
3601 \def\MT@char@{\number#1#2#3}%
3602 (debug)\MT@info@n1{3}{> ... a decimal number: \MT@char@}%
3603 }\MT@norestfalse
3604 \fi

```

```

3605 \fi
3606 \ifnum\MT@char@ > \MT@max@slot
3607 \MT@warn@number@too@large{\noexpand#1\noexpand#2\noexpand#3}%
3608 \let\MT@char@\m@ne
3609 \fi
3610 \fi
3611 \fi
3612 }

```

`\MT@is@active` Expand an active character. (This was completely broken in v1.7, and only worked by chance before.) We `\set@display@protect` to translate, e.g., Å into `\"A`, that is to whatever it is defined in the `inputenc` encoding file.

Unfortunately, the (older) `inputenc` definitions prefer the protected/generic variants (e.g., `\copyright` instead of `\textcopyright`), which our parser won't be able to understand. (I'm fed up now, so you have to complain if you really, really want to be able to write '©' instead of `\textcopyright`, thus rendering your configuration files unportable.)

Unicode characters (`inputenc/utf8,utf8x`) are also supported.

```

3613 \def\MT@is@active#1#2\@nil{%
3614 \ifnum\catcode`#1 = \active
3615 \begingroup
3616 \set@display@protect
3617 \let\IeC\@firstofone
3618 \let\@inpenc@undefined@\MT@undefined@char

```

Unicode handling has changed again with L<sup>A</sup>T<sub>E</sub>X 2019/10/01.

```

3619 \let\UTF@two@octets@noexpand\@empty
3620 \let\UTF@three@octets@noexpand\@empty
3621 \let\UTF@four@octets@noexpand\@empty

```

We refrain from checking whether there is a sufficient number of octets.

```

3622 \def\UTFviii@defined##1{\ifx ##1\relax
3623 \MT@undefined@char{utf8}\else\expandafter ##1\fi}%

```

For ucs (`utf8x`). Let's call it experimental ...

```

3624 \MT@ifdefined@c@T\PrerenderUnicode
3625 {\PrerenderUnicode{\@tempa}\let\unicode@charfilter\@firstofone}%
3626 \MT@is@active@hook{#1}%

```

The `\expandafter` hocus-pocus should please `newunicodechar`.

```

3627 \edef\x{\endgroup
3628 \def\noexpand\@tempa{\expandafter\expandafter\expandafter\@empty\@tempa}%

```

Append what we think the translation is to the token register we use for the log.

```

3629 \MT@toks={\the\MT@toks\space(=
3630 \expandafter\expandafter\expandafter\@empty\@tempa)}%
3631 }%
3632 \x
3633 \fi
3634 }

```

`\MT@is@active@hook` Test for these packages only once (requires `etoolbox`).

```

3635 \let\MT@is@active@hook\@gobble
3636 ^^Q\@gobble
3637 {\catcode`\#=12
3638 \MT@addto@setup{%

```

If a char has been made active by `listings's \lstMakeShortInline`, we need to retrieve the original meaning, or else make sure that we're seeing a non-active char.

```

3639 \MT@with@package@T{listings}{%
3640 \apptocmd\MT@is@active@hook{%
3641 \MT@ifdefined@n@T{\lst@ShortInlineOldCatcode\string#1}{%

```

```

3642 \catcode`#1=\csname 1st@ShortInlineOldCatcode\string#1\endcsname\relax
3643 \ifnum\catcode`#1=\active
3644 \begingroup
3645 \catcode`\~\active \lccode`\~`#1%
3646 \lowercase{\endgroup
3647 \MT@let@cn~{1st@ShortInlineOldMeaning\string#1}}%
3648 \else
3649 \def\@tempa{#1}%
3650 \fi
3651 }%
3652 }{}{}%
3653 }%

```

Same for `\MakeShortVerb` of `doc/shortvrb` (and implicitly `memoir`).

```

3654 \MT@if@false
3655 \MT@with@package@T{doc}\MT@if@true
3656 \MT@with@package@T{shortvrb}\MT@if@true
3657 \ifMT@if@expandafter\@firstofone\else\expandafter\@gobble\fi{%
3658 \apptocmd\MT@is@active@hook{%
3659 \MT@if@defined@n@T{cc\string#1}{%
3660 \catcode`#1=\csname cc\string#1\endcsname\relax
3661 \ifnum\catcode`#1=\active
3662 \begingroup
3663 \catcode`\~\active \lccode`\~`#1%
3664 \lowercase{\endgroup
3665 \MT@let@cn~{ac\string#1}}%
3666 \else
3667 \def\@tempa{#1}%
3668 \fi
3669 }%
3670 }{}{}%
3671 }%
3672 }}

```

`\MT@undefined@char` For characters not defined in the current input encoding.

```

3673 \def\MT@undefined@char#1{undefined in input encoding ``#1''}

```

`\MT@is@symbol` The symbol commands might expand to funny stuff, depending on context. Instead of simply expanding `\(command)`, we construct the command `\(encoding)\(command)` and see whether its meaning is `\char"⟨hex number⟩`, which is the case for everything that has been defined with `\DeclareTextSymbol` in the encoding definition files.

```

3674 \def\MT@is@symbol{%
3675 \expandafter\def\expandafter\MT@char\expandafter
3676 {\csname\MT@encoding\MT@detokenize@c\@tempa\endcsname}%

```

Since recently, some glyphs are defined optionally in  $\text{\LaTeX}$  by checking if the glyph actually exists in the font (e.g., `\textasteriskcentered`).

```

3677 \expandafter\expandafter\expandafter
3678 \MT@is@opt@char\MT@char\iffontchar\char\else\fi\relax
3679 \expandafter\MT@exp@two@c\expandafter\MT@is@char\expandafter
3680 \meaning\expandafter\MT@char\MT@charstring\relax\relax\relax
3681 \ifnum\MT@char@ < \z@

```

In TU encoding, some commands (currently, `\textquotesingle`, `\textasciigrave` and `\textquotedbl`) are defined by means of the auxiliary macro `\remove@tlig`, which we take care of here.

```

3682 \expandafter\expandafter\expandafter\MT@is@tlig\MT@char\relax\relax
3683 \ifnum\MT@char@ < \z@

```

Finally, if it hasn't been defined by `\DeclareTextSymbol`, it could be a letter (e.g., `\i`, when using `frenchpro`).

```

3684 \expandafter\expandafter\expandafter\MT@is@letter\MT@char\relax\relax

```

```

3685 \fi
3686 \fi
3687 }

```

`\MT@is@opt@char` This seems adventurous, but we're only redefining the text command within the scope of our setup.

```

3688 \def\MT@is@opt@char#1\iffontchar#2\char#3\else#4\fi\relax{%
3689 \MT@ifempty{#1}{%
3690 \iffontchar#2%
3691 \MT@exp@cs\chardef{\MT@encoding\MT@detokenize@c\@tempa}=#3\relax
3692 \fi
3693 }\relax
3694 }

```

`\MT@is@char` A helper macro that inspects the `\meaning` of its argument.

```

\MT@charstring 3695 \begingroup
3696 \catcode`\=/\z@

3697 /MT@map@tlist@n{\CHARLEX}/@makeother
3698 /lowercase{%
3699 /def/x{/endgroup
3700 /def/MT@charstring{\CHAR"%
3701 /def/MT@is@char##1\CHAR"##2##3##4/relax{%
3702 /ifx/relax##4/relax
3703 /ifMT@xunicode
3704 /expandafter/MT@is@charx/MT@strip@prefix##1>/relax\CHAR "%
3705 /relax/relax/relax/relax/relax
3706 /fi
3707 /else
3708 /ifx/relax##1/relax
3709 /if##3\relax
3710 /edef/MT@char@{/number"##2}%
3711 /MT@ifstreq/MT@charstring{##3##4}/relax/MT@norestfalse
3712 /else
3713 /edef/MT@char@{/number"##2##3}%
3714 /MT@ifstreq/MT@charstring{##4}/relax
3715 {/MT@is@xchar##2##3|##4\CHAR"/relax}%
3716 /fi
3717 <debug> /MT@dinfo@n1{3}{>~/the/MT@toks' is a \char (/MT@char@)}%
3718 /fi
3719 /fi
3720 }%

```

`\MT@is@xchar` With `fontspec`'s TU encoding, glyph numbers may be up to four digits.

```

3721 /def/MT@is@xchar##1|##2\CHAR"##3##4/relax{%
3722 /MT@ifstreq/MT@charstring{##3##4}%
3723 {/edef/MT@char@{/number"##1##2}/MT@norestfalse
3724 }%

```

`\MT@charxstring` For xunicode, which doesn't `\countdef`, but rather `\defs` the chars.

```

\MT@strip@prefix 3725 /def/MT@charxstring{\CHAR "%
\MT@is@charx 3726 /def/MT@strip@prefix##1>##2/relax{##2}%
3727 /def/MT@is@charx##1\CHAR "##2##3##4##5##6/relax{%
3728 /ifx/relax##1/relax
3729 /ifx/relax##6/relax/else
3730 /edef/MT@char@{/number"##2##3##4##5}%
3731 /MT@ifstreq{\RELAX >\CHAR "}{##6}/relax/MT@norestfalse
3732 <debug> /MT@dinfo@n1{3}{>~/the/MT@toks' is a xunicode \char (/MT@char@)}%
3733 /fi
3734 /fi
3735 }%
3736 }%
3737 }
3738 /x

```

`\MT@is@tlig` This might have to change again with the next L<sup>A</sup>T<sub>E</sub>X release, ... or so I feared, but it still seems to be fine.

```
3739 \def\MT@is@tlig#1#2\relax{%
3740 \ifx\remove@tlig#1%
3741 (debug) \MT@dinfo@n1{3}{> `the\MT@toks' (removing remove@tlig)}%
3742 \MT@remove@tlig
3743 \fi
3744 }
```

`\MT@remove@tlig` We remove the `\remove@tlig` command and only pass on the number.

```
3745 \def\MT@remove@tlig{%
3746 \expandafter\MT@exp@two@c\expandafter\MT@is@number
3747 \expandafter\@secondoftwo\MT@char\relax\relax
3748 }
```

`\MT@is@composite` Here, we are dealing with accented characters, specified as two tokens.

```
3749 \def\MT@is@composite#1#2\relax{%
3750 \ifx\#2\\\else
```

Again, we construct a control sequence, this time of the form: `\\(encoding)(accent)-(character)`, e.g., `\\T1\"-a`, which we then expand once to see if it is a letter (if it has been defined by `\DeclareTextComposite`). This should be robust, finally, especially, since we also `\detokenize` the input instead of only `\stringifying` it. Thus, we will die gracefully even on wrong Unicode input without `utf8`.

```
3751 \expandafter\def\expandafter\MT@char\expandafter{\csname\expandafter
3752 \string\csname\MT@encoding\endcsname
3753 \MT@detokenize@n{#1}-\MT@detokenize@n{#2}\endcsname}%
```

In 2017, L<sup>A</sup>T<sub>E</sub>X introduced a new way of declaring accented Unicode commands (`\DeclareUnicodeComposite`), which we take care of here (`\UnicodeEncodingName` has been introduced at the same time):

```
3754 \ifx\UnicodeEncodingName\undefined\else
3755 \expandafter\expandafter\expandafter
3756 \MT@is@uni@comp\MT@char\iffontchar\else\fi\relax
3757 \fi
3758 \expandafter\expandafter\expandafter\MT@is@letter\MT@char\relax\relax
```

Again, `xunicode`.

```
3759 \ifnum\MT@char@ < \z@
3760 \ifMT@xunicode
3761 \edef\MT@char{\MT@exp@two@c\MT@strip@prefix\meaning\MT@char>\relax}%
3762 \expandafter\MT@exp@two@c\expandafter\MT@is@charx\expandafter
3763 \MT@char\MT@charxstring\relax\relax\relax\relax\relax
3764 \fi
3765 \fi
3766 \fi
3767 }
```

`\MT@is@uni@comp` Helper for `\DeclareUnicodeComposite`.

```
3768 \def\MT@is@uni@comp#1\iffontchar#2\else#3\fi\relax{%
3769 \ifx\#1\\\edef\MT@char{\iffontchar#2\fi}\fi
3770 }
```

[What about math? Well, for a moment the following looked like a solution, with `\mt@is@mathchar` defined accordingly, analogous to `\MT@is@char` above, to pick up the last two tokens (the `\meaning` of a `\mathchardef`'ed command expands to its hexadecimal notation):

```
\def\MT@is@mathchar#1{%
 \if\relax\noexpand#1% it's a macro
 \let\x#1%
 \else % it's a character
```



```

\mathchardef\x=\mathcode`#1\relax
\fi
\expandafter\MT@exp@two@c\expandafter\mt@is@mathchar\expandafter
\meaning\expandafter\x\mt@mathcharstring\relax\relax\relax
}

```

However, the problem is that `\mathcodes` and `\mathchardefs` have global scope. Therefore, if they are changed by a package that loads different math fonts, there is no guarantee whatsoever that things will still be correct (e.g., the minus in `cmsy` when the `euler` package is loaded). So, no way to go, unfortunately.]

Some warning messages, for performance reasons separated here.

`\MT@curr@list@name` The type and name of the current list, defined at various places.

```

\MT@set@listname 3771 \def\MT@set@listname{%
3772 \edef\MT@curr@list@name{\@nameuse{MT@abbr@MT@feat} list\noexpand\MessageBreak
3773 \@nameuse{MT@MT@feat @c@name}'}%
3774 }

```

`\MT@warn@ascii` For ‘other’ characters > 127, we issue a warning (`inputenc` probably hasn’t been loaded), since correspondence with the slot numbers would be purely coincidental.

```

3775 \def\MT@warn@ascii{%
3776 \MT@warning@nl{Character `the\MT@toks' (= \MT@char@)
3777 is outside of ASCII range.\MessageBreak
3778 You must load the `inputenc' package before using\MessageBreak
3779 8-bit characters in \MT@curr@list@name}%
3780 }

```

`\MT@warn@number@too@large` Number too large.

```

3781 \def\MT@warn@number@too@large#1{%
3782 \MT@warning@nl{%
3783 Number #1 in encoding `the\MT@encoding' too large!\MessageBreak
3784 Ignoring it in \MT@curr@list@name}%
3785 }

```

`\MT@warn@rest` Not all of the string has been parsed.

```

3786 \def\MT@warn@rest{%
3787 \MT@warning@nl{%
3788 Unknown slot number of character\MessageBreak`the\MT@toks'%
3789 \MT@warn@maybe@inputenc\MessageBreak
3790 in font encoding `the\MT@encoding'.\MessageBreak
3791 Make sure it's a single character\MessageBreak
3792 (or a number) in \MT@curr@list@name}%
3793 }

```

`\MT@warn@unknown` No idea what went wrong.

```

3794 \def\MT@warn@unknown{%
3795 \MT@warning@nl{%
3796 Unknown slot number of character\MessageBreak`the\MT@toks'%
3797 \MT@warn@maybe@inputenc\MessageBreak
3798 in font encoding `the\MT@encoding' in \MT@curr@list@name}%
3799 }

```

`\MT@warn@maybe@inputenc` In case an input encoding had been requested.

```

3800 \def\MT@warn@maybe@inputenc{%
3801 \MT@ifdefined@n@T
3802 {MT@MT@feat @\MT@cat @\csname MT@MT@feat @\MT@cat @name\endcsname @inputenc}%
3803 { (input encoding `the\@nameuse
3804 {MT@MT@feat @\MT@cat @\csname MT@MT@feat @\MT@cat @name\endcsname @inputenc}')}%
3805 }

```

### 1.2.10 Hook into L<sup>A</sup>T<sub>E</sub>X's font selection

We append `\MT@setupfont` to `\pickup@font`, which is called by L<sup>A</sup>T<sub>E</sub>X every time a font is selected. We then check whether we've already seen this font, and if not, set it up for micro-typography. This ensures that we will catch all fonts, and that we will not set up fonts more than once. The whole package really hangs on this command.

In contrast to the `pdfcpot` package, it is not necessary to declare in advance which fonts should benefit from micro-typographic treatment. Also, only those fonts that are actually being used will be set up.

For my reference:

- `\pickup@font` is called by `\selectfont`, `\wrong@fontshape`, or `\getanddefine@fonts` (for math).
- `\pickup@font` calls `\define@newfont`.
- `\define@newfont` may call (inside a group!)
  - `\wrong@fontshape`, which in turn will call `\pickup@font`, and thus `\define@newfont` again, or
  - `\extract@font`.
- `\get@external@font` is called by `\extract@font`, by itself, and by the substitution macros.

Up to version 1.3 of this package, we were using `\define@newfont` as the hook, which is only called for *new* fonts, and therefore seemed the natural choice. However, this meant that we had to take special care to catch all fonts: we additionally had to set up the default font, the error font (if it wasn't the default font), we had to check for some packages that might have been loaded before `microtype` and were loading fonts, e.g., `jurabib`, `ledmac`, `pi font` (loaded by `hyperref`), `tipa`, and probably many more. Furthermore, we had to include a hack for the `IEEEtran` class which loads all fonts in the class file itself (to fine tune inter-word spacing), and the `memoir` class, too. To cut this short: it seemed to get out of hand, and I decided that it would be better to use `\pickup@font` and decide for ourselves whether we've already seen that font. I hope the overhead isn't too large.

`\MT@font@list` We use a comma separated list.

```
\MT@font 3806 \let\MT@font@list\@empty
 3807 \let\MT@font\@empty
```

All this is done at the beginning of the document. It doesn't work for `plain`, of course, which doesn't have `\pickup@font`.

```
3808 </package>
3809 <*package|letterspace>
3810 <plain>\MT@requires@latex2{
3811 \MT@addto@setup%
```

`\MT@orig@pickupfont` The `luatexja` package redefines `\char`, which will upset our parsing of text symbols and commands; instead of fixing this, we won't bother, at least for the moment, but simply issue a warning and disable all further warnings. The fix is left to the user by not specifying any text commands but only (Unicode) letters. The `xeCJK` package, or rather its `xunicode-addon`, also modifies the way text symbols are defined (like `luatexja` but in a different way). Again, we only issue a warning.

```
3812 <package> \MT@with@packageT{luatexja}{\MT@warn@unknown@once{luatexja}}%
```

```
3813 (package) \MT@with@package@T{xeCJK} {\MT@warn@unknown@once{xeCJK}}%
```

microtype also works with CJK in the sense that nothing will break when both packages are used at the same time. However, since CJK has its own way of encoding, it is currently not possible to create character-specific settings. That is, the only feature available with CJK fonts is (non-selected) expansion. (Tracking doesn't really work for other reasons.) Like us, CJK redefines `\pickup@font`.

```
3814 \ifpackage@loaded{CJK}{%
```

The `xeCJK` package in turn pretends that CJK was loaded, but does not change the definition of `\pickup@font`. With `xeCJK`, protrusion should be possible also for C/J/K characters; I haven't tried it, though.

```
3815 \ifpackage@loaded{xeCJK}{\@firstofone}{%
3816 \ifpackage@later{CJK}{2006/10/17}% 4.7.0
3817 {\def\MT@orig@pickupfont{\CJK@ifundefined\CJK@plane}}%
3818 {\def\MT@orig@pickupfont{\ifundefined{CJK@plane}}}%
3819 \g@addto@macro\MT@orig@pickupfont
3820 {\expandafter\ifx\font@name\relax\define@newfont\fi}}%
```

`CJKutf8` redefines `\pickup@font` once more (recent versions, in PDF mode, as determined by `ifpdf`, which `CJKutf8` loads).

```
3821 \ifpackage@loaded{CJKutf8}%
3822 {\ifpackage@later{CJKutf8}{2008/05/22}% 4.8.0
3823 {\ifpdf\expandafter\@secondoftwo\else\expandafter\@firstoftwo\fi}%
3824 {\@firstoftwo}}%
3825 {\@firstoftwo}%
3826 \g@addto@macro\MT@orig@pickupfont{%
3827 \expandafter\ifx\csname\curr@fontshape/\f@size/\CJK@plane\endcsname\relax
3828 \define@newfont\else\xdef\font@name{%
3829 \csname \curr@fontshape/\f@size/\CJK@plane\endcsname}\fi}}%
3830 \g@addto@macro\MT@orig@pickupfont{%
3831 \expandafter\ifx\csname \curr@fontshape/\f@size/\CJK@plane\endcsname\relax
3832 \define@newfont\def\CJK@temp{v}%
3833 \ifx\CJK@temp\CJK@plane
3834 \expandafter\ifx\csname CJK@cmapp/\f@family\CJK@plane\endcsname\relax
3835 \else\csname CJK@cmapp/\f@family\CJK@plane\endcsname\fi
3836 \else\CJK@addcmapp\CJK@plane \fi
3837 \else\xdef\font@name{%
3838 \csname \curr@fontshape/\f@size/\CJK@plane\endcsname}\fi}}%
3839 \@gobble
3840 }%
3841 }{\@firstofone}%
```

This is the normal L<sup>A</sup>T<sub>E</sub>X definition.

```
3842 {\def\MT@orig@pickupfont{\expandafter\ifx\font@name\relax\define@newfont\fi}}%
```

Check whether `\pickup@font` is defined as expected. The warning issued by `\CheckCommand*` would be a bit too generic.

```
3843 \ifx\pickup@font\MT@orig@pickupfont \else
3844 \MT@warning@nl{%
3845 Command \string\pickup@font\space is not defined as expected.%
3846 \MessageBreak Patching it anyway. Some things may break%
3847 (*package)
3848 .\MessageBreak Double-check whether micro-typography is indeed%
3849 \MessageBreak applied to the document.%
3850 \MessageBreak (Hint: Turn on `verbose' mode)%
3851 (/package)
3852 }%
3853 \fi
```

`\pickup@font` Then we append our stuff. Everything is done inside a group.

```
3854 \g@addto@macro\pickup@font{\begingroup}%
```

If the `trace` package is loaded, we turn off tracing of `mimetype`'s setup, which is extremely noisy.

```

3855 \MT@with@package@T{trace}{\g@addto@macro\pickup@font{\conditionally@traceoff}}%
3856 \g@addto@macro\pickup@font{%
3857 \escapechar\m@ne
3858 }*package)
3859 <debug> \global\MT@inannottrue
3860 <debug> \MT@glet\MT@pdf@annot\@empty
3861 <debug> \MT@addto@annot{(line \number\inputlineno)}%

```

If `\MT@font` is empty, no substitution has taken place, hence `\font@name` is correct. Otherwise, if they are different, `\font@name` does not describe the font actually used. This test will catch first order substitutions, like `bx` to `b`, but it will still fail if the substituting font is itself substituted.

```

3862 \MT@let@cn\MT@font{MT@subst@\expandafter\string\font@name}%
3863 \ifx\MT@font\relax
3864 \let\MT@font\font@name
3865 \else
3866 \ifx\MT@font\font@name \else
3867 <debug> \MT@addto@annot{= substituted with \MT@font}%
3868 \MT@register@subst@font
3869 \fi
3870 \fi
3871 \MT@setupfont
3872 </package>
3873 <letterspace> \MT@tracking
3874 \endgroup
3875 }%
3876 <*package>

```

`\MT@pickupfont` Remember the patched command, because we may have to disable ourselves in certain situations.

```

\MT@MT@pickupfont
\MT@ltx@pickupfont 3877 \let\MT@pickupfont\pickup@font
3878 \def\MT@MT@pickupfont {\let\pickup@font\MT@pickupfont}%
3879 \def\MT@ltx@pickupfont{\let\pickup@font\MT@orig@pickupfont}%

```

`\do@subst@correction` Additionally, we hook into `\do@subst@correction`, which is called if a substitution has taken place, to record the name of the ersatz font. Unfortunately, this will only work for one-level substitutions. We have to remember the substitute for the rest of the document, not just for the first time it is called, since we need it every time a font is letterspaced.

```

3880 \g@addto@macro\do@subst@correction
3881 {\edef\MT@font{\csname\curr@fontshape/\f@size\endcsname}%
3882 \MT@glet@nc{MT@subst@\expandafter\string\font@name}\MT@font}%

```

`\add@accent` Inside `\add@accent`, we have to disable `mimetype`'s setup, since the grouping in `\MT@orig@add@accent` the patched `\pickup@font` would break the accent if different fonts are used for the base character and the accent. Fortunately,  $\LaTeX$  takes care that the fonts used for the `\accent` are already set up, so that we cannot be overlooking them.

```

3883 \let\MT@orig@add@accent\add@accent
3884 \def\add@accent#1#2{%
3885 \MT@ltx@pickupfont
3886 \MT@orig@add@accent{#1}{#2}%
3887 \MT@MT@pickupfont
3888 }%
3889 </package>
3890 }
3891 <plain>\relax
3892 </package|letterspace>
3893 <*package>

```

Consequently (if all goes well), we are the last ones to change these commands, therefore there is no need to check whether our definition has survived.

```

\MT@check@font Check whether we've already seen the current font.
3894 \def\MT@check@font{\MT@exp@one@n\MT@in@clist\MT@font\MT@font@list}

\MT@register@font Register the current font.
3895 \def\MT@register@font{\xdef\MT@font@list{\MT@font@list\MT@font,}}

\MT@register@subst@font Register the substituted font (only if isn't registered already). Additionally, we
have to remove the substitute font from the list of fonts, so that we set it up again.
3896 \def\MT@register@subst@font{%
3897 \MT@exp@one@n\MT@in@clist\font@name\MT@font@list
3898 \ifMT@inlist@else
3899 \xdef\MT@font@list{\MT@font@list\font@name,}%
3900 \expandafter\MT@rem@from@clist\MT@font\MT@font@list
3901 \fi
3902 }
3903 </package>

```

### 1.2.11 Context-sensitive setup

Here are the variants for context-sensitive setup.

`\MT@active@features` The activated features are stored in a command. We always allow contexts for tracking, because `\textls` may be used without activating the feature.

```

3904 <*pdf-|lua-|xe-
3905 <pdf->\MT@requires@pdftex6
3906 <lua->\MT@requires@luatex3
3907 <pdf-|lua-> {\def\MT@active@features{,tr}}{%
3908 \let\MT@active@features@empty
3909 <pdf-|lua-> }
3910 </pdf-|lua-|xe-

```

`\MT@check@font@cx` Every feature has its own list of fonts that have already been dealt with. If the font needn't be set up for a feature, we temporarily disable the corresponding setup command. This should be more efficient than book-keeping the fonts in lists associated with the combination of contexts, as we've done it before.

```

3911 <*package>
3912 \def\MT@check@font@cx{%
3913 \MT@if@true
3914 \MT@map@clist@c\MT@active@features{%
3915 \expandafter\MT@exp@one@n\expandafter\MT@in@clist\expandafter\MT@font
3916 \csname MT@##1@\csname MT@##1@context\endcsname font@list\endcsname
3917 \ifMT@inlist@
3918 \MT@let@nc{MT@\@nameuse{MT@abbr@##1}}\relax
3919 \else
3920 \MT@if@false
3921 \fi
3922 }%
3923 \ifMT@if@ \MT@inlist@true \else \MT@inlist@false \fi
3924 }

```

`\MT@register@subst@font@cx` Add the substituted font to each feature list and possibly remove substitute font.

```

3925 \def\MT@register@subst@font@cx{%
3926 \MT@map@clist@c\MT@active@features{%
3927 \expandafter\MT@exp@one@n\expandafter\MT@in@clist\expandafter\font@name
3928 \csname MT@##1@\csname MT@##1@context\endcsname font@list\endcsname
3929 \ifMT@inlist@ \else
3930 \MT@exp@cs\MT@xadd
3931 {MT@##1@\csname MT@##1@context\endcsname font@list}%
3932 {\font@name,}%

```

```

3933 \expandafter\MT@exp@one@n\expandafter\MT@rem@from@clist\expandafter\MT@font
3934 \csname MT@##1@\csname MT@##1@context\endcsname font@list\endcsname
3935 \fi
3936 }%
3937 }

```

`\MT@register@font@cx` For each feature, add the current font to the list, unless we didn't set it up.

```

3938 \def\MT@register@font@cx{%
3939 \MT@map@clist@c\MT@active@features{%
3940 \MT@exp@cs\ifx{MT@\@nameuse{MT@abbr@##1}}\relax\else
3941 \MT@exp@cs\MT@xadd
3942 {MT@##1@\csname MT@##1@context\endcsname font@list}%
3943 {\MT@font,}%
3944 \def\@tempa{##1}%
3945 \MT@exp@cs\MT@map@tlist@c{MT@##1@doc@contexts}\MT@maybe@rem@from@list
3946 \fi
3947 }%
3948 }

```

`\MT@maybe@rem@from@list` Recurse through all context font lists of the document and remove the font, unless it's the current context.

```

3949 \def\MT@maybe@rem@from@list#1{%
3950 \MT@ifstreq{\@tempa/#1}{\@tempa/\csname MT@\@tempa @context\endcsname}\relax{%
3951 \expandafter\MT@exp@one@n\expandafter\MT@rem@from@clist\expandafter
3952 \MT@font \csname MT@\@tempa @#1font@list\endcsname
3953 }%
3954 }

```

`\microtypecontext` The user may change the context, so that different setups are possible. This is especially useful for multi-lingual documents.

`\MT@microtypecontext`

Inside the preamble, this command shouldn't actually do anything but remember itself for later.

```

3955 \def\microtypecontext{\MT@begin@catcodes\MT@microtypecontext}
3956 \def\MT@microtypecontext#1{\MT@end@catcodes\MT@addto@setup{\microtypecontext{#1}}}
3957 \MT@addto@setup{%
3958 \DeclareRobustCommand\microtypecontext{%
3959 \MT@begin@catcodes
3960 \MT@microtypecontext
3961 }%
3962 \def\MT@microtypecontext#1{%
3963 \MT@end@catcodes
3964 \MT@setup@contexts
3965 \let\MT@reset@context\relax

```

We need to ensure that math fonts are set up anew.

```

3966 \MT@glet\glb@currsiz@empty
3967 \setkeys{MTC}{#1}%
3968 \selectfont
3969 \MT@reset@context
3970 }%
3971 }

```

`\textmicrotypecontext` This is just a wrapper around `\microtypecontext`.

```

\MT@textmicrotypecontext 3972 \DeclareRobustCommand\textmicrotypecontext{\MT@begin@catcodes\MT@textmicrotypecontext}
\MT@text@microtypecontext 3973 \def\MT@textmicrotypecontext#1{\MT@end@catcodes\MT@text@microtypecontext{#1}}
3974 \def\MT@text@microtypecontext#1#2{{\microtypecontext{#1}#2}}

```

`\MT@reset@context` We have to reset the font at the end of the group, provided there actually was a change.

`\MT@reset@context@`

```

3975 \def\MT@reset@context@{%
3976 \MT@vinfo{<<< Resetting contexts\online
3977 (debug) \MessageBreak= \MT@pr@context/\MT@ex@context
3978 (debug) \MT@tr@context/\MT@kn@context/\MT@sp@context

```

```

3979 }%
3980 \selectfont
3981 }

```

`\MT@setup@contexts` The first time `\microtypecontext` is called, we initialise the context lists and redefine the commands used in `\pickup@font`.

```

3982 \def\MT@setup@contexts{%
3983 \MT@map@clist@c\MT@active@features
3984 { \MT@gl@et@nc{MT@##1@font@list}\MT@font@list}%
3985 \MT@gl@et\MT@check@font\MT@check@font@cx
3986 \MT@gl@et\MT@register@font\MT@register@font@cx
3987 \MT@gl@et\MT@register@subst@font\MT@register@subst@font@cx
3988 \MT@gl@et\MT@setup@contexts\relax
3989 }

```

Define context keys.

```

3990 \MT@map@clist@c\MT@features@long{%
3991 \define@key{MTC}{#1}[]{}%
3992 \edef\@tempb{\@nameuse{MT@rba@#1}}%
3993 \MT@exp@one@n\MT@in@clist\@tempb\MT@active@features
3994 \ifMT@inlist@

```

Using an empty context is only asking for trouble, therefore we choose the ‘@’ instead (hoping for the L<sup>A</sup>T<sub>E</sub>X users’ natural awe of this character).

```

3995 \MT@ifempty{#1}{\def\MT@val{0}}{\def\MT@val{##1}}%
3996 \MT@exp@cs\ifx{MT@\@tempb @context}\MT@val
3997 <debug>\MT@dinfo{1}{>>> no change of #1 context: `~\MT@val'}%
3998 \else
3999 \MT@vinfo{>>> Changing #1 context to `~\MT@val'\MessageBreak\@online
4000 <debug> \space(previous: `~\@nameuse{MT@\@tempb @context}')%
4001 }%
4002 \def\MT@reset@context{\aftergroup\MT@reset@context@}%

```

The next time we see the font, we have to reset *all* factors.

```

4003 \MT@gl@et@nn{MT@reset@\@tempb @codes}\MT@reset@\@tempb @codes@}%

```

We must also keep track of all contexts in the document.

```

4004 \expandafter\MT@exp@one@n\expandafter\MT@in@tlist\expandafter
4005 \MT@val \csname MT@\@tempb @doc@contexts\endcsname
4006 \ifMT@inlist@ \else
4007 \MT@exp@cs\MT@xadd{MT@\@tempb @doc@contexts}{\MT@val}%
4008 <debug> \MT@dinfo{1}{||| added #1 context: \@nameuse{MT@\@tempb @doc@contexts}}%
4009 \fi
4010 \MT@edef@n{MT@\@tempb @context}{\MT@val}%
4011 \fi
4012 \fi
4013 }%
4014 }

```

We also allow the activate shortcut.

```

4015 \define@key{MTC}{activate}[]{}%
4016 \setkeys{MTC}{protrusion={#1}}%
4017 \setkeys{MTC}{expansion={#1}}%
4018 }

```

`\MT@pr@context` Initialise the contexts.

```

\MT@ex@context 4019 \MT@exp@one@n\MT@map@clist@n{\MT@features,nl}{%

```

```

\MT@tr@context 4020 \MT@def@n{MT@#1@context}{@}%

```

```

\MT@sp@context 4021 \MT@def@n{MT@#1@doc@contexts}{\@}%

```

```

4022 }

```

```

\MT@kn@context 4023 \let\MT@extra@context\@empty

```

```

\MT@pr@doc@contexts

```

```

\MT@ex@doc@contexts

```

```

\MT@tr@doc@contexts

```

```

\MT@sp@doc@contexts

```

```

\MT@kn@doc@contexts

```

```

\MT@extra@context

```

### 1.3 Configuration

### 1.3.1 Font sets

`\DeclareMicrotypeSet` Calling this macro will create a comma list for every font attribute of the form: `\MT{feature}list@{attribute}@{set name}`. If the optional argument is empty, lists for all available features will be created.

The third argument must be a list of key=value pairs. If a font attribute is not specified, we define the corresponding list to `\relax`, so that it does not constitute a constraint.

```
4024 \def\DeclareMicrotypeSet{%
4025 \MT@begin@catcodes
4026 \ifstar
4027 \MT@DeclareSetAndUseIt
4028 \MT@DeclareSet
4029 }
```

`\MT@DeclareSet`

```
4030 \newcommand\MT@DeclareSet[3] [] {%
4031 \MT@ifempty{#1}{%
4032 \MT@map@clist@{c}\MT@features{\begingroup\MT@declare@sets{##1}{#2}{#3}\endgroup}%
4033 }{%
4034 \MT@map@clist@{n}{#1}{\begingroup
4035 \MT@ifempty{##1}\relax{%
4036 \MT@is@feature{##1}{set declaration `#2'}{%
4037 \MT@exp@one@{n}\MT@declare@sets
4038 {\csname MT@rbba@##1\endcsname}{#2}{#3}%
4039 }%
4040 }%
4041 \endgroup}%
4042 }%
4043 \MT@end@catcodes
4044 }
```

`\MT@DeclareSetAndUseIt`

```
4045 \newcommand\MT@DeclareSetAndUseIt[3] [] {%
4046 \MT@DeclareSet[#1]{#2}{#3}%
4047 \UseMicrotypeSet[#1]{#2}%
4048 }
```

`\MT@curr@set@name` We need to remember the name of the set currently being declared.

```
4049 \let\MT@curr@set@name\@empty
```

`\MT@declare@sets` Define the current set name and parse the keys.

```
4050 \def\MT@declare@sets#1#2#3{%
4051 \def\MT@curr@set@name{#2}%
4052 \MT@ifdefined@n@T{MT@#1@set@@\MT@curr@set@name}{%
4053 \MT@warning{Redefining \nameuse{MT@abbr@#1} set ~\MT@curr@set@name!}%
4054 \MT@map@clist@{font,encoding,family,series,shape,size}{%
4055 \MT@gl@et@nc{MT@#1list@##1@\MT@curr@set@name}\@undefined
4056 }%
4057 }%
4058 \MT@gl@et@nc{MT@#1@set@@\MT@curr@set@name}\@empty
4059 <debug>\MT@dinfo{1}{declaring \nameuse{MT@abbr@#1} set ~\MT@curr@set@name!}%
4060 \setkeys{MT@#1@set}{#3}%
4061 }
```

`\MT@define@set@key@` `<#1> = font axis, <#2> = feature.`

```
4062 \def\MT@define@set@key@#1#2{%
4063 \define@key{MT@#2@set}{#1} [] {%
4064 \MT@gl@et@nc{MT@#2list@#1@\MT@curr@set@name}\@empty
4065 \MT@map@clist@{n}{##1}{%
4066 \KV@sp@def\MT@val{###1}%
4067 \MT@get@highlevel{#1}%

```



We do not add the expanded value to the list ...

```
4068 \MT@exp@two@n@g@addto@macro
4069 {\csname MT@#2list@#1@MT@curr@set@name\expandafter\endcsname}%
4070 {\MT@val,}%
4071 }%
```

... but keep in mind that the list has to be expanded at the end of the preamble.

```
4072 \expandafter@g@addto@macro\expandafter\MT@font@sets
4073 \csname MT@#2list@#1@MT@curr@set@name\endcsname
4074 <debug>\MT@dinfol{1}{-- #1: \@nameuse{MT@#2list@#1@MT@curr@set@name}}%
4075 }%
4076 }
```

\MT@get@highlevel Saying, for instance, ‘family=rm\*’ or ‘shape=bf\*’ will expand to \rmdefault resp. \bfdefault.

```
4077 \def\MT@get@highlevel#1{%
4078 \expandafter\MT@test@ast\MT@val*\@nil\relax%
```

And ‘family = \*’ will become \familydefault.

```
4079 \MT@ifempty\@tempa{\def\@tempa{#1}}\relax
```

Test whether the command is actually defined.

```
4080 \MT@ifdefined@TF{\@tempa default}%
4081 {\edef\MT@val{\MT@exp@cs\noexpand{\@tempa default}}}%
4082 {\MT@warning{\@backslashchar\@tempa default' is not a defined command.\MessageBreak
4083 Ignoring `#1 = {\@tempa*}' in font set\MessageBreak`\MT@curr@set@name'}}%
4084 \let\MT@val\@empty}%
```

In contrast to earlier versions, these values will not be expanded immediately, but at the end of the preamble.

```
4085 }%
4086 }
```

\MT@test@ast It the last character is an asterisk, execute the second argument, otherwise the first one.

```
4087 \def\MT@test@ast#1*#2\@nil{%
4088 \def\@tempa{#1}%
4089 \MT@ifempty{#2}%
4090 }
```

\MT@font@sets Fully expand the font specification and fix catcodes for all font sets. Also remove  
\MT@fix@font@set fontspec’s counters.

```
4091 \let\MT@font@sets\@empty
4092 \def\MT@fix@font@set#1{%
4093 \MT@ifdefined@c@T{#1}%
4094 \xdef#1{#1}%
4095 \ifMT@fontspec
4096 \xdef#1{\expandafter\MT@scrubfeatures#1()\relax}%
4097 \fi
4098 \global\@onelevel@sanitize#1%
4099 }%
4100 }
```

\MT@define@set@key@size size requires special treatment.

```
4101 \def\MT@define@set@key@size#1{%
4102 \define@key{MT@#1@set}{size}[]{}%
4103 \MT@map@clist@n{##1}%
4104 \def\MT@val{###1}%
4105 \expandafter\MT@get@range\MT@val--\@nil
4106 \ifx\MT@val\relax\else
4107 \MT@exp@cs\MT@xadd
4108 {MT@#1list@size@MT@curr@set@name}%
4109 {{{\MT@lower}{\MT@upper}}\relax}%
4110 \fi
```

```

4111 }%
4112 <debug>\MT@info{n1}{-- size: \@nameuse{MT@#1list@size@\MT@curr@set@name}}%
4113 }%
4114 }

```

Font sizes may also be specified as ranges. This has been requested by Andreas Bühmann, who has also offered valuable help in implementing this. Now, it is for instance possible to set up different lists for fonts with optical sizes. (The MinionPro project does this for the OpenType version of Adobe’s Minion. (Available from CTAN at [pkg/minionpro](#)))

`\MT@get@range` Ranges will be stored as triplets of  $\{\langle lower\ bound\rangle\}\{\langle upper\ bound\rangle\}\{\langle list\ name\rangle\}$ .

`\MT@upper` For simple sizes, the upper boundary is  $-1$ .

```

\MT@lower 4115 \def\MT@get@range#1-#2-#3\@nil{%
4116 \MT@ifempty{#1}{%
4117 \MT@ifempty{#2}{%
4118 \let\MT@val\relax
4119 }%
4120 \def\MT@lower{0}%
4121 \def\MT@val{#2}%
4122 \MT@get@size
4123 \edef\MT@upper{\MT@val}%
4124 }%
4125 }%
4126 \def\MT@val{#1}%
4127 \MT@get@size
4128 \ifx\MT@val\relax \else
4129 \edef\MT@lower{\MT@val}%
4130 \MT@ifempty{#2}{%
4131 \MT@ifempty{#3}{%
4132 {\def\MT@upper{-1}}%

```

2048 pt is TeX’s maximum font size.

```

4133 {\def\MT@upper{2048}}%
4134 }%
4135 \def\MT@val{#2}%
4136 \MT@get@size
4137 \ifx\MT@val\relax \else
4138 \MT@ifdim\MT@lower>\MT@val{%
4139 \MT@error{%
4140 Invalid size range (\MT@lower\space > \MT@val) in font set
4141 '\MT@curr@set@name'.\MessageBreak Swapping sizes}}%
4142 \edef\MT@upper{\MT@lower}%
4143 \edef\MT@lower{\MT@val}%
4144 }%
4145 \edef\MT@upper{\MT@val}%
4146 }%
4147 \MT@ifdim\MT@lower=\MT@upper
4148 {\def\MT@upper{-1}}%
4149 \relax
4150 \fi
4151 }%
4152 \fi
4153 }%
4154 }

```

`\MT@get@size` Translate a size selection command and normalise it.

```
4155 \def\MT@get@size{%
```

A single star would mean `\sizedefault`, which doesn’t exist, so we define it to be `\normalsize`.

```

4156 \if*\MT@val\relax
4157 \def\@tempa{\normalsize}%
4158 \else

```

```

4159 \MT@let@cn\@tempa{\MT@val}%
4160 \fi
4161 \ifx\@tempa\relax\else
4162 \MT@get@size@
4163 \fi

```

Test whether we finally got a number or dimension so that we can strip the ‘pt’ (\@defaultunits and \strip@pt are kernel macros).

```

4164 \MT@ifdimen\MT@val{%
4165 \@defaultunits\@tempdima\MT@val pt\relax\@nni1
4166 \edef\MT@val{\strip@pt\@tempdima}%
4167 }{%
4168 \MT@warning{Could not parse font size `~\MT@val'\MessageBreak
4169 in font set `~\MT@curr@set@name'}%
4170 \let\MT@val\relax
4171 }%
4172 }

```

\MT@get@size@ The resize solution of parsing \@setfontsize does not work with the AMS classes, among others. I hope my hijacking doesn’t do any harm. We redefine \set@fontsize instead of \@setfontsize because some classes might define the size selection commands by simply using \fontsize (e.g., the a0poster class).

```

4173 \def\MT@get@size@@{%
4174 \begingroup
4175 \def\set@fontsize##1##2##3##4\@nil{\endgroup\def\MT@val{##2}}%
4176 \@tempa\@nil
4177 }

```

The svjour3 class defines the size commands using conditionals; using e-TeX primitives, we close any leftovers here.

```

4178 ^^X\@ifclassloaded{svjour3}{%
4179 ^^X \def\MT@get@size@{%
4180 ^^X \@tempcnta=currentiflevel
4181 ^^X \MT@get@size@@
4182 ^^X \MT@loop
4183 ^^X \ifnum\numexprcurrentiflevel-1>\@tempcnta
4184 ^^X \csname fi\endcsname
4185 ^^X \MT@repeat
4186 ^^X }%
4187 ^^X}{%
4188 \let\MT@get@size@\MT@get@size@@
4189 ^^X}

```

\MT@define@set@key@font

```

4190 \def\MT@define@set@key@font#1{%
4191 \define@key{MT@#1@set}{font}[]{}%
4192 \MT@gl@et@nc{MT@#1@list@font@\MT@curr@set@name}\@empty
4193 \MT@map@clist@n{##1}{%
4194 \def\MT@val{###1}%
4195 \MT@ifstreq\MT@val*{\def\MT@val{*/*/*/*/}}\relax
4196 \expandafter\MT@get@font\MT@val////\@nil
4197 \MT@exp@two@n@g@addto@macro
4198 {\csname MT@#1@list@font@\MT@curr@set@name\expandafter\endcsname}%
4199 {\MT@val,}%
4200 }%
4201 \expandafter\g@addto@macro\expandafter\MT@font@sets
4202 \csname MT@#1@list@font@\MT@curr@set@name\endcsname
4203 <debug>\MT@dinfo@n1{1}{-- font: \nameuse{MT@#1@list@font@\MT@curr@set@name}}%
4204 }%
4205 }

```

\MT@get@font Translate any asterisks.

```

4206 \def\MT@get@font#1/#2/#3/#4/#5/#6\@nil{%

```

```

4207 \MT@get@font@{#1}{#2}{#3}{#4}{#5}{0}%
4208 \ifx\MT@val\relax\def\MT@val{0}\fi
4209 \expandafter\g@addto@macro\expandafter\@tempb\expandafter{\MT@val}%
4210 \let\MT@val\@tempb
4211 }

```

`\MT@get@font@` Helper macro, also used by `\MT@get@font@and@size`.

```

4212 \def\MT@get@font@#1#2#3#4#5#6{%
4213 \let\@tempb\@empty
4214 \def\MT@temp{#1/#2/#3/#4/#5}%
4215 \MT@get@axis{encoding}{#1}%
4216 \MT@get@axis{family}{#2}%
4217 \MT@get@axis{series}{#3}%
4218 \MT@get@axis{shape}{#4}%
4219 \ifnum#6>\z@\edef\@tempb{\@tempb*}\fi
4220 \MT@ifempty{#5}{%
4221 \MT@warn@axis@empty{size}{\string\normalsize}%
4222 \def\MT@val{*}%
4223 }{%
4224 \def\MT@val{#5}%
4225 }%
4226 \MT@get@size
4227 }

```

`\MT@get@axis`

```

4228 \def\MT@get@axis#1#2{%
4229 \def\MT@val{#2}%
4230 \MT@get@highlevel{#1}%
4231 \MT@ifempty\MT@val{%
4232 \MT@warn@axis@empty{#1}{\csname #1default\endcsname}%
4233 \expandafter\def\expandafter\MT@val\expandafter{\csname #1default\endcsname}%
4234 } \relax
4235 \expandafter\g@addto@macro\expandafter\@tempb\expandafter{\MT@val/}%
4236 }

```

`\MT@warn@axis@empty`

```

4237 \def\MT@warn@axis@empty#1#2{%
4238 \MT@warning{#1 axis is empty in font specification\MessageBreak
4239 \MT@temp'. Using `#2' instead}%
4240 }

```

We can finally assemble all pieces to define `\DeclareMicrotypeSet`'s keys. They are also used for `\DisableLigatures`.

```

4241 \MT@exp@one@n\MT@map@clist@n{\MT@features,n1}{%
4242 \MT@define@set@key@{encoding}{#1}%
4243 \MT@define@set@key@{family}{#1}%
4244 \MT@define@set@key@{series}{#1}%
4245 \MT@define@set@key@{shape}{#1}%
4246 \MT@define@set@key@size{#1}%
4247 \MT@define@set@key@font{#1}%
4248 }

```

`\UseMicrotypeSet` To use a particular set we simply redefine `MT@{feature}@setname`. If the optional argument is empty, set names for all features will be redefined.

```

4249 \def\UseMicrotypeSet{%
4250 \MT@begin@catcodes
4251 \MT@UseMicrotypeSet
4252 }

```

`\MT@UseMicrotypeSet`

```

4253 \newcommand*\MT@UseMicrotypeSet[2][]{%
4254 \MT@ifempty{#1}{%
4255 \MT@map@clist@c\MT@features{\begin@group\MT@use@set{##1}{#2}\end@group}%
4256 }{%

```

```

4257 \MT@map@clist@n{#1}{\begingroup
4258 \MT@ifempty{##1}\relax{%
4259 \MT@is@feature{##1}{activation of set `#2'}{%
4260 \MT@exp@one@n\MT@use@set
4261 {\csname MT@rbba@##1\endcsname}{#2}%
4262 }%
4263 }%
4264 \endgroup}%
4265 }%
4266 \MT@end@catcodes
4267 }

```

`\MT@pr@setname` Only use sets that have been declared.

```

\MT@ex@setname 4268 \def\MT@use@set#1#2{%
\MT@tr@setname 4269 \MT@ifdefined@n@TF{MT@#1@set@#2}{%
4270 \MT@xdef@n{MT@#1@setname}{#2}%
\MT@sp@setname 4271 }{%
\MT@kn@setname 4272 \MT@ifdefined@n@TF{MT@#1@setname}\relax{%
\MT@use@set 4273 \MT@xdef@n{MT@#1@setname}{\@nameuse{MT@default@#1@set}}%
4274 }%
4275 \MT@error{%
4276 The \@nameuse{MT@abbr@#1} set `#2' is undeclared.\MessageBreak
4277 Using set ` \@nameuse{MT@#1@setname}' instead}{}%
4278 }%
4279 }

```

`\DeclareMicrotypeSetDefault` This command can be used in the main configuration file to declare the default font set, in case no set is specified in the package options.

```

4280 \def\DeclareMicrotypeSetDefault{%
4281 \MT@begin@catcodes
4282 \MT@DeclareMicrotypeSetDefault
4283 }

```

`\MT@DeclareMicrotypeSetDefault`

```

4284 \newcommand*\MT@DeclareMicrotypeSetDefault[2][]{%
4285 \MT@ifempty{#1}{%
4286 \MT@map@clist@c\MT@features{\begingroup\MT@set@default@set{##1}{#2}\endgroup}%
4287 }{%
4288 \MT@map@clist@n{#1}{\begingroup
4289 \MT@ifempty{##1}\relax{%
4290 \MT@is@feature{##1}{declaration of default set `#2'}{%
4291 \MT@exp@one@n\MT@set@default@set
4292 {\csname MT@rbba@##1\endcsname}{#2}%
4293 }%
4294 }%
4295 \endgroup}%
4296 }%
4297 \MT@end@catcodes
4298 }

```

`\MT@default@pr@set`

```

\MT@default@ex@set 4299 \def\MT@set@default@set#1#2{%
\MT@default@tr@set 4300 \MT@ifdefined@n@TF{MT@#1@set@#2}{%
\MT@default@sp@set 4301 <debug>\MT@dinfo{1}{declaring default \@nameuse{MT@abbr@#1} set `#2'}%
\MT@default@kn@set 4302 \MT@xdef@n{MT@default@#1@set}{#2}%
\MT@set@default@set 4303 }{%
4304 \MT@error{%
4305 The \@nameuse{MT@abbr@#1} set `#2' is not declared.\MessageBreak
4306 Cannot make it the default set. Using set\@nameuse{MT@abbr@#1} instead}{}%
4307 \MT@xdef@n{MT@default@#1@set}{all}%
4308 }%
4309 }

```

### 1.3.2 Variants and aliases

`\DeclareMicrotypeVariants` Specify suffixes for variants (see `fontname/variants.map`). The starred version appends to the list.

`\MT@variants`

```
4310 \let\MT@variants\@empty
4311 \def\DeclareMicrotypeVariants{%
4312 \MT@begin@catcodes
4313 \ifstar
4314 \MT@DeclareVariants
4315 {\let\MT@variants\@empty\MT@DeclareVariants}%
4316 }
```

`\MT@DeclareVariants`

```
4317 \def\MT@DeclareVariants#1{%
4318 \MT@map@clist@n{#1}%
4319 \def\@tempa{##1}%
4320 \@onelevel@sanitize\@tempa
4321 \xdef\MT@variants{\MT@variants{\@tempa}}%
4322 }%
4323 \MT@end@catcodes
4324 }
```

`\DeclareMicrotypeAlias` This can be used to set an alias name for a font, so that the file and the settings for the aliased font will be loaded.

```
4325 \def\DeclareMicrotypeAlias{%
4326 \MT@begin@catcodes
4327 \MT@DeclareMicrotypeAlias
4328 }
```

`\MT@DeclareMicrotypeAlias`

```
4329 \newcommand*\MT@DeclareMicrotypeAlias[2]{%
4330 \def\@tempb{#2}%
4331 \@onelevel@sanitize\@tempb
4332 \MT@ifdefined@n{T\MT@#1@alias}{%
4333 \MT@warning{Alias font family '\@tempb' will override
4334 alias '\@nameuse{MT@#1@alias}'\MessageBreak
4335 for font family '#1'}}%
4336 \MT@xdef@n{MT@#1@alias}{\@tempb}%
```

If we encounter this command while a font is being set up, we also set the alias for the current font so that if `\DeclareMicrotypeAlias` has been issued inside a configuration file, the configuration file for the alias font will be loaded, too.

```
4337 \MT@ifdefined@c{T\MT@family}%
4338 <debug>\MT@dinfo{1}{Activating alias font '\@tempb' for '\MT@family'}%
4339 \MT@gl@et\MT@familyalias\@tempb
4340 }%
4341 \MT@end@catcodes
4342 }
```

### 1.3.3 Configuration file management

`\LoadMicrotypeFile` May be used to load a configuration file manually.

```
4343 \def\LoadMicrotypeFile#1{%
4344 \edef\@tempa{\zap@space#1 \@empty}%
4345 \@onelevel@sanitize\@tempa
4346 \MT@exp@one@n\MT@in@clist\@tempa\MT@file@list
4347 \ifMT@inlist@
4348 \MT@vinfo{... Configuration file \MT@cfg@prefix-\@tempa.cfg already loaded}%
4349 \else
4350 \MT@xadd\MT@file@list{\@tempa,}%
4351 \MT@begin@catcodes
4352 \InputIfFileExists{\MT@cfg@prefix-\@tempa.cfg}{%
```

```

4353 \edef\MT@curr@file{\MT@cfg@prefix-\@tempa.cfg}%
4354 \MT@vinfo{... Loading configuration file \MT@curr@file}%
4355 }{%
4356 \MT@warning{Configuration file \MT@cfg@prefix-\@tempa.cfg\MessageBreak
4357 does not exist}%
4358 }%
4359 \MT@end@catcodes
4360 \fi
4361 }

```

`\MT@cfg@prefix` The configuration files' prefix may be customised.

```

\DeclareMicrotypeFilePrefix 4362 \def\MT@cfg@prefix{mt}
4363 \def\DeclareMicrotypeFilePrefix#1{%
4364 \def\MT@cfg@prefix{#1}%
4365 }
4366 </package>

```

### 1.3.4 Disabling ligatures

`\DisableLigatures` This is really simple now: we can re-use the set definitions of `\DeclareMicrotypeSet`; there can only be one set, which we'll call 'no ligatures'.

`\MT@DisableLigatures` The optional argument may be used to disable selected ligatures only.

```

\MT@nl@ligatures 4367 <pdf-|lua->
4368 <pdf->\MT@requires@pdftex5{
4369 \def\DisableLigatures{%
4370 \MT@begin@catcodes
4371 \MT@DisableLigatures
4372 }
4373 \newcommand*\MT@DisableLigatures[2][]{%
4374 \MT@ifempty{#1}\relax{\gdef\MT@nl@ligatures{#1}}%
4375 \xdef\MT@active@features{\MT@active@features,nl}%
4376 \global\MT@noligaturestrue
4377 \MT@declare@sets{nl}{no ligatures}{#2}%
4378 \gdef\MT@nl@setname{no ligatures}%
4379 \MT@end@catcodes
4380 }
4381 <pdf->{
4382 </pdf-|lua->

```

If pdf<sub>T</sub>E<sub>X</sub> is too old, we throw an error.

```

4383 <pdf-|xe->
4384 \renewcommand*\DisableLigatures[2][]{%
4385 \MT@error{Disabling ligatures of a font is only possible\MessageBreak
4386 with pdftex version 1.30 or newer.\MessageBreak
4387 Ignoring \@backslashchar \DisableLigatures}{%
4388 <pdf-> Upgrade
4389 <xe-> Use
4390 pdftex.}%
4391 }
4392 <pdf->{
4393 </pdf-|xe->

```

### 1.3.5 Interaction with babel

`\DeclareMicrotypeBabelHook` Declare the context that should be loaded when a babel language is selected. The command will not check whether a previous declaration will be overwritten.

```

4394 <package>
4395 \def\DeclareMicrotypeBabelHook#1#2{%
4396 \MT@map@clist@n{#1}{%
4397 \KV@@sp@def\@tempa{##1}%
4398 \MT@gdef@n{MT@babel@}\@tempa}{#2}%
4399 }%

```

```
4400 }
```

### 1.3.6 Fine tuning

The commands `\SetExpansion` and `\SetProtrusion` provide an interface for setting the character protrusion resp. expansion factors for a set of fonts.

`\SetProtrusion` This macro accepts three arguments: [options,] set of font attributes and list of character protrusion factors.

A new macro called `\MT@pr@c@<name>` will be defined to be `<#3>` (i.e., the list of characters, not expanded).

```
4401 \def\SetProtrusion{%
4402 \MT@begin@catcodes
4403 \MT@SetProtrusion
4404 }
```

`\MT@SetProtrusion` We want the catcodes to be correct even if this is called in the preamble.

```
\MT@pr@c@name 4405 \newcommand*\MT@SetProtrusion[3] [] {%
```

```
\MT@extra@context 4406 \let\MT@extra@context\@empty
```

`\MT@permutelist` Parse the optional first argument. We first have to know the name before we can deal with the extra options.

```
4407 \MT@set@named@keys{MT@pr@c}{#1}%
4408 <debug>\MT@dinfor{1}{creating protrusion list `~\MT@pr@c@name'}%
4409 \def\MT@permutelist{pr@c}%
4410 \setkeys{MT@cfg}{#2}%
```

We have parsed the second argument, and can now define macros for all permutations of the font attributes to point to `\MT@pr@c@<name>`, ...

```
4411 \MT@permute
```

... which we can now define to be `<#3>`. Here, as elsewhere, we have to make the definitions global, since they will occur inside a group.

```
4412 \MT@gdefn{MT@pr@c@~\MT@pr@c@name}{#3}%
4413 \MT@end@catcodes
4414 }
```

```
4415 </package>
```

`\SetExpansion` `\SetExpansion` only differs in that it allows some extra options (stretch, shrink, step, auto).

```
4416 <*pdf-|lua->
4417 \def\SetExpansion{%
4418 \MT@begin@catcodes
4419 \MT@SetExpansion
4420 }
```

```
\MT@SetExpansion
```

```
\MT@ex@c@name 4421 \newcommand*\MT@SetExpansion[3] [] {%
```

```
\MT@extra@context 4422 \let\MT@extra@context\@empty
```

```
\MT@permutelist 4423 \MT@set@named@keys{MT@ex@c}{#1}%
```

```
4424 \MT@ifdefinedn@T{MT@ex@c@~\MT@ex@c@name @factor}{%
4425 \ifnum\csname MT@ex@c@~\MT@ex@c@name @factor\endcsname > \@m
4426 \MT@warningn1{Expansion factor \number\@nameuse{MT@ex@c@~\MT@ex@c@name @factor}
4427 too large in list\MessageBreak `~\MT@ex@c@name'. Setting it to the
4428 maximum of 1000}%
4429 \MT@gletnc{MT@ex@c@~\MT@ex@c@name @factor}\@m
4430 \fi
4431 }%
```

```
4432 <debug>\MT@dinfor{1}{creating expansion list `~\MT@ex@c@name'}%
```

```
4433 \def\MT@permutelist{ex@c}%
```

```
4434 \setkeys{MT@cfg}{#2}%
```

```
4435 \MT@permute
```



```

4436 \MT@gdef@n{MT@ex@c@MT@ex@c@name}{#3}%
4437 \MT@end@catcodes
4438 }

```

## \SetTracking

```

4439 \def\SetTracking{%
4440 \MT@begin@catcodes
4441 \MT@SetTracking
4442 }

```

## \MT@SetTracking Third argument may be empty.

```

4443 \newcommand*MT@SetTracking[3] [] {%
4444 \letMT@extra@context\empty
4445 \MT@set@named@keys{MT@tr@c}{#1}%
4446 debug\MT@dinfo{1}{creating tracking list `MT@tr@c@name'}%
4447 \defMT@permutelist{tr@c}%
4448 \setkeys{MT@cfg}{#2}%
4449 \MT@permute
4450 \KV@sp@def\@tempa{#3}%
4451 \MT@ifempty\@tempa\relax{%
4452 \MT@ifint\@tempa
4453 {\MT@xdef@n{MT@tr@c@MT@tr@c@name}{\@tempa}}%
4454 {\MT@warning{Value `@tempa' is not a number in\MessageBreak
4455 tracking set `MT@curr@set@name'}}}%
4456 \MT@end@catcodes
4457 }
4458 /pdf-|lua-

```

## \SetExtraSpacing

```

4459 (*pdf-)
4460 \def\SetExtraSpacing{%
4461 \MT@begin@catcodes
4462 \MT@SetExtraSpacing
4463 }

```

## \MT@SetExtraSpacing

```

\MT@sp@c@name 4464 \newcommand*MT@SetExtraSpacing[3] [] {%
\MT@extra@context 4465 \letMT@extra@context\empty
\MT@set@named@keys{MT@sp@c}{#1}%
\MT@permutelist 4466 \MT@set@named@keys{MT@sp@c}{#1}%
4467 debug\MT@dinfo{1}{creating spacing list `MT@sp@c@name'}%
4468 \defMT@permutelist{sp@c}%
4469 \setkeys{MT@cfg}{#2}%
4470 \MT@permute
4471 \MT@gdef@n{MT@sp@c@MT@sp@c@name}{#3}%
4472 \MT@end@catcodes
4473 }

```

## \SetExtraKerning

```

4474 \def\SetExtraKerning{%
4475 \MT@begin@catcodes
4476 \MT@SetExtraKerning
4477 }

```

## \MT@SetExtraKerning

```

\MT@kn@c@name 4478 \newcommand*MT@SetExtraKerning[3] [] {%
\MT@extra@context 4479 \letMT@extra@context\empty
\MT@set@named@keys{MT@kn@c}{#1}%
\MT@permutelist 4480 \MT@set@named@keys{MT@kn@c}{#1}%
4481 debug\MT@dinfo{1}{creating kerning list `MT@kn@c@name'}%
4482 \defMT@permutelist{kn@c}%
4483 \setkeys{MT@cfg}{#2}%
4484 \MT@permute
4485 \MT@gdef@n{MT@kn@c@MT@kn@c@name}{#3}%
4486 \MT@end@catcodes
4487 }
4488 /pdf-

```

`\MT@set@named@keys` We first set the name (if specified), then remove it from the list, and set the  
`\MT@options` remaining keys.

```
4489 (*package)
4490 \def\MT@set@named@keys#1#2{%
4491 \def\x##1name=##2,##3\@nil{%
4492 \setkeys{#1}{name=##2}%
4493 \gdef\MT@options{##1##3}%
4494 \MT@rem@from@clist{name=}\MT@options
4495 }%
4496 \x#2,name=,\@nil
4497 \@expandtwoargs\setkeys{#1}\MT@options
4498 }
```

`\MT@define@code@key` Define the keys for the configuration lists (which are setting the codes, in pdfTEX speak).

```
4499 \def\MT@define@code@key#1#2{%
4500 \define@key{MT@#2}{#1}[]{%
4501 \@tempcnta=\@ne
4502 \MT@map@clist@{##1}%
4503 \KV@sp@def\MT@val{###1}%
```

Here, too, we allow for something like ‘bf\*’. It will be expanded immediately.

```
4504 \MT@get@highlevel{#1}%
4505 \MT@edef@{MT@temp#1\the\@tempcnta}{\MT@val}%
4506 \advance\@tempcnta \@ne
4507 }%
4508 }%
4509 }
```

`\MT@define@code@key@family` Remove fontspec’s internal feature counter.

```
4510 \def\MT@define@code@key@family#1{%
4511 \define@key{MT@#1}{family}[]{%
4512 \@tempcnta=\@ne
4513 \MT@map@clist@{##1}%
4514 \KV@sp@def\MT@val{###1}%
4515 \MT@get@highlevel{family}%
4516 \ifMT@fontspec
4517 \edef\x{\edef\noexpand\MT@val{\noexpand\MT@scrubfeature\MT@val()\relax}}\x
4518 \fi
4519 \MT@edef@{MT@tempfamily\the\@tempcnta}{\MT@val}%
4520 \advance\@tempcnta \@ne
4521 }%
4522 }%
4523 }
```

`\MT@define@code@key@size` `\MT@tempsize` must be in a `\csname`, so that it is at least `\relax`, not undefined.

```
4524 \def\MT@define@code@key@size#1{%
4525 \define@key{MT@#1}{size}[]{%
4526 \MT@map@clist@{##1}%
4527 \KV@sp@def\MT@val{###1}%
4528 \expandafter\MT@get@range\MT@val--\@nil
4529 \ifx\MT@val\relax \else
4530 \MT@exp@cs\MT@xadd\MT@tempsize{%
4531 {{{\MT@lower}{\MT@upper}{\MT@curr@set@name}}}%
4532 \fi
4533 }%
4534 }%
4535 }
```

`\MT@define@code@key@font`

```
4536 \def\MT@define@code@key@font#1{%
4537 \define@key{MT@#1}{font}[]{%
4538 \MT@map@clist@{##1}%
4539 \KV@sp@def\MT@val{###1}%
```

```

4540 \MT@ifstreq\MT@val*{\def\MT@val{*/**/*/*}}\relax
4541 \expandafter\MT@get@font@and@size\MT@val///// \@nil
4542 \ifMT@fontspec
4543 \edef\@tempb{\expandafter\MT@scrubfeatures\@tempb()\relax}%
4544 \fi
4545 \MT@xdefon{MT@\MT@permutelist @\@tempb\MT@extra@context}%
4546 {\csname MT@\MT@permutelist @name\endcsname}%
4547 (debug)\MT@dinfo@n1{1}{initialising: use list for font \@tempb=\MT@val
4548 (debug) \ifx\MT@extra@context\@empty\else\MessageBreak
4549 (debug) (context: \MT@extra@context)\fi}%
4550 \MT@exp@cs\MT@xaddb
4551 {MT@\MT@permutelist @\@tempb\MT@extra@context @sizes}%
4552 {{{\MT@val}{\m@ne}{\MT@curr@set@name}}}%
4553 }%
4554 }%
4555 }

```

`\MT@get@font@and@size` Translate any asterisks and split off the size.

```

4556 \def\MT@get@font@and@size#1/#2/#3/#4/#5/#6\@nil{%
4557 \MT@get@font@{#1}{#2}{#3}{#4}{#5}{1}%
4558 }
4559 \MT@define@code@key{encoding}{cfg}
4560 \MT@define@code@key@family {cfg}
4561 \MT@define@code@key{series} {cfg}
4562 \MT@define@code@key{shape} {cfg}
4563 \MT@define@code@key@size {cfg}
4564 \MT@define@code@key@font {cfg}

```

`\MT@define@opt@key`

```

4565 \def\MT@define@opt@key#1#2{%
4566 \define@key{MT@#1@c}{#2}[]{\MT@ifempty{##1}\relax}%
4567 \MT@xdefon{MT@#1@c@\MT@curr@set@name @#2}{##1}}%
4568 }

```

`\MT@listname@count` The options in the optional first argument.

```

4569 \newcount\MT@listname@count
4570 \MT@map@clist@c\MT@features{%

```

Use file name and line number as the list name if the user didn't bother to invent one – also check whether the name already exists (in case more than one unnamed list is loaded in the same line, for example `\AtBeginDocument`).

```

4571 \define@key{MT@#1@c}{name}[]{%
4572 \MT@ifempty{##1}%
4573 \MT@ifdefined@n@TF{MT@#1@c@\MT@curr@file/\the\inputlineno}{%
4574 \global\advance\MT@listname@count\@ne
4575 \MT@edefon{MT@#1@c@name}{\MT@curr@file/\the\inputlineno
4576 (\number\MT@listname@count)}%
4577 }%
4578 \MT@edefon{MT@#1@c@name}{\MT@curr@file/\the\inputlineno}%
4579 }%
4580 }{%
4581 \MT@edefon{MT@#1@c@name}{##1}%
4582 \MT@ifdefined@n@T{MT@#1@c@\csname MT@#1@c@name\endcsname}{%
4583 \MT@warning{Redefining \nameuse{MT@abbr#1} list `\'@nameuse{MT@#1@c@name}'}}%
4584 }%
4585 }%
4586 \MT@let@cn\MT@curr@set@name{MT@#1@c@name}%
4587 }%
4588 \MT@define@opt@key{#1}{load}%
4589 \MT@define@opt@key{#1}{factor}%
4590 \MT@define@opt@key{#1}{preset}%
4591 \MT@define@opt@key{#1}{inputenc}%

```

Only one context is allowed. This might change in the future.

```

4592 \define@key{MT@#1c}{context}[]{\MT@ifempty{##1}\relax{\def\MT@extra@context{##1}}}%
4593 }
4594 </package>

```

Automatically enable font copying if we find a protrusion or expansion context. After the preamble, check whether font copying is enabled. For older pdfTEX versions, disallow. It also works with LuaTEX 0.30 or newer.

```

4595 <pdf-|lua-
4596 <pdf-)\MT@requires@pdftex7{
4597 \define@key{MT@ex@c}{context}[]{%
4598 \MT@ifempty{##1}\relax{%
4599 \MT@gl@t\MT@copy@font\MT@copy@font@
4600 \def\MT@extra@context{##1}%
4601 }%
4602 }
4603 \MT@addto@setup{%
4604 \define@key{MT@ex@c}{context}[]{%
4605 \ifx\MT@copy@font\MT@copy@font@
4606 \MT@ifempty{##1}\relax{\def\MT@extra@context{##1}}%
4607 \else
4608 \MT@error{\MT@MT\space isn't set up for expansion contexts.\MessageBreak
4609 Ignoring `context' key\on@line}%
4610 {Either move the settings inside the preamble,\MessageBreak
4611 or load the package with the `copyfonts' option.}%
4612 \fi
4613 }%
4614 }

```

Protrusion contexts *might* also work without copying the font, so we don't issue an error but only a warning. The problem is that pdfTEX only allows one set of protrusion factors for a given font within one paragraph (those that are in effect at the end of the paragraph will be in effect for the whole paragraph). When different fonts are loaded – like in the example with the footnote markers – we don't need to copy the fonts.

```

4615 \define@key{MT@pr@c}{context}[]{%
4616 \MT@ifempty{##1}\relax{%
4617 \MT@gl@t\MT@copy@font\MT@copy@font@
4618 \def\MT@extra@context{##1}%
4619 }%
4620 }
4621 \MT@addto@setup{%
4622 \define@key{MT@pr@c}{context}[]{%
4623 \MT@ifempty{##1}\relax{\def\MT@extra@context{##1}}%
4624 \ifx\MT@copy@font\MT@copy@font@\else
4625 \MT@warning@nl{If protrusion contexts don't work as expected,
4626 \MessageBreak load the package with the `copyfonts' option}%
4627 \fi
4628 }%
4629 }
4630 </pdf-|lua-
4631 <pdf-
4632 >{
4633 \define@key{MT@ex@c}{context}[]{%
4634 \MT@error{Expansion contexts only work with pdftex 1.40.4\MessageBreak
4635 or later. Ignoring `context' key\on@line}%
4636 {Upgrade pdftex.}%
4637 }
4638 </pdf-
4639 <pdf-|xe-
4640 \define@key{MT@pr@c}{context}[]{%
4641 \MT@error{Protrusion contexts only work with pdftex
4642 <pdf-
4643 <xe-

```

```

4644 Ignoring `context' key\on@line}%
4645 <pdf- > {Upgrade pdftex.}%
4646 <xe- > {Use pdftex or luatex.}%
4647 }
4648 </pdf-|xe- >
4649 <pdf- >

```

\MT@warn@nodim

```

4650 <*package >
4651 \def\MT@warn@nodim#1{%
4652 \MT@warning{\@tempa' is not a dimension.\MessageBreak
4653 Ignoring it and setting values relative to\MessageBreak #1}%
4654 }

```

Protrusion codes may be relative to character width, or to any dimension.

```

4655 \define@key{MT@pr@c}{unit}[character]{%
4656 \MT@glet@c{MT@pr@c@MT@curr@set@name @unit}\@empty
4657 \def\@tempa{#1}%
4658 \MT@ifstreq\@tempa{character}\relax{%

```

Test whether it's a dimension, but do not translate it into its final form here, since it may be font-specific.

```

4659 \MT@ifdimen\@tempa
4660 {\MT@glet@c{MT@pr@c@MT@curr@set@name @unit}\@tempa}%
4661 {\MT@warn@nodim{character widths}}%
4662 }%
4663 }
4664 </package >

```

Tracking may only be relative to a dimension.

```

4665 <*pdf-|lua- >
4666 \define@key{MT@tr@c}{unit}[1em]{%
4667 \MT@glet@c{MT@tr@c@MT@curr@set@name @unit}\@empty
4668 \def\@tempa{#1}%
4669 \MT@ifdimen\@tempa
4670 {\MT@glet@c{MT@tr@c@MT@curr@set@name @unit}\@tempa}%
4671 {\MT@warn@nodim{1em}%
4672 \MT@gdef{n{MT@tr@c@MT@curr@set@name @unit}{1em}}%
4673 }
4674 </pdf-|lua- >

```

Spacing and kerning codes may additionally be relative to space dimensions.

```

4675 <*pdf- >
4676 \MT@map@c@list@n{sp,kn}{%
4677 \define@key{MT@#1@c}{unit}[space]{%
4678 \MT@glet@c{MT@#1@c@MT@curr@set@name @unit}\@empty
4679 \def\@tempa{##1}%
4680 \MT@ifstreq\@tempa{character}\relax{%
4681 \MT@glet@c{MT@#1@c@MT@curr@set@name @unit}\m@ne
4682 \MT@ifstreq\@tempa{space}\relax{%
4683 \MT@ifdimen\@tempa
4684 {\MT@glet@c{MT@#1@c@MT@curr@set@name @unit}\@tempa}%
4685 {\MT@warn@nodim{width of space}}%
4686 }%
4687 }%
4688 }%
4689 }
4690 </pdf- >

```

The first argument to \SetExpansion accepts some more options.

```

4691 <*pdf-|lua- >
4692 \MT@map@c@list@n{stretch,shrink,step}{%
4693 \define@key{MT@ex@c}{#1}[]{%
4694 \MT@ifempty{##1}\relax{%
4695 \MT@ifint{##1}{%

```

A space terminates the number.

```

4696 \MT@gdef@n{MT@ex@c@MT@curr@set@name @#1}{##1 }%
4697 }{%
4698 \MT@warning{%
4699 Value `##1' for option `##1' is not a number.\MessageBreak
4700 Ignoring it}%
4701 }%
4702 }%
4703 }%
4704 }
4705 \define@key{MT@ex@c}{auto}[true]{%
4706 \def\@tempa{#1}%
4707 \csname if\@tempa\endcsname

```

Don't use autoexpand for pdfTeX version older than 1.20.

```

4708 (pdf-) \MT@requires@pdftex4%
4709 (lua-) \MT@requires@luatex3\relax
4710 {\MT@gdef@n{MT@ex@c@MT@curr@set@name @auto}{autoexpand}}%
4711 (pdf-) {\MT@warning{pdftex too old for automatic font expansion}}%
4712 \else
4713 (pdf-) \MT@requires@pdftex4%
4714 (*lua-)
4715 \MT@requires@luatex3{%
4716 \MT@warning{Non-automatic font expansion doesn't work with\MessageBreak
4717 luatex}}%
4718 (/lua-)
4719 {\MT@glet@nc{MT@ex@c@MT@curr@set@name @auto}\@empty}%
4720 (pdf-) \relax
4721 \fi
4722 }

```

Tracking: Interword spacing and outer kerning. The variant with space just in case `\SetTracking` is called inside an argument (e.g., to `\IfFileExists`).

```

4723 \MT@define@opt@key{tr}{spacing}
4724 \MT@define@opt@key{tr}{outerspacing}
4725 \MT@define@opt@key{tr}{outerkerning}

```

Which ligatures should be disabled?

```

4726 \define@key{MT@tr@c}{noligatures}[]%
4727 {\MT@xdef@n{MT@tr@c@MT@curr@set@name @noligatures}{#1}}
4728 \define@key{MT@tr@c}{outer spacing}[]{\setkeys{MT@tr@c}{outerspacing={#1}}}
4729 \define@key{MT@tr@c}{outer kerning}[]{\setkeys{MT@tr@c}{outerkerning={#1}}}
4730 \define@key{MT@tr@c}{no ligatures}[]{\setkeys{MT@tr@c}{noligatures={#1}}}
4731 (/pdf-|lua-)

```

### 1.3.7 Character inheritance

`\DeclareCharacterInheritance` This macro may be used in the configuration files to declare characters that should inherit protrusion resp. expansion values from other characters. Thus, there is no need to define all accented characters (e.g., `\'a`, `\'a`, `\^a`, `\~a`, `\"a`, `\r{a}`, `\k{a}`, `\u{a}`), which will make the configuration files look much nicer and easier to maintain. If a single character of an inheritance list should have a different value, one can simply override it.

`\MT@inh@feat` The optional argument may be used to restrict the list to some features,  
`\MT@extra@inputenc` and to specify an input encoding.

```

4732 (*package)
4733 \renewcommand*\DeclareCharacterInheritance[1][]{%
4734 \let\MT@extra@context\@empty
4735 \let\MT@extra@inputenc\@undefined
4736 \let\MT@inh@feat\@empty
4737 \setkeys{MT@inh@}{#1}%

```

```

4738 \MT@begin@catcodes
4739 \MT@set@inh@list
4740 }

```

\MT@set@inh@list No need to create an inheritance list for tracking.

```

4741 \def\MT@set@inh@list#1#2{%
4742 \MT@ifempty\MT@inh@feat{%
4743 \MT@map@clist@c\MT@features{\begingroup
4744 \MT@ifstreq{#1}{tr}\relax{\MT@declare@char@inh{##1}{#1}{#2}}%
4745 \endgroup}%
4746 }%
4747 \MT@map@clist@c\MT@inh@feat{\begingroup
4748 \KV@sp@def\@tempa{##1}%
4749 \MT@ifempty\@tempa\relax{%
4750 \edef\@tempa{\csname MT@rbba@\@tempa\endcsname}%
4751 \MT@ifstreq\@tempa{tr}\relax{%
4752 \MT@exp@one@n\MT@declare@char@inh{\@tempa}{#1}{#2}}%
4753 \endgroup}%
4754 }%
4755 \MT@end@catcodes
4756 }

```

The keys for the optional argument.

```

4757 \MT@map@clist@c\MT@features@long{%
4758 \define@key{MT@inh@}{#1}[]{\edef\MT@inh@feat{\MT@inh@feat#1,}}%
4759 \define@key{MT@inh@}{inputenc}{\def\MT@extra@inputenc{#1}}

```

\MT@declare@char@inh The lists cannot be given a name by the user.

```

4760 \def\MT@declare@char@inh#1#2#3{%
4761 \MT@edef@n{MT@#1@inh@name}%
4762 {\MT@curr@file/\the\inputlineno (\@nameuse{MT@abbr#1})}%
4763 \MT@let@cn\MT@curr@set@name{MT@#1@inh@name}%
4764 \MT@ifdefined@T\MT@extra@inputenc{%
4765 \MT@xdef@n{MT@#1@inh@\MT@curr@set@name @inputenc}{\MT@extra@inputenc}}%
4766 (debug)\MT@dinfo{1}{creating inheritance list ` \@nameuse{MT@#1@inh@name}'}%
4767 \MT@gdef@n{MT@#1@inh@\csname MT@#1@inh@name\endcsname}{#3}%
4768 \def\MT@permutelist{#1@inh}%
4769 \setkeys{MT@inh}{#2}%
4770 \MT@permute
4771 }

```

Parse the second argument. \DeclareCharacterInheritance may also be set up for various combinations. We can reuse the key setup from the configuration lists (\Set...).

```

4772 \MT@define@code@key{encoding}{inh}
4773 \MT@define@code@key{family}{inh}
4774 \MT@define@code@key{series}{inh}
4775 \MT@define@code@key{shape}{inh}
4776 \MT@define@code@key{size}{inh}
4777 \MT@define@code@key{font}{inh}

```

\MT@inh@do Now parse the third argument, the inheritance lists. We define the commands \MT@inh@<name>@<slot>, containing the inheriting characters. They will also be translated to slot numbers here, to save some time. The following will be executed only once, namely the first time this inheritance list is encountered (in \MT@set@<feature>@codes).

```

4778 \def\MT@inh@do#1,{%
4779 \ifx\relax#1\empty \else
4780 \MT@inh@split #1==\relax
4781 \expandafter\MT@inh@do
4782 \fi
4783 }

```

`\MT@inh@split` Only gather the inheriting characters here. Their codes will actually be set in `\MT@set@{feature}@codes`.

```

4784 {/package}
4785 {*pdf-|lua-|xe-}
4786 \def\MT@inh@split#1=#2=#3\relax{%
4787 \def\@tempa{#1}%
4788 \ifx\@tempa\@empty \else
4789 \expandafter\MT@has@inh@prefix\@tempa()\relax\@nil
4790 \MT@get@slot
4791 {pdf-|lua-} \ifnum\MT@char > \m@ne
4792 {xe-} \ifx\MT@char\@empty\else
4793 \let\MT@val\MT@char
4794 \MT@map@clist@n{#2}{%
4795 \def\@tempa{##1}%
4796 \ifx\@tempa\@empty \else
4797 \MT@get@slot
4798 {pdf-|lua-} \ifnum\MT@char > \m@ne
4799 {xe-} \ifx\MT@char\@empty\else
4800 \ifx\MT@inh@prefix\@empty
4801 \MT@exp@cs\MT@xadd{MT@inh\MT@listname @\MT@val @}{\MT@char}%
4802 \else
4803 \MT@exp@cs\MT@xadd{MT@inh\MT@listname @prefixes}%
4804 {{{\MT@val}{\MT@char}\MT@inh@prefix@}}%
4805 \fi
4806 \fi
4807 \fi
4808 }%
4809 {debug}\MT@dinfol{2}{children of #1 (\MT@val):
4810 {debug} \@nameuse{MT@inh\MT@listname @\ifx\MT@inh@prefix\@empty\MT@val @\else prefixes\fi}}%
4811 \fi
4812 \fi
4813 }
4814 {/pdf-|lua-|xe-}

```

`\MT@inh@prefix` If the inheriting character is preceded by (`\langle prefix \rangle`), where `\langle prefix \rangle` is one of `l`, `r` or `lr`, this has a special meaning for protrusion. For the other features, we ignore these settings.

```

4815 {*package}
4816 \def\MT@has@inh@prefix#1(#2)#3#4\@nil{%
4817 \let\MT@temp\relax
4818 \ifx\relax#3%
4819 \def\@tempa{#1#2}%
4820 \let\MT@inh@prefix\@empty
4821 \else
4822 \MT@ifstreq{\MT@feat}{pr}{%
4823 \MT@ifstreq{#2}{l}{\def\MT@inh@prefix@{{1000}{0}}\@firstoftwo}{%
4824 \MT@ifstreq{#2}{r}{\def\MT@inh@prefix@{{0}{1000}}\@firstoftwo}{%
4825 \MT@ifstreq{#2}{lr}{\def\MT@inh@prefix@{{500}{500}}\@firstoftwo}{%
4826 \MT@warning@n{`#2' is not a valid prefix in inheritance list%
4827 \MessageBreak\MT@listname. Ignoring it}%
4828 \@secondoftwo}}%
4829 {\def\@tempa{#3}%
4830 \def\MT@inh@prefix{#2}%
4831 \@gobble}%
4832 {\@firstofone}%
4833 }{\@firstofone}%
4834 {\let\MT@char\m@ne
4835 \let\MT@temp\@gobble
4836 }%
4837 \fi
4838 \MT@temp
4839 }

```



### 1.3.8 Permutation

`\MT@permute` Calling `\MT@permute` will define commands for all permutations of the specified font attributes of the form `\MT@⟨list type⟩@⟨encoding⟩/⟨family⟩/⟨series⟩/⟨shape⟩/⟨|*⟩` to be the expansion of `\MT@⟨list type⟩@name`, i.e., the name of the currently defined list. Size ranges are held in a separate macro called `\MT@⟨list type⟩@/⟨font axes⟩@sizes`, which in turn contains the respective `⟨list name⟩s` attached to the ranges. So that,

```
\SetProtrusion
{ encoding = U,
 family = {euroitc,euroitcs} }
{ E = {100,50} }
\SetProtrusion
{ encoding = U,
 family = {euroitc,euroitcs},
 shape = it* }
{ E = {100,} }
```

would yield the following assignments:

```
4840 \MT@gdefn{MT@pr@c@U/euroitc///}{euroitc}
4841 \MT@gdefn{MT@pr@c@U/euroitcs///}{euroitc}
4842 \MT@gdefn{MT@pr@c@U/euroitc//it/}{euroitci}
4843 \MT@gdefn{MT@pr@c@U/euroitcs//it/}{euroitci}
4844 \MT@gdefn{MT@pr@c@euroitc}{E={100,50}}
4845 \MT@gdefn{MT@pr@c@euroitci}{E={100,}}
4846 \def\MT@permute{%
4847 \let\MT@cnt@encoding\@ne
4848 \MT@permute@
```

Undefine commands for the next round.

```
4849 \MT@map@tlist@n{⟨encoding⟩{⟨family⟩{⟨series⟩{⟨shape⟩}}}\MT@permute@reset
4850 \MT@glet\MT@temp@size\@undefined
4851 }
4852 \def\MT@permute@{%
4853 \let\MT@cnt@family\@ne
4854 \MT@permute@@
4855 \MT@increment\MT@cnt@encoding
4856 \MT@ifdefined@n@T{MT@temp@encoding\MT@cnt@encoding}%
4857 \MT@permute@
4858 }
4859 \def\MT@permute@@{%
4860 \let\MT@cnt@series\@ne
4861 \MT@permute@@@
4862 \MT@increment\MT@cnt@family
4863 \MT@ifdefined@n@T{MT@temp@family\MT@cnt@family}%
4864 \MT@permute@@@
4865 }
4866 \def\MT@permute@@@{%
4867 \let\MT@cnt@shape\@ne
4868 \MT@permute@@@@
4869 \MT@increment\MT@cnt@series
4870 \MT@ifdefined@n@T{MT@temp@series\MT@cnt@series}%
4871 \MT@permute@@@@
4872 }
4873 \def\MT@permute@@@@{%
4874 \MT@permute@@@@@
4875 \MT@increment\MT@cnt@shape
4876 \MT@ifdefined@n@T{MT@temp@shape\MT@cnt@shape}%
4877 \MT@permute@@@@@
4878 }
```

`\MT@permute@@@@@` In order to save some memory, we can ignore unused encodings (inside the document).

```
4879 \def\MT@permute@@@@@{%
```

```

4880 \MT@permutef@define{encoding}%
4881 \ifMT@document
4882 \ifx\MT@tempencoding\empty \else
4883 \MT@ifdefined@n@TF{TF\MT@tempencoding}\relax
4884 {\expandafter\expandafter\expandafter\@gobble}%
4885 \fi
4886 \fi
4887 \MT@permutef@{}
4888 }

```

\MT@permutef@{}

```

4889 \def\MT@permutef@{}%
4890 \MT@permutef@define{family}%
4891 \MT@permutef@define{series}%
4892 \MT@permutef@define{shape}%
4893 \edef\@tempa{\MT@tempencoding
4894 /\MT@tempfamily
4895 /\MT@tempseries
4896 /\MT@tempshape
4897 /\MT@ifdefined@c@T\MT@tempsize *}%

```

Some sanity checks: an encoding must be specified (unless nothing else is).

```

4898 \MT@ifstreq\@tempa{////}\relax{%
4899 \ifx\MT@tempencoding\empty
4900 \MT@warning{%
4901 You have to specify an encoding for\MessageBreak
4902 \@nameuse{MT@abbr@MT@permutelist} list
4903 ~\@nameuse{MT@\MT@permutelist @name}'.\MessageBreak
4904 Ignoring it}%
4905 \else
4906 \MT@ifdefined@c@TF\MT@tempsize{%

```

Add the list of ranges to the beginning of the current combination, after checking for conflicts.

```

4907 \MT@ifdefined@n@T{MT@\MT@permutelist @\@tempa\MT@extra@context @sizes}{%
4908 \MT@map@tlist@c\MT@tempsize\MT@check@rlist
4909 }%
4910 \MT@exp@cs\MT@xaddb
4911 {MT@\MT@permutelist @\@tempa\MT@extra@context @sizes}%
4912 \MT@tempsize
4913 <debug>\MT@dinfo@n1{initialising: use list for font \@tempa,\MessageBreak
4914 <debug> sizes: \csname MT@\MT@permutelist @\@tempa\MT@extra@context
4915 <debug> @sizes\endcsname}%
4916 }%

```

Only one list can apply to a given combination. But we don't warn if the overridden list is to be loaded by the current one.

```

4917 \MT@ifdefined@n@T{MT@\MT@permutelist @\@tempa\MT@extra@context}{%
4918 \MT@ifstreq{\csname MT@\MT@permutelist @\@tempa\MT@extra@context\endcsname}%
4919 {\csname MT@\MT@permutelist @\csname MT@\MT@permutelist @name\endcsname @load\endcsname}%
4920 \relax%
4921 \MT@warning{\@nameuse{MT@abbr@MT@permutelist} list
4922 ~\@nameuse{MT@\MT@permutelist @name}' will\MessageBreak override
4923 list ~\@nameuse{MT@\MT@permutelist @\@tempa\MT@extra@context}'
4924 for \MessageBreak font \@tempa'}%
4925 }%
4926 }%
4927 <debug>\MT@dinfo@n1{initialising: use list for font \@tempa
4928 <debug> \ifx\MT@extra@context\empty\else\MessageBreak
4929 <debug> (context: \MT@extra@context)\fi}%
4930 }%
4931 \MT@xdef@n{MT@\MT@permutelist @\@tempa\MT@extra@context}%
4932 {\csname MT@\MT@permutelist @name\endcsname}%
4933 \fi
4934 }%

```

```

4935 }

\MT@permute@define Define the commands.
4936 \def\MT@permute@define#1{%
4937 \@tempcnta=\csname MT@cnt@#1\endcsname\relax
4938 \MT@ifdefined@n@TF{MT@temp#1\the\@tempcnta}%
4939 {\MT@edef@n{MT@temp#1}{\csname MT@temp#1\the\@tempcnta\endcsname}}%
4940 {\MT@let@nc{MT@temp#1}\@empty}%
4941 }

\MT@permute@reset Reset the commands.
4942 \def\MT@permute@reset#1{%
4943 \@tempcnta=@ne
4944 \MT@loop
4945 \MT@let@nc{MT@temp#1\the\@tempcnta}\@undefined
4946 \advance\@tempcnta\@ne
4947 \MT@ifdefined@n@TF{MT@temp#1\the\@tempcnta}%
4948 \iftrue
4949 \iffalse
4950 \MT@repeat
4951 }

\MT@check@rlist For every new range item in \MT@tempsize, check whether it overlaps with ranges
 in the existing list.
4952 \def\MT@check@rlist#1{\expandafter\MT@check@rlist@ #1}

\MT@check@rlist@ Define the current new range and ...
4953 \def\MT@check@rlist@#1#2#3{%
4954 \def\@tempb{#1}%
4955 \def\@tempc{#2}%
4956 \MT@if@false
4957 \MT@exp@cs\MT@map@tlist@
4958 {MT\MT@permutelist @\@tempa\MT@extra@context @sizes}%
4959 \MT@check@range
4960 }

\MT@check@range ... recurse through the list of existing ranges.
4961 \def\MT@check@range#1{\expandafter\MT@check@range@ #1}

\MT@check@range@ \@tempb and \@tempc are lower resp. upper bound of the new range, <#1> and <#2>
 those of the existing range. <#3> is the list name.
4962 \def\MT@check@range@#1#2#3{%
4963 \MT@ifdim{#2}=\m@ne{%
4964 \MT@ifdim\@tempc=\m@ne{%

- Both items are simple sizes.
4965 \MT@ifdim\@tempb={#1}\MT@iftrue\relax
4966 }{%
 - Item in list is a simple size, new item is a range.
4967 \MT@ifdim\@tempb>{#1}\relax{%
4968 \MT@ifdim\@tempc>{#1}{%
4969 \MT@iftrue
4970 \edef\@tempb{#1 (with range: \@tempb\space to \@tempc)}%
4971 }\relax
4972 }%
4973 }%
4974 }{%
 - Item in list is a range, new item is a simple size.
4975 \MT@ifdim\@tempc=\m@ne{%

```

```

4977 \MT@ifdim\@tempb<{#1}\relax\MT@if@true
4978 }\relax
4979 }{%

```

- Both items are ranges.

```

4980 \MT@ifdim\@tempb<{#2}{%
4981 \MT@ifdim\@tempc>{#1}{%
4982 \MT@if@true
4983 \edef\@tempb{#1 to #2 (with range: \@tempb\space to \@tempc)}%
4984 }\relax
4985 }\relax
4986 }%
4987 }%
4988 \ifMT@if@
4989 \MT@ifstreq{#3}%
4990 {\cname MT@MT@permutelist @\cname MT@MT@permutelist @name\endcsname @load\endcsname}%
4991 \relax}%
4992 \MT@warning{\@nameuse{MT@abbr@MT@permutelist} list
4993 ~\@nameuse{MT@MT@permutelist @name}' will override\MessageBreak
4994 list ~#3' for font \@tempa,\MessageBreak size \@tempb}%
4995 }%

```

If we've already found a conflict with this item, we can skip the rest of the list.

```

4996 \expandafter\MT@tlist@break
4997 \fi
4998 }

```

## 1.4 Package options

### 1.4.1 Declaring the options

```

\ifMT@opt@expansion Keep track of whether the user explicitly set these options.
\ifMT@opt@auto 4999 \newif\ifMT@opt@expansion
\ifMT@opt@DVI 5000 \newif\ifMT@opt@auto
 5001 \newif\ifMT@opt@DVI

\MT@optwarn@admissible Some warnings.
5002 \def\MT@optwarn@admissible#1#2{%
5003 \MT@warning@n1{~#1' is not an admissible value for option\MessageBreak
5004 ~#2'. Assuming ~false'}%
5005 }

\MT@optwarn@nan
5006 </package>
5007 <*package|letterspace>
5008 <plain>\MT@requires@latex1{
5009 \def\MT@optwarn@nan#1#2{%
5010 \MT@warning@n1{Value ~#1' for option ~#2' is not a\MessageBreak number.
5011 Using default value of \number\@nameuse{MT@#2@default}}%
5012 }
5013 <plain>}\relax
5014 </package|letterspace>
5015 <*package>

\MT@opt@def@set
5016 \def\MT@opt@def@set#1{%
5017 \MT@ifdefined@n@TF{MT@\@tempb @set@@\MT@val}}{%
5018 \MT@xdef@n{MT@\@tempb @setname}{\MT@val}%
5019 }{%
5020 \MT@xdef@n{MT@\@tempb @setname}{\@nameuse{MT@default@\@tempb @set}}%
5021 \MT@warning@n1{The #1 set ~\MT@val' is undeclared.\MessageBreak
5022 Using set ~\@nameuse{MT@\@tempb @setname}' instead}%

```

```
5023 }%
5024 }
```

expansion and protrusion may be true, false, compatibility, nocompatibility and/or a *<set name>*.

```
5025 \MT@map@clist@n{protrusion,expansion}{%
5026 \define@key{MT}{#1}[true]{%
5027 \csname MT@opt@#1true\endcsname
5028 \MT@map@clist@n{##1}{%
5029 \KV@sp@def\MT@val{###1}%
5030 \MT@ifempty\MT@val\relax{%
5031 \csname MT@#1true\endcsname
5032 \edef\@tempb{\csname MT@rbba@#1\endcsname}%
5033 \MT@ifstreq\MT@val{true}\relax
5034 {%
5035 \MT@ifstreq\MT@val{false}{%
5036 \csname MT@#1false\endcsname
5037 }{%
5038 \MT@ifstreq\MT@val{compatibility}{%
5039 \MT@let@nc{MT@\@tempb @level}\@one
5040 }{%
5041 \MT@ifstreq\MT@val{nocompatibility}{%
5042 \MT@let@nc{MT@\@tempb @level}\tw@
5043 }{%

```

If everything failed, it should be a set name.

```
5044 \MT@opt@def@set{#1}%
5045 }%
5046 }%
5047 }%
5048 }%
5049 }%
5050 }%
5051 }%
5052 }
```

activate is a shortcut for protrusion and expansion.

```
5053 \define@key{MT}{activate}[true]{%
5054 \setkeys{MT}{protrusion={#1}}%
5055 \setkeys{MT}{expansion={#1}}%
5056 }
```

spacing, kerning and tracking do not have a compatibility level.

```
5057 \MT@map@clist@n{spacing,kerning,tracking}{%
5058 \define@key{MT}{#1}[true]{%
5059 \MT@map@clist@n{##1}{%
5060 \KV@sp@def\MT@val{###1}%
5061 \MT@ifempty\MT@val\relax{%
5062 \csname MT@#1true\endcsname
5063 \MT@ifstreq\MT@val{true}\relax
5064 {%
5065 \MT@ifstreq\MT@val{false}{%
5066 \csname MT@#1false\endcsname
5067 }{%
5068 \edef\@tempb{\csname MT@rbba@#1\endcsname}%
5069 \MT@opt@def@set{#1}%
5070 }%
5071 }%
5072 }%
5073 }%
5074 }%
5075 }
```

`\MT@def@boo1@opt` The true/false options: draft (may be inherited from the class options), auto,

selected, babel, DVIoutput, defersetup, copyfonts.

```

5076 \def\MT@def@bool@opt#1#2{%
5077 \define@key{MT}{#1}[true]{%
5078 \def\@tempa{##1}%
5079 \MT@ifstreq\@tempa{true}\relax{%
5080 \MT@ifstreq\@tempa{false}\relax{%
5081 \MT@optwarn@admissible{##1}{#1}%
5082 \def\@tempa{false}%
5083 }%
5084 }%
5085 #2%
5086 }%
5087 }

```

Boolean options that only set the switch.

```

5088 \MT@map@clist@n{draft,selected,babel}{%
5089 \MT@def@bool@opt{#1}{\csname MT@#1\@tempa\endcsname}}
5090 \MT@def@bool@opt{auto}{\csname MT@auto\@tempa\endcsname \MT@opt@autotruer}

```

The DVIoutput option will change \pdfoutput immediately to minimise the risk of confusing other packages.

```

5091 </package>
5092 <*pdf-|lua-|xe-|
5093 <lua->\MT@requires@luatex4{\let\pdfoutput\outputmode}\relax
5094 \MT@def@bool@opt{DVIoutput}{%
5095 \csname if\@tempa\endcsname
5096 <*pdf-|lua-|
5097 \ifnum\pdfoutput>\z@ \MT@opt@DVItrue \fi
5098 \pdfoutput\z@
5099 \else
5100 \ifnum\pdfoutput<\@ne \MT@opt@DVItrue \fi
5101 \pdfoutput\@ne
5102 </pdf-|lua-|
5103 <xe-> \MT@warning@n1{Ignoring `DVIoutput' option}%
5104 \fi
5105 }
5106 </pdf-|lua-|xe-|

```

Setting the defersetup option to false will restore the old behaviour, where the setup took place at the time when the package was loaded. This is *undocumented*, since I would like to learn about the cases where this is necessary.

The only problem with the new deferred setup I can think of is when a box is being constructed inside the preamble and this box contains a font that is not loaded before the box is being used.

```

5107 </package>
5108 \MT@def@bool@opt{defersetup}{%
5109 \csname if\@tempa\endcsname \else
5110 \AtEndOfPackage{%
5111 \MT@setup@
5112 \let\MT@setup@\@empty
5113 \let\MT@addto@setup\@firstofone
5114 }%
5115 \fi
5116 }
5117 </package>

```

copyfonts will copy all fonts before setting them up. This allows protrusion and expansion with different parameters. This options is also *undocumented* in the hope that we can always find out automatically whether it's required. It also works with Lua<sub>T</sub><sub>E</sub>X 0.30 or newer.

```

5118 <*pdf-|lua-|
5119 <pdf->\MT@requires@pdftex7{

```

```

5120 \MT@def@bool@opt{copyfonts}{%
5121 \csname if\@tempa\endcsname
5122 \MT@gl@et\MT@copy@font\MT@copy@font@
5123 \else
5124 \MT@gl@et\MT@copy@font\relax
5125 \fi
5126 }
5127 <pdf->{
5128 </pdf-|lua->
5129 <*pdf-|xe->
5130 \MT@def@bool@opt{copyfonts}{%
5131 \csname if\@tempa\endcsname
5132 \MT@error
5133 <pdf-> {The pdftex version you are using is too old\MessageBreak
5134 <pdf-> to use the `copyfonts' option}{Upgrade pdftex.}%
5135 <xe-> {The `copyfonts' option does not work with xetex}
5136 <xe-> {Use pdftex or luatex instead.}%
5137 \fi
5138 }
5139 <pdf->
5140 </pdf-|xe->

```

`final` is the opposite to `draft`. It's only kept for backwards compatibility.

```

5141 <*package>
5142 \MT@def@bool@opt{final}{}

```

The `disable` option replaces the `draft` option, which could be inherited from the class options. The third value `ifdraft` mimicks this behaviour.

```

5143 \define@key{MT}{disable}[true]{%
5144 \def\@tempa{#1}%
5145 \MT@ifstreq\@tempa{true}\MT@disabletrue{%
5146 \MT@ifstreq\@tempa{ifdraft}{\ifMT@draft\MT@disabletrue\fi}{%
5147 \MT@ifstreq\@tempa{false}\relax{%
5148 \MT@optwarn@admissible{#1}{disable}%
5149 }%
5150 }%
5151 }%
5152 }

```

For verbose output, we redefine `\MT@vinfo`.

```

5153 \define@key{MT}{verbose}[true]{%
5154 \let\MT@vinfo\MT@info@nl
5155 \def\@tempa{#1}%
5156 \MT@ifstreq\@tempa{true}\relax{%

```

Take problems seriously.

```

5157 \MT@ifstreq\@tempa{errors}{%
5158 \let\MT@warning \MT@warn@err
5159 \let\MT@warning@nl \MT@warn@err
5160 }{%
5161 \let\MT@vinfo\@gobble

```

Cast warnings to the winds.

```

5162 \MT@ifstreq\@tempa{silent}{%
5163 \let\MT@warning \MT@info
5164 \let\MT@warning@nl \MT@info@nl
5165 }{%
5166 \MT@ifstreq\@tempa{false}\relax{\MT@optwarn@admissible{#1}{verbose}}%
5167 }%
5168 }%
5169 }%
5170 }
5171 </package>

```

Options with numerical keys: `factor`, `stretch`, `shrink`, `step`, `letterspace`.

```

5172 <*package|letterspace>
5173 <plain>\MT@requires@latex1{
5174 \MT@map@clist@n{%
5175 <package> stretch,shrink,step,%
5176 letterspace}{%
5177 \define@key{MT}{#1}[\csname MT@#1@default\endcsname]{%
5178 \def\@tempa{##1 }%

```

No nonsense in \MT@factor et al.? A space terminates the number.

```

5179 \MT@ifint\@tempa
5180 {\MT@edef@n{MT@#1}{\@tempa}}%
5181 {\MT@optwarn@nan{##1}{#1}}%
5182 }%
5183 }
5184 <plain>\relax
5185 </package|letterspace>

```

factor will define the protrusion factor only.

```

5186 <*package>
5187 \define@key{MT}{factor}[\MT@factor@default]{%
5188 \def\@tempa{#1 }%
5189 \MT@ifint\@tempa
5190 {\edef\MT@pr@factor{\@tempa}}
5191 {\MT@optwarn@nan{#1}{factor}}%
5192 }

```

Unit for protrusion codes.

```

5193 \define@key{MT}{unit}[character]{%
5194 \def\@tempa{#1}%
5195 \MT@ifstreq\@tempa{character}\relax{%
5196 \MT@ifdimen\@tempa
5197 {\let\MT@pr@unit\@tempa}%
5198 {\MT@warning@n1{\@tempa' is not a dimension.\MessageBreak
5199 Ignoring it and setting values relative to\MessageBreak
5200 character widths}}%
5201 }%
5202 }

```

\MT@patches@list      The patch and nopatch options. Remember chosen option for later (\relax means  
\MT@nopatches@list    ‘all’, \@empty means ‘none’).

```

5203 \let\MT@patches@list\relax
5204 \let\MT@nopatches@list\@empty
5205 \define@key{MT}{patch}[all]{%
5206 \def\@tempa{#1}%
5207 \MT@ifstreq\@tempa{all}
5208 \relax
5209 {\MT@ifstreq\@tempa{none}
5210 {\let\MT@patches@list\@empty}
5211 {\def\MT@patches@list{#1}}}%
5212 }
5213 \define@key{MT}{nopatch}[all]{%
5214 \def\@tempa{#1}%
5215 \MT@ifstreq\@tempa{all}
5216 {\let\MT@nopatches@list\relax}
5217 {\MT@ifstreq\@tempa{none}
5218 \relax
5219 {\def\MT@nopatches@list{#1}}}%
5220 }

```

We can only apply the patches AtBeginDocument.

```

5221 \MT@addto@setup{%
5222 \ifx\MT@patches@list\relax
5223 \let\MT@patches@list\MT@patches@def
5224 \fi

```



```

5225 \ifx\MT@nopatches@list\empty\else
5226 \ifx\MT@nopatches@list\relax
5227 \let\MT@nopatches@list\MT@patches@def
5228 \fi
5229 \MT@map@clist@c\MT@nopatches@list{%
5230 \MT@rem@from@clist{#1}\MT@patches@list}%
5231 \fi
5232 \ifx\MT@patches@list\empty\else
5233 ^^X \MT@map@clist@c\MT@patches@list{\MT@apply@patch{#1}}%
5234 ^^Q \MT@warning@nl{Patches require the etex extensions. Ignoring them}%
5235 \fi
5236 }

```

### 1.4.2 Loading the definition file

Load the engine-specific code (as strewn across this file).

```
5237 \input{microtype-\MT@engine tex.def}
```

### 1.4.3 Reading the configuration file

The package should just work if called without any options. Therefore, expansion will be switched off by default if output is DVI, since it isn't likely that expanded fonts are available. (This grows more important as modern T<sub>E</sub>X systems have switched to the pdfT<sub>E</sub>X engine even for DVI output, so that the user might not even be aware of the fact that she's running pdfT<sub>E</sub>X.)

```

5238 \MT@protrusiontrue
5239 /package
5240 <*pdf-|lua->
5241 \ifnum\pdfoutput<\@ne \else

```

Also, we only enable expansion by default if pdfT<sub>E</sub>X can expand the fonts automatically.

```

5242 (pdf-) \MT@requires@pdftex4{
5243 \MT@expansiontrue
5244 (pdf-) \MT@autottrue
5245 (pdf-) }\relax
5246 \fi
5247 (lua-)\MT@autottrue
5248 (/pdf-|lua-)

```

The main configuration file will be loaded before processing the package options.

\MT@config@file However, the config option must of course be evaluated beforehand. We also have to define a no-op for the regular option processing later.

```

5249 <*package>
5250 \define@key{MT}{config}[]{\relax}
5251 \def\MT@get@config#1config=#2,#3\@nil{%
5252 \MT@ifempty{#2}%
5253 {\def\MT@config@file{\MT@MT.cfg}}%
5254 {\def\MT@config@file{#2.cfg}}%
5255 }
5256 \expandafter\expandafter\expandafter\MT@get@config
5257 \csname opt@\currname.\@current\endcsname,config=\@nil

```

Load the file.

```

5258 \IfFileExists{\MT@config@file}{%
5259 \MT@info@nl{Loading configuration file \MT@config@file}%
5260 \MT@begin@catcodes
5261 \let\MT@begin@catcodes\relax
5262 \let\MT@end@catcodes\relax
5263 \let\MT@curr@file\MT@config@file

```

```

5264 \input{\MT@config@file}%
5265 \endgroup
5266 }{\MT@warning@nl{%
5267 Could not find configuration file `{\MT@config@file}'!\MessageBreak
5268 This will almost certainly cause undesired results.\MessageBreak
5269 Please fix your installation)%
5270 }

```

`\MT@check@active@set` We have to make sure that font sets are active. If the user didn't activate any, we use those sets declared by `\DeclareMicrotypeSetDefault` (this is done at the end of the preamble).

```

5271 \def\MT@check@active@set#1{%
5272 \MT@ifdefined@n@TF{MT@#1@setname}{%
5273 \MT@info@nl{Using \nameuse{MT@abbr@#1} set `{\nameuse{MT@#1@setname}'}%
5274 }{%
5275 \MT@ifdefined@n@TF{MT@default@#1@set}{%
5276 \MT@gl@et@nn{MT@#1@setname}{MT@default@#1@set}%
5277 \MT@info@nl{Using default \nameuse{MT@abbr@#1} set `{\nameuse{MT@#1@setname}'}%
5278 }{%

```

If no default font set has been declared in the main configuration file, we use the (empty, non-existent) set '@', and issue a warning.

```

5279 \MT@gdef@n{MT@#1@setname}{@}%
5280 \MT@warning@nl{No \nameuse{MT@abbr@#1} set chosen, no default set declared.
5281 \MessageBreak Using empty set}%
5282 }%
5283 }%
5284 }

```

#### 1.4.4 Hook for other packages

`\Microtype@Hook` This hook may be used by font package authors, e.g., to declare alias fonts. If it is defined, it will be executed here, i.e., after the main configuration file has been loaded, and before the package options are evaluated.

This hook was needed in versions prior to 1.9a to overcome the situation that (1) the `microtype` package should be loaded after all font defaults have been set up (hence, using `\ifpackageloaded` in the font package was not viable), and (2) checking `\AtBeginDocument` could be too late, since fonts might already have been loaded, and consequently set up, in the preamble. With the new deferred setup, one could live without this command, however, it remains here since it's simpler than testing whether the package was loaded both in the preamble as well as at the beginning of the document (which is what one would have to do).

Package authors should check whether the command is already defined so that existing definitions by other packages aren't overwritten. Example:

```

\def\MinionPro@MT@Hook{\DeclareMicrotypeAlias{MinionPro-LF}{MinionPro}}
\ifpackageloaded{microtype}
 \MinionPro@MT@Hook
 {\ifundefined{Microtype@Hook}
 {\let\Microtype@Hook\MinionPro@MT@Hook}
 {\g@addto@macro\Microtype@Hook{\MinionPro@MT@Hook}}}

```

`\MicroType@Hook` with a capital T (which only existed in version 1.7) is now officially deprecated.

```

5285 \MT@ifdefined@c@T\MicroType@Hook{\MT@error{%
5286 Command \@backslashchar MicroType@Hook is deprecated.\MessageBreak
5287 Use \@backslashchar Microtype@Hook instead}
5288 {You might want to inform the font package authors.}\MicroType@Hook}
5289 \MT@ifdefined@c@T\Microtype@Hook\Microtype@Hook

```

### 1.4.5 Changing options later

`\microtypesetup` Inside the preamble, `\microtypesetup` accepts the same options as the package (unless `defersetup=false`). In the document body, it accepts the options: protrusion, expansion, activate, tracking, spacing and kerning (but specifying font sets is not allowed), and patch and nopatch.

```

5290 \def\microtypesetup{\setkeys{MT}}
5291 \MT@addto@setup{\def\microtypesetup#1{\setkeys{MTX}{#1}\selectfont}}
5292 </package>
5293 <*pdf-|lua-|xe-
5294 \def\MT@define@optionX#1#2{%
5295 \define@key{MTX}{#1}[true]{%
5296 \edef\@tempb{\csname MT@rbba@#1\endcsname}%
5297 \MT@map@clist@n{##1}{%
5298 \KV@sp@def\MT@val{###1}%
5299 \MT@ifempty\MT@val\relax{%
5300 \@tempcnta=\m@ne
5301 \MT@ifstreq\MT@val{true}{%

```

Enabling micro-typography in the middle of the document is not allowed if it has been disabled in the package options since fonts might already have been loaded and hence wouldn't be set up.

```

5302 \MT@checksetup{#1}{%
5303 \@tempcnta=\csname MT@\@tempb @level\endcsname
5304 \MT@vinfo{Enabling #1
5305 (level \number\csname MT@\@tempb @level\endcsname)\on@line}%
5306 }%
5307 }{%
5308 \MT@ifstreq\MT@val{false}{%
5309 \@tempcnta=\z@
5310 \MT@vinfo{Disabling #1\on@line}%
5311 }{%
5312 \MT@ifstreq\MT@val{compatibility}{%
5313 \MT@checksetup{#1}{%
5314 \@tempcnta=\@ne
5315 \MT@let@nc{MT@\@tempb @level}\@ne
5316 \MT@vinfo{Setting #1 to level 1\on@line}%
5317 }%
5318 }{%
5319 \MT@ifstreq\MT@val{nocompatibility}{%
5320 \MT@checksetup{#1}{%
5321 \@tempcnta=\tw@
5322 \MT@let@nc{MT@\@tempb @level}\tw@
5323 \MT@vinfo{Setting #1 to level 2\on@line}%
5324 }%
5325 }{\MT@error{Value `~\MT@val' for key `~#1' not recognised}
5326 {Use any of `true', `false', `compatibility' or
5327 `nocompatibility'.}%
5328 }%
5329 }%
5330 }%
5331 }%
5332 \ifnum\@tempcnta>\m@ne
5333 #2\@tempcnta\relax
5334 \fi
5335 }%
5336 }%
5337 }%
5338 }

```

`\MT@checksetup` Test whether the feature wasn't disabled in the package options.

```

5339 \def\MT@checksetup#1{%
5340 \csname ifMT@#1\endcsname

```

```

5341 \expandafter\@firstofone
5342 \else
5343 \MT@error{You cannot enable #1 if it was disabled\MessageBreak
5344 in the package options}{Load microtype with #1 enabled.}%
5345 \expandafter\@gobble
5346 \fi
5347 }

5348 \MT@define@optionX{protrusion}\MT@protrudechars
5349 </pdf-|lua-|xe-
5350 *pdf-|lua-
5351 \MT@define@optionX{expansion}\MT@adjustspacing

```

\MT@protrudechars

\MT@adjustspacing

```

5352 <*lua-
5353 \MT@requires@luatex4{
5354 \let\pdfprotrudechars\protrudechars
5355 \let\pdfadjustspacing\adjustspacing
5356 } \relax
5357 </lua-
5358 \let\MT@protrudechars\pdfprotrudechars
5359 \let\MT@adjustspacing\pdfadjustspacing
5360 </pdf-|lua-
5361 *xe-
5362 \let\MT@protrudechars\XeTeXprotrudechars
5363 \define@key{MTX}{expansion}[true]{\MT@warning{Ignoring expansion setup}}
5364 </xe-

```

\MT@define@optionX@

The same for tracking, spacing and kerning, which do not have a compatibility level.

```

5365 <*pdf-|lua-
5366 pdf-\MT@requires@pdftex6{
5367 lua-\MT@requires@luatex3{
5368 \def\MT@define@optionX@#1#2{%
5369 \define@key{MTX}{#1}[true]{%
5370 \MT@map@clist@n{##1}{%
5371 \KV@sp@def\MT@val{###1}%
5372 \MT@ifempty\MT@val\relax{%
5373 \@tempcnta=\m@ne
5374 \MT@ifstreq\MT@val{true}{%
5375 \MT@checksetup{#1}{%
5376 \@tempcnta=\@ne
5377 \MT@vinfo{Enabling #1\on@line}%
5378 }%
5379 }{%
5380 \MT@ifstreq\MT@val{false}{%
5381 \@tempcnta=\z@
5382 \MT@vinfo{Disabling #1\on@line}%
5383 }{\MT@error{Value `~\MT@val' for key `~#1' not recognised}
5384 {Use either `true' or `false'}}%
5385 }%
5386 }%
5387 \ifnum\@tempcnta>\m@ne
5388 #2\relax
5389 \fi
5390 }%
5391 }%
5392 }%
5393 }

```

We cannot simply let \MT@tracking relax, since this may select the already letter-spaced font instance.

```

5394 \MT@define@optionX@{tracking}{\ifnum\@tempcnta=\z@ \let\MT@tracking\MT@set@tr@zero
5395 \else \let\MT@tracking\MT@tracking@ \fi}
5396 <pdf-
\MT@define@optionX@{spacing}{\pdfadjustinterwordglue\@tempcnta}

```

```

5397 <pdf- > \MT@define@optionX@{kerning}{\pdfprependkern\@tempcnta
5398 <pdf- > \pdfappendkern\@tempcnta}
5399 }{
5400 </pdf- |lua- >
5401 <*pdf- |lua- |xe- >

```

Disable for older pdfTeX versions and for XeTeX and LuaTeX.

```

5402 \define@key{MTX}{tracking}[true]{\MT@warning{Ignoring tracking setup}}
5403 <lua- >
5404 \define@key{MTX}{kerning}[true]{\MT@warning{Ignoring kerning setup}}
5405 \define@key{MTX}{spacing}[true]{\MT@warning{Ignoring spacing setup}}
5406 <pdf- >
5407 \define@key{MTX}{activate}[true]{%
5408 \setkeys{MTX}{protrusion=#1}}%
5409 <pdf- |lua- > \setkeys{MTX}{expansion=#1}}%
5410 }
5411 </pdf- |lua- |xe- >

```

`\MT@saved@setupfont` Disable everything – may be used as a temporary work-around in case setting up fonts doesn't work under certain circumstances, but only until that specific problem is fixed. These options are *undocumented*, as they completely deprive us of the possibility to act – we're blind and paralysed.

```

5412 <*package >
5413 \let\MT@saved@setupfont\MT@setupfont
5414 \define@key{MTX}{deactivate}[]{%
5415 \MT@info{Deactivate `MT@MT' package}%
5416 \let\MT@setupfont\relax
5417 }
5418 \define@key{MTX}{reactivate}[]{%
5419 \MT@info{Reactivate `MT@MT' package}%
5420 \let\MT@setupfont\MT@saved@setupfont
5421 }

```

Apply or revert patches.

```

5422 \define@key{MTX}{patch}[all]{%
5423 \def\@tempa{#1}%
5424 \MT@ifstreq\@tempa{all}
5425 {\let\@tempa\MT@patches@def}
5426 {\MT@ifstreq\@tempa{none}
5427 {\let\@tempa\@empty}
5428 \relax}%
5429 \ifx\@tempa\@empty\else
5430 ^^X \MT@map@clist@c\@tempa{\MT@apply@patch{##1}}%
5431 ^^Q \MT@warning@nl{Patches require the etex extensions. Ignoring them}%
5432 \fi
5433 }
5434 \define@key{MTX}{nopatch}[all]{%
5435 \def\@tempa{#1}%
5436 \MT@ifstreq\@tempa{all}
5437 {\let\@tempa\MT@patches@def}
5438 {\MT@ifstreq\@tempa{none}
5439 {\let\@tempa\@empty}
5440 \relax}%
5441 \ifx\@tempa\@empty\else
5442 ^^X \MT@map@clist@c\@tempa{\MT@undo@patch{##1}}%
5443 \fi
5444 }
5445 </package >

```

#### 1.4.6 Processing the options

`\MT@ProcessOptionsWithKV` Parse options.

```

5446 <package|letterspace>
5447 <plain>\MT@requires@latex1{
5448 \def\MT@ProcessOptionsWithKV#1{%
5449 \let\@tempc\relax
5450 \let\MT@temp\@empty
5451 <plain> \MT@requires@latex2{
5452 \MT@map@clist@c\@classoptionslist{%
5453 \def\CurrentOption{##1}%
5454 \MT@ifdefined@n@T{KV@#1@\expandafter\MT@getkey\CurrentOption=\@nil}{%
5455 \edef\MT@temp{\MT@temp,\CurrentOption,}%
5456 \expandtwoargs\@removeelement\CurrentOption
5457 \@unusedoptionlist\@unusedoptionlist
5458 }%
5459 }%
5460 \edef\MT@temp{\noexpand\setkeys{#1}%
5461 \MT@temp\@optionlist{\@currname.\@current}}}%

```

plain can handle package options.

```

5462 <plain>
5463 }{\edef\MT@temp{\noexpand\setkeys{#1}%
5464 \csname usepkg@options@usepkg@pkg\endcsname}}
5465 </plain>
5466 \MT@temp
5467 \MT@clear@options
5468 }

```

\MT@getkey For key=val in class options.

```

5469 \def\MT@getkey#1=#2\@nil{#1}
5470 \MT@ProcessOptionsWithKV{MT}
5471 <plain>\relax
5472 </package|letterspace>
5473 <package>

```

Now we can take the appropriate actions. We also tell the log file which options the user has chosen (in case it's interested).

```

5474 \MT@addto@setup{%
5475 \ifMT@disable

```

We disable most of what we've just defined in the 5475 lines above if we are running in disable (aka. draft) mode.

```

5476 \MT@warning@n1{The `disable' option is in effect.\MessageBreak
5477 Disabling all micro-typographic extensions.\MessageBreak
5478 This might lead to different line and page breaks}%
5479 \let\MT@setupfont\relax
5480 \renewcommand*\LoadMicrotypeFile[1]{}%
5481 \renewcommand*\microtypesetup[1]{}%
5482 \renewcommand*\microtypecontext[1]{}%
5483 \renewcommand*\lststyle{}%
5484 \else
5485 \MT@setup@PDF
5486 \MT@setup@copies

```

Fix the font sets.

```

5487 \MT@map@tlist@c\MT@font@sets\MT@fix@font@set
5488 \MT@setup@protrusion
5489 \MT@setup@expansion
5490 \MT@setup@tracking
5491 \MT@setup@warntracking
5492 \MT@setup@spacing
5493 \MT@setup@kerning
5494 \MT@setup@noligatures
5495 }
5496 </package>

```

`\MT@setup@PDF` pdfTeX can create DVI output, too. However, both the DVI viewer and dvips need to find actual fonts. Therefore, expansion will only work if the fonts for different degrees of expansion are readily available.

Some packages depend on the value of `\pdfoutput` and will get confused if it is changed after they have been loaded. These packages are, among others: `color`, `graphics`, `hyperref`, `crop`, `contour`, `pstricks` and, as a matter of course, `ifpdf`. Instead of testing for each package (that's not our job), we only say that it was microtype that changed it. This must be sufficient!

```
5497 <*/pdf-|lua-|
5498 \def\MT@setup@PDF{%
5499 \ifnum\pdfoutput<\@ne DVI \else PDF \fi output%
5500 \ifMT@opt@DVI\space (changed by \MT@MT)\fi}%
5501 }
```

`\MT@setup@copies` Working on font copies?

```
5502 \def\MT@setup@copies{%
5503 \ifx\MT@copy@font\relax\else \MT@info@n1{Using font copies for contexts}\fi
5504 }
5505 </pdf-|lua-|
5506 <*/xe-|
5507 \let\MT@setup@PDF\relax
5508 \let\MT@setup@copies\relax
5509 </xe-|
```

`\MT@setup@protrusion` Protrusion.

```
5510 <*/pdf-|lua-|xe-|
5511 \def\MT@setup@protrusion{%
5512 \ifMT@protrusion
5513 \edef\MT@active@features{\MT@active@features,pr}%
5514 \MT@protrudechars\MT@pr@level
5515 \MT@info@n1{Character protrusion enabled (level \number\MT@pr@level)%
5516 \ifnum\MT@pr@factor=\MT@factor@default \else,\MessageBreak
5517 factor: \number\MT@pr@factor}\fi
5518 \ifx\MT@pr@unit\@empty \else,\MessageBreak unit: \MT@pr@unit}\fi}%
5519 \MT@check@active@set{pr}%
5520 \else
5521 \let\MT@protrusion\relax
5522 \MT@info@n1{No character protrusion}%
5523 \fi
5524 }
5525 </pdf-|lua-|xe-|
```

`\MT@setup@expansion` For DVI output, the user must have explicitly passed the expansion option to the package. Under LuaTeX, expansion works quite differently: the glyphs will be positioned as if they were transformed, without actually being transformed. Since this could still be considered a viable option, we don't disable the feature completely, but issue a warning.

```
5526 <*/pdf-|lua-|
5527 \def\MT@setup@expansion{%
5528 \ifnum\pdfoutput<\@ne
5529 \ifMT@opt@expansion
5530 <*/lua-|
5531 \ifMT@expansion
5532 \MT@requires@luatex3{%
5533 \MT@warning@n1{Font expansion doesn't work properly with luatex in\MessageBreak
5534 DVI mode: the glyphs won't be actually transformed,\MessageBreak
5535 but will only be shifted. You might want to use\MessageBreak
5536 pdflatex instead. I'll continue anyway ..}%
5537 %\MT@expansionfalse
5538 }\relax
5539 \fi
```

```

5540 /lua-
5541 \else
5542 \MT@expansionfalse
5543 \fi
5544 \fi
5545 \ifMT@expansion

```

Set up the values for font expansion: if stretch has not been specified, we take the default value of 20.

```

5546 \ifnum\MT@stretch=\m@ne
5547 \let\MT@stretch\MT@stretch@default
5548 \fi

```

If shrink has not been specified, it will inherit the value from stretch.

```

5549 \ifnum\MT@shrink=\m@ne
5550 \let\MT@shrink\MT@stretch
5551 \fi

```

If step has not been specified, we will just set it to 1 for recent pdfTeX versions. My tests did not show much difference neither in compilation time (within the margin of error) nor in file size (less than 1% difference for `microtype.pdf` with `step=1` compared to `step=5`). With older versions, we set it to  $\min(\text{stretch}, \text{shrink})/5$ , rounded off, minimum value 1.

```

5552 \ifnum\MT@step=\m@ne
5553 (pdf-) \MT@requires@pdftex6{%
5554 \def\MT@step{1 }%
5555 (*pdf-)
5556 }{%
5557 \ifnum\MT@stretch>\MT@shrink
5558 \ifnum\MT@shrink=\z@
5559 \@tempcnta=\MT@stretch
5560 \else
5561 \@tempcnta=\MT@shrink
5562 \fi
5563 \else
5564 \ifnum\MT@stretch=\z@
5565 \@tempcnta=\MT@shrink
5566 \else
5567 \@tempcnta=\MT@stretch
5568 \fi
5569 \fi
5570 \divide\@tempcnta 5\relax
5571 \ifnum\@tempcnta=\z@ \@tempcnta=\@ne \fi
5572 \edef\MT@step{\number\@tempcnta\space}%
5573 }%
5574 /pdf-
5575 \fi
5576 \ifnum\MT@step=\z@
5577 \MT@warning@nl{The expansion step cannot be set to zero.\MessageBreak
5578 Setting it to one}%
5579 \def\MT@step{1 }%
5580 \fi

```

`\MT@auto` Automatic expansion of the font? This new feature of pdfTeX 1.20 makes the `fix` programme really usable. It must be either ‘autoexpand’ or empty (or ‘1000’ for older versions of pdfTeX). With LuaTeX, we just leave it empty, as there’s actually no difference – non-automatic font expansion doesn’t work anymore. In LuaTeX 1.0.6, the ‘autoexpand’ option seems to have been removed altogether and would trigger a warning.

```

5581 \let\MT@auto\@empty
5582 \ifMT@auto

```



We turn off automatic expansion if output mode is DVI.

```

5583 <pdf-
5584 \MT@requires@pdftex4{%
5585 \ifnum\pdfoutput<\@ne
5586 \ifMT@opt@auto
5587 \MT@error{%
5588 Automatic font expansion only works for PDF output.\MessageBreak
5589 However, you are creating a DVI file}
5590 {If you have created expanded fonts instances, remove `auto' from%
5591 \MessageBreak the package options. Otherwise, you have to switch
5592 off expansion\MessageBreak completely.}%
5593 \fi
5594 \MT@autofalse
5595 \else
5596 \def\MT@auto{autoexpand}%
5597 \fi

```

Also, if pdfTeX is too old.

```

5598 }{%
5599 \MT@error{%
5600 The pdftex version you are using is too old for\MessageBreak
5601 automatic font expansion}%
5602 {If you have created expanded fonts instances, remove `auto' from\MessageBreak
5603 the package options. Otherwise, you have to switch off expansion\MessageBreak
5604 completely, or upgrade pdftex to version 1.20 or newer.}%
5605 \MT@autofalse
5606 \def\MT@auto{1000 }%
5607 }%
5608 </pdf-
5609 <lua-
5610 \else
5611 <pdf-

```

No automatic expansion.

```

5612 \MT@requires@pdftex4\relax{%
5613 \def\MT@auto{1000 }%
5614 }%
5615 </pdf-
5616 <*lua-
5617 \MT@requires@luatex3{%
5618 \ifMT@opt@auto
5619 \MT@error{Non-automatic font expansion does not work with\MessageBreak
5620 luatex}{Remove `auto=false' from the package options, or use pdftex.}%
5621 \MT@autotru
5622 \fi
5623 }\relax
5624 </lua-
5625 \fi

```

Choose the appropriate macro for selected expansion.

```

5626 \ifMT@selected
5627 \let\MT@set@ex@codes\MT@set@ex@codes@s
5628 \else
5629 \let\MT@set@ex@codes\MT@set@ex@codes@n
5630 \fi

```

Filter out stretch=0, shrink=0, since it would result in a pdfTeX error.

```

5631 \ifnum\MT@stretch=\z@
5632 \ifnum\MT@shrink=\z@
5633 \MT@warning@n1{%
5634 Both the stretch and shrink limit are set to zero.\MessageBreak
5635 Disabling font expansion}%
5636 \MT@expansionfalse
5637 \fi
5638 \fi

```

```

5639 \fi
5640 \ifMT@expansion
5641 \edef\MT@active@features{\MT@active@features,ex}%
5642 \MT@adjustspacing\MT@ex@level
5643 \MT@info@n1{\ifMT@auto A\else Non-a\fi utomatic font expansion enabled
5644 (level \number\MT@ex@level),\MessageBreak
5645 stretch: \number\MT@stretch, shrink: \number\MT@shrink,
5646 step: \number\MT@step, \ifMT@selected\else non-\fi selected}%

```

`\MT@check@step` Check whether stretch and shrink are multiples of step.

```

5647 \def\MT@check@step##1{%
5648 \@tempcnta=\csname MT@##1\endcsname
5649 \divide\@tempcnta \MT@step
5650 \multiply\@tempcnta \MT@step
5651 \ifnum\@tempcnta=\csname MT@##1\endcsname\else
5652 \MT@warning@n1{The ##1 amount is not a multiple of step.\MessageBreak
5653 The effective maximum ##1 is \the\@tempcnta\space
5654 (step \number\MT@step)}%
5655 \fi
5656 }%
5657 \MT@check@step{stretch}%
5658 \MT@check@step{shrink}%
5659 \MT@check@active@set{ex}%

```

`\showhyphens` Inside `\showhyphens`, font expansion should be disabled. (Since 2017/01/10, the  $\LaTeX$  format contains a different version for  $X_{\text{Y}}\TeX$ , but since expansion doesn't work with  $X_{\text{Y}}\TeX$ , we don't have to bother.) Since 2019/10/01, the command is robust.

```

5660 \MT@ifdefined@n@TF{showhyphens }{%
5661 \def\MT@temp##1##2{%
5662 \MT@exp@cs\CheckCommand{showhyphens }[1]{##1}%
5663 \DeclareRobustCommand\showhyphens[1]{##2}}%
5664 }{%
5665 \def\MT@temp##1##2{%
5666 \CheckCommand*\showhyphens[1]{##1}%
5667 \gdef\showhyphens###1{##2}}%
5668 }%
5669 \MT@temp
5670 {\setbox0\vbox{\color@begingroup
5671 \everypar{\parfillskip\z@skip
5672 \hsize\maxdimen\normalfont\pretolerance\m@ne\tolerance\m@ne
5673 \hbadness\z@\showboxdepth\z@\ ##1\color@endgroup}}
5674 {\setbox0\vbox{\color@begingroup\pdfadjustspacing\z@
5675 \everypar{\parfillskip\z@skip
5676 \hsize\maxdimen\normalfont\pretolerance\m@ne\tolerance\m@ne
5677 \hbadness\z@\showboxdepth\z@\ ##1\color@endgroup}}%
5678 \else
5679 \let\MT@expansion\relax
5680 \MT@info@n1{No font expansion}%
5681 \fi
5682 }
5683 /pdf-|lua-
5684 *xe-
5685 \def\MT@setup@expansion{%
5686 \ifMT@expansion
5687 \ifMT@opt@expansion
5688 \MT@error{Font expansion does not work with xetex}
5689 {Use pdftex or luatex instead.}%
5690 \fi
5691 \fi
5692 }
5693 /xe-

```

`\MT@setup@tracking` Tracking, spacing and kerning.

```
5694 <pdf-|lua-
5695 <pdf-)\MT@requires@pdftex6{%
5696 <lua-)\MT@requires@luatex3{%
5697 \def\MT@setup@tracking{%
5698 \ifMT@tracking
5699 \MT@info@nl{Tracking enabled}%
5700 \MT@check@active@set{tr}%
```

Enable protrusion for compensation at the line edges.

```
5701 \ifMT@protrusion\else\MT@protrudechars\@ne\fi
5702 \else
5703 \let\MT@tracking\relax
5704 \MT@info@nl{No adjustment of tracking}%
5705 \fi
5706 }
5707 </pdf-|lua-
```

`\MT@setup@spacing`

```
5708 <pdf-
5709 \def\MT@setup@spacing{%
5710 \ifMT@spacing
5711 \edef\MT@active@features{\MT@active@features,sp}%
5712 \pdfadjustinterwordglue\@ne
5713 \MT@info@nl{Adjustment of interword spacing enabled}%
```

The ragged2e package sets interword spaces to a fixed value without glue. microtype's modifications can therefore have undesired effects. Therefore, we issue a warning.

```
5714 \MT@with@package@T{ragged2e}{%
5715 \MT@warning@nl{You are using the `ragged2e' package.\MessageBreak
5716 Adjustment of interword spacing may lead to\MessageBreak
5717 undesired results when used with `ragged2e'.\MessageBreak
5718 In this case, disable the `spacing' option}%
5719 }%
5720 \MT@check@active@set{sp}%
5721 \else
5722 \let\MT@spacing\relax
5723 \MT@info@nl{No adjustment of interword spacing}%
5724 \fi
5725 }
```

`\MT@setup@spacing@check` Warning if `\nonfrenchspacing` is active, since space factors will be ignored with `\pdfadjustinterwordglue > 0`. Why 1500? Because some packages redefine `\frenchspacing`.<sup>7</sup>

```
5726 \def\MT@setup@spacing@check{%
5727 \ifMT@spacing
5728 \ifMT@babel \else
5729 \ifnum\sfcode`. > 1500
5730 \MT@ifstreq\MT@sp@context{nonfrench}\relax{%
5731 \MT@warning@nl{%
5732 \@backslashchar nonfrenchspacing is active. Adjustment of\MessageBreak
5733 interword spacing will disable it. You might want\MessageBreak
5734 to add \@backslashchar microtypecontext{spacing=nonfrench}'\MessageBreak
5735 to your preamble}%
5736 }%
5737 \fi
5738 \fi
5739 \fi
5740 }
```

`\MT@setup@kerning`

```
5741 \def\MT@setup@kerning{%
```

<sup>7</sup> Cf. the c.t.t. thread '`\frenchspacing` with AMS packages and babel', started by Philipp Lehman on 16 August 2005, MID: ddtbaj\$rob\$1@online.de

```

5742 \ifMT@kerning
5743 \edef\MT@active@features{\MT@active@features,kn}%
5744 \pdfprependkern\@ne
5745 \pdfappendkern\@ne
5746 \MT@info@n1{Adjustment of character kerning enabled}%
5747 \MT@check@active@set{kn}%
5748 \else
5749 \let\MT@kerning\relax
5750 \MT@info@n1{No adjustment of character kerning}%
5751 \fi
5752 }
5753 </pdf->

```

`\MT@error@doesnt@work` If pdfTeX is too old, we disable tracking, spacing and kerning, and throw an error message. We also switch the features off for LuaTeX and XeTeX.

```

5754 <pdf-|lua->{
5755 *lua-}
5756 \def\MT@setup@tracking{%
5757 \ifMT@tracking
5758 \MT@error{The tracking feature only works with luatex 0.62\MessageBreak
5759 or newer. Switching it off}{Upgrade luatex.}%
5760 \MT@trackingfalse
5761 \MT@let@nc{MT@tracking}\relax
5762 \else
5763 \MT@info@n1{No adjustment of tracking (luatex too old)}%
5764 \fi
5765 }
5766 }
5767 </lua->
5768 *pdf-|lua-|xe-}
5769 \def\MT@error@doesnt@work#1{%
5770 \csname ifMT@#1\endcsname
5771 \MT@error{The #1 feature only works with pdftex 1.40\MessageBreak
5772 or newer. Switching it off}
5773 <pdf-> {Upgrade pdftex.}%
5774 <lua-|xe-> {Use pdftex instead.}%
5775 \csname MT@#1false\endcsname
5776 \MT@let@nc{MT@#1}\relax
5777 \else
5778 \MT@info@n1{No adjustment of #1%
5779 <pdf-> \space(pdftex too old)%
5780 }%
5781 \fi
5782 }
5783 <pdf-|xe-> \def\MT@setup@tracking{\MT@error@doesnt@work{tracking}}
5784 \def\MT@setup@kerning {\MT@error@doesnt@work{kerning}}
5785 \def\MT@setup@spacing {\MT@error@doesnt@work{spacing}}
5786 <pdf->}
5787 </pdf-|lua-|xe->

```

`\MT@setup@warntracking`

```

5788 <letterspace>\MT@addto@setup
5789 <pdf-|lua->\def\MT@setup@warntracking

```

`\MT@warn@tracking@DVI` With pdfTeX, we issue a warning, when letterspacing in DVI mode, since it will probably not work. We also switch on protrusion if it isn't already, to compensate for the letterspacing kerns.

```

5790 *pdf-|lua-|letterspace)
5791 {%
5792 *pdf-|letterspace)
5793 \ifnum\pdfoutput<\@ne
5794 \def\MT@warn@tracking@DVI{%
5795 <letterspace> \MT@pdf@or@lua{%
5796 \MT@warning@n1{%

```

```

5797 You are using tracking/letterspacing in DVI mode.\MessageBreak
5798 This will probably not work, unless the post-\MessageBreak
5799 processing program (dvips, dvipdfm(x), ...) is\MessageBreak
5800 able to create the virtual fonts on the fly}%
5801 (letterspace) }\relax
5802 \MT@gl@et\MT@warn@tracking@DVI\relax
5803 }%
5804 \else
5805 (/pdf-|letterspace)
5806 \def\MT@warn@tracking@DVI{%
5807 \ifnum\pdfprotrudechars<\@ne \global\pdfprotrudechars\@ne \fi
5808 \MT@gl@et\MT@warn@tracking@DVI\relax
5809 }%
5810 (pdf-|letterspace) \fi
5811 \ifnum\MT@letterspace=\m@ne
5812 \let\MT@letterspace\MT@letterspace@default
5813 \else
5814 \MT@ls@too@large\MT@letterspace
5815 \fi
5816 }
5817 (/pdf-|lua-|letterspace)
5818 (xe-)\let\MT@setup@warntracking\relax

```

`\MT@setup@noligatures`     `\DisableLigatures` is only admissible in the preamble, therefore we can now disable the corresponding macro, if it was never called.

```

5819 (*pdf-|lua-)
5820 \def\MT@setup@noligatures{%
5821 (pdf-) \MT@requires@pdftex5{%
5822 \ifMT@noligatures \else
5823 \let\MT@noligatures\relax
5824 \fi
5825 (pdf-) }\relax
5826 }
5827 (/pdf-|lua-)
5828 (xe-)\let\MT@setup@noligatures\relax

```

Remove the leading comma in `\MT@active@features`, and set the document switch to true.

```

5829 (*package)
5830 \MT@addto@setup{%
5831 \ifx\MT@active@features\@empty \else
5832 \edef\MT@active@features{\expandafter\@gobble\MT@active@features}%
5833 \fi
5834 \MT@documenttrue
5835 }

```

`\MT@set@babel@context`     Interaction with babel.

```

5836 \def\MT@set@babel@context#1{%
5837 \MT@ifdefined@n@TF{MT@babel@#1}{%
5838 \MT@vinfo{*** Changing to language context `#1'\MessageBreak\on@line}%
5839 \expandafter\MT@exp@one@n\expandafter\microtypecontext
5840 \csname MT@babel@#1\endcsname
5841 }{%
5842 \microtypecontext{protrusion=,expansion=,spacing=,kerning=}%
5843 }%
5844 }

```

`\MT@shorthandoff`     Active characters can only be switched off if babel isn't loaded after microtype.

```

5845 \@ifpackageloaded{babel}{
5846 \def\MT@shorthandoff#1#2{%
5847 \MT@info@n1{Switching off #1 babel's active characters (#2)}%
5848 \shorthandoff{#2}}
5849 }{
5850 \def\MT@shorthandoff#1#2{%

```

```

5851 \MT@error{You must load `babel' before `\

```

We patch babel's language switching commands to enable language-dependent setup.

```

5855 \MT@addto@setup{%
5856 \ifMT@babel
5857 \ifpackageloaded{babel}{%
5858 \MT@info@nl{Redefining babel's language switching commands}%
5859 \let\

```

Disable French babel's active characters.

```

5870 \MT@if@false
5871 \MT@with@babel@and@T{french} \MT@if@true
5872 \MT@with@babel@and@T{frenchb} \MT@if@true
5873 \MT@with@babel@and@T{français}\MT@if@true
5874 \MT@with@babel@and@T{canadien}\MT@if@true
5875 \MT@with@babel@and@T{acadian} \MT@if@true
5876 \ifMT@if@\

```

Disable Turkish babel's active characters.

```

5877 \MT@if@false
5878 \MT@with@babel@and@T{turkish} \MT@if@true
5879 \ifMT@if@\

```

In case babel was loaded before microtype:

```

5881 \MT@set@babel@context\language@name

```

The polyglossia package has a useful hook. Unfortunately, compatibility with polyglossia is less useful in itself, as only LuaTeX allows working on font copies, and currently doesn't provide the kerning or spacing feature. But who knows, maybe somebody would want more protrusion in French. . .

```

5882 }{%
5883 \ifpackageloaded{polyglossia}{%
5884 \MT@info@nl{Registering with polyglossia's language switching hook}%
5885 \gappto\polyglossia@language@switched{%
5886 \MT@set@babel@context{\language@name}%
5887 }%
5888 \MT@set@babel@context\language@name
5889 }{%
5890 \MT@warning@nl{%
5891 You did not load the babel or the polyglossia package.\MessageBreak
5892 The `babel' option won't have any effect}%
5893 }%
5894 }%
5895 \fi
5896 }

```

Now we close the \fi from \ifMT@disable.

```

5897 \MT@addto@setup{\fi

```

Set up the current font, most likely the normal font. This has to come after all of the setup (including anything from the preamble) has been dealt with.

```
5898 \selectfont}
```

`\MT@curr@file` This is the current file (hopefully with the correct extension).

```
5899 \edef\MT@curr@file{\jobname.tex}
```

```
5900 </package>
```

Finally, execute the setup macro at the end of the preamble, and empty it (the `combine` class calls it repeatedly).

```
5901 <*package|letterspace>
```

```
5902 <plain>\MT@requires@latex1{
```

```
5903 \AtBeginDocument{\MT@setup@ \MT@gl@et\MT@setup@ \@empty}
```

```
5904 <plain>}\relax
```

```
5905 </package|letterspace>
```

Must come at the very, very end.

```
5906 <package>\MT@ifdefined@c@T\MT@setup@spacing@check
```

```
5907 <package> { \AtBeginDocument{\MT@setup@spacing@check} }
```

Restore catcodes.

```
5908 <package|letterspace>\MT@restore@catcodes
```

That was that.

## 2 Configuration files

Let's now write the font configuration files.

```
5909 (*config)
5910
```

### 2.1 Font sets

We first declare some sets in the main configuration file.

```
5911 (*m-t)
5912 %%% -----
5913 %%% FONT SETS
5914
5915 \DeclareMicrotypeSet{all}
5916 { }
5917
5918 \DeclareMicrotypeSet{allmath}
5919 { encoding = {OT1,T1,T2A,LY1,OT4,QX,T5,EU1,EU2,TU,TS1,OML,OMS,U} }
5920
5921 \DeclareMicrotypeSet{alltext}
5922 { encoding = {OT1,T1,T2A,LY1,OT4,QX,T5,TS1,EU1,EU2,TU} }
5923
5924 \DeclareMicrotypeSet{allmath-nott}
5925 { encoding = {OT1,T1,T2A,LY1,OT4,QX,T5,EU1,EU2,TU,TS1,OML,OMS,U},
5926 family = {rm*,sf*}
5927 }
5928
5929 \DeclareMicrotypeSet{alltext-nott}
5930 { encoding = {OT1,T1,T2A,LY1,OT4,QX,T5,TS1,EU1,EU2,TU},
5931 family = {rm*,sf*}
5932 }
5933
5934 \DeclareMicrotypeSet{basicmath}
5935 { encoding = {OT1,T1,T2A,LY1,OT4,QX,T5,EU1,EU2,TU,OML,OMS},
5936 family = {rm*,sf*},
5937 series = {md*},
5938 size = {normalsize,footnotesize,small,large}
5939 }
5940
5941 \DeclareMicrotypeSet{basictext}
5942 { encoding = {OT1,T1,T2A,LY1,OT4,QX,T5,EU1,EU2,TU},
5943 family = {rm*,sf*},
5944 series = {md*},
5945 size = {normalsize,footnotesize,small,large}
5946 }
5947
5948 \DeclareMicrotypeSet{smallcaps}
5949 { encoding = {OT1,T1,T2A,LY1,OT4,QX,T5,TS1,EU1,EU2,TU},
5950 shape = {sc*,si,scit}
5951 }
5952
5953 \DeclareMicrotypeSet{footnotesize}
5954 { encoding = {OT1,T1,T2A,LY1,OT4,QX,T5,TS1,EU1,EU2,TU},
5955 size = {-small}
5956 }
5957
5958 \DeclareMicrotypeSet{scriptsize}
5959 { encoding = {OT1,T1,T2A,LY1,OT4,QX,T5,TS1,EU1,EU2,TU},
```



```

5960 size = {-footnotesize}
5961 }
5962
5963 \DeclareMicrotypeSet{normal font}
5964 { font = */*/*/*/* }
5965

```

The default sets.

```

5966 %%% -----
5967 %%% DEFAULT SETS
5968
5969 \DeclareMicrotypeSetDefault[protrusion]{alltext}
5970 \DeclareMicrotypeSetDefault[expansion]{alltext-nott}
5971 \DeclareMicrotypeSetDefault[spacing]{alltext-nott}
5972 \DeclareMicrotypeSetDefault[kerning]{alltext}
5973 \DeclareMicrotypeSetDefault[tracking]{smallcaps}
5974

```

## 2.2 Font variants and aliases

These are the variants I happen to be using (expert encoding, oldstyle numerals, swashes, alternative, display, inferior and superior numerals): Additionally, we add the now common variants for Lining, Tabular, Oldstyle, and Tabular Oldstyle numbers.

```

5975 %%% -----
5976 %%% FONT VARIANTS AND ALIASES
5977
5978 \DeclareMicrotypeVariants{x,j,w,a,d,0,1,-LF,-TLF,-OsF,-TosF}

```

Other candidates: 2 (proportional digits), e (engraved), f (Fraktur), g (small text), h (shadow), l (outline), n (informal), p (ornaments), r (roman), s (sans serif), t (typewriter). I've omitted them since they seem hardly be used and/or they are actually more than just a variant, i.e., they shouldn't share a file.

Fonts that are 'the same': The fontspec package will set `lmr` as the default font, whose declarations for EU1/EU2/TU encoding are in `mt-LatinModernRoman.cfg`. Since 2016/12/03, the default encoding with X<sub>Y</sub>TeX and LuaTeX in the L<sup>A</sup>T<sub>E</sub>X format is TU, even if fontspec is not loaded.

```

5979
5980 \MT@if@false
5981 \ifx\UnicodeEncodingName\undefined\else
5982 \MT@if@fstreq{\encodingdefault}{\UnicodeEncodingName}\MT@if@true\relax
5983 \fi
5984 \ifMT@fontspec\MT@if@true\fi
5985 \ifMT@if@
5986 % -- Computer/Latin Modern Roman
5987 \DeclareMicrotypeAlias{lmr}{Latin Modern Roman}
5988 \else
5989 \DeclareMicrotypeAlias{lmr}{cmr} % lmodern
5990 \fi

```

The Latin Modern fonts, the virtual fonts from the `ae` and `zefonts` and the `eco` and `hfoldsty` packages (oldstyle numerals), as well as `mlmodern`, all inherit the (basic) settings from Computer Modern Roman. Some of them are in part overwritten later.

We mustn't forget the Latin Modern math fonts.

```

5991 \DeclareMicrotypeAlias{lmsy}{cmsy} % ""
5992 \DeclareMicrotypeAlias{lmm}{cmm} % ""
5993 \DeclareMicrotypeAlias{aer}{cmr} % ae
5994 \DeclareMicrotypeAlias{zer}{cmr} % zefonts

```

```

5995 \DeclareMicrotypeAlias{cmor}{cmr} % eco
5996 \DeclareMicrotypeAlias{hfor}{cmr} % hfoldsty
5997 \DeclareMicrotypeAlias{mlmr}{cmr} % mlmodern
5998 \DeclareMicrotypeAlias{mlmsy}{cmsy} % "
5999 \DeclareMicrotypeAlias{mlmm}{cmm} % "

```

Another, new Computer Modern extension. The `newcomputermodern` package loads it by file name.

```

6000 \DeclareMicrotypeAlias{NewCM10-Book.otf} {New Computer Modern}
6001 \DeclareMicrotypeAlias{NewCM10-Regular.otf}{New Computer Modern}

```

CMU Serif can use the settings from New Computer Modern too.

```

6002 \DeclareMicrotypeAlias{CMU Serif} {New Computer Modern}

```

The packages `pxfonts` and `txfonts` fonts inherit Palatino and Times settings respectively, also the T<sub>E</sub>X Gyre fonts Pagella and Termes (formerly: `qfonts`).

```

6003 %% -- Palatino
6004 \DeclareMicrotypeAlias{pxr}{ppl} % pxfonts
6005 \DeclareMicrotypeAlias{qpl}{ppl} % TeX Gyre Pagella (formerly: qfonts/QuasiPalatino)

```

The ‘FPL Neu’ fonts, a ‘re-implementation’ of Palatino.

```

6006 \DeclareMicrotypeAlias{fp9x}{pplx} % FPL Neu
6007 \DeclareMicrotypeAlias{fp9j}{pplj} % "

```

The `newpx` package, a replacement for `pxfonts`.

```

6008 \DeclareMicrotypeAlias{zpllf}{pplx} % newpxtext
6009 \DeclareMicrotypeAlias{zplosf}{pplj} % "
6010 \DeclareMicrotypeAlias{zpltlf}{pplx} % "
6011 \DeclareMicrotypeAlias{zpltosf}{pplj} % "

```

The `domitian` package.

```

6012 \DeclareMicrotypeAlias{Domitian-TLF}{pplx}% domitian
6013 \DeclareMicrotypeAlias{Domitian-T0sF}{pplj}% "

```

The OpenType versions:

```

6014 \DeclareMicrotypeAlias{Palatino Linotype}{Palatino}
6015 \DeclareMicrotypeAlias{Palatino LT Std} {Palatino}
6016 \DeclareMicrotypeAlias{TeX Gyre Pagella} {Palatino}
6017 \DeclareMicrotypeAlias{Domitian} {Palatino}
6018 \DeclareMicrotypeAlias{Asana Math} {Palatino}
6019 %% -- Times New Roman
6020 \DeclareMicrotypeAlias{txr}{ptm} % txfonts

```

The `newtx` package, a replacement for `txfonts`.

```

6021 \DeclareMicrotypeAlias{ntxlf}{ptmx} % newtxtext
6022 \DeclareMicrotypeAlias{ntxtlf}{ptmx} % "
6023 \DeclareMicrotypeAlias{ntxosf}{ptmj} % "
6024 \DeclareMicrotypeAlias{ntxtosf}{ptmj} % "

```

The `tempora` package.

```

6025 \DeclareMicrotypeAlias{Tempora-TLF}{ptmx} % tempora
6026 \DeclareMicrotypeAlias{Tempora-T0sF}{ptmj} % "
6027 \DeclareMicrotypeAlias{qtm}{ptm} % TeX Gyre Termes (formerly: qfonts/QuasiTimes)

```

The `step` package.

```

6028 \DeclareMicrotypeAlias{STEP-TLF}{ptmx} % step
6029 \DeclareMicrotypeAlias{STEP-T0sF}{ptmj} % "

```

The `stix`, `stix2` and `stickstoo` packages (the latter two have departed a bit from being a Times clone, but still seem close enough).

```

6030 \DeclareMicrotypeAlias{stix}{ptm} % stix
6031 \DeclareMicrotypeAlias{stix2}{ptm} % stix2
6032 \DeclareMicrotypeAlias{SticksTooText-LF}{ptmx}
6033 \DeclareMicrotypeAlias{SticksTooText-TLF}{ptmx}

```

```
6034 \DeclareMicrotypeAlias{SticksTooText-0sF} {ptmj}
6035 \DeclareMicrotypeAlias{SticksTooText-T0sF} {ptmj}
```

More Times variants, to be checked: pns, mns (TimesNewRomanPS); mnt (TimesNewRomanMT, TimesNRSevenMT), mtm (TimesSmallTextMT); pte (TimesEuropa); ptt (TimesTen); TimesEighteen; TimesModernEF.

MicroPress's Charter version (chmath).

```
6036 %% -- Charter
6037 \DeclareMicrotypeAlias{chr}{bch} % CH Math
```

The XCharter package extends the Charter fonts.

```
6038 \DeclareMicrotypeAlias{XCharter-TLF} {bch} % XCharter
6039 \DeclareMicrotypeAlias{XCharter-T0sF} {bch} % "
```

The mathdesign package provides math fonts matching Bitstream Charter and URW Garamond.

```
6040 \DeclareMicrotypeAlias{mdbch}{bch} % mathdesign/Charter
6041 %% -- Garamond
6042 \DeclareMicrotypeAlias{mdugm}{ugm} % mathdesign/URW Garamond
```

The garamondx package, an extension of URW Garamond, providing small caps and oldstyle figures.

```
6043 \DeclareMicrotypeAlias{zgmX}{ugm} % garamondx
6044 \DeclareMicrotypeAlias{zgmj}{ugm} % "
6045 \DeclareMicrotypeAlias{zgmI}{ugm} % "
6046 \DeclareMicrotypeAlias{zgmq}{ugm} % "
```

Because a configuration file for Adobe Garamond wouldn't be permitted for T<sub>E</sub>X Live distribution, we use EB Garamond as the base font.

```
6047 \DeclareMicrotypeAlias{pad} {EBGaramond-LF}% Adobe Garamond
6048 \DeclareMicrotypeAlias{padx}{EBGaramond-TLF}% "
6049 \DeclareMicrotypeAlias{padj}{EBGaramond-T0sF}% "
6050 %% --
```

URW Letter Gothic is similar enough to Bitstream Letter Gothic to share the configuration.

```
6051 \DeclareMicrotypeAlias{ulg}{blg} % URW LetterGothic -> Bitstream LetterGothic12Pitch
```

The eulervm package virtually extends the Euler fonts.

```
6052 \DeclareMicrotypeAlias{zeur}{eur} % Euler VM
6053 \DeclareMicrotypeAlias{zeus}{eus} % "
```

Euro symbol fonts, to save some files.

```
6054 \DeclareMicrotypeAlias{zpeus} {zpeu} % Adobe Euro sans -> serif
6055 \DeclareMicrotypeAlias{eurosans}{zpeu} % Adobe Euro sans -> serif
```

The Lato and Fontin fonts (and many, many more...) only contain a basic set of glyphs. We alias them here to the basic settings (see 3.1.5) to prevent lots of warning messages from the inheritance settings; they will still receive protrusion settings from the default (T1) configuration.

```
6056 \DeclareMicrotypeAlias{Lato} {TU-basic}
6057 \DeclareMicrotypeAlias{Lato-Regular} {TU-basic}
6058 \DeclareMicrotypeAlias{Fontin} {TU-basic}
6059 \DeclareMicrotypeAlias{Fontin-Regular} {TU-basic}
6060 \DeclareMicrotypeAlias{Bergamo Std} {TU-basic}
```

The fontawesome and fontawesome5 packages are aliased to empty settings (see 3.1.6 and 3.2.6).

```
6061 \DeclareMicrotypeAlias{FontAwesome} {TU-empty} % fontawesome
6062 \DeclareMicrotypeAlias{fontawesomefree} {TU-empty} % fontawesome5
6063 \DeclareMicrotypeAlias{fontawesomepro} {TU-empty}
6064 \DeclareMicrotypeAlias{fontawesomebrands}{TU-empty}
```

6065

## 2.3 Interaction with babel

Contexts that are to be set when switching to a language.

```

6066 %%% -----
6067 %%% INTERACTION WITH THE `babel' PACKAGE
6068
6069 \DeclareMicrotypeBabelHook
6070 {english,UKenglish,british,USenglish,american}
6071 {kerning=, spacing=nonfrench}
6072
6073 \DeclareMicrotypeBabelHook
6074 {french,français,acadian,canadien}
6075 {kerning=french, spacing=}
6076
6077 \DeclareMicrotypeBabelHook
6078 {turkish}
6079 {kerning=turkish, spacing=}
6080

```

## 2.4 Note on admissible characters

All printable ASCII characters are allowed in the settings, with the following exceptions (on the left hand side, the replacements on the right):

```

\ : \textbackslash
{ : \textbraceleft
} : \textbraceright
^ : \textasciicircum
% : \%
: \#

```

Comma and equal sign must be guarded with braces (`{,}`, `{=}`) to keep keyval happy.

Character commands are allowed as far as they have been defined in the proper  $\LaTeX$  way, that is, when they have been assigned a slot in the font encoding with `\DeclareTextSymbol` or `\DeclareTextComposite`. Characters defined via `\chardef` are also possible.

Ligatures and `\mathchardef`'ed symbols have to be specified numerically. Of course, numerical identification is possible in any other case, too.

8-bit characters are also admissible, provided they have been declared in the input encoding file. They should, however, only be used in private configuration files, where the proper input encoding is guaranteed, or else in combination with the `'inputenc'` key.

With  $X_{\text{L}}\TeX$  or  $\text{Lua}\TeX$ , in contrast, it is advisable to use the proper Unicode characters, or the font-specific glyph names prefixed with `'/` (cf. section 3).

## 2.5 Character inheritance

First the lists of inheriting characters. We only declare those characters that are the same on *both* sides, i.e., not  $\text{C}\text{E}$  for  $\text{O}$ .

```

6081 </m-t>
6082 <+m-t|ebg|zpeu|mvs>

```

```

6083 %%% -----
6084 %%% CHARACTER INHERITANCE
6085
6086 </m-t|ebg|zpeu|mvs>
6087 <*m-t>

```

### 2.5.1 OT1

Glyphs that should possibly inherit settings on one side only: 012 ('fi' ligature), 013 ('fl'), 014 ('ffi'), 015 ('ffl'), Æ, æ, Œ, œ.

```

6088 \DeclareCharacterInheritance
6089 { encoding = OT1 }
6090 { f = {011}, % ff
6091 i = {\i},
6092 j = {\j},
6093 O = {\O},
6094 o = {\o}
6095 }
6096

```

### 2.5.2 T1

Candidates here: 028 ('fi'), 029 ('fl'), 030 ('ffi'), 031 ('ffl'), 156 ('IJ' ligature, since L<sup>A</sup>T<sub>E</sub>X 2005/12/01 accessible as \IJ), 188 ('ij', \ij), Æ, æ, Œ, œ.

```

6097 \DeclareCharacterInheritance
6098 { encoding = T1 }
6099 { A = {\^A,\A,\^A,\-A,\"A,\r A,\k A,\u A},
6100 a = {\^a,\a,\^a,\-a,\"a,\r a,\k a,\u a},
6101 C = {\'C,\c C,\v C},
6102 c = {\'c,\c c,\v c},
6103 D = {\v D,\DH},
6104 d = {\v d,\dj},
6105 E = {\^E,\'E,\^E,\"E,\k E,\v E},
6106 e = {\^e,\'e,\^e,\"e,\k e,\v e},
6107 f = {027}, % ff
6108 G = {\u G},
6109 g = {\u g},
6110 I = {\^I,\'I,\^I,\"I,\.I},
6111 i = {\^i,\'i,\^i,\"i,\i},
6112 j = {\j},
6113 L = {\L,\'L,\v L},
6114 l = {\l,\'l,\v l},
6115 N = {\'N,\-N,\v N},
6116 n = {\'n,\-n,\v n},
6117 O = {\O,\^O,\'O,\^O,\-O,\"O,\H O},
6118 o = {\o,\^o,\'o,\^o,\-o,\"o,\H o},
6119 R = {\'R,\v R},
6120 r = {\'r,\v r},
6121 S = {\'S,\c S,\v S,\SS},
6122 s = {\'s,\c s,\v s},
6123 T = {\c T,\v T},
6124 t = {\c t,\v t},
6125 U = {\^U,\'U,\^U,\"U,\H U,\r U},
6126 u = {\^u,\'u,\^u,\"u,\H u,\r u},
6127 Y = {\'Y,\"Y},
6128 y = {\'y,\"y},
6129 Z = {\'Z,\.Z,\v Z},
6130 z = {\'z,\.z,\v z}

```

The 'soft hyphen' often has reduced right side bearing so that it may already be protruded, hence no inheritance.

```

6131 % - = {127},

```

```
6132 }
6133
```

### 2.5.3 LY1

More characters: 008 ('fl'), 012 ('fi'), 014 ('ffi'), 015 ('ffl'), Æ, æ, Œ, œ.

```
6134 \DeclareCharacterInheritance
6135 { encoding = LY1 }
6136 { A = {\^A,\'A,\^A,\-A,\"A,\r A},
6137 a = {\^a,\'a,\^a,\-a,\"a,\r a},
6138 C = {\c C},
6139 c = {\c c},
6140 D = {\DH},
6141 E = {\^E,\'E,\^E,\"E},
6142 e = {\^e,\'e,\^e,\"e},
6143 f = {011}, % ff
6144 I = {\^I,\'I,\^I,\"I},
6145 i = {\^i,\'i,\^i,\"i,\i},
6146 L = {\L},
6147 l = {\l},
6148 N = {\-N},
6149 n = {\-n},
6150 O = {\^O,\'O,\^O,\-O,\"O,\O},
6151 o = {\^o,\'o,\^o,\-o,\"o,\o},
6152 S = {\v S},
6153 s = {\v s},
6154 U = {\^U,\'U,\^U,\"U},
6155 u = {\^u,\'u,\^u,\"u},
6156 Y = {\'Y,\"Y},
6157 y = {\'y,\"y},
6158 Z = {\v Z},
6159 z = {\v z}
6160 }
6161
```

### 2.5.4 OT4

The Polish OT1 extension. More interesting characters here: 009 ('fk'), 012 ('fi'), 013 ('fl'), 014 ('ffi'), 015 ('ffl'), Æ, æ, Œ, œ.

```
6162 \DeclareCharacterInheritance
6163 { encoding = OT4 }
6164 { A = {\k A},
6165 a = {\k a},
6166 C = {\'C},
6167 c = {\'c},
6168 E = {\k E},
6169 e = {\k e},
6170 f = {011}, % ff
6171 i = {\i},
6172 j = {\j},
6173 L = {\L},
6174 l = {\l},
6175 N = {\'N},
6176 n = {\'n},
6177 O = {\O,\"O},
6178 o = {\o,\"o},
6179 S = {\'S},
6180 s = {\'s},
6181 Z = {\'Z,\"Z},
6182 z = {\'z,\"z},
6183 \textquotedblleft = "FF
6184 }
6185
```

### 2.5.5 QX

The Central European QX encoding.<sup>8</sup> Ligatures: 009 ('fk'), 012 ('fi'), 013 ('fl'), 014 ('ffi'), 015 ('ffl'), Æ, æ, Œ, œ.

```

6186 \DeclareCharacterInheritance
6187 { encoding = QX }
6188 { A = {\^A,\'A,\^A,\-A,\"A,\k A,\AA},
6189 a = {\`a,\'a,\^a,\-a,\"a,\k a,\aa},
6190 C = {\'C,\c C},
6191 c = {\'c,\c c},
6192 D = {\DH},
6193 E = {\^E,\'E,\^E,\"E,\k E},
6194 e = {\`e,\'e,\^e,\"e,\k e},
6195 f = {011}, % ff
6196 I = {\^I,\'I,\^I,\"I,\k I},
6197 i = {\`i,\'i,\^i,\"i,\k i,\i},
6198 j = {\j},
6199 L = {\L},
6200 l = {\l},
6201 N = {\'N,\-N},
6202 n = {\'n,\-n},
6203 O = {\0,\^0,\'0,\^0,\-0,\"0},
6204 o = {\o,\^o,\'o,\^o,\-o,\"o},

```

The Romanian `\textcommabelow` accents are actually replacements for the `\c` variants, which had previously (and erroneously<sup>9</sup>) been included in QX encoding. They are still kept for backwards compatibility.

```

6205 S = {\'S,\c S,\textcommabelow S,\v S},
6206 s = {\'s,\c s,\textcommabelow s,\v s},
6207 T = {\c T,\textcommabelow T},
6208 t = {\c t,\textcommabelow t},
6209 U = {\^U,\'U,\^U,\"U,\k U},
6210 u = {\`u,\'u,\^u,\"u,\k u},
6211 Y = {\'Y,\"Y},
6212 y = {\'y,\"y},
6213 Z = {\'Z,\-Z,\v Z},
6214 z = {\'z,\-z,\v z},
6215 . = \textellipsis
6216 }
6217

```

### 2.5.6 T5

The Vietnamese encoding T5. It is so crowded with accented and double-accented characters that there is no room for any ligatures.

```

6218 \DeclareCharacterInheritance
6219 { encoding = T5 }
6220 { A = {\^A,\'A,\-A,\h A,\d A,\^A,\u A,
6221 \^{\Acircumflex},\'\Acircumflex,\-\Acircumflex,\h{\Acircumflex},\d{\Acircumflex},
6222 \^{\Abreve},\'\Abreve,\-\Abreve,\h{\Abreve},\d{\Abreve}},
6223 a = {\`a,\'a,\-a,\h a,\d a,\^a,\u a,
6224 \^{\acircumflex},\'\acircumflex,\-\acircumflex,\h{\acircumflex},\d{\acircumflex},
6225 \^{\abreve},\'\abreve,\-\abreve,\h{\abreve},\d{\abreve}},
6226 D = {\DJ},
6227 d = {\dj},
6228 E = {\^E,\'E,\-E,\h E,\d E,\^E,
6229 \^{\Ecircumflex},\'\Ecircumflex,\-\Ecircumflex,\h{\Ecircumflex},\d{\Ecircumflex}},
6230 e = {\`e,\'e,\-e,\h e,\d e,\^e,
6231 \^{\ecircumflex},\'\ecircumflex,\-\ecircumflex,\h{\ecircumflex},\d{\ecircumflex}},

```

<sup>8</sup> Contributed by Maciej Eder.

<sup>9</sup> Cf. <https://tug.org/pipermail/tex-live/2008-August/017204.html>

```

6232 I = {\^I,\'I,\-I,\h I,\d I},
6233 i = {\^i,\'i,\-i,\h i,\d i,\i},
6234 O = {\^O,\'O,\-O,\h O,\d O,\^O,\horn O,
6235 \^Ocircumflex,\'Ocircumflex,\-Ocircumflex,\hOcircumflex,\dOcircumflex,
6236 \^Ohorn,\'Ohorn,\-Ohorn,\hOhorn,\dOhorn},
6237 o = {\^o,\'o,\-o,\h o,\d o,\^o,\horn o,
6238 \^ocircumflex,\'ocircumflex,\-ocircumflex,\hocircumflex,\docircumflex,
6239 \^ohorn,\'ohorn,\-ohorn,\hohorn,\dohorn},
6240 U = {\^U,\'U,\-U,\h U,\d U,\horn U,
6241 \^Uhorn,\'Uhorn,\-Uhorn,\hUhorn,\dUhorn},
6242 u = {\^u,\'u,\-u,\h u,\d u,\horn u,
6243 \^uhorn,\'uhorn,\-uhorn,\huhorn,\duhorn},
6244 Y = {\^Y,\'Y,\-Y,\h Y,\d Y},
6245 y = {\^y,\'y,\-y,\h y,\d y}
6246 }
6247

```

### 2.5.7 EU1, EU2, TU

The EU1 (X<sub>Y</sub>TeX), EU2 (LuaTeX), and, since fontspec version 2.5, TU encodings are not well-defined in the sense that they don't contain a fixed number of glyphs, all of which must be present. OpenType fonts may contain thousands of glyphs, but we only define those that should be present in every font (basically T1). This inheritance list should be overridden by font-specific ones.

```

6248 \DeclareCharacterInheritance
6249 { encoding = {TU,EU1,EU2} }
6250 { A = {\^A,\'A,\^A,\-A,\"A,\r A,\k A,\u A},
6251 a = {\^a,\'a,\^a,\-a,\"a,\r a,\k a,\u a},
6252 C = {\'C,\c C,\v C},
6253 c = {\'c,\c c,\v c},
6254 D = {\v D,\DH},
6255 d = {\v d,\dj},
6256 E = {\^E,\'E,\^E,\"E,\k E,\v E},
6257 e = {\^e,\'e,\^e,\"e,\k e,\v e},
6258 % f = {/f_f}, % sometimes /f_f, sometimes /ff
6259 G = {\u G},
6260 g = {\u g},
6261 I = {\^I,\'I,\^I,\"I,\.I},
6262 i = {\^i,\'i,\^i,\"i,\i},
6263 % j = {\j},
6264 L = {\L,\'L,\v L},
6265 l = {\l,\'l,\v l},
6266 N = {\'N,\-N,\v N},
6267 n = {\'n,\-n,\v n},
6268 O = {\^O,\'O,\^O,\-O,\"O,\H O},
6269 o = {\^o,\'o,\^o,\-o,\"o,\H o},
6270 R = {\'R,\v R},
6271 r = {\'r,\v r},
6272 S = {\'S,\c S,\v S}, % \SS
6273 s = {\'s,\c s,\v s},
6274 T = {\c T,\v T},
6275 t = {\c t,\v t},
6276 U = {\^U,\'U,\^U,\"U,\H U,\r U},
6277 u = {\^u,\'u,\^u,\"u,\H u,\r u},
6278 Y = {\'Y,\"Y},
6279 y = {\'y,\"y},
6280 Z = {\'Z,\.Z,\v Z},
6281 z = {\'z,\.z,\v z}
6282 }
6283
6284 (/m-t)

```



### 2.5.8 LGR

The Greek LGR encoding. EB Garamond contains some more glyphs.

```

6285 <*m-t|ebg>
6286 \DeclareCharacterInheritance
6287 { encoding = LGR,
6288 <ebg> family = {EBGaramond-OsF,EBGaramond-TosF,EBGaramond-LF,EBGaramond-TLF}
6289 }
6290 {
6291 <m-t> A = {012},
6292 <ebg> A = {009,012,253},
6293 <ebg> (1)E = {199},
6294 <ebg> H = {010},
6295 <ebg> (1)H = {159},
6296 I = {219},
6297 <ebg> (1)I = {155},
6298 O = J,
6299 <ebg> (1)O = {151},
6300 U = {013,223},
6301 W = {011},
6302 a = {014,128,129,130,131,132,133,134,135,136,137,138,139,140,141,142,143,
6303 144,145,146,148,149,150,248},
6304 e = {224,225,226,227,232,233,234,235},
6305 h = {152,153,154,156,157,158,160,161,162,163,164,165,166,167,168,169,170,
6306 171,172,173,174,175,249},
6307 <m-t> i = {200,201,202,203,208,209,210,211,216,217,218,240,241,242,243},
6308 <ebg> i = {008,200,201,202,203,208,209,210,211,216,217,218,240,241,242,243},
6309 o = {228,229,230,231,236,237,238,239},
6310 r = {251,252},
6311 u = {015,204,205,206,207,212,213,214,215,220,221,222,244,245,246,247},
6312 w = {176,177,178,179,180,181,182,183,184,185,186,187,188,189,190,191,192,
6313 193,194,196,197,198,250},
6314 <ebg> \textstigma = \textvarstigma,
6315 . = {059} % ano teleia
6316 }
6317
6318 </m-t|ebg>

```

### 2.5.9 Euro symbols

Make Euro symbols settings simpler.

```

6319 <*zpeu>
6320 \DeclareCharacterInheritance
6321 { encoding = U,
6322 family = {zpeu,zpeus,eurosans} }
6323 { E = 128 }
6324
6325 </zpeu>
6326 <*mvs>

```

Since 2006/05/11 (that is, one week after I've added these settings, after the package had been dormant for six years!), marvosym's encoding is (correctly) U instead of OT1.

```

6327 \DeclareCharacterInheritance
6328 { encoding = {OT1,U},
6329 family = mvs }
6330 { 164 = {099,100,101} } % \EURhv,\EURcr,\EURtm
6331
6332 </mvs>

```

## 2.6 Tracking

By default, we only disable the ‘f\*’ ligatures, for those fonts that have any. Thus, ligatures and especially kerning for all other characters will be retained.

```
6333 (*m-t)
6334 %%% -----
6335 %%% TRACKING/LETTERSPACING
6336
6337 \SetTracking
6338 [name = default,
6339 no ligatures = {f}]
6340 { encoding = {OT1,T1,T2A,LY1,OT4,QX,EU2,TU} }
6341 { }
6342
```

## 2.7 Font expansion

These are Hàn Thế Thành’s original expansion settings. They are used for all fonts (until somebody shows mercy and creates font-specific settings).

```
6343 %%% -----
6344 %%% EXPANSION
6345
6346 \SetExpansion
6347 [name = default]
6348 { encoding = {OT1,OT4,QX,T1,LY1} }
6349 {
6350 A = 500, a = 700,
6351 \AE = 500, \ae = 700,
6352 B = 700, b = 700,
6353 C = 700, c = 700,
6354 D = 500, d = 700,
6355 E = 700, e = 700,
6356 F = 700,
6357 G = 500, g = 700,
6358 H = 700, h = 700,
6359 K = 700, k = 700,
6360 M = 700, m = 700,
6361 N = 700, n = 700,
6362 O = 500, o = 700,
6363 \OE = 500, \oe = 700,
6364 P = 700, p = 700,
6365 Q = 500, q = 700,
6366 R = 700,
6367 S = 700, s = 700,
6368 U = 700, u = 700,
6369 W = 700, w = 700,
6370 Z = 700, z = 700,
6371 2 = 700,
6372 3 = 700,
6373 6 = 700,
6374 8 = 700,
6375 9 = 700
6376 }
6377
```

Settings for Cyrillic T2A encoding.<sup>10</sup>

```
6378 \SetExpansion
6379 [name = T2A]
6380 { encoding = T2A }
6381 {
6382 A = 500, a = 700,
```

<sup>10</sup> Contributed by *Karl Karlsson*.

```

6383 B = 700, b = 700,
6384 C = 700, c = 700,
6385 D = 500, d = 700,
6386 E = 700, e = 700,
6387 F = 700,
6388 G = 500, g = 700,
6389 H = 700, h = 700,
6390 K = 700, k = 700,
6391 M = 700, m = 700,
6392 N = 700, n = 700,
6393 O = 500, o = 700,
6394 P = 700, p = 700,
6395 Q = 500, q = 700,
6396 R = 700,
6397 S = 700, s = 700,
6398 U = 700, u = 700,
6399 W = 700, w = 700,
6400 Z = 700, z = 700,
6401 2 = 700,
6402 3 = 700,
6403 6 = 700,
6404 8 = 700,
6405 9 = 700,
6406 \CYRA = 500, \cyra = 700,
6407 \CYRB = 700, \cyrb = 700,
6408 \CYRV = 700, \cyrv = 700,
6409 \CYRG = 700, \cyrg = 700,
6410 \CYRD = 700, \cyrd = 700,
6411 \CYRE = 700, \cyre = 700,
6412 \CYRZH = 700, \cyrzh = 700,
6413 \CYRZ = 700, \cyrz = 700,
6414 \CYRI = 700, \cyri = 700,
6415 \CYRISHRT = 700, \cyrishrt = 700,
6416 \CYRK = 700, \cyrk = 700,
6417 \CYRL = 700, \cyrl = 700,
6418 \CYRM = 700, \cyrm = 700,
6419 \CYRN = 700, \cyrn = 700,
6420 \CYRO = 500, \cyro = 700,
6421 \CYRP = 700, \cyrp = 700,
6422 \CYRR = 700, \cyrr = 700,
6423 \CYRS = 700, \cyrs = 700,
6424 \CYRT = 700, \cyrt = 700,
6425 \CYRU = 700, \cyru = 700,
6426 \CYRF = 700, \cyrf = 700,
6427 \CYRH = 700, \cyrh = 700,
6428 \CYRC = 700, \cyrc = 700,
6429 \CYRCH = 700, \cyrch = 700,
6430 \CYRSH = 700, \cyrsh = 700,
6431 \CYRSHCH = 700, \cyrshch = 700,
6432 \CYRHRDSN = 700, \cyhrdsn = 700,
6433 \CYRERY = 700, \cyrery = 700,
6434 \CYRSFTSN = 700, \cyrsftsn = 700,
6435 \CYREREV = 700, \cyrerev = 700,
6436 \CYRYU = 700, \cyryu = 700,
6437 \CYRYA = 700, \cyrya = 700
6438 }
6439

```

T5 encoding does not contain \AE, \ae, \OE and \oe.

```

6440 \SetExpansion
6441 [name = T5]
6442 { encoding = T5 }
6443 {
6444 A = 500, a = 700,
6445 B = 700, b = 700,

```

```

6446 C = 700, c = 700,
6447 D = 500, d = 700,
6448 E = 700, e = 700,
6449 F = 700,
6450 G = 500, g = 700,
6451 H = 700, h = 700,
6452 K = 700, k = 700,
6453 M = 700, m = 700,
6454 N = 700, n = 700,
6455 O = 500, o = 700,
6456 P = 700, p = 700,
6457 Q = 500, q = 700,
6458 R = 700,
6459 S = 700, s = 700,
6460 U = 700, u = 700,
6461 W = 700, w = 700,
6462 Z = 700, z = 700,
6463 2 = 700,
6464 3 = 700,
6465 6 = 700,
6466 8 = 700,
6467 9 = 700
6468 }
6469
6470 </m-t>

```

## 2.8 Character protrusion

```

6471 %%% -----
6472 %%% PROTRUSION
6473

```

For future historians, Hàn Thế Thành's original settings (from `protcode.tex`, converted to `microtype` notation).

```

\SetProtrusion
[name = thanh]
{ encoding = OT1 }
{
 A = {50,50},
 F = { ,50},
 J = {50, },
 K = { ,50},
 L = { ,50},
 T = {50,50},
 V = {50,50},
 W = {50,50},
 X = {50,50},
 Y = {50,50},
 k = { ,50},
 r = { ,50},
 t = { ,50},
 v = {50,50},
 w = {50,50},
 x = {50,50},
 y = {50,50},
 . = { ,700}, {,}= { ,700},
 : = { ,500}, ; = { ,500},
 ! = { ,200}, ? = { ,200},
 (= {50, },) = { ,50},
 - = { ,700},
 \textendash = { ,300}, \textemdash = { ,200},
 \textquoteleft = {700, }, \textquoteright = { ,700},
 \textquotedblleft = {500, }, \textquotedblright = { ,500}
}

```

### 2.8.1 Normal

The default settings always use the most moderate value.

```
6474 <*cfg-t>
6475 \SetProtrusion
6476 <m-t> [name = default]
```

We also create configuration files for the fonts

- Bitstream Charter (NFSS code bch)

```
6477 <bch> [name = bch-default]
```

- Bitstream Letter Gothic (blg)

```
6478 <blg> [name = blg-default]
```

- Computer Modern Roman (cmr)

```
6479 <cmr> [name = cmr-default]
```

- EB Garamond

```
6480 <ebg> [name = EBGaramond-default]
```

- Minion<sup>11</sup> (pmnx, pmnj)

```
6481 <pmn> [name = pmnj-default]
```

- Palatino (ppl, pplx, pplj)

```
6482 <ppl> [name = ppl-default]
```

- Times (ptm, ptmx, ptmj)

```
6483 <ptm> [name = ptm-default]
```

- URW Garamond (ugm)

```
6484 <ugm> [name = ugm-default]
6485 <m-t|cmr|pmn|ebg> { }
6486 <bch|blg|ugm> { encoding = OT1,
6487 <ppl|ptm> { encoding = {OT1,OT4},
6488 <bch> family = bch }
6489 <blg> family = blg }
6490 <ppl> family = {ppl,pplx,pplj} }
6491 <ptm> family = {ptm,ptmx,ptmj} }
6492 <ugm> family = ugm }
6493 {
6494 <m-t|bch|blg|cmr|ebg|pmn|ppl|ptm> A = {50,50},
6495 <ugm> A = {50,100},
6496 <ebg|ptm> \AE = {50, },
6497 <ugm> \AE = {150,50},
6498 <ugm> B = { ,50},
6499 <bch|ebg|pmn|ugm> C = {50, },
6500 <bch|ebg|pmn> D = { ,50},
6501 <ugm> D = { ,70},
6502 <ugm> E = { ,50},
6503 <m-t|bch|cmr|ebg|pmn|ptm> F = { ,50},
6504 <ugm> F = { ,70},
6505 <bch|ebg|pmn> G = {50, },
6506 <ugm> G = {50,50},
6507 <blg> I = {150,150},
6508 <m-t|cmr|ebg|pmn|ppl|ptm|ugm> J = {50, },
6509 <bch|blg> J = {100, },
```

---

11 Contributed by Harald Harders and Karl Karlsson.

6510  $\langle !blg \rangle$  K = { ,50},  
6511  $\langle blg \rangle$  K = {50, },  
6512  $\langle m-t|bch|cmr|ebg|pmn|ppl \rangle$  L = { ,50},  
6513  $\langle blg \rangle$  L = { ,150},  
6514  $\langle ptm \rangle$  L = { ,80},  
6515  $\langle ugm \rangle$  L = { ,120},  
6516  $\langle bch|ebg|pmn|ugm \rangle$  O = {50,50},  
6517  $\langle ebg \rangle$  \OE = {50, },  
6518  $\langle ugm \rangle$  \OE = {50,50},  
6519  $\langle blg \rangle$  P = { ,100},  
6520  $\langle ugm \rangle$  P = { ,50},  
6521  $\langle bch|ebg|pmn \rangle$  Q = {50,70},  
6522  $\langle ugm \rangle$  Q = {50,50},  
6523  $\langle bch \rangle$  R = { ,50},  
6524  $\langle ugm|ebg \rangle$  R = { ,70},  
6525  $\langle m-t|bch|cmr|pmn|ppl|ptm \rangle$  T = {50,50},  
6526  $\langle blg \rangle$  T = {100,100},  
6527  $\langle ebg|ugm \rangle$  T = {70,70},  
6528  $\langle m-t|bch|cmr|ebg|pmn|ppl|ptm \rangle$  V = {50,50},  
6529  $\langle blg|ugm \rangle$  V = {70,70},  
6530  $\langle m-t|bch|cmr|ebg|pmn|ppl|ptm \rangle$  W = {50,50},  
6531  $\langle ugm \rangle$  W = {70,70},  
6532  $\langle m-t|bch|cmr|ebg|pmn|ppl|ptm \rangle$  X = {50,50},  
6533  $\langle ugm \rangle$  X = {50,70},  
6534  $\langle m-t|bch|cmr|ebg|pmn|ppl \rangle$  Y = {50,50},  
6535  $\langle blg|ptm|ugm \rangle$  Y = {80,80},  
6536  $\langle ugm \rangle$  Z = {50,50},  
6537  $\langle blg \rangle$  f = {150,100},  
6538  $\langle blg \rangle$  i = {150,150},  
6539  $\langle blg \rangle$  j = {100,100},  
6540  $\langle m-t|bch|cmr|ebg|pmn|ppl|ptm \rangle$  k = { ,50},  
6541  $\langle ugm \rangle$  k = { ,70},  
6542  $\langle blg \rangle$  l = {150,150},  
6543  $\langle pmn \rangle$  l = { , -50},  
6544  $\langle ppl \rangle$  p = {50,50},  
6545  $\langle ebg|ugm \rangle$  p = { ,50},  
6546  $\langle ebg|ppl \rangle$  q = {50, },  
6547  $\langle !blg \rangle$  r = { ,50},  
6548  $\langle blg \rangle$  r = {100, 80},  
6549  $\langle cmr|ebg|pmn \rangle$  t = { ,70},  
6550  $\langle bch \rangle$  t = { ,50},  
6551  $\langle blg \rangle$  t = {150, 80},  
6552  $\langle ugm \rangle$  t = { ,100},  
6553  $\langle m-t|bch|cmr|ebg|pmn|ppl|ptm \rangle$  v = {50,50},  
6554  $\langle blg \rangle$  v = {100,100},  
6555  $\langle ugm \rangle$  v = {50,70},  
6556  $\langle m-t|bch|cmr|ebg|pmn|ppl|ptm \rangle$  w = {50,50},  
6557  $\langle ugm \rangle$  w = {50,70},  
6558  $\langle !blg \rangle$  x = {50,50},  
6559  $\langle blg \rangle$  x = {100,100},  
6560  $\langle m-t|bch|ebg|pmn \rangle$  y = { ,50},  
6561  $\langle blg \rangle$  y = { 50,100},  
6562  $\langle cmr|ppl|ptm \rangle$  y = {50,70},  
6563  $\langle ugm \rangle$  y = { ,70},  
  
6564  $\langle cmr \rangle$  0 = { ,50},  
6565  $\langle m-t \rangle$  1 = {50,50},  
6566  $\langle bch|blg|ptm|ugm \rangle$  1 = {150,150},  
6567  $\langle cmr \rangle$  1 = {100,200},  
6568  $\langle pmn \rangle$  1 = { ,50},  
6569  $\langle ppl \rangle$  1 = {100,100},  
6570  $\langle bch|cmr|ugm \rangle$  2 = {50,50},  
6571  $\langle blg \rangle$  2 = { ,100},  
6572  $\langle bch|pmn \rangle$  3 = {50, },  
6573  $\langle cmr|ugm \rangle$  3 = {50,50},  
6574  $\langle blg \rangle$  3 = {100, },

```

6575 <m-t> 4 = {50,50},
6576 <bch> 4 = {100,50},
6577 <blg> 4 = {100, },
6578 <cmr|ugm> 4 = {70,70},
6579 <pmn> 4 = {50, },
6580 <ptm> 4 = {70, },
6581 <cmr> 5 = { ,50},
6582 <bch> 6 = {50, },
6583 <cmr> 6 = { ,50},
6584 <m-t> 7 = {50,50},
6585 <bch|pmn|ugm> 7 = {50,80},
6586 <blg> 7 = {100,100},
6587 <cmr|ptm> 7 = {50,100},
6588 <ppl> 7 = { ,50},
6589 <cmr> 8 = { ,50},
6590 <bch> 9 = {50,50},
6591 <cmr> 9 = { ,50},
6592 <m-t|cmr|pmn|ppl|ptm|ugm> . = { ,700},
6593 <bch|ebg> . = { ,600},
6594 <blg> . = {400,500},
6595 <!blg> {,}= { ,500},
6596 <blg> {,}= {300,400},
6597 <m-t|cmr|pmn|ppl|ptm|ugm> : = { ,500},
6598 <bch|ebg> : = { ,400},
6599 <blg> : = {300,400},
6600 <m-t|bch|ebg|pmn|ptm> ; = { ,300},
6601 <blg> ; = {200,300},
6602 <cmr|ppl> ; = { ,500},
6603 <ugm> ; = { ,400},
6604 <!blg> ! = { ,100},
6605 <blg> ! = {200,200},
6606 <m-t|ebg|pmn|ptm> ? = { ,100},
6607 <bch|cmr|ppl|ugm> ? = { ,200},
6608 <blg> ? = {150,150},
6609 <pmn> " = {300,300},
6610 <m-t|bch|cmr|ebg|pmn|ppl> @ = {50,50},
6611 <ptm> @ = {100,100},
6612 <m-t|bch|blg|cmr|ebg|pmn|ppl|ptm> ~ = {200,250},
6613 <ugm> ~ = {300,350},
6614 <ebg|ppl|ptm> & = {50,100},
6615 <ugm> & = { ,100},
6616 <m-t|cmr|ebg|pmn> \% = {50,50},
6617 <bch> \% = { ,50},
6618 <ppl|ptm> \% = {100,100},
6619 <ugm> \% = {50,100},
6620 <blg> \# = {100,100},
6621 <m-t|ppl|ptm|ugm> * = {200,200},
6622 <bch|pmn> * = {200,300},
6623 <blg> * = {150,200},
6624 <cmr|ebg> * = {300,300},
6625 <m-t|cmr|ebg|ppl|ptm> + = {250,250},
6626 <bch> + = {150,250},
6627 <blg|pmn> + = {150,200},
6628 <ugm> + = {250,300},
6629 <blg|ugm> {=} = {200,200},
6630 <m-t|ebg|pmn|ptm> (= {100, },) = { ,200},
6631 <bch|ugm> (= {200, },) = { ,200},
6632 <cmr|blg> (= {300, },) = { ,300},
6633 <ppl> (= {100, },) = { ,300},
6634 <bch|pmn> [= {100, },] = { ,100},
6635 <blg> [= {300,100},] = { ,300},

6636 <m-t|ebg|pmn|ptm> / = {100,200},
6637 <bch> / = { ,200},
6638 <blg> / = {300,300},
6639 <cmr|ppl> / = {200,300},

```

```

6640 <ugm> / = {100,300},
6641 <m-t|ptm> - = {500,500},
6642 <bch|cmr|ppl> - = {400,500},
6643 <blg> - = {300,400},
6644 <ebg> - = {300,500},
6645 <pmn> - = {200,400},
6646 <ugm> - = {500,600},
6647 <blg> < = {200,100}, > = {100,200},
6648 <blg> _ = {150,250},
6649 <blg> | = {250,250},
6650 <m-t|pmn> \textendash = {200,200}, \textemdash = {150,150},
6651 <bch> \textendash = {200,300}, \textemdash = {150,250},
6652 <cmr> \textendash = {400,300}, \textemdash = {300,200},
6653 <ebg|ppl|ptm> \textendash = {300,300}, \textemdash = {200,200},
6654 <ugm> \textendash = {250,300}, \textemdash = {250,250},

```

Why settings for left *and* right quotes? Because in some languages they might be used like that (see the csquotes package for examples).

```

6655 <m-t|bch|pmn> \textquoteleft = {300,400}, \textquoteright = {300,400},
6656 <blg> \textquoteleft = {400,600}, \textquoteright = {400,600},
6657 <cmr> \textquoteleft = {500,700}, \textquoteright = {500,600},
6658 <ebg> \textquoteleft = {300,500}, \textquoteright = {400,400},
6659 <ppl> \textquoteleft = {500,700}, \textquoteright = {500,700},
6660 <ptm> \textquoteleft = {500,500}, \textquoteright = {300,500},
6661 <ugm> \textquoteleft = {300,600}, \textquoteright = {300,600},
6662 <m-t|ebg|bch|pmn> \textquotedblleft = {300,300}, \textquotedblright = {300,300}
6663 <blg> \textquotedblright = {300,400}
6664 <cmr> \textquotedblleft = {500,300}, \textquotedblright = {200,600}
6665 <ppl|ptm> \textquotedblleft = {300,400}, \textquotedblright = {300,400}
6666 <ugm> \textquotedblleft = {400,400}, \textquotedblright = {400,400}
6667 }
6668

```

Greek uppercase letters are in OT1 encoding only.

```

6669 <*m-t|cmr|ebg|pmn>
6670 \SetProtrusion
6671 <m-t> [name = OT1-default,
6672 <cmr> [name = cmr-OT1,
6673 <ebg> [name = EBGaramond-OT1,
6674 <pmn> [name = pmnj-OT1,
6675 <m-t> load = default]
6676 <cmr> load = cmr-default]
6677 <ebg> load = EBGaramond-default]
6678 <pmn> load = pmnj-default]
6679 <m-t> { encoding = OT1 }
6680 <cmr> { encoding = {OT1,OT4},
6681 <pmn> { encoding = OT1,
6682 <cmr> family = cmr }
6683 <pmn> family = pmnj }
6684 <ebg> { }
6685 {
6686 <m-t|cmr> \AE = {50, },
6687 <pmn> \OE = {50, }
6688 <*cmr|ebg>
6689 "00 = { ,150}, % \Gamma
6690 "01 = {100,100}, % \Delta
6691 "02 = { 50, 50}, % \Theta
6692 "03 = {100,100}, % \Lambda
6693 <ebg> "04 = { 50, 50}, % \Xi
6694 <cmr> "06 = { 50, 50}, % \Sigma
6695 "07 = {100,100}, % \Upsilon
6696 "08 = { 50, 50}, % \Phi
6697 "09 = { 50, 50}, % \Psi
6698 <ebg> "0A = { 50, 50}, % \Omega
6699 <ebg> 138 = { , 50}, % \L

```



Remaining slots can be found in the source file.

```
6700 </cmr|ebg>
6701 }
6702
```

Settings for figure variants.

```
6703 <*ebg>
6704 \SetProtrusion
6705 [name = EBGaramond-OT1-LF,
6706 load = EBGaramond-OT1]
6707 { encoding = OT1,
6708 family = {EBGaramond-LF,EBGaramond-TLF,EBGaramond-OsF} }
6709 {
6710 1 = {50,50},
6711 2 = {50,50},
6712 4 = {50,50},
6713 7 = {50,50},
6714 }
6715
6716 \SetProtrusion
6717 [name = EBGaramond-OT1-T0sF,
6718 load = EBGaramond-OT1]
6719 { encoding = OT1,
6720 family = {EBGaramond-T0sF} }
6721 {
6722 1 = {150,150},
6723 2 = {50,50},
6724 3 = {50,50},
6725 4 = {50,50},
6726 5 = {50,50},
6727 6 = {50,50},
6728 7 = {50,80},
6729 8 = {50,50},
6730 9 = {50,50},
6731 }
6732
6733 </ebg>
6734 </m-t|cmr|ebg|pmn>
```

T1 and LY1 encodings contain some more characters. The default list will be loaded first. For X<sub>Y</sub>TeX (EU1) and LuaTeX (EU2) we simply use the T1 list as default (for now).

```
6735 \SetProtrusion
6736 <m-t> [name = T1-default,
6737 <bch> [name = bch-T1,
6738 <blg> [name = blg-T1,
6739 <cmr> [name = cmr-T1,
6740 <ebg> [name = EBGaramond-T1,
6741 <pmn> [name = pmnj-T1,
6742 <ppl> [name = ppl-T1,
6743 <ptm> [name = ptm-T1,
6744 <ugm> [name = ugm-T1,
6745 <m-t> load = default]
6746 <bch> load = bch-default]
6747 <blg> load = blg-default]
6748 <cmr> load = cmr-default]
6749 <ebg> load = EBGaramond-default]
6750 <pmn> load = pmnj-default]
6751 <ppl> load = ppl-default]
6752 <ptm> load = ptm-default]
6753 <ugm> load = ugm-default]
6754 <m-t> { encoding = {T1,LY1,EU1,EU2,TU} }
6755 <bch|cmr|pmn|ppl> { encoding = {T1,LY1},
6756 <blg|ptm|ugm> { encoding = {T1},
```

```

6757 <ebg> { encoding = {LY1},
6758 <bch> family = bch }
6759 <blg> family = blg }
6760 <cmr> family = cmr }
6761 <ebg> family = {EBGaramond-LF,EBGaramond-TLF,EBGaramond-0sF,EBGaramond-T0sF }
6762 <pmn> family = pmnj }
6763 <ppl> family = {ppl,pplx,pplj} }
6764 <ptm> family = {ptm,ptmx,ptmj} }
6765 <ugm> family = ugm }
6766 {
6767 <m-t|cmr> \AE = {50, },
6768 <bch|pmn> \OE = {50, },
6769 <pmn> \TH = { ,50},
6770 <blg> \v L = { ,250},
6771 <blg> \v d = { ,250},
6772 <blg> \v l = { ,250},
6773 <blg> \v t = { ,250},
6774 <blg> 127 = {300,400},
6775 <blg> 156 = {100, }, % IJ
6776 <blg> 188 = { 80, 80}, % ij
6777 <m-t|bch|ebg|pmn|ppl|ptm> _ = {100,100},
6778 <cmr> _ = {200,200},
6779 <ugm> _ = {100,200},
6780 <m-t|ebg|pmn|ptm> \textbackslash = {100,200},
6781 <bch> \textbackslash = {150,200},
6782 <blg> \textbackslash = {250,300},
6783 <cmr|ppl> \textbackslash = {200,300},
6784 <ugm> \textbackslash = {100,300},
6785 <ugm> \textbar = {200,200},
6786 <blg> \textendash = {300,300}, \textemdash = {150,150},
6787 <blg> \textquotedbl = {300,400}, \textquotedblleft = {300,400},
6788 <cmr> \textquotedbl = {300,300}, \textquotedblleft = {200,600},

```

The EC fonts do something weird: they insert an implicit kern between quote and boundary character. Therefore, we must override the settings from OT1.

```

6789 <m-t|cmr|ebg|ppl|ptm|ugm> \quotesinglbase = {400,400}, \quotedblbase = {400,400},
6790 <blg> \quotesinglbase = {400,400}, \quotedblbase = {300,400},
6791 <bch|pmn> \quotesinglbase = {400,400}, \quotedblbase = {300,300},
6792 <m-t|bch|pmn> \guilsinglleft = {400,300}, \guilsingright = {300,400},
6793 <blg> \guilsinglleft = {300,500}, \guilsingright = {300,500},
6794 <cmr|ebg|ppl|ptm> \guilsinglleft = {400,400}, \guilsingright = {300,500},
6795 <ugm> \guilsinglleft = {400,400}, \guilsingright = {300,600},
6796 <m-t> \guillemotleft = {200,200}, \guillemotright = {200,200},
6797 <cmr> \guillemotleft = {300,200}, \guillemotright = {100,400},
6798 <bch|pmn> \guillemotleft = {200,200}, \guillemotright = {150,300},
6799 <blg|ppl|ptm> \guillemotleft = {300,300}, \guillemotright = {200,400},
6800 <ebg> \guillemotleft = {300,300}, \guillemotright = {200,300},
6801 <ugm> \guillemotleft = {300,400}, \guillemotright = {300,400},
6802 <m-t|bch|cmr|ebg|pmn|ppl|ugm> \textexclamdown = {100, }, \textquestiondown = {100, },
6803 <blg> \textexclamdown = {200, }, \textquestiondown = {100, },
6804 <ptm> \textexclamdown = {200, }, \textquestiondown = {200, },
6805 <m-t|cmr|ebg|ppl|ptm|ugm> \textbraceleft = {400,200}, \textbraceright = {200,400},
6806 <bch|blg|pmn> \textbraceleft = {200, }, \textbraceright = { ,300},
6807 <m-t|bch|cmr|ebg|ppl|ptm|ugm> \textless = {200,100}, \textgreater = {100,200}
6808 <pmn> \textless = {100, }, \textgreater = { ,100},
6809 <pmn> \textvisiblespace = {100,100} % not in LY1
6810 }
6811

```

The lmodern fonts used to restore the original settings from OT1 fonts. Now, they require even other settings, though.

```

6812 (*cmr)
6813 \SetProtrusion
6814 [name = lmr-T1,

```

```

6815 load = cmr-T1]
6816 { encoding = {T1,LY1},
6817 family = lmr }
6818 {
6819 \textquotedblleft = {300,400}, \textquotedblright = {300,400}
6820 }
6821
6822 </cmr>
6823 <*ebg>
6824 \SetProtrusion
6825 [name = EBGaramond-T1-LF,
6826 load = EBGaramond-T1]
6827 { encoding = T1,
6828 family = {EBGaramond-LF,EBGaramond-TLF,EBGaramond-OsF} }
6829 {
6830 1 = {50,50},
6831 2 = {50,50},
6832 4 = {50,50},
6833 7 = {50,50},
6834 }
6835
6836 \SetProtrusion
6837 [name = EBGaramond-T1-T0sF,
6838 load = EBGaramond-T1]
6839 { encoding = T1,
6840 family = {EBGaramond-T0sF} }
6841 {
6842 1 = {150,150},
6843 2 = {50,50},
6844 3 = {50,50},
6845 4 = {50,50},
6846 5 = {50,50},
6847 6 = {50,50},
6848 7 = {50,80},
6849 8 = {50,50},
6850 9 = {50,50},
6851 }
6852
6853 </ebg>

```

#### Settings for the T2A encoding (generic, Computer Modern Roman, and Minion).<sup>12</sup>

```

6854 <*m-t|cmr|pmn>
6855 \SetProtrusion
6856 <m-t> [name = T2A-default,
6857 <cmr> [name = cmr-T2A,
6858 <pmn> [name = pmnj-T2A,
6859 <m-t> load = default]
6860 <cmr> load = cmr-default]
6861 <pmn> load = pmnj-default]
6862 { encoding = T2A,
6863 <m-t> }
6864 <cmr> family = cmr }
6865 <pmn> family = pmnj }
6866 {
6867 \CYRA = {50,50},
6868 \CYRG = { ,50},
6869 \CYRK = { ,50},
6870 \CYRT = {50,50},
6871 \CYRH = {50,50},
6872 \CYRU = {50,50},
6873 <pmn> \CYRS = {50, },
6874 <pmn> \CYRO = {50,50},
6875 \cyrk = { ,50},
6876 \cyrg = { ,50},

```

---

<sup>12</sup> Contributed by Karl Karlsson.

```

6877 \cyrh = {50,50},
6878 <m-t|pmn> \cyru = {50,50},
6879 <cmr> \cyru = {50,70},
6880 <m-t> - = {100,100},
6881 <cmr> - = {200,200},
6882 <m-t> \textbackslash = {100,200}, \quotedblbase = {400,400},
6883 <cmr> \textbackslash = {200,300}, \quotedblbase = {400,400},
6884 <pmn> \textbackslash = {100,200}, \quotedblbase = {300,300},
6885 <cmr> \textquotedbl = {300,300}, \textquotedblleft = {200,600},
6886 <m-t> \guillemotleft = {200,200}, \guillemotright = {200,200},
6887 <cmr> \guillemotleft = {300,200}, \guillemotright = {100,400},
6888 <pmn> \guillemotleft = {200,200}, \guillemotright = {150,300},
6889 <m-t|cmr> \textbraceleft = {400,200}, \textbraceright = {200,400},
6890 <pmn> \textbraceleft = {200, }, \textbraceright = { ,300},
6891 <m-t|cmr> \textless = {200,100}, \textgreater = {100,200}
6892 <pmn> \textless = {100, }, \textgreater = { ,100}
6893 }
6894
6895 </m-t|cmr|pmn>

```

Settings for the QX encoding (generic and Times).<sup>13</sup> It also includes some glyphs otherwise in TS1.

```

6896 <*m-t|ptm>
6897 \SetProtrusion
6898 <m-t> [name = QX-default,
6899 <ptm> [name = ptm-QX,
6900 <m-t> load = default]
6901 <ptm> load = ptm-default]
6902 <m-t> { encoding = QX }
6903 <ptm> { encoding = QX,
6904 <ptm> family = {ptm,ptmx,ptmj} }
6905 {
6906 \AE = {50, },
6907 <ptm> * = {200,200},
6908 {=} = {100,100},
6909 \textunderscore = {100,100},
6910 \textbackslash = {100,200},
6911 \quotedblbase = {400,400},
6912 <m-t> \guillemotleft = {200,200}, \guillemotright = {200,200},
6913 <ptm> \guillemotleft = {300,300}, \guillemotright = {200,400},
6914 \textexclamdown = {100, }, \textquestiondown = {100, },
6915 <m-t> \textbraceleft = {400,200}, \textbraceright = {200,400},
6916 <ptm> \textbraceleft = {200,200}, \textbraceright = {200,300},
6917 \textless = {200,100}, \textgreater = {100,200},
6918 \textminus = {200,200}, \textdegree = {300,300},
6919 <m-t> \copyright = {100,100}, \textregistered = {100,100}
6920 <ptm> \copyright = {100,150}, \textregistered = {100,150},
6921 <ptm> \textxgeq = { ,100}, \textxleq = {100, },
6922 <ptm> \textalpha = { , 50}, \textDelta = { 70, 70},
6923 <ptm> \textpi = { 50, 80}, \textSigma = { , 70},
6924 <ptm> \textmu = { , 80}, \texteuro = { 50, 50},
6925 <ptm> \textellipsis = {150,200}, \textasciitilde = { 80, 80},
6926 <ptm> \textapprox = { 50, 50}, \textinfty = {100,100},
6927 <ptm> \textdagger = {150,150}, \textdaggerdbl = {100,100},
6928 <ptm> \textdiv = { 50,150}, \textsection = { 80, 80},
6929 <ptm> \texttimes = {100,150}, \textpm = { 50, 80},
6930 <ptm> \textbullet = {150,150}, \textperiodcentered = {300,300},
6931 <ptm> \textquotesingle = {500,500}, \textquotedbl = {300,300},
6932 <ptm> \textperthousand = { ,50}
6933 }
6934
6935 </m-t|ptm>

```

T5 is based on OT1; it shares some but not all extra characters of T1. All accented

13 Contributed by Maciej Eder.

characters are already taken care of by the inheritance list.

```

6936 <*cmr|bch>
6937 \SetProtrusion
6938 <cmr> [name = cmr-T5,
6939 <cmr> load = cmr-default]
6940 <bch> [name = bch-T5,
6941 <bch> load = bch-default]
6942 { encoding = T5,
6943 <cmr> family = cmr }
6944 <bch> family = bch }
6945 {
6946 <bch> _ = {100,100},
6947 <bch> \textbackslash = {150,200},
6948 <cmr> \textbackslash = {200,300},
6949 <cmr> \textquotedblleft = {200,600},
6950 <cmr> \textquotedbl = {300,300},
6951 <bch> \quotesinglbase = {400,400}, \quotedblbase = {300,300},
6952 <cmr> \quotesinglbase = {400,400}, \quotedblbase = {400,400},
6953 <bch> \guilsinglleft = {400,300}, \guilsinglright = {300,400},
6954 <cmr> \guilsinglleft = {400,400}, \guilsinglright = {300,500},
6955 <bch> \guillemotleft = {200,200}, \guillemotright = {150,300},
6956 <cmr> \guillemotleft = {300,200}, \guillemotright = {100,400},
6957 <bch> \textbraceleft = {200, }, \textbraceright = { ,300},
6958 <cmr> \textbraceleft = {400,200}, \textbraceright = {200,400},
6959 \textless = {200,100}, \textgreater = {100,200}
6960 }
6961
6962 </cmr|bch>

```

Minion with lining numbers.

```

6963 <*pmn>
6964 \SetProtrusion
6965 [name = pmnx-OT1,
6966 load = pmnj-default]
6967 { encoding = OT1,
6968 family = pmnx }
6969 {
6970 1 = {230,180}
6971 }
6972
6973 \SetProtrusion
6974 [name = pmnx-T1,
6975 load = pmnj-T1]
6976 { encoding = {T1,LY1},
6977 family = pmnx }
6978 {
6979 1 = {230,180}
6980 }
6981
6982 \SetProtrusion
6983 [name = pmnx-T2A,
6984 load = pmnj-T2A]
6985 { encoding = {T2A},
6986 family = pmnx }
6987 {
6988 1 = {230,180}
6989 }
6990
6991 </pmn>

```

Times is the default font for LY1, therefore we provide settings for the additional characters in this encoding, too.

```

6992 <*ptm>
6993 \SetProtrusion
6994 [name = ptm-LY1,

```

```

6995 load = ptm-T1]
6996 { encoding = LY1,
6997 family = {ptm,ptmx,ptmj} }
6998 {
6999 - = {100,100},
7000 \texttrademark = {100,100},
7001 \textregistered = {100,100},
7002 \textcopyright = {100,100},
7003 \textdegree = {300,300},
7004 \textminus = {200,200},
7005 \textellipsis = {150,200},
7006 % \texteuro = { , }, % ?
7007 \textcent = {100,100},
7008 \textquotesingle = {500,500},
7009 \textflorin = { 50, 70},
7010 \textdagger = {150,150},
7011 \textdaggerdbl = {100,100},
7012 \textperthousand = { , 50},
7013 \textbullet = {150,150},
7014 \textonesuperior = {100,100},
7015 \texttwosuperior = { 50, 50},
7016 \textthreesuperior = { 50, 50},
7017 \textperiodcentered = {300,300},
7018 \textplusminus = { 50, 80},
7019 \textmultiply = {100,100},
7020 \textdivide = { 50,150}

```

Remaining slots in the source file.

```

7021 }
7022
7023 </ptm>

```

For the Greek LGR encoding.

```

7024 <*ebg>
7025 \SetProtrusion
7026 [name = EBGaramond-LGR]
7027 { }
7028 {
7029 A = {50,50},
7030 D = {100,100},
7031 F = {50,50},
7032 G = { ,150},
7033 K = { ,50},
7034 L = {100,100},
7035 O = {50,50},
7036 U = {100,100},
7037 T = {50,50},
7038 W = { ,50},
7039 Y = {50,50},
7040 . = { ,600},
7041 {,} = { ,500},
7042 : = { ,400},
7043 ; = { ,300},
7044 ! = { ,100},
7045 ? = { ,100},
7046 ~ = {200,250},
7047 \% = {50,50},
7048 * = {300,300},
7049 + = {250,250},
7050 {=} = { 50, 50},
7051 (= {100, },) = { ,200},
7052 / = {100,200},
7053 - = {300,500},
7054 \texteuro = { 50,100},
7055 \textendash = {300,300}, \textemdash = {200,200},

```

```

7056 \textquoteleft = {300,500}, \textquoteright = {400,400},
7057 \guillemotleft = {300,300}, \guillemotright = {200,400},
7058 }
7059
7060 \SetProtrusion
7061 [name = EBGaramond-LGR-LF,
7062 load = EBGaramond-LGR]
7063 { encoding = LGR,
7064 family = {EBGaramond-LF,EBGaramond-TLF,EBGaramond-0sF} }
7065 {
7066 1 = {50,50},
7067 2 = {50,50},
7068 4 = {50,50},
7069 7 = {50,50},
7070 }
7071
7072 \SetProtrusion
7073 [name = EBGaramond-LGR-T0sF,
7074 load = EBGaramond-LGR]
7075 { encoding = LGR,
7076 family = {EBGaramond-T0sF} }
7077 {
7078 1 = {150,150},
7079 2 = {50,50},
7080 3 = {50,50},
7081 4 = {50,50},
7082 5 = {50,50},
7083 6 = {50,50},
7084 7 = {50,80},
7085 8 = {50,50},
7086 9 = {50,50},
7087 }
7088
7089 </ebg>

```

### 2.8.2 Italics

To find default settings for italic is difficult, since the character shapes and their behaviour at the beginning or end of line may be wildly different for different fonts. In the generic settings we therefore omit the letters, and only set up the punctuation characters.

The italic glyphs of Computer Modern Roman feature a lot of side bearing, therefore almost all of them have to protrude.<sup>14</sup>

```

7090 \SetProtrusion
7091 <m-t> [name = OT1-it]
7092 <bch> [name = bch-it]
7093 <blg> [name = blg-it,
7094 load = blg-default]
7095 <cmr> [name = cmr-it]
7096 <ebg> [name = EBGaramond-it]
7097 <pmn> [name = pmn-it]
7098 <ppl> [name = ppl-it]
7099 <ptm> [name = ptm-it]
7100 <ugm> [name = ugm-it]
7101 <m-t|bch|blg|ugm> { encoding = OT1,
7102 <ppl|ptm> { encoding = {OT1,OT4},
7103 <bch> family = bch,
7104 <blg> family = blg,
7105 <ppl> family = {ppl,pplx,pplj},
7106 <ptm> family = {ptm,ptmx,ptmj},

```

<sup>14</sup> Settings contributed by *Hendrik Vogt*.

```

7107 <ugm> family = ugm,
7108 <m-t|bch|ppl|ptm> shape = {it,s1} }
7109 <blg|ugm> shape = it }
7110 <cmr|ebg|pmn> { }
7111 {
7112 <cmr> A = {100,100},
7113 <ptm> A = {100,50},
7114 <ebg|pmn> A = {50, },
7115 <ugm> A = { ,150},
7116 <ppl> A = {50,50},
7117 <ptm> \AE = {100, },
7118 <ebg|ppl> \AE = {50, },
7119 <cmr> B = {83,-40},
7120 <ebg|ppl|ptm> B = {50, },
7121 <pmn> B = {20,-50},
7122 <bch|ppl|ptm|ugm> C = {50, },
7123 <cmr> C = {165,-75},
7124 <ebg> C = {100, },
7125 <pmn> C = {50,-50},
7126 <cmr> D = {75, -28},
7127 <ebg|ppl|ptm> D = {50,50},
7128 <pmn> D = {20, },
7129 <cmr> E = {80,-55},
7130 <ebg|ppl|ptm> E = {50, },
7131 <pmn> E = {20,-50},
7132 <cmr> F = {85,-80},
7133 <ebg|ptm> F = {100, },
7134 <pmn> F = {10, },
7135 <ppl> F = {50, },
7136 <bch|ppl|ptm|ugm> G = {50, },
7137 <cmr> G = {153,-15},
7138 <ebg> G = {100, },
7139 <pmn> G = {50,-50},
7140 <cmr> H = {73,-60},
7141 <ebg|ppl|ptm> H = {50, },
7142 <cmr> I = {140,-120},
7143 <ebg|ptm> I = {50, },
7144 <pmn> I = {20,-50},
7145 <cmr> J = {135,-80},
7146 <ebg> J = {50, },
7147 <pmn> J = {20, },
7148 <ptm> J = {100, },
7149 <cmr> K = {70,-30},
7150 <ebg|ppl|ptm> K = {50, },
7151 <pmn> K = {20, },
7152 <cmr> L = {87, 40},
7153 <ebg|ppl|ptm> L = {50, },
7154 <pmn> L = {20,50},
7155 <ugm> L = { ,100},
7156 <cmr> M = {67,-45},
7157 <pmn> M = { , -30},
7158 <ptm> M = {50, },
7159 <cmr> N = {75,-55},
7160 <pmn> N = { , -30},
7161 <ptm> N = {50, },
7162 <bch|pmn|ppl|ptm> O = {50, },
7163 <cmr> O = {150,-30},
7164 <ebg> O = {100, },
7165 <ugm> O = {70,50},
7166 <ppl|ptm> \OE = {50, },
7167 <ebg> \OE = {100, },
7168 <cmr> P = {82,-50},
7169 <ebg|ppl|ptm> P = {50, },
7170 <pmn> P = {20,-50},
7171 <bch|pmn|ppl|ptm> Q = {50, },

```



```

7172 <cmr> Q = {150,-30},
7173 <ebg> Q = {100, },
7174 <ugm> Q = {70,50},
7175 <cmr> R = {75, 15},
7176 <ebg|ppl|ptm> R = {50, },
7177 <pmn> R = {20, },
7178 <bch|ebg|ppl|ptm> S = {50, },
7179 <cmr> S = {90,-65},
7180 <pmn> S = {20,-30},
7181 <bch|ebg|ppl|ptm> $ = {50, },
7182 <cmr> $ = {100,-20},
7183 <pmn> $ = {20,-30},
7184 <bch|pmn|ugm> T = {70, },
7185 <cmr> T = {220,-85},
7186 <ebg|ppl|ptm> T = {100, },
7187 <cmr> U = {230,-55},
7188 <ebg|ppl|ptm> U = {50, },
7189 <pmn> U = {50,-50},
7190 <cmr> V = {260,-60},
7191 <ebg|pmn|ugm> V = {100, },
7192 <ppl|ptm> V = {100,50},
7193 <cmr> W = {185,-55},
7194 <ebg|pmn|ugm> W = {100, },
7195 <ppl> W = {50, },
7196 <ptm> W = {100,50},
7197 <cmr> X = {70,-30},
7198 <ppl|ptm> X = {50, },
7199 <cmr> Y = {250,-60},
7200 <pmn> Y = {50, },
7201 <ppl> Y = {100,50},
7202 <ptm> Y = {100, },
7203 <cmr> Z = {90,-60},
7204 <pmn> Z = { , -50},
7205 <cmr> a = {150,-10},
7206 <cmr> b = {170, },
7207 <cmr> c = {173,-10},
7208 <cmr> d = {150,-55},
7209 <pmn> d = { , -50},
7210 <cmr> e = {180, },
7211 <cmr> f = { , -250},
7212 <ebg|pmn> f = { , -100},
7213 <cmr> g = {150,-10},
7214 <cmr> h = {100, },
7215 <cmr> i = {210, },
7216 <pmn> i = { , -30},
7217 <cmr> j = { , -40},
7218 <pmn> j = { , -30},
7219 <cmr> k = {110,-50},
7220 <cmr> l = {240,-110},
7221 <pmn> l = { , -100},
7222 <cmr> m = {80, },
7223 <cmr> n = {115, },
7224 <bch> o = {50,50},
7225 <cmr> o = {155, },
7226 <bch> p = { , 50},
7227 <pmn> p = {-50, },
7228 <bch> q = {50, },
7229 <cmr> q = {170,-40},
7230 <cmr> r = {155,-40},
7231 <pmn> r = { , 50},
7232 <cmr> s = {130, },
7233 <bch> t = { , 50},
7234 <cmr> t = {230,-10},
7235 <cmr> u = {120, },
7236 <cmr> v = {140,-25},

```

```

7237 <pmn|ugm> v = {50, },
7238 <bch> w = { ,50},
7239 <cmr> w = {98,-20},
7240 <pmn|ugm> w = {50, },
7241 <cmr> x = {65,-40},
7242 <bch> y = { ,50},
7243 <cmr> y = {130,-20},
7244 <cmr> z = {110,-80},
7245 <cmr> 0 = {170,-85},
7246 <bch|ptm> 1 = {150,100},
7247 <cmr> 1 = {230,110},
7248 <ebg> 1 = {150, },
7249 <pmn> 1 = {50, },
7250 <ppl> 1 = {100, },
7251 <ugm> 1 = {150,150},
7252 <cmr> 2 = {130,-70},
7253 <ebg|ppl|ptm> 2 = {50, },
7254 <pmn> 2 = {-50, },
7255 <bch> 3 = {50, },
7256 <cmr> 3 = {140,-70},
7257 <pmn> 3 = {-100, },
7258 <ptm> 3 = {100,50},
7259 <bch> 4 = {100, },
7260 <cmr> 4 = {130,80},
7261 <ebg> 4 = {150, },
7262 <ppl|ptm> 4 = {50, },
7263 <cmr> 5 = {160, },
7264 <ptm> 5 = {50, },
7265 <bch> 6 = {50, },
7266 <cmr> 6 = {175,-30},
7267 <bch|ebg|ptm> 7 = {100, },
7268 <cmr> 7 = {250,-150},
7269 <pmn> 7 = {20, },
7270 <ppl> 7 = {50, },
7271 <cmr> 8 = {130,-40},
7272 <cmr> 9 = {155,-80},
7273 <m-t|cmr|ebg|pmn|ppl> . = { ,500},
7274 <blg> . = {400,600},
7275 <bch|ptm|ugm> . = { ,700},
7276 <blg> {,}= {300,500},
7277 <m-t|ebg|pmn|ppl> {,}= { ,500},
7278 <cmr> {,}= { ,450},
7279 <bch|ugm> {,}= { ,600},
7280 <ptm> {,}= { ,700},
7281 <m-t|cmr|ebg|ppl> := { ,300},
7282 <bch|ugm> := { ,400},
7283 <pmn> := { ,200},
7284 <ptm> := { ,500},
7285 <m-t|cmr|ebg|ppl> ; = { ,300},
7286 <bch|ugm> ; = { ,400},
7287 <pmn> ; = { ,200},
7288 <ptm> ; = { ,500},
7289 <ptm> ! = { ,100},
7290 <bch> ? = { ,200},
7291 <ptm> ? = { ,100},
7292 <ppl> ? = { ,300},
7293 <pmn> " = {400,200},
7294 <m-t|ebg|pmn|ppl|ptm> & = {50,50},
7295 <bch> & = { ,80},
7296 <cmr> & = {130,30},
7297 <ugm> & = {50,100},
7298 <m-t|ebg|pmn> \% = {100, },
7299 <cmr> \% = {180,50},
7300 <bch> \% = {50,50},
7301 <ppl|ptm> \% = {100,100},

```

```

7302 <ugm> \% = {100,50},
7303 <m-t|pmn|ppl> * = {200,200},
7304 <bch> * = {300,200},
7305 <cmr> * = {380,20},
7306 <ebg> * = {500,100},
7307 <ptm|ugm> * = {400,200},
7308 <m-t|pmn|ppl> + = {150,200},
7309 <cmr> + = {180,200},
7310 <bch|ugm> + = {250,250},
7311 <ebg|ptm> + = {250,200},
7312 <m-t|ebg|pmn|ppl> @ = {50,50},
7313 <bch> @ = {80,50},
7314 <cmr> @ = {180,10},
7315 <ptm> @ = {150,150},
7316 <m-t|bch|ugm> ~ = {150,150},
7317 <cmr|ebg|pmn|ppl|ptm> ~ = {200,150},
7318 <ugm> {=} = {200,200},
7319 <m-t|bch|ebg|pmn|ppl|ptm|ugm> (= {200, },) = { ,200},
7320 <cmr> (= {300, },) = { ,70},
7321 <m-t|ebg|ppl|ptm|ugm> / = {100,200},
7322 <cmr> / = {100,100},
7323 <bch> / = { ,150},
7324 <pmn> / = {100,150},
7325 <m-t> - = {300,300},
7326 <bch|ebg> - = {300,400},
7327 <pmn> - = {200,300},
7328 <cmr> - = {500,300},
7329 <ppl> - = {300,500},
7330 <ptm> - = {500,500},
7331 <ugm> - = {400,700},
7332 <blg> - = {0,300},
7333 <m-t|pmn> \textendash = {200,200}, \textendash = {150,150},
7334 <bch> \textendash = {200,300}, \textendash = {150,200},
7335 <cmr> \textendash = {500,300}, \textendash = {400,170},
7336 <ebg|ppl|ptm|ugm> \textendash = {300,300}, \textendash = {200,200},
7337 <m-t|bch|pmn|ugm> \textquoteleft = {400,200}, \textquoteright = {400,200},
7338 <blg> \textquoteleft = {400,400}, \textquoteright = {400,400},
7339 <cmr> \textquoteleft = {800,200}, \textquoteright = {800,-20},
7340 <ebg> \textquoteleft = {800,200}, \textquoteright = {800,200},
7341 <ppl> \textquoteleft = {700,400}, \textquoteright = {700,400},
7342 <ptm> \textquoteleft = {800,500}, \textquoteright = {800,500},
7343 <m-t|bch|pmn> \textquotedblleft = {400,200}, \textquotedblright = {400,200}
7344 <blg> \textquotedblright = {300,300}
7345 <cmr> \textquotedblleft = {540,100}, \textquotedblright = {500,100}
7346 <ebg> \textquotedblleft = {700,200}, \textquotedblright = {700,200}
7347 <ppl> \textquotedblleft = {500,300}, \textquotedblright = {500,300}
7348 <ptm> \textquotedblleft = {700,400}, \textquotedblright = {700,400}
7349 <ugm> \textquotedblleft = {600,200}, \textquotedblright = {600,200}
7350 }
7351
7352 <*cmr|ebg|pmn>
7353 \SetProtrusion
7354 <cmr> [name = cmr-it-OT1,
7355 <ebg> [name = EBGaramond-it-OT1,
7356 <pmn> [name = pmnj-it-OT1,
7357 <cmr> load = cmr-it]
7358 <ebg> load = EBGaramond-it]
7359 <pmn> load = pmnj-it]
7360 <cmr> { encoding = {OT1,OT4},
7361 <pmn> { encoding = OT1,
7362 <cmr> family = cmr,
7363 <pmn> family = pmnj,
7364 <cmr> shape = it }
7365 <pmn> shape = {it,sl} }
7366 <ebg> { }

```

```

7367 {
7368 <cmr> \AE = {100, },
7369 <pmn> \AE = { , -50},
7370 <cmr> \OE = {100, },
7371 <pmn> \OE = {50, }
7372 <*cmr|ebg>
7373 <cmr> "00 = {200,150}, % \Gamma
7374 <ebg> "00 = { ,150}, % \Gamma
7375 <cmr> "01 = {150,100}, % \Delta
7376 <ebg> "01 = {100,100}, % \Delta
7377 <cmr> "02 = {150, 50}, % \Theta
7378 <ebg> "02 = { 50, 50}, % \Theta
7379 <cmr> "03 = {150, 50}, % \Lambda
7380 <ebg> "03 = {100,100}, % \Lambda
7381 <cmr> "04 = {100,100}, % \Xi
7382 <ebg> "04 = { 50, 50}, % \Xi
7383 <cmr> "05 = {100,100}, % \Pi
7384 <cmr> "06 = {100, 50}, % \Sigma
7385 <cmr> "07 = {200,150}, % \Upsilon
7386 <ebg> "07 = {100,100}, % \Upsilon
7387 <cmr> "08 = {150, 50}, % \Phi
7388 <ebg> "08 = { 50, 50}, % \Phi
7389 <cmr> "09 = {150,100}, % \Psi
7390 <ebg> "09 = { 50, 50}, % \Psi
7391 "0A = { 50, 50}, % \Omega
7392 <ebg> 138 = { , 50}, % \L
7393 </cmr|ebg>
7394 }
7395
7396 </cmr|ebg|pmn>
7397 <*ebg>
7398 \SetProtrusion
7399 [name = EBGaramond-it-OT1-LF,
7400 load = EBGaramond-it-OT1]
7401 { encoding = OT1,
7402 family = {EBGaramond-LF,EBGaramond-TLF},
7403 shape = it }
7404 {
7405 1 = {50,50},
7406 2 = {50,50},
7407 3 = {80,50},
7408 4 = {50,50},
7409 5 = {50,50},
7410 6 = {50,50},
7411 7 = {50,50},
7412 8 = {50,50},
7413 9 = {50, },
7414 }
7415
7416 \SetProtrusion
7417 [name = EBGaramond-it-OT1-0sF,
7418 load = EBGaramond-it-OT1]
7419 { encoding = OT1,
7420 family = {EBGaramond-0sF},
7421 shape = it }
7422 {
7423 1 = {50,50},
7424 2 = {50,50},
7425 3 = { ,80},
7426 4 = {50,50},
7427 7 = {50,50},
7428 }
7429
7430 \SetProtrusion
7431 [name = EBGaramond-it-OT1-T0sF,

```

```

7432 load = EBGaramond-it-OT1]
7433 { encoding = OT1,
7434 family = {EBGaramond-T0sF},
7435 shape = it }
7436 {
7437 0 = {150,150},
7438 1 = {150,150},
7439 2 = {80,80},
7440 3 = {50,80},
7441 4 = {50,80},
7442 5 = {50,80},
7443 6 = {50,50},
7444 7 = {50,100},
7445 8 = {50,50},
7446 9 = {50,80},
7447 }
7448
7449 </ebg>
7450 \SetProtrusion
7451 <m-t> [name = T1-it-default,
7452 <bch> [name = bch-it-T1,
7453 <blg> [name = blg-it-T1,
7454 <cmr> [name = cmr-it-T1,
7455 <ebg> [name = EBGaramond-it-T1,
7456 <pmn> [name = pmnj-it-T1,
7457 <ppl> [name = ppl-it-T1,
7458 <ptm> [name = ptm-it-T1,
7459 <ugm> [name = ugm-it-T1,
7460 <m-t> load = OT1-it]
7461 <bch> load = bch-it]
7462 <blg> load = blg-T1]
7463 <cmr> load = cmr-it]
7464 <pmn> load = pmnj-it]
7465 <ebg> load = EBGaramond-it]
7466 <ppl> load = ppl-it]
7467 <ptm> load = ptm-it]
7468 <ugm> load = ugm-it]
7469 <m-t|bch|cmr|pmn|ppl> { encoding = {T1,LY1},
7470 <ebg> { encoding = {LY1},
7471 <blg|ptm|ugm> { encoding = T1,
7472 <bch> family = bch,
7473 <blg> family = blg,
7474 <cmr> family = cmr,
7475 <pmn> family = pmnj,
7476 <ebg> family = {EBGaramond-LF,EBGaramond-TLF,EBGaramond-0sF,EBGaramond-T0sF},
7477 <ppl> family = {ppl,pplx,pplj},
7478 <ptm> family = {ptm,ptmx,ptmj},
7479 <ugm> family = ugm,
7480 <m-t|bch|pmn|ppl|ptm> shape = {it,s1} }
7481 <blg|cmr|ebg|ugm> shape = it }
7482 {
7483 <m-t|bch|pmn> _ = { ,100},
7484 <blg> _ = {0,300},
7485 <cmr|ugm> _ = {100,200},
7486 <ebg|ppl|ptm> _ = {100,100},
7487 <blg> . = {400,600},
7488 <blg> {,}= {300,500},
7489 <cmr> \AE = {100, },
7490 <pmn> \AE = { , -50},
7491 <bch|pmn> \OE = { 50, },
7492 <cmr> \OE = {100, },
7493 <pmn> 031 = { , -100}, % ffl
7494 <cmr|ptm> 156 = {100, }, % IJ
7495 <ebg> 156 = {50, }, % IJ
7496 <pmn> 156 = {20, }, % IJ

```

```

7497 <pmn> 188 = { , -30}, % ij
7498 <pmn> \v t = { , 100},
7499 <m-t|ebg|ppl|ptm> \textbackslash = {100,200},
7500 <cmr|ugm> \textbackslash = {300,300},
7501 <bch> \textbackslash = {150,150},
7502 <pmn> \textbackslash = {100,150},
7503 <ugm> \textbar = {200,200},
7504 <cmr> \textquotedblleft = {500,300},
7505 <blg> \textquoteleft = {400,400}, \textquoteright = {400,400},
7506 <blg> \textquotedbl = {300,300}, \textquotedblleft = {300,300},
7507 <blg> \textquotedblright = {300,300}, \quotedblbase = {200,600},
7508 <m-t|ptm> \quotesinglbase = {300,700}, \quotedblbase = {400,500},
7509 <cmr> \quotesinglbase = {300,700}, \quotedblbase = {200,600},
7510 <bch|pmn> \quotesinglbase = {200,500}, \quotedblbase = {150,500},
7511 <ebg|ppl> \quotesinglbase = {500,500}, \quotedblbase = {400,400},
7512 <ugm> \quotesinglbase = {300,700}, \quotedblbase = {300,500},
7513 <m-t|ppl|ptm> \guilsinglleft = {400,400}, \guilsingright = {300,500},
7514 <bch|pmn> \guilsinglleft = {300,400}, \guilsingright = {200,500},
7515 <cmr> \guilsinglleft = {500,300}, \guilsingright = {400,400},
7516 <ebg> \guilsinglleft = {500,400}, \guilsingright = {300,500},
7517 <ugm> \guilsinglleft = {400,400}, \guilsingright = {300,600},
7518 <m-t|ppl> \guillemotleft = {300,300}, \guillemotright = {300,300},
7519 <bch|pmn> \guillemotleft = {200,300}, \guillemotright = {150,400},
7520 <cmr> \guillemotleft = {400,100}, \guillemotright = {200,300},
7521 <ebg> \guillemotleft = {300,300}, \guillemotright = {200,400},
7522 <ptm> \guillemotleft = {300,400}, \guillemotright = {200,400},
7523 <ugm> \guillemotleft = {300,400}, \guillemotright = {300,400},
7524 <m-t|ebg|ppl|ugm> \textexclamdown = {100, }, \textquestiondown = {200, },
7525 <cmr|ptm> \textexclamdown = {200, }, \textquestiondown = {200, },
7526 <pmn> \textexclamdown = {-50, }, \textquestiondown = {-50, },
7527 <m-t|ppl|ugm> \textbraceleft = {200,100}, \textbraceright = {200,200},
7528 <bch|pmn> \textbraceleft = {200, }, \textbraceright = { ,200},
7529 <cmr|ebg|ptm> \textbraceleft = {400,100}, \textbraceright = {200,200},
7530 <bch|pmn> \textless = {100, }, \textgreater = { ,100},
7531 <cmr|ebg|ppl|ptm> \textless = {300,100}, \textgreater = {200,100}
7532 <pmn> \textvisiblespace = {100,100}
7533 }
7534
7535 <*ebg>
7536 \SetProtrusion
7537 [name = EBGaramond-it-T1-LF,
7538 load = EBGaramond-it-T1]
7539 { encoding = T1,
7540 family = {EBGaramond-LF,EBGaramond-TLF},
7541 shape = it }
7542 {
7543 1 = {50,50},
7544 2 = {50,50},
7545 3 = {80,50},
7546 4 = {50,50},
7547 5 = {50,50},
7548 6 = {50,50},
7549 7 = {50,50},
7550 8 = {50,50},
7551 9 = {50, },
7552 }
7553
7554 \SetProtrusion
7555 [name = EBGaramond-it-T1-OsF,
7556 load = EBGaramond-it-T1]
7557 { encoding = T1,
7558 family = {EBGaramond-OsF},
7559 shape = it }
7560 {
7561 1 = {50,50},

```

```

7562 2 = {50,50},
7563 3 = { ,80},
7564 4 = {50,50},
7565 7 = {50,50},
7566 }
7567
7568 \SetProtrusion
7569 [name = EBGaramond-it-T1-T0sF,
7570 load = EBGaramond-it-T1]
7571 { encoding = T1,
7572 family = {EBGaramond-T0sF},
7573 shape = it }
7574 {
7575 0 = {150,150},
7576 1 = {150,150},
7577 2 = {80,80},
7578 3 = {50,80},
7579 4 = {50,80},
7580 5 = {50,80},
7581 6 = {50,50},
7582 7 = {50,100},
7583 8 = {50,50},
7584 9 = {50,80},
7585 }
7586
7587 (/ebg)
7588 <*m-t|cmr|pmn)
7589 \SetProtrusion
7590 <m-t) [name = T2A-it-default,
7591 <cmr) [name = cmr-it-T2A,
7592 <pmn) [name = pmnj-it-T2A,
7593 <m-t) load = OT1-it]
7594 <cmr) load = cmr-it]
7595 <pmn) load = pmnj-it]
7596 { encoding = T2A,
7597 <cmr) family = cmr,
7598 <pmn) family = pmnj,
7599 <m-t|pmn) shape = {it,sl} }
7600 <cmr) shape = it }
7601 {
7602 <cmr) \CYRA = {100,50},
7603 <pmn) \CYRA = {50, },
7604 <cmr) \CYRB = {50, },
7605 <cmr) \CYRV = {50, },
7606 <pmn) \CYRV = {20,-50},
7607 <cmr) \CYRG = {100, },
7608 <pmn) \CYRG = {10, },
7609 <cmr) \CYRD = {50, },
7610 <cmr) \CYRE = {50, },
7611 <pmn) \CYRE = {20,-50},
7612 <cmr) \CYRZH = {50, },
7613 <cmr) \CYRZ = {50, },
7614 <pmn) \CYRZ = {20,-50},
7615 <cmr) \CYRI = {50, },
7616 <pmn) \CYRI = { , -30},
7617 <cmr) \CYRISHRT = {50, },
7618 <cmr) \CYRK = {50, },
7619 <pmn) \CYRK = {20, },
7620 <cmr) \CYRL = {50, },
7621 <cmr) \CYRM = {50, },
7622 <pmn) \CYRM = { , -30},
7623 <cmr) \CYRN = {50, },
7624 <cmr) \CYRO = {100, },
7625 <pmn) \CYRO = {50, },
7626 <cmr) \CYRP = {50, },

```

```

7627 <cmr> \CYRR = {50, },
7628 <pmn> \CYRR = {20,-50},
7629 <cmr> \CYRS = {100, },
7630 <pmn> \CYRS = {50, },
7631 <cmr> \CYRT = {100, },
7632 <pmn> \CYRT = {70, },
7633 <cmr> \CYRU = {100, },
7634 <pmn> \CYRU = {50, },
7635 <cmr> \CYRF = {100, },
7636 <cmr> \CYRH = {50, },
7637 <cmr> \CYRC = {50, },
7638 <cmr> \CYRCH = {100, },
7639 <cmr> \CYRSH = {50, },
7640 <cmr> \CYRSHCH = {50, },
7641 <cmr> \CYRHRDSN = {100, },
7642 <cmr> \CYRERY = {50, },
7643 <cmr> \CYRSFTSN = {50, },
7644 <cmr> \CYREREV = {50, },
7645 <cmr> \CYRYU = {50, },
7646 <cmr> \CYRYA = {50, },
7647 <pmn> \CYRYA = { ,20},
7648 <pmn> \cyrr = {-50, },
7649 <m-t|pmn> _ = { ,100},
7650 <cmr> _ = {100,200},
7651 <pmn> 031 = { ,-100}, % ff1
7652 <pmn> \v t = { ,100},
7653 <m-t> \textbackslash = {100,200}, \quotedblbase = {400,500},
7654 <cmr> \textbackslash = {300,300}, \quotedblbase = {200,600},
7655 <pmn> \textbackslash = {100,150}, \quotedblbase = {150,500},
7656 <m-t> \guillemotleft = {300,300}, \guillemotright = {300,300},
7657 <cmr> \guillemotleft = {400,100}, \guillemotright = {200,300},
7658 <pmn> \guillemotleft = {200,300}, \guillemotright = {150,400},
7659 <m-t> \textbraceleft = {200,100}, \textbraceright = {200,200},
7660 <cmr> \textbraceleft = {400,100}, \textbraceright = {200,200},
7661 <pmn> \textbraceleft = {200, }, \textbraceright = { ,200},
7662 <cmr> \textquotedblleft = {500,300},
7663 <cmr> \textless = {300,100}, \textgreater = {200,100}
7664 <pmn> \textless = {100, }, \textgreater = { ,100}
7665 }
7666
7667 </m-t|cmr|pmn>
7668 <*m-t|ptm>
7669 \SetProtrusion
7670 <m-t> [name = QX-it-default,
7671 <ptm> [name = ptm-it-QX,
7672 <m-t> load = OT1-it]
7673 <ptm> load = ptm-it]
7674 { encoding = {QX},
7675 <ptm> family = {ptm,ptmx,ptmj},
7676 shape = {it,sl} }
7677 {
7678 <ptm> 009 = { , 50}, % fk
7679 {=} = {100,100},
7680 <m-t> \textunderscore = {100,100},
7681 <ptm> \textunderscore = {100,150},
7682 \textbackslash = {100,200},
7683 \quotedblbase = {300,400},
7684 <m-t> \guillemotleft = {300,300}, \guillemotright = {300,300},
7685 <ptm> \guillemotleft = {200,400}, \guillemotright = {200,400},
7686 \textexclamdown = {200, }, \textquestiondown = {200, },
7687 \textbraceleft = {200,100}, \textbraceright = {200,200},
7688 \textless = {100,100}, \textgreater = {100,100},
7689 \textminus = {200,200}, \textdegree = {300,150},
7690 <m-t> \copyright = {100,100}, \textregistered = {100,100}
7691 <ptm> \textregistered = {100,150}, \copyright = {100,150},

```



```

7692 <ptm> \textDelta = { 70, }, \textdelta = { , 50},
7693 <ptm> \textpi = { 50, 80}, \textmu = { , 80},
7694 <ptm> \texteuro = {200, }, \textellipsis = {100,200},
7695 <ptm> \textquoteleft = {500,400}, \textquoteright = {500,400},
7696 <ptm> \textquotedblleft = {500,300}, \textquotedblright = {400,400},
7697 <ptm> \textapprox = { 50, 50}, \textinfty = {100,100},
7698 <ptm> \textdagger = {150,150}, \textdaggerdbl = {100,100},
7699 <ptm> \textdiv = {150,150}, \textasciitilde = { 80, 80},
7700 <ptm> \texttimes = {100,150}, \textpm = { 50, 80},
7701 <ptm> \textbullet = {300,100}, \textperiodcentered = {300,300},
7702 <ptm> \textquotesingle = {500,500}, \textquotedbl = {300,300},
7703 <ptm> \textperthousand = { ,50}
7704 }
7705
7706 </m-t|ptm>
7707 <*cmr|bch>
7708 \SetProtrusion
7709 <cmr> [name = cmr-it-T5,
7710 <cmr> load = cmr-it]
7711 <bch> [name = bch-it-T5,
7712 <bch> load = bch-it]
7713 { encoding = T5,
7714 <bch> family = bch,
7715 <cmr> family = cmr,
7716 shape = it }
7717 {
7718 <bch> _ = { ,100},
7719 <cmr> _ = {100,200},
7720 <bch> \textbackslash = {150,150},
7721 <cmr> \textbackslash = {300,300},
7722 <bch> \quotesinglbase = {200,500}, \quotedblbase = {150,500},
7723 <cmr> \quotesinglbase = {300,700}, \quotedblbase = {200,600},
7724 <bch> \guilsinglleft = {300,400}, \guilsinglright = {200,500},
7725 <cmr> \guilsinglleft = {500,300}, \guilsinglright = {400,400},
7726 <bch> \guillemotleft = {200,300}, \guillemotright = {150,400},
7727 <cmr> \guillemotleft = {400,100}, \guillemotright = {200,300},
7728 <bch> \textbraceleft = {200, }, \textbraceright = { ,200},
7729 <cmr> \textbraceleft = {400,100}, \textbraceright = {200,200},
7730 <bch> \textless = {100, }, \textgreater = { ,100}
7731 <cmr> \textless = {300,100}, \textgreater = {200,100}
7732 }
7733
7734 </cmr|bch>

```

Slanted is very similar to italic.

```

7735 <*cmr>
7736 \SetProtrusion
7737 [name = cmr-sl,
7738 load = cmr-it-OT1]
7739 { encoding = {OT1,OT4},
7740 family = cmr,
7741 shape = sl }
7742 {
7743 L = { ,50},
7744 f = { , -50},
7745 - = {300, },
7746 \textendash = {400, }, \textemdash = {300, }
7747 }
7748
7749 \SetProtrusion
7750 [name = cmr-sl-T1,
7751 load = cmr-it-T1]
7752 { encoding = {T1,LY1},
7753 family = cmr,
7754 shape = sl }

```

```

7755 {
7756 L = { ,50},
7757 f = { ,-50},
7758 - = {300, },
7759 \textendash = {400, }, \textemdash = {300, }
7760 }
7761
7762 \SetProtrusion
7763 [name = cmr-sl-T2A,
7764 load = cmr-it-T2A]
7765 { encoding = T2A,
7766 family = cmr,
7767 shape = sl }
7768 {
7769 L = { ,50},
7770 f = { ,-50},
7771 - = {300, },
7772 \textendash = {400, }, \textemdash = {300, }
7773 }
7774
7775 \SetProtrusion
7776 [name = cmr-sl-T5,
7777 load = cmr-it-T5]
7778 { encoding = T5,
7779 family = cmr,
7780 shape = sl }
7781 {
7782 L = { ,50},
7783 f = { ,-50},
7784 - = {300, },
7785 \textendash = {400, }, \textemdash = {300, }
7786 }
7787
7788 \SetProtrusion
7789 [name = lmr-it-T1,
7790 load = cmr-it-T1]
7791 { encoding = {T1,LY1},
7792 family = lmr,
7793 shape = {it,sl} }
7794 {
7795 \textquotedblleft = { ,200}, \textquotedblright = { ,200},
7796 \quotesinglbase = { ,400}, \quotedblbase = { ,500}
7797 }
7798

```

Oldstyle numerals are slightly different.

```

7799 \SetProtrusion
7800 [name = cmr(oldstyle)-it,
7801 load = cmr-it-T1]
7802 { encoding = T1,
7803 family = {hfor,cmor},
7804 shape = {it,sl} }
7805 {
7806 1 = {250, 50},
7807 2 = {150,-100},
7808 3 = {100,-50},
7809 4 = {150,150},
7810 6 = {200, },
7811 7 = {200, 50},
7812 8 = {150,-50},
7813 9 = {100, 50}
7814 }
7815
7816 </cmr>
7817 < *pmn >

```

```

7818 \SetProtrusion
7819 [name = pmnx-it,
7820 load = pmnj-it]
7821 { encoding = OT1,
7822 family = pmnx,
7823 shape = {it,s1} }
7824 {
7825 1 = {100,150}
7826 }
7827
7828 \SetProtrusion
7829 [name = pmnx-it-T1,
7830 load = pmnj-it-T1]
7831 { encoding = {T1,LY1},
7832 family = pmnx,
7833 shape = {it,s1} }
7834 {
7835 1 = {100,150}
7836 }
7837
7838 \SetProtrusion
7839 [name = pmnx-it-T2A,
7840 load = pmnj-it-T2A]
7841 { encoding = {T2A},
7842 family = pmnx,
7843 shape = {it,s1} }
7844 {
7845 1 = {100,150}
7846 }
7847
7848 (/pmn)
7849 (*ptm)
7850 \SetProtrusion
7851 [name = ptm-it-LY1,
7852 load = ptm-it-T1]
7853 { encoding = {LY1},
7854 family = {ptm,ptmx,ptmj},
7855 shape = {it,s1} }
7856 {
7857 - = {100,100},
7858 \texttrademark = {100,100},
7859 \textregistered = {100,100},
7860 \textcopyright = {100,100},
7861 \textdegree = {300,100},
7862 \textminus = {200,200},
7863 \textellipsis = {100,200},
7864 % \texteuro = { , }, % ?
7865 \textcent = {100,100},
7866 \textquotesingle = {500, },
7867 \textflorin = {100, 70},
7868 \textdagger = {150,150},
7869 \textdaggerdbl = {100,100},
7870 \textbullet = {150,150},
7871 \textonesuperior = {150,100},
7872 \texttwosuperior = {150, 50},
7873 \textthreesuperior = {150, 50},
7874 \textparagraph = {100, },
7875 \textperiodcentered = {500,300},
7876 \textonequarter = { 50, },
7877 \textonehalf = { 50, },
7878 \textplusminus = {100,100},
7879 \textmultiply = {150,150},
7880 \textdivide = {150,150}
7881 }
7882

```

7883  $\langle /ptm \rangle$

### 2.8.3 Small caps

Small caps should inherit the values from their big brothers. Since values are relative to character width, we don't need to adjust them any further (but we have to reset some characters).

```

7884 $\langle *!(blg|ugm) \rangle$
7885 \SetProtrusion
7886 $\langle m-t \rangle$ [name = OT1-sc,
7887 $\langle bch \rangle$ [name = bch-sc,
7888 $\langle cmr \rangle$ [name = cmr-sc-OT1,
7889 $\langle ebg \rangle$ [name = EBGaramond-sc-OT1-Prop,
7890 $\langle pmn \rangle$ [name = pmnj-sc,
7891 $\langle ppl \rangle$ [name = ppl-sc,
7892 $\langle ptm \rangle$ [name = ptm-sc,
7893 $\langle m-t \rangle$ load = default]
7894 $\langle bch \rangle$ load = bch-default]
7895 $\langle cmr \rangle$ load = cmr-OT1]
7896 $\langle ebg \rangle$ load = EBGaramond-OT1-LF]
7897 $\langle pmn \rangle$ load = pmnj-default]
7898 $\langle ppl \rangle$ load = ppl-default]
7899 $\langle ptm \rangle$ load = ptm-default]
7900 $\langle m-t|bch|ebg|pmn \rangle$ { encoding = OT1,
7901 $\langle cmr|ppl|ptm \rangle$ { encoding = {OT1,OT4},
7902 $\langle bch \rangle$ family = bch,
7903 $\langle cmr \rangle$ family = cmr,
7904 $\langle ebg \rangle$ family = {EBGaramond-LF,EBGaramond-0sF},
7905 $\langle pmn \rangle$ family = pmnj,
7906 $\langle ppl \rangle$ family = {ppl,pplx,pplj},
7907 $\langle ptm \rangle$ family = {ptm,ptmx,ptmj},
7908 shape = sc }
7909 {
7910 a = {50,50},
7911 $\langle cmr|ebg|ppl|ptm \rangle$ \ae = {50, },
7912 $\langle bch|pmn \rangle$ c = {50, },
7913 $\langle bch|ebg|pmn \rangle$ d = { ,50},
7914 $\langle m-t|bch|cmr|ebg|pmn|ptm \rangle$ f = { ,50},
7915 $\langle bch|ebg|pmn \rangle$ g = {50, },
7916 $\langle m-t|cmr|ebg|pmn|ppl|ptm \rangle$ j = {50, },
7917 $\langle bch \rangle$ j = {100, },
7918 $\langle m-t|bch|cmr|ebg|pmn|ppl \rangle$ l = { ,50},
7919 $\langle ptm \rangle$ l = { ,80},
7920 $\langle m-t|bch|cmr|pmn|ppl \rangle$ 013 = { ,50}, % f1
7921 $\langle ptm \rangle$ 013 = { ,80}, % f1
7922 $\langle bch|ebg|pmn \rangle$ o = {50,50},
7923 $\langle ebg|pmn \rangle$ \oe = {50, },
7924 $\langle ppl \rangle$ p = { 0, 0},
7925 $\langle bch|ebg|pmn \rangle$ q = {50,70},
7926 $\langle ppl \rangle$ q = { 0, },
7927 $\langle m-t|cmr|ebg|pmn|ppl|ptm \rangle$ r = { , 0},
7928 t = {50,50},
7929 $\langle m-t|bch|cmr|ebg|pmn|ppl \rangle$ y = {50,50}
7930 $\langle ptm \rangle$ y = {80,80}
7931 }
7932
7933 $\langle *ebg \rangle$
7934 \SetProtrusion
7935 [name = EBGaramond-sc-OT1-Tab,
7936 load = EBGaramond-OT1-T0sF]
7937 { encoding = OT1,
7938 family = {EBGaramond-TLF,EBGaramond-T0sF},
7939 shape = sc }

```

```

7940 {
7941 a = {50,50},
7942 \ae = {50, },
7943 d = { ,50},
7944 f = { ,50},
7945 g = {50, },
7946 j = {50, },
7947 l = { ,50},
7948 o = {50,50},
7949 \oe = {50, },
7950 q = {50,70},
7951 r = { , 0},
7952 t = {50,50},
7953 y = {50,50}
7954 }
7955
7956 (/ebg)
7957 \SetProtrusion
7958 <m-t> [name = Tl-sc,
7959 <bch> [name = bch-sc-Tl,
7960 <cmr> [name = cmr-sc-Tl,
7961 <ebg> [name = EBGaramond-sc-Tl,
7962 <pmn> [name = pmnj-sc-Tl,
7963 <ppl> [name = ppl-sc-Tl,
7964 <ptm> [name = ptm-sc-Tl,
7965 <m-t> load = Tl-default]
7966 <bch> load = bch-Tl]
7967 <cmr> load = cmr-Tl]
7968 <ebg> load = EBGaramond-Tl]
7969 <pmn> load = pmnj-Tl]
7970 <ppl> load = ppl-Tl]
7971 <ptm> load = ptm-Tl]
7972 <!ebg> { encoding = {Tl,LYl},
7973 <ebg> { encoding = {LYl},
7974 <bch> family = bch,
7975 <cmr> family = cmr,
7976 <ebg> family = {EBGaramond-LF,EBGaramond-TLF,EBGaramond-OfF,EBGaramond-TOsF},
7977 <pmn> family = pmnj,
7978 <ppl> family = {ppl,pplx,pplj},
7979 <ptm> family = {ptm,ptmx,ptmj},
7980 shape = sc }
7981 {
7982 a = {50,50},
7983 <cmr|ebg|ppl|ptm> \ae = {50, },
7984 <bch|pmn> c = {50, },
7985 <bch|ebg|pmn> d = { ,50},
7986 <m-t|bch|cmr|ebg|pmn|ptm> f = { ,50},
7987 <bch|ebg|pmn> g = {50, },
7988 <m-t|cmr|ebg|pmn|ppl|ptm> j = {50, },
7989 <bch> j = {100, },
7990 <m-t|bch|cmr|ebg|pmn|ppl> l = { ,50},
7991 <ptm> l = { ,80},
7992 <m-t|bch|cmr|pmn|ppl> 029 = { ,50}, % fl
7993 <ptm> 029 = { ,80}, % fl
7994 <bch|ebg|pmn> o = {50,50},
7995 <bch|ebg|pmn> \oe = {50, },
7996 <ppl> p = { 0, 0},
7997 <bch|ebg|pmn> q = {50,70},
7998 <ppl> q = { 0, },
7999 <m-t|cmr|ebg|pmn|ppl|ptm> r = { , 0},
8000 t = {50,50},
8001 <m-t|bch|cmr|ebg|pmn|ppl> y = {50,50}
8002 <ptm> y = {80,80}
8003 }
8004

```

```

8005 /(big|ugm)
8006 (*m-t|cmr)
8007 \SetProtrusion
8008 (m-t) [name = T2A-sc,
8009 (cmr) [name = cmr-sc-T2A,
8010 (m-t) load = T2A-default]
8011 (cmr) load = cmr-T2A]
8012 { encoding = T2A,
8013 (cmr) family = cmr,
8014 shape = sc }
8015 {
8016 \cyra = {50,50},
8017 \cyrg = { ,50},
8018 \cyrt = {50,50},
8019 \cyrj = { ,50}
8020 }
8021
8022 (/m-t|cmr)
8023 (*m-t)
8024 \SetProtrusion
8025 [name = QX-sc,
8026 load = QX-default]
8027 { encoding = QX,
8028 shape = sc }
8029 {
8030 a = {50,50},
8031 f = { ,50},
8032 j = {50, },
8033 l = { ,50},
8034 013 = { ,50}, % fl
8035 r = { , 0},
8036 t = {50,50},
8037 y = {50,50}
8038 }
8039
8040 (/m-t)
8041 (*cmr|bch)
8042 \SetProtrusion
8043 (bch) [name = bch-sc-T5,
8044 (bch) [load = bch-T5]
8045 (cmr) [name = cmr-sc-T5,
8046 (cmr) [load = cmr-T5]
8047 { encoding = T5,
8048 (bch) family = bch,
8049 (cmr) family = cmr,
8050 shape = sc }
8051 {
8052 a = {50,50},
8053 (bch) c = {50, },
8054 (bch) d = { ,50},
8055 f = { ,50},
8056 (bch) g = {50, },
8057 (bch) j = {100, },
8058 (cmr) j = {50, },
8059 l = { ,50},
8060 (bch) o = {50,50},
8061 (bch) q = { 0, },
8062 (cmr) r = { , 0},
8063 t = {50,50},
8064 y = {50,50}
8065 }
8066
8067 (/cmr|bch)
8068 (*ebg)
8069 \SetProtrusion

```

```

8070 [name = EBGaramond-sc-T1-Prop,
8071 load = EBGaramond-T1-LF]
8072 { encoding = T1,
8073 family = {EBGaramond-LF,EBGaramond-0sF},
8074 shape = sc }
8075 {
8076 a = {50,50},
8077 \ae = {50, },
8078 d = { ,50},
8079 f = { ,50},
8080 g = {50, },
8081 j = {50, },
8082 l = { ,50},
8083 o = {50,50},
8084 \oe = {50, },
8085 q = {50,70},
8086 r = { , 0},
8087 t = {50,50},
8088 y = {50,50}
8089 }
8090
8091 \SetProtrusion
8092 [name = EBGaramond-sc-T1-Tab,
8093 load = EBGaramond-T1-T0sF]
8094 { encoding = T1,
8095 family = {EBGaramond-TLF,EBGaramond-T0sF},
8096 shape = sc }
8097 {
8098 a = {50,50},
8099 \ae = {50, },
8100 d = { ,50},
8101 f = { ,50},
8102 g = {50, },
8103 j = {50, },
8104 l = { ,50},
8105 o = {50,50},
8106 \oe = {50, },
8107 q = {50,70},
8108 r = { , 0},
8109 t = {50,50},
8110 y = {50,50}
8111 }
8112
8113 /ebg
8114 (*pmn)
8115 \SetProtrusion
8116 [name = pmnx-sc,
8117 load = pmnj-sc]
8118 { encoding = OT1,
8119 family = pmnx,
8120 shape = sc }
8121 {
8122 l = {230,180}
8123 }
8124
8125 \SetProtrusion
8126 [name = pmnx-sc-T1,
8127 load = pmnj-sc-T1]
8128 { encoding = {T1,LY1},
8129 family = pmnx,
8130 shape = sc }
8131 {
8132 l = {230,180}
8133 }
8134

```

### 2.8.4 Italic small caps

Minion provides real small caps in italics. The `slantsc` package calls them `scit`, Philipp Lehman's font installation guide suggests `si`.

```

8135 \SetProtrusion
8136 [name = pmnj-scit,
8137 load = pmnj-it]
8138 { encoding = OT1,
8139 family = pmnj,
8140 shape = {scit,si} }
8141 {
8142 a = {50, },
8143 \ae = { , -50},
8144 b = {20, -50},
8145 c = {50, -50},
8146 d = {20, 0},
8147 e = {20, -50},
8148 f = {10, 0},
8149 012 = {10, -50}, % fi
8150 013 = {10, -50}, % fl
8151 014 = {10, -50}, % ffi
8152 015 = {10, -50}, % ffl
8153 g = {50, -50},
8154 i = {20, -50},
8155 j = {20, 0},
8156 k = {20, },
8157 l = {20, 50},
8158 m = { , -30},
8159 n = { , -30},
8160 o = {50, },
8161 \oe = {50, -50},
8162 p = {20, -50},
8163 q = {50, },
8164 r = {20, 0},
8165 s = {20, -30},
8166 t = {70, },
8167 u = {50, -50},
8168 v = {100, },
8169 w = {100, },
8170 y = {50, },
8171 z = { , -50}
8172 }
8173
8174 \SetProtrusion
8175 [name = pmnj-scit-T1,
8176 load = pmnj-it-T1]
8177 { encoding = {T1,LY1},
8178 family = pmnj,
8179 shape = {scit,si} }
8180 {
8181 a = {50, },
8182 \ae = { , -50},
8183 b = {20, -50},
8184 c = {50, -50},
8185 d = {20, 0},
8186 e = {20, -50},
8187 f = {10, 0},
8188 028 = {10, -50}, % fi
8189 029 = {10, -50}, % fl
8190 030 = {10, -50}, % ffi
8191 031 = {10, -50}, % ffl
8192 g = {50, -50},
8193 i = {20, -50},
8194 188 = {20, 0}, % ij
8195 j = {20, 0},

```



```

8196 k = {20, },
8197 l = {20,50},
8198 m = { , -30},
8199 n = { , -30},
8200 o = {50, },
8201 \oe = {50,-50},
8202 p = {20,-50},
8203 q = {50, },
8204 r = {20, 0},
8205 s = {20,-30},
8206 t = {70, },
8207 u = {50,-50},
8208 v = {100, },
8209 w = {100, },
8210 y = {50, },
8211 z = { , -50}
8212 }
8213
8214 \SetProtrusion
8215 [name = pmnx-scit,
8216 load = pmnj-scit]
8217 { encoding = OT1,
8218 family = pmnx,
8219 shape = {scit,si} }
8220 {
8221 l = {100,150}
8222 }
8223
8224 \SetProtrusion
8225 [name = pmnx-scit-T1,
8226 load = pmnj-scit-T1]
8227 { encoding = {T1,LY1},
8228 family = pmnx,
8229 shape = {scit,si} }
8230 {
8231 l = {100,150}
8232 }
8233
8234 </pmn>
8235 <*ebg>

```

For small caps italics, we copy the definitions from the small caps settings, except that we first load the italics settings.

```

8236 \SetProtrusion
8237 [name = EBGaramond-scit-OT1-Prop,
8238 load = EBGaramond-it-OT1-LF]
8239 { encoding = OT1,
8240 family = {EBGaramond-LF,EBGaramond-OfF},
8241 shape = scit }
8242 {
8243 a = {50,50},
8244 \ae = {50, },
8245 d = { ,50},
8246 f = { ,50},
8247 g = {50, },
8248 j = {50, },
8249 l = { ,50},
8250 o = {50,50},
8251 \oe = {50, },
8252 q = {50,70},
8253 r = { , 0},
8254 t = {50,50},
8255 y = {50,50}
8256 }
8257

```

```
8258 \SetProtrusion
8259 [name = EBGaramond-scit-OT1-Tab,
8260 load = EBGaramond-it-OT1-T0sF]
8261 { encoding = OT1,
8262 family = {EBGaramond-TLF,EBGaramond-T0sF},
8263 shape = scit }
8264 {
8265 a = {50,50},
8266 \ae = {50, },
8267 d = { ,50},
8268 f = { ,50},
8269 g = {50, },
8270 j = {50, },
8271 l = { ,50},
8272 o = {50,50},
8273 \oe = {50, },
8274 q = {50,70},
8275 r = { , 0},
8276 t = {50,50},
8277 y = {50,50}
8278 }
8279
8280 \SetProtrusion
8281 [name = EBGaramond-scit-T1-Prop,
8282 load = EBGaramond-it-T1-LF]
8283 { encoding = T1,
8284 family = {EBGaramond-LF,EBGaramond-0sF},
8285 shape = scit }
8286 {
8287 a = {50,50},
8288 \ae = {50, },
8289 d = { ,50},
8290 f = { ,50},
8291 g = {50, },
8292 j = {50, },
8293 l = { ,50},
8294 o = {50,50},
8295 \oe = {50, },
8296 q = {50,70},
8297 r = { , 0},
8298 t = {50,50},
8299 y = {50,50}
8300 }
8301
8302 \SetProtrusion
8303 [name = EBGaramond-scit-T1-Tab,
8304 load = EBGaramond-it-T1-T0sF]
8305 { encoding = T1,
8306 family = {EBGaramond-TLF,EBGaramond-T0sF},
8307 shape = scit }
8308 {
8309 a = {50,50},
8310 \ae = {50, },
8311 d = { ,50},
8312 f = { ,50},
8313 g = {50, },
8314 j = {50, },
8315 l = { ,50},
8316 o = {50,50},
8317 \oe = {50, },
8318 q = {50,70},
8319 r = { , 0},
8320 t = {50,50},
8321 y = {50,50}
8322 }
```

8323  
8324 */ebg*

### 2.8.5 Text companion

Finally the TS1 encoding. Still quite incomplete for Times and especially Palatino.  
Anybody?

```

8325 \SetProtrusion
8326 m-t [name = textcomp]
8327 bch [name = bch-textcomp]
8328 blg [name = blg-textcomp]
8329 cmr [name = cmr-textcomp]
8330 ebg [name = EBGaramond-textcomp]
8331 pmn [name = pmn-textcomp]
8332 ppl [name = ppl-textcomp]
8333 ptm [name = ptm-textcomp]
8334 ugm [name = ugm-textcomp]
8335 m-t { encoding = TS1 }
8336 !m-t { encoding = TS1,
8337 bch family = bch }
8338 blg family = blg }
8339 cmr family = cmr }
8340 ebg family = {EBGaramond-LF,EBGaramond-TLF,EBGaramond-OsF,EBGaramond-TOsF} }
8341 pmn family = {pmnx,pmnj} }
8342 ppl family = {ppl,pplx,pplj} }
8343 ptm family = {ptm,ptmx,ptmj} }
8344 ugm family = ugm }
8345 {
8346 blg \textquotestraightbase = {400,500},
8347 cmr \textquotestraightbase = {300,300},
8348 ebg|pmn \textquotestraightbase = {400,400},
8349 blg \textquotestraightdblbase = {300,400},
8350 cmr|pmn \textquotestraightdblbase = {300,300},
8351 ebg \textquotestraightdblbase = {400,400},
8352 bch|cmr|ebg|pmn|ugm \texttwelvewardash = {200,200},
8353 bch|cmr|ebg|pmn \textthreequartersemdash = {150,150},
8354 ugm \textthreequartersemdash = {200,200},
8355 blg \textquotesingle = {500,600},
8356 cmr|pmn \textquotesingle = {300,400},
8357 ebg \textquotesingle = {400,500},
8358 ptm \textquotesingle = {500,500},
8359 ugm \textquotesingle = {300,500},
8360 bch|cmr|pmn \textasteriskcentered = {200,300},
8361 blg \textasteriskcentered = {150,200},
8362 ebg \textasteriskcentered = {300,300},
8363 ugm \textasteriskcentered = {100,200},
8364 pmn \textfractionsolidus = {-200,-200},
8365 cmr \textoneoldstyle = {100,100},
8366 pmn \textoneoldstyle = { , 50},
8367 cmr \textthreeoldstyle = { , 50},
8368 ebg|pmn \textthreeoldstyle = { 50, },
8369 cmr \textfouroldstyle = { 50, 50},
8370 ebg|pmn \textfouroldstyle = { 50, },
8371 cmr|ebg|pmn \textsevenoldstyle = { 50, 80},
8372 cmr \textlangle = {400, },
8373 cmr \textrangle = { ,400},
8374 m-t|bch|pmn|ptm \textminus = {200,200},
8375 cmr|ebg|ppl \textminus = {300,300},
8376 blg|ugm \textminus = {250,300},
8377 bch|ebg|pmn \textlbrackdbl = {100, },
8378 blg \textlbrackdbl = {200, },
8379 bch|ebg|pmn \textrbrackdbl = { ,100},
8380 blg \textrbrackdbl = { ,200},
8381 pmn \textasciigrave = {200,500},

```

```

8382 <bch|blg|cmr|ebg|pmn> \texttildebelow = {200,250},
8383 <pmn> \textasciibreve = {300,400},
8384 <pmn> \textasciicaron = {300,400},
8385 <pmn> \textacutedbl = {200,300},
8386 <pmn> \textgravedbl = {150,300},
8387 <bch|pmn|ugm> \textdagger = { 80, 80},
8388 <blg> \textdagger = {200,200},
8389 <cmr|ebg> \textdagger = {100,100},
8390 <ptm> \textdagger = {150,150},
8391 <blg> \textdaggerdbl = {150,150},
8392 <cmr|ebg|pmn> \textdaggerdbl = { 80, 80},
8393 <ptm> \textdaggerdbl = {100,100},
8394 <bch> \textbardbl = {100,100},
8395 <blg|ugm> \textbardbl = {150,150},
8396 <bch> \textbullet = {200,200},
8397 <blg> \textbullet = {400,500},
8398 <cmr|ebg|pmn> \textbullet = { ,100},
8399 <ptm> \textbullet = {150,150},
8400 <ugm> \textbullet = { 50,100},
8401 <bch|cmr|pmn> \textcelsius = { 50, },
8402 <ebg> \textcelsius = { 80, },
8403 <bch> \textflorin = { 50, 50},
8404 <blg> \textflorin = {100,100},
8405 <ebg|ugm> \textflorin = { ,100},
8406 <pmn> \textflorin = { 50,100},
8407 <ptm> \textflorin = { 50, 70},
8408 <cmr> \textcolonmonetary = { , 50},
8409 <ebg|pmn> \textcolonmonetary = { 50, },
8410 <pmn> \textinterrobang = { ,100},
8411 <pmn> \textinterrobangdown = {100, },
8412 <m-t|ebg|ptm> \texttrademark = {100,100},
8413 <bch> \texttrademark = {150,150},
8414 <blg|cmr|ppl> \texttrademark = {200,200},
8415 <pmn> \texttrademark = { 50, 50},
8416 <ugm> \texttrademark = {100,150},
8417 <bch|ugm> \textcent = { 50, },
8418 <ptm> \textcent = {100,100},
8419 <bch> \textsterling = { 50, },
8420 <ugm> \textsterling = { , 50},
8421 <bch> \textbrokenbar = {200,200},
8422 <blg> \textbrokenbar = {250,250},
8423 <ugm> \textbrokenbar = {200,300},
8424 <pmn> \textasciidieresis = {300,400},
8425 <m-t|bch|cmr|ebg|ptm|ugm> \textcopyright = {100,100},
8426 <pmn> \textcopyright = {100,150},
8427 <ppl> \textcopyright = {200,200},
8428 <bch|cmr|ugm> \textordfeminine = {100,200},
8429 <ebg|pmn> \textordfeminine = {200,200},
8430 <bch|cmr|ebg|pmn|ugm> \textlnot = {200, },
8431 <blg> \textlnot = {200,100},
8432 <m-t|bch|cmr|ebg|ptm|ugm> \textregistered = {100,100},
8433 <pmn> \textregistered = { 50,150},
8434 <ppl> \textregistered = {200,200},
8435 <pmn> \textasciimacron = {150,200},
8436 <m-t|ppl|ptm> \textdegree = {300,300},
8437 <bch> \textdegree = {150,200},
8438 <blg|ugm> \textdegree = {200,200},
8439 <cmr|ebg> \textdegree = {400,400},
8440 <pmn> \textdegree = {150,400},
8441 <bch|cmr|ebg|pmn|ugm> \textpm = {150,200},
8442 <blg> \textpm = {100,100},
8443 <ptm> \textpm = { 50, 80},
8444 <bch|blg|ugm> \texttwosuperior = {100,200},
8445 <cmr> \texttwosuperior = { 50,100},
8446 <ebg|pmn> \texttwosuperior = {200,200},

```

```

8447 <ptm> \texttwosuperior = { 50, 50},
8448 <bch|blg|ugm> \textthreesuperior = {100,200},
8449 <cmr> \textthreesuperior = { 50,100},
8450 <ebg|pmn> \textthreesuperior = {200,200},
8451 <ptm> \textthreesuperior = { 50, 50},
8452 <pmn> \textasciicute = {300,400},
8453 <bch|ugm> \textmu = { ,100},
8454 <bch|ebg|pmn> \textparagraph = { ,100},
8455 <bch|cmr|ebg|pmn> \textperiodcentered = {300,400},
8456 <blg> \textperiodcentered = {400,500},
8457 <ptm> \textperiodcentered = {300,300},
8458 <ugm> \textperiodcentered = {200,500},
8459 <bch|blg|ugm> \textonesuperior = {200,300},
8460 <cmr|ebg|pmn> \textonesuperior = {200,200},
8461 <ptm> \textonesuperior = {100,100},
8462 <bch|ebg|pmn|ugm> \textordmasculine = {200,200},
8463 <blg|cmr> \textordmasculine = {100,200},
8464 <bch|cmr|pmn> \texteuro = {100, },
8465 <ebg> \texteuro = { 50,100},
8466 <bch> \texttimes = {200,200},
8467 <blg|ptm> \texttimes = {100,100},
8468 <cmr> \texttimes = {150,250},
8469 <ebg> \texttimes = {100,150},
8470 <pmn> \texttimes = { 70,100},
8471 <ugm> \texttimes = {200,300},
8472 <bch|ebg|pmn> \textdiv = {150,200}
8473 <blg> \textdiv = {100,100}
8474 <cmr> \textdiv = {150,250}
8475 <ptm> \textdiv = { 50,100},
8476 <ugm> \textdiv = {200,300},
8477 <ptm> \textperthousand = { ,50}
8478 <ugm> \textsection = { ,100},
8479 <ugm> \textonehalf = { 50,100},
8480 <ugm> \textonequarter = { 50,100},
8481 <ugm> \textthreequarters = { 50,100},
8482 <ugm> \textsurd = { ,100}

```

Remaining slots in the source file.

```

8483 }
8484
8485 <*cmr|ebg|pmn|ugm>
8486 \SetProtrusion
8487 <cmr> [name = cmr-textcomp-it]
8488 <ebg> [name = EBGaramond-textcomp-it]
8489 <pmn> [name = pmn-textcomp-it]
8490 <ugm> [name = ugm-textcomp-it]
8491 { encoding = TS1,
8492 <cmr> family = cmr,
8493 <ebg> family = {EBGaramond-LF,EBGaramond-TLF,EBGaramond-OsF,EBGaramond-TOsF},
8494 <pmn> family = {pmnx,pmnj},
8495 <ugm> family = ugm,
8496 <cmr|pmn> shape = {it,s1} }
8497 <ebg|ugm> shape = it }
8498 {
8499 <cmr> \textquotestraightbase = {300,600},
8500 <ebg|pmn> \textquotestraightbase = {400,400},
8501 <cmr> \textquotestraightdblbase = {300,600},
8502 <ebg> \textquotestraightdblbase = {300,400},
8503 <pmn> \textquotestraightdblbase = {300,300},
8504 \texttwelveudash = {200,200},
8505 <cmr|ebg|pmn> \textthreequartersemdash = {150,150},
8506 <ugm> \textthreequartersemdash = {200,200},
8507 <cmr> \textquotesingle = {600,300},
8508 <ebg> \textquotesingle = {800,100},
8509 <pmn> \textquotesingle = {300,200},

```

```

8510 <ugm> \textquotesingle = {500,500},
8511 <cmr> \textasteriskcentered = {300,200},
8512 <ebg> \textasteriskcentered = {500,100},
8513 <pmn> \textasteriskcentered = {200,300},
8514 <ugm> \textasteriskcentered = {300,150},
8515 <pmn> \textfractionsolidus = {-200,-200},
8516 <cmr> \textoneoldstyle = {100, 50},
8517 <ebg> \textoneoldstyle = {100, },
8518 <pmn> \textoneoldstyle = { 50, },
8519 <ebg> \texttwooldstyle = { 50, },
8520 <pmn> \texttwooldstyle = {-50, },
8521 <cmr> \textthreeoldstyle = {100, 50},
8522 <pmn> \textthreeoldstyle = {-100, },
8523 <cmr> \textfouroldstyle = { 50, 50},
8524 <ebg> \textfouroldstyle = { 50,100},
8525 <cmr> \textsevenoldstyle = { 50, 80},
8526 <ebg> \textsevenoldstyle = { 50, },
8527 <pmn> \textsevenoldstyle = { 20, },
8528 <cmr> \textlangle = {400, },
8529 <cmr> \textrightangle = { ,400},
8530 <cmr|ebg> \textminus = = {300,300},
8531 <pmn> \textminus = {200,200},
8532 <ugm> \textminus = {250,300},
8533 <ebg|pmn> \textlbrackdbl = {100, },
8534 <ebg|pmn> \textrbrackdbl = { ,100},
8535 <pmn> \textasciigrave = {300,300},
8536 <cmr|ebg|pmn> \texttildebelow = {200,250},
8537 <pmn> \textasciibreve = {300,300},
8538 <pmn> \textasciicaron = {300,300},
8539 <pmn> \textacutedbl = {200,300},
8540 <pmn> \textgravedbl = {150,300},
8541 <cmr> \textdagger = {100,100},
8542 <ebg> \textdagger = {200,100},
8543 <pmn> \textdagger = { 80, 50},
8544 <ugm> \textdagger = { 80, 80},
8545 <cmr|ebg> \textdaggerdbl = = { 80, 80},
8546 <pmn> \textdaggerdbl = { 80, 50},
8547 <ugm> \textbardbl = {150,150},
8548 <cmr> \textbullet = {200,100},
8549 <ebg> \textbullet = {300, },
8550 <pmn> \textbullet = { 30, 70},
8551 <ugm> \textbullet = { 50,100},
8552 <cmr> \textcelsius = {100, },
8553 <ebg> \textcelsius = {200, },
8554 <pmn> \textcelsius = { 50,-50},
8555 <ebg> \textflorin = {100, },
8556 <pmn> \textflorin = { 50,100},
8557 <ugm> \textflorin = { ,100},
8558 <cmr> \textcolonmonetary = {150, },
8559 <ebg> \textcolonmonetary = {100, },
8560 <pmn> \textcolonmonetary = { 50,-50},
8561 <cmr|ebg> \texttrademark = {200, },
8562 <pmn> \texttrademark = { 50,100},
8563 <ugm> \texttrademark = {150, 50},
8564 <ugm> \textcent = { 50, },
8565 <ugm> \textsterling = { , 50},
8566 <ugm> \textbrokenbar = {200,300},
8567 <pmn> \textasciidieresis = {300,200},
8568 <cmr> \textcopyright = {100, },
8569 <ebg> \textcopyright = {200,100},
8570 <pmn> \textcopyright = {100,150},
8571 <ugm> \textcopyright = {300, },
8572 <cmr> \textordfeminine = {100,100},
8573 <pmn> \textordfeminine = {200,200},
8574 <ugm> \textordfeminine = {100,200},

```

```

8575 <cmr|ebg> \textlnot = {300, },
8576 <pmn|ugm> \textlnot = {200, },
8577 <cmr> \textregistered = {100, },
8578 <ebg> \textregistered = {200,100},
8579 <pmn> \textregistered = { 50,150},
8580 <ugm> \textregistered = {300, },
8581 <pmn> \textasciimacron = {150,200},
8582 <cmr|ebg> \textdegree = {500,100},
8583 <pmn> \textdegree = {150,150},
8584 <ugm> \textdegree = {300,200},
8585 <cmr> \textpm = {150,100},
8586 <ebg> \textpm = {200,150},
8587 <pmn|ugm> \textpm = {150,200},
8588 <cmr> \textonesuperior = {400, },
8589 <ebg> \textonesuperior = {300,100},
8590 <pmn> \textonesuperior = {200,100},
8591 <ugm> \textonesuperior = {300,300},
8592 <cmr> \texttwosuperior = {400, },
8593 <ebg> \texttwosuperior = {300, },
8594 <pmn> \texttwosuperior = {200,100},
8595 <ugm> \texttwosuperior = {300,200},
8596 <cmr> \textthreesuperior = {400, },
8597 <ebg> \textthreesuperior = {300, },
8598 <pmn> \textthreesuperior = {200,100},
8599 <ugm> \textthreesuperior = {300,200},
8600 <ugm> \textmu = { ,100},
8601 <pmn> \textasciiaacute = {300,200},
8602 <cmr> \textparagraph = {200, },
8603 <pmn> \textparagraph = { ,100},
8604 <cmr> \textperiodcentered = {500,500},
8605 <ebg|pmn|ugm> \textperiodcentered = {300,400},
8606 <cmr> \textordmasculine = {100,100},
8607 <pmn> \textordmasculine = {200,200},
8608 <ugm> \textordmasculine = {300,200},
8609 <cmr> \texteuro = {200, },
8610 <ebg> \texteuro = {100, },
8611 <pmn> \texteuro = {100,-50},
8612 <cmr> \texttimes = {200,200},
8613 <ebg> \texttimes = {200,100},
8614 <pmn> \texttimes = { 70,100},
8615 <ugm> \texttimes = {200,300},
8616 <cmr|ebg> \textdiv = {200,200}
8617 <pmn> \textdiv = {150,200}
8618 <ugm> \textdiv = {200,300},
8619 <ugm> \textsection = { ,200},
8620 <ugm> \textonehalf = { 50,100},
8621 <ugm> \textonequarter = { 50,100},
8622 <ugm> \textthreequarters = { 50,100},
8623 <ugm> \textsurd = { ,100}
8624 }
8625
8626 </cmr|ebg|pmn|ugm>

```

## 2.8.6 Computer Modern math

Now to the math symbols for Computer Modern Roman. Definitions have been extracted from fontmath.ltx. I did not spend too much time fiddling with these settings, so they can surely be improved.

The math font ‘operators’ (also used for the `\mathrm` and `\mathbf` alphabets) is OT1/cmr, which we’ve already set up above. It’s declared as:

```

\DeclareSymbolFont{operators}{OT1}{cmr}{m}{n}
\SetSymbolFont{operators}{bold}{OT1}{cmr}{bx}{n}

```

$\backslash\mathit$  (OT1/cmr/m/it) is also already set up.  
 There are (for the moment) no settings for  $\backslash\mathsf$  and  $\backslash\mathtt$ .  
 Math font 'letters' (also used as  $\backslash\mathnormal$ ) is declared as:

```
\DeclareSymbolFont{letters} {OML}{cmm}{m}{it}
\SetSymbolFont{letters} {bold}{OML}{cmm}{b}{it}
```

```
8627 (*cmr)
8628 \SetProtrusion
8629 [name = cmr-math-letters]
8630 { encoding = OML,
8631 family = cmm,
8632 series = {m,b},
8633 shape = it }
8634 {
8635 A = {100, 50}, % \mathnormal
8636 B = { 50, },
8637 C = { 50, },
8638 D = { 50, 50},
8639 E = { 50, },
8640 F = {100, 50},
8641 G = { 50, 50},
8642 H = { 50, 50},
8643 I = { 50, 50},
8644 J = {150, 50},
8645 K = { 50,100},
8646 L = { 50, 50},
8647 M = { 50, },
8648 N = { 50, },
8649 O = { 50, },
8650 P = { 50, },
8651 Q = { 50, 50},
8652 R = { 50, },
8653 S = { 50, },
8654 T = { 50,100},
8655 U = { 50, 50},
8656 V = {100,100},
8657 W = { 50,100},
8658 X = { 50,100},
8659 Y = {100,100},
8660 f = {100,100},
8661 h = { ,100},
8662 i = { , 50},
8663 j = { , 50},
8664 k = { , 50},
8665 r = { , 50},
8666 v = { , 50},
8667 w = { , 50},
8668 x = { , 50},
8669 "0B = { 50,100}, % \alpha
8670 "0C = { 50, 50}, % \beta
8671 "0D = {200,150}, % \gamma
8672 "0E = { 50, 50}, % \delta
8673 "0F = { 50, 50}, % \epsilon
8674 "10 = { 50,150}, % \zeta
8675 "12 = { 50, }, % \theta
8676 "13 = { ,100}, % \iota
8677 "14 = { ,100}, % \kappa
8678 "15 = {100, 50}, % \lambda
8679 "16 = { , 50}, % \mu
8680 "17 = { , 50}, % \nu
8681 "18 = { , 50}, % \xi
8682 "19 = { 50,100}, % \pi
8683 "1A = { 50, 50}, % \rho
8684 "1B = { ,150}, % \sigma
```



```

8685 "1C = { 50,150}, % \tau
8686 "1D = { 50, 50}, % \upsilon
8687 "1F = { 50,100}, % \chi
8688 "20 = { 50, 50}, % \psi
8689 "21 = { , 50}, % \omega
8690 "22 = { , 50}, % \varepsilon
8691 "23 = { , 50}, % \vartheta
8692 "24 = { , 50}, % \varpi
8693 "25 = {100, }, % \varrho
8694 "26 = {100,100}, % \varsigma
8695 "27 = { 50, 50}, % \varphi
8696 "28 = {100,100}, % \leftharpoonup
8697 "29 = {100,100}, % \leftharpoondown
8698 "2A = {100,100}, % \rightharpoonup
8699 "2B = {100,100}, % \rightharpoondown
8700 "2C = {300,200}, % \lhook
8701 "2D = {200,300}, % \rhook
8702 "2E = { ,100}, % \triangleright
8703 "2F = {100, }, % \triangleleft
8704 "3A = { ,500}, % \cdot
8705 "3B = { ,500}, % ,
8706 "3C = {200,100}, % <
8707 "3D = {300,400}, % /
8708 "3E = {100,200}, % >
8709 "3F = {200,200}, % \star
8710 "5B = { ,100}, % \flat
8711 "5E = {200,200}, % \smile
8712 "5F = {200,200}, % \frown
8713 "7C = {100, }, % \jmath
8714 "7D = { ,100} % \wp

```

Remaining slots in the source file.

```

8715 }
8716

```

Math font ‘symbols’ (also used for the `\mathcal` alphabet) is declared as:

```

\DeclareSymbolFont{symbols} {OMS}{cmsy}{m}{n}
\SetSymbolFont{symbols} {bold}{OMS}{cmsy}{b}{n}

```

```

8717 \SetProtrusion
8718 [name = cmr-math-symbols]
8719 { encoding = OMS,
8720 family = cmsy,
8721 series = {m,b},
8722 shape = n }
8723 {
8724 A = {150, 50}, % \mathcal
8725 C = { ,100},
8726 D = { , 50},
8727 F = { 50,150},
8728 I = { ,100},
8729 J = {100,150},
8730 K = { ,100},
8731 L = {100, },
8732 M = { 50, 50},
8733 N = { 50,100},
8734 P = { , 50},
8735 Q = { 50, },
8736 R = { , 50},
8737 T = { 50,150},
8738 V = { 50, 50},
8739 W = { , 50},
8740 X = {100,100},
8741 Y = {100, },
8742 Z = {100,150},

```

```

8743 "00 = {300,300}, % -
8744 "01 = { ,700}, % \cdot, \cdotp
8745 "02 = {150,250}, % \times
8746 "03 = {150,250}, % *, \ast
8747 "04 = {200,300}, % \div
8748 "05 = {150,250}, % \diamond
8749 "06 = {200,200}, % \pm
8750 "07 = {200,200}, % \mp
8751 "08 = {100,100}, % \oplus
8752 "09 = {100,100}, % \ominus
8753 "0A = {100,100}, % \otimes
8754 "0B = {100,100}, % \oslash
8755 "0C = {100,100}, % \odot
8756 "0D = {100,100}, % \bigcirc
8757 "0E = {100,100}, % \circ
8758 "0F = {100,100}, % \bullet
8759 "10 = {100,100}, % \asymp
8760 "11 = {100,100}, % \equiv
8761 "12 = {200,100}, % \subseteq
8762 "13 = {100,200}, % \supseteq
8763 "14 = {200,100}, % \leq
8764 "15 = {100,200}, % \geq
8765 "16 = {200,100}, % \preceq
8766 "17 = {100,200}, % \succeq
8767 "18 = {200,200}, % \sim
8768 "19 = {150,150}, % \approx
8769 "1A = {200,100}, % \subset
8770 "1B = {100,200}, % \supset
8771 "1C = {200,100}, % \ll
8772 "1D = {100,200}, % \gg
8773 "1E = {300,100}, % \prec
8774 "1F = {100,300}, % \succ
8775 "20 = {100,200}, % \leftarrow
8776 "21 = {200,100}, % \rightarrow
8777 "22 = {100,100}, % \uparrow
8778 "23 = {100,100}, % \downarrow
8779 "24 = {100,100}, % \leftrightarrows
8780 "25 = {100,100}, % \nearrow
8781 "26 = {100,100}, % \searrow
8782 "27 = {100,100}, % \simeq
8783 "28 = {100,100}, % \Leftarrow
8784 "29 = {100,100}, % \Rightarrow
8785 "2A = {100,100}, % \Uparrow
8786 "2B = {100,100}, % \Downarrow
8787 "2C = {100,100}, % \Leftrightarrow
8788 "2D = {100,100}, % \nrightarrow
8789 "2E = {100,100}, % \swarrow
8790 "2F = { ,100}, % \propto
8791 "30 = { ,400}, % \prime
8792 "31 = {100,100}, % \infty
8793 "32 = {150,100}, % \in
8794 "33 = {100,150}, % \ni
8795 "34 = {100,100}, % \triangle, \bigtriangleup
8796 "35 = {100,100}, % \bigtriangledown
8797 "38 = { ,100}, % \forall
8798 "39 = {100, }, % \exists
8799 "3A = {200, }, % \neg
8800 "3E = {200,200}, % \top
8801 "3F = {200,200}, % \bot, \perp
8802 "5E = {100,200}, % \wedge
8803 "5F = {100,200}, % \vee
8804 "60 = { ,300}, % \vdash
8805 "61 = {300, }, % \dashv
8806 "62 = {100,100}, % \lfloor
8807 "63 = {100,100}, % \rfloor

```

```

8808 "64 = {100,100}, % \lceil
8809 "65 = {100,100}, % \rceil
8810 "66 = {150, }, % \lbrace
8811 "67 = { ,150}, % \rbrace
8812 "68 = {400, }, % \langle
8813 "69 = { ,400}, % \rangle
8814 "6C = {100,100}, % \updownarrow
8815 "6D = {100,100}, % \Updownarrow
8816 "6E = {100,300}, % \, \backslash, \setminus
8817 "72 = {100,100}, % \nabla
8818 "79 = {200,200}, % \dagger
8819 "7A = {100,100}, % \ddagger
8820 "7B = {100, }, % \mathparagraph
8821 "7C = {100,100}, % \clubsuit
8822 "7D = {100,100}, % \diamondsuit
8823 "7E = {100,100}, % \heartsuit
8824 "7F = {100,100} % \spadesuit

```

Remaining slots in the source file.

```

8825 }
8826

```

We don't bother about 'largsymbols', since it will only be used in display math, where protrusion doesn't work anyway. It's declared as:

```
\DeclareSymbolFont{largsymbols}{OMX}{cmex}{m}{n}
```

```

8827 </cmr>
8828 </cfg-t>

```

### 2.8.7 AMS symbols

Settings for the AMS math fonts (amssymb).

```
8829 <*cfg-u>
```

Symbol font 'a'.

```

8830 <*msa>
8831 \SetProtrusion
8832 [name = AMS-a]
8833 { encoding = U,
8834 family = msa }
8835 {
8836 "05 = {150,250}, % \centerdot
8837 "06 = {100,100}, % \lozenge
8838 "07 = { 50, 50}, % \blacklozenge
8839 "08 = { 50, 50}, % \circlearrowright
8840 "09 = { 50, 50}, % \circlearrowleft
8841 "0A = {100,100}, % \rightleftharpoons
8842 "0B = {100,100}, % \leftrightharpoons
8843 "0D = {-50,200}, % \Vdash
8844 "0E = {-50,200}, % \Vvdash
8845 "0F = {-70,150}, % \vDash
8846 "10 = {100,150}, % \twoheadrightarrow
8847 "11 = {100,150}, % \twoheadleftarrow
8848 "12 = { 50,100}, % \leftleftarrows
8849 "13 = { 50, 80}, % \rightrightarrows
8850 "14 = {120,120}, % \upuparrows
8851 "15 = {120,120}, % \downdownarrows
8852 "16 = {200,200}, % \upharpoonright
8853 "17 = {200,200}, % \downharpoonright
8854 "18 = {200,200}, % \upharpoonleft
8855 "19 = {200,200}, % \downharpoonleft
8856 "1A = { 80,100}, % \rightarrowtail
8857 "1B = { 80,100}, % \leftarrowtail

```

```

8858 "1C = { 50, 50}, % \leftrightharrows
8859 "1D = { 50, 50}, % \rightleftarrows
8860 "1E = {250, }, % \Lsh
8861 "1F = { ,250}, % \Rsh
8862 "20 = {100,100}, % \rightsquigarrow
8863 "21 = {100,100}, % \leftrightsquigarrow
8864 "22 = {100, 50}, % \looparrowleft
8865 "23 = { 50,100}, % \looparrowright
8866 "24 = { 50, 80}, % \circeq
8867 "25 = { ,100}, % \succsim
8868 "26 = { ,100}, % \gtrsim
8869 "27 = { ,100}, % \gtrapprox
8870 "28 = {150, 50}, % \multimap
8871 "2B = {100,150}, % \doteqdot
8872 "2C = {100,150}, % \triangleq
8873 "2D = {100, 50}, % \precsim
8874 "2E = {100, 50}, % \lessim
8875 "2F = { 50, 50}, % \lessapprox
8876 "30 = {100, 50}, % \eqslantless
8877 "31 = { 50, 50}, % \eqslantgtr
8878 "32 = {100, 50}, % \curlyeqprec
8879 "33 = { 50,100}, % \curlyeqsucc
8880 "34 = {100, 50}, % \preccurlyeq
8881 "36 = { 50, }, % \leqslant
8882 "38 = { , 50}, % \backprime
8883 "39 = {250,250}, % \dabar@ : the dash bar in \dash(left,right)arrow
8884 "3C = { 50,100}, % \succcurlyeq
8885 "3E = { , 50}, % \geqslant
8886 "40 = { , 50}, % \sqsubset
8887 "41 = { 50, }, % \sqsupset
8888 "42 = { ,150}, % \vartriangleright, \rhd
8889 "43 = {150, }, % \vartriangleleft, \lhd
8890 "44 = { ,100}, % \trianglerighteq, \unrhd
8891 "45 = {100, }, % \trianglelefteq, \unlhd
8892 "46 = {100,100}, % \bigstar
8893 "48 = { 50, 50}, % \blacktriangledown
8894 "49 = { ,100}, % \blacktriangleright
8895 "4A = {100, }, % \blacktriangleleft
8896 "4B = { ,150}, % \dashrightarrow (the arrow)
8897 "4C = {150, }, % \dashleftarrow
8898 "4D = { 50, 50}, % \vartriangle
8899 "4E = { 50, 50}, % \blacktriangle
8900 "4F = { 50, 50}, % \triangledown
8901 "50 = { 50, 50}, % \eqcirc
8902 "56 = { ,150}, % \Rrightarrow
8903 "57 = {150, }, % \Lleftarrow
8904 "58 = {100,300}, % \checkmark
8905 "5C = { 50, 50}, % \angle
8906 "5D = { 50, 50}, % \measuredangle
8907 "5E = { 50, 50}, % \sphericalangle
8908 "5F = { , 50}, % \varpropto
8909 "60 = {100,100}, % \smallsmile
8910 "61 = {100,100}, % \smallfrown
8911 "62 = { 50, }, % \Subset
8912 "63 = { , 50}, % \Supset
8913 "66 = {150,150}, % \curlywedge
8914 "67 = {150,150}, % \curlyvee
8915 "68 = { 50,150}, % \leftthreetimes
8916 "69 = {100, 50}, % \rightthreetimes
8917 "6C = { 50, 50}, % \bumpeq
8918 "6D = { 50, 50}, % \Bumpeq
8919 "6E = {100, }, % \lll
8920 "6F = { ,100}, % \ggg
8921 "70 = { 50,100}, % \ulcorner
8922 "71 = {100, 50}, % \urcorner

```

```

8923 "75 = {150,200}, % \dotplus
8924 "76 = { 50,100}, % \backsim
8925 "78 = { 50,100}, % \llcorner
8926 "79 = {100, 50}, % \lrcorner
8927 "7C = {100,100}, % \intercal
8928 "7D = { 50, 50}, % \circledcirc
8929 "7E = { 50, 50}, % \circledast
8930 "7F = { 50, 50} % \circleddash

```

Remaining slots in the source file.

```

8931 }
8932
8933 </msa>

```

Symbol font 'b'.

```

8934 <*msb>
8935 \SetProtrusion
8936 [name = AMS-b]
8937 { encoding = U,
8938 family = msb }
8939 {
8940 A = { 50, 50}, % \mathbb
8941 C = { 50, 50},
8942 G = { , 50},
8943 L = { , 50},
8944 P = { , 50},
8945 R = { , 50},
8946 T = { , 50},
8947 V = { 50, 50},
8948 X = { 50, 50},
8949 Y = { 50, 50},
8950 "00 = { 50, 50}, % \lvertneqq
8951 "01 = { 50, 50}, % \gvertneqq
8952 "02 = { 50, 50}, % \lneq
8953 "03 = { 50, 50}, % \gneq
8954 "04 = {100, 50}, % \lless
8955 "05 = { 50,150}, % \ngtr
8956 "06 = {100, 50}, % \nprec
8957 "07 = { 50,150}, % \nsucc
8958 "08 = { 50, 50}, % \lneqq
8959 "09 = { 50, 50}, % \gneqq
8960 "0A = {100,100}, % \lneqslant
8961 "0B = {100,100}, % \gneqslant
8962 "0C = {100, 50}, % \lneq
8963 "0D = { 50,100}, % \gneq
8964 "0E = {100, 50}, % \npreceq
8965 "0F = { 50,100}, % \nsucceq
8966 "10 = { 50, }, % \precnsim
8967 "11 = { 50, 50}, % \succnsim
8968 "12 = { 50, 50}, % \lnsim
8969 "13 = { 50, 50}, % \gnsim
8970 "14 = { 50, 50}, % \lneqq
8971 "15 = { 50, 50}, % \gneqq
8972 "16 = { 50, 50}, % \precneqq
8973 "17 = { 50, 50}, % \succneqq
8974 "18 = { 50, 50}, % \precnapprox
8975 "19 = { 50, 50}, % \succnapprox
8976 "1A = { 50, 50}, % \lnapprox
8977 "1B = { 50, 50}, % \gnapprox
8978 "1C = {150,200}, % \nsim
8979 "1D = { 50, 50}, % \ncong
8980 "1E = {100,150}, % \diagup
8981 "1F = {100,150}, % \diagdown
8982 "20 = {100, 50}, % \varsubsetneq
8983 "21 = { 50,100}, % \varsupsetneq

```

```

8984 "22 = {100, 50}, % \subsetteqq
8985 "23 = { 50,100}, % \supsetteqq
8986 "24 = {100, 50}, % \subsetneqq
8987 "25 = { 50,100}, % \supsetneqq
8988 "26 = {100, 50}, % \varsubsetneqq
8989 "27 = { 50,100}, % \varsupsetneqq
8990 "28 = {100, 50}, % \subseteq
8991 "29 = { 50,100}, % \supseteq
8992 "2A = {100, 50}, % \subset
8993 "2B = { 50,100}, % \supset
8994 "2C = { 50,100}, % \parallel
8995 "2D = {100,150}, % \mid
8996 "2E = {150,150}, % \shortmid
8997 "2F = {100,100}, % \shortparallel
8998 "30 = { ,150}, % \nvDash
8999 "31 = { ,150}, % \nVDash
9000 "32 = { ,100}, % \nvDash
9001 "33 = { ,100}, % \nVDash
9002 "34 = { ,100}, % \ntrianglerighteq
9003 "35 = {100, }, % \trianglelefteq
9004 "36 = {100, }, % \triangleleft
9005 "37 = { ,100}, % \triangleright
9006 "38 = {100,200}, % \leftarrow
9007 "39 = {100,200}, % \rightarrow
9008 "3A = {100,100}, % \Leftarrow
9009 "3B = { 50,100}, % \Rightarrow
9010 "3C = {100,100}, % \Leftrightarrow
9011 "3D = {100,200}, % \leftrightarrows
9012 "3E = { 50, 50}, % \divideontimes
9013 "3F = { 50, 50}, % \varnothing
9014 "60 = {200, }, % \Finv
9015 "61 = { , 50}, % \Game
9016 "68 = {100,100}, % \eqsim
9017 "69 = { 50, }, % \beth
9018 "6A = { 50, }, % \gimel
9019 "6B = {150, }, % \daleth
9020 "6C = {200, }, % \lessdot
9021 "6D = { ,200}, % \gtrdot
9022 "6E = {100,200}, % \ltimes
9023 "6F = {150,100}, % \rtimes
9024 "70 = { 50,100}, % \shortmid
9025 "71 = { 50, 50}, % \shortparallel
9026 "72 = {200,300}, % \smallsetminus
9027 "73 = {100,200}, % \thicksim
9028 "74 = { 50,100}, % \thickapprox
9029 "75 = { 50, 50}, % \approx
9030 "76 = { 50,100}, % \succapprox
9031 "77 = { 50, 50}, % \preccurlyeq
9032 "78 = {100,100}, % \curvearrowleft
9033 "79 = { 50,150}, % \curvearrowright
9034 "7A = { 50,200}, % \digamma
9035 "7B = {100, 50}, % \varkappa
9036 "7F = {200, } % \backepsilon

```

Remaining slots in the source file.

```

9037 }
9038
9039 (/msb)

```

### 2.8.8 Euler

Euler Roman font (package `euler`).

```

9040 (*eur)
9041 \SetProtrusion

```

```

9042 [name = euler]
9043 { encoding = U,
9044 family = eur }
9045 {
9046 "01 = {100,100},
9047 "03 = {100,150},
9048 "06 = { ,100},
9049 "07 = {100,150},
9050 "08 = {100,100},
9051 "0A = {100,100},
9052 "0B = { , 50},
9053 "0C = { ,100},
9054 "0D = {100,100},
9055 "0E = { ,100},
9056 "0F = {100,100},
9057 "10 = {100,100},
9058 "13 = { ,100},
9059 "14 = { ,100},
9060 "15 = { , 50},
9061 "16 = { , 50},
9062 "17 = { 50,100},
9063 "18 = { 50,100},
9064 "1A = { , 50},
9065 "1B = { , 50},
9066 "1C = { 50,100},
9067 "1D = { 50,100},
9068 "1E = { 50,100},
9069 "1F = { 50,100},
9070 "20 = { , 50},
9071 "21 = { , 50},
9072 "22 = { 50,100},
9073 "24 = { , 50},
9074 "27 = { 50,100},
9075 1 = {100,100},
9076 7 = { 50,100},
9077 "3A = {300,500},
9078 "3B = {200,400},
9079 "3C = {200,100},
9080 "3D = {200,200},
9081 "3E = {100,200},
9082 A = { ,100},
9083 D = { , 50},
9084 J = { 50, },
9085 K = { , 50},
9086 L = { , 50},
9087 Q = { , 50},
9088 T = { 50, },
9089 X = { 50, 50},
9090 Y = { 50, },
9091 h = { , 50},
9092 k = { , 50}
9093 }
9094

```

Extended by the eulervm package.

```

9095 \SetProtrusion
9096 [name = euler-vm,
9097 load = euler]
9098 { encoding = U,
9099 family = zeur }
9100 {
9101 "28 = {100,200},
9102 "29 = {100,200},
9103 "2A = {100,150},
9104 "2B = {100,150},

```

```

9105 "2C = {200,300},
9106 "2D = {200,300},
9107 "2E = { ,100},
9108 "2F = {100, },
9109 "3F = {150,150},
9110 "5B = { ,100},
9111 "5E = {100,100},
9112 "5F = {100,100},
9113 "80 = { , 50},
9114 "81 = {200,250},
9115 "82 = {100,200}
9116 }
9117
9118 </eur>

```

### Euler Script font (eucal).

```

9119 <+eus>
9120 \SetProtrusion
9121 [name = euscript]
9122 { encoding = U,
9123 family = eus }
9124 {
9125 A = {100,100},
9126 B = { 50,100},
9127 C = { 50, 50},
9128 D = { 50,100},
9129 E = { 50,100},
9130 F = { 50, },
9131 G = { 50, },
9132 H = { ,100},
9133 K = { , 50},
9134 L = { ,150},
9135 M = { , 50},
9136 N = { , 50},
9137 O = { 50, 50},
9138 P = { 50, 50},
9139 T = { ,100},
9140 U = { , 50},
9141 V = { 50, 50},
9142 W = { 50, 50},
9143 X = { 50, 50},
9144 Y = { 50, },
9145 Z = { 50,100},
9146 "00 = {250,250},
9147 "18 = {200,200},
9148 "3A = {200,150},
9149 "40 = { ,100},
9150 "5E = {100,100},
9151 "5F = {100,100},
9152 "66 = { 50, },
9153 "67 = { , 50},
9154 "6E = {200,200}
9155 }
9156
9157 \SetProtrusion
9158 [name = euscript-vm,
9159 load = euscript]
9160 { encoding = U,
9161 family = zeus }
9162 {
9163 "01 = {600,600},
9164 "02 = {200,200},
9165 "03 = {200,200},
9166 "04 = {200,200},
9167 "05 = {150,150},

```



```
9168 "06 = {200,200},
9169 "07 = {200,200},
9170 "08 = {100,100},
9171 "09 = {100,100},
9172 "0A = {100,100},
9173 "0B = {100,100},
9174 "0C = {100,100},
9175 "0D = {100,100},
9176 "0E = {150,150},
9177 "0F = {100,100},
9178 "10 = {150,150},
9179 "11 = {100,100},
9180 "12 = {150,100},
9181 "13 = {100,150},
9182 "14 = {150,100},
9183 "15 = {100,150},
9184 "16 = {200,100},
9185 "17 = {100,200},
9186 "19 = {150,150},
9187 "1A = {150,100},
9188 "1B = {100,150},
9189 "1C = {100,100},
9190 "1D = {100,100},
9191 "1E = {250,100},
9192 "1F = {100,250},
9193 "20 = {150,200},
9194 "21 = {150,200},
9195 "22 = {150,150},
9196 "23 = {150,150},
9197 "24 = {100,200},
9198 "25 = {150,150},
9199 "26 = {150,150},
9200 "27 = {100,100},
9201 "28 = {100,100},
9202 "29 = {100,150},
9203 "2A = {100,100},
9204 "2B = {100,100},
9205 "2C = {100,100},
9206 "2D = {150,150},
9207 "2E = {150,150},
9208 "2F = {100,100},
9209 "30 = {100,100},
9210 "31 = {100,100},
9211 "32 = {100,100},
9212 "33 = {100,100},
9213 "34 = {100,100},
9214 "35 = {100,100},
9215 "3E = {150,150},
9216 "3F = {150,150},
9217 "60 = { ,200},
9218 "61 = {200, },
9219 "62 = {100,100},
9220 "63 = {100,100},
9221 "64 = {100,100},
9222 "65 = {100,100},
9223 "68 = {300, },
9224 "69 = { ,300},
9225 "6C = {100,100},
9226 "6D = {100,100},
9227 "6F = {100,100},
9228 "72 = {100,100},
9229 "73 = {200,100},
9230 "76 = { ,100},
9231 "77 = {100, },
9232 "78 = { 50, 50},
```

```

9233 "79 = {100,100},
9234 "7A = {100,100},
9235 "7D = {150,150},
9236 "7E = {100,100},
9237 "A8 = {100,100},
9238 "A9 = {100,100},
9239 "AB = {200,200},
9240 "BA = { ,200},
9241 "BB = { ,200},
9242 "BD = {200,200},
9243 "DE = {200,200}
9244 }
9245
9246 </eus>

```

### Euler Fraktur font (eufrak).

```

9247 <+euf>
9248 \SetProtrusion
9249 [name = mathfrak]
9250 { encoding = U,
9251 family = euf }
9252 {
9253 A = { , 50},
9254 B = { , 50},
9255 C = { 50, 50},
9256 D = { , 80},
9257 E = { 50, },
9258 G = { , 50},
9259 L = { , 80},
9260 O = { , 50},
9261 T = { , 80},
9262 X = { 80, 50},
9263 Z = { 80, 50},
9264 b = { , 50},
9265 c = { , 50},
9266 k = { , 50},
9267 p = { , 50},
9268 q = { 50, },
9269 v = { , 50},
9270 w = { , 50},
9271 x = { , 50},
9272 1 = {100,100},
9273 2 = { 80, 80},
9274 3 = { 80, 50},
9275 4 = { 80, 50},
9276 7 = { 50, 50},
9277 "12 = {500,500},
9278 "13 = {500,500},
9279 ! = { ,200},
9280 ' = {200,300},
9281 (= {200, },
9282) = { ,200},
9283 * = {200,200},
9284 + = {200,250},
9285 - = {200,200},
9286 {,} = {300,300},
9287 . = {400,400},
9288 {=} = {200,200},
9289 : = { ,200},
9290 ; = { ,200},
9291] = { ,200}
9292 }
9293
9294 </euf>
9295 </cfg-u>

```

### 2.8.9 Euro symbols

Settings for various Euro symbols (Adobe Euro fonts (packages eurosans, europs), ITC Euro fonts (package euroitc) and marvosym<sup>15</sup>). The euroitc settings are hidden in the package itself (1.3.8) for ‘free software’ compliance reasons. (Not quite sure whether this is what Karl really had in mind ...)

```

9296 <*cfg-e>
9297 \SetProtrusion
9298 <zpeu> { encoding = U,
9299 <mvs> { encoding = {OT1,U},
9300 <zpeu> family = zpeu }
9301 <mvs> family = mvs }
9302 {
9303 <zpeu> E = {50, }
9304 <mvs> 164 = {50,50}, % \EUR
9305 <mvs> 068 = {50,-100} % \EURdig
9306 }
9307
9308 <*zpeu>
9309 \SetProtrusion
9310 { encoding = U,
9311 family = zpeu,
9312 shape = it* }
9313 {
9314 E = {100,-50}
9315 }
9316
9317 \SetProtrusion
9318 { encoding = U,
9319 family = {zpeus,eurosans} }
9320 {
9321 E = {100,50}
9322 }
9323
9324 \SetProtrusion
9325 { encoding = U,
9326 family = {zpeus,eurosans},
9327 shape = it* }
9328 {
9329 E = {200, }
9330 }
9331
9332 </zpeu>
9333 </cfg-e>

```

## 2.9 Interword spacing

Default unit is space.

```

9334 <*m-t|cmr>
9335 %%% -----
9336 %%% INTERWORD SPACING
9337
9338 </m-t|cmr>
9339 <*m-t>
9340 \SetExtraSpacing
9341 [name = default]
9342 { encoding = {OT1,T1,LY1,OT4,QX,T5} }
9343 {

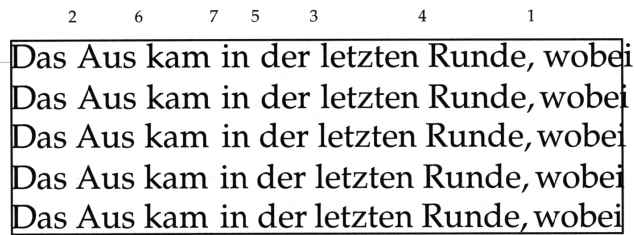
```

These settings are only a first approximation. The following reasoning is from a

15 Of course, there are many more symbols in this font. Feel free to contribute protrusion settings!

Figure 1:

Example of interword spacing (from: M. Siemoneit, *Typographisches Gestalten*, Frankfurt/M. 1989). The numbers indicate the preference for shrinking the interword space.



mail from *Ulrich Dirr*, who also provided the sample in figure 1. I do not claim to have coped with the task.

‘The idea is – analog to the tables for expansion and protrusion – to have tables for optical reduction/expansion of spaces in dependence of the actual character so that the distance between words is optically equal.

When reducing distances the (weighting) order is:

- after commas

9344           {,} = { , -500, 500},

- in front of capitals which have optical more room on their left side, e.g., ‘A’, ‘J’, ‘T’, ‘V’, ‘W’, and ‘Y’ [this is not yet possible – RS]

- in front of capitals which have circle/oval shapes on their left side, e.g., ‘C’, ‘G’, ‘O’, and ‘Q’ [ditto – RS]

- after ‘r’ (because of the bigger optical room on the righthand side)

9345           r = { , -300, 300},

- [before or] after lowercase characters with ascenders

9346           b = { , -200, 200},

9347           d = { , -200, 200},

9348           f = { , -200, 200},

9349           h = { , -200, 200},

9350           k = { , -200, 200},

9351           l = { , -200, 200},

9352           t = { , -200, 200},

- [before or] after lowercase characters with x-height plus descender with additional optical space, e.g., ‘v’, or ‘w’

9353           c = { , -100, 100},

9354           p = { , -100, 100},

9355           v = { , -100, 100},

9356           w = { , -100, 100},

9357           z = { , -100, 100},

9358           x = { , -100, 100},

9359           y = { , -100, 100},

- [before or] after lowercase characters with x-height plus descender without additional optical space

9360           i = { , 50, -50},

9361           m = { , 50, -50},

9362           n = { , 50, -50},

9363           u = { , 50, -50},

- after colon and semicolon

9364           : = { , 200, -200},

9365           ; = { , 200, -200},

- after punctuation which ends a sentence, e.g., period, exclamation mark, question mark

```
9366 . = { ,250,-250},
9367 ! = { ,250,-250},
9368 ? = { ,250,-250}
```

The order has to be reversed when enlarging is needed.’

```
9369 }
9370
9371 </m-t>
```

Questions are:

- Is the result really better?
- Is it overdone? (Try with a factor < 1000.)
- Should the first parameter also be used? (Probably.)
- What about quotation marks, parentheses etc.?

Furthermore, there seems to be a pdfTeX bug with spacing in combination with a non-zero `\spaceskip` (reported by *Axel Berger*):

```
\parfillskip0pt
\rightskip0pt plus 1em
\spaceskip\fontdimen2\font
test test\par
\pdfadjustinterwordglue2
\stbscode\font`t=-50
test test
\bye
```

Some more characters in T2A. <sup>16</sup>

```
9372 < *cmr >
9373 \SetExtraSpacing
9374 [name = T2A,
9375 load = default]
9376 { encoding = T2A,
9377 family = cmr }
9378 {
9379 \cyrg = { , -300, 300},
9380 \cyrb = { , -200, 200},
9381 \cyrk = { , -200, 200},
9382 \cyrs = { , -100, 100},
9383 \cyrr = { , -100, 100},
9384 \cyrh = { , -100, 100},
9385 \cyru = { , -100, 100},
9386 \cyrt = { , 50, -50},
9387 \cyrp = { , 50, -50},
9388 \cyri = { , 50, -50},
9389 \cyrishrt = { , 50, -50},
9390 }
9391
```

### 2.9.1 Nonfrenchspacing

The following settings simulate `\nonfrenchspacing` (since space factors will be ignored when spacing adjustment is in effect). They may be used for English contexts.

From the TeXbook:

---

16 Contributed by *Karl Karlsson*.

'If the space factor  $f$  is different from 1000, the interword glue is computed as follows: Take the normal space glue for the current font, and add the extra space if  $f \geq 2000$ . [...] Then the stretch component is multiplied by  $f/1000$ , while the shrink component is multiplied by  $1000/f$ .'

The 'extra space' (`\fontdimen 7`) for Computer Modern Roman is a third of `\fontdimen 2`, i.e., 333.

```
9392 \SetExtraSpacing
9393 [name = nonfrench-cmr,
9394 load = default,
9395 context = nonfrench]
9396 { encoding = {OT1,T1,LY1,OT4,QX,T5},
9397 family = cmr }
9398 {
```

`latex.ltx` has:

```
\def\nonfrenchspacing{
 \sfcode`. 3000
 \sfcode`? 3000
 \sfcode`! 3000
```

```
9399 . = {333,2000,-667},
9400 ? = {333,2000,-667},
9401 ! = {333,2000,-667},
```

```
\sfcode`: 2000
```

```
9402 : = {333,1000,-500},
```

```
\sfcode`; 1500
```

```
9403 ; = { , 500,-333},
```

```
\sfcode`\, 1250
```

```
9404 {,}= { , 250,-200}
```

```
}
```

```
9405 }
```

```
9406
```

```
9407 </cmr>
```

`fontinst`, however, which is also used to create the `psnfss` font metrics, sets `\fontdimen 7` to 240 by default. Therefore, the fallback settings use this value for the first component.

```
9408 (*m-t)
9409 \SetExtraSpacing
9410 [name = nonfrench-default,
9411 load = default,
9412 context = nonfrench]
9413 { encoding = {OT1,T1,LY1,OT4,QX,T5} }
9414 {
9415 . = {240,2000,-667},
9416 ? = {240,2000,-667},
9417 ! = {240,2000,-667},
9418 : = {240,1000,-500},
9419 ; = { , 500,-333},
9420 {,}= { , 250,-200}
9421 }
9422
```

Empty settings to prevent spurious warnings.

```
9423 \SetExtraSpacing
9424 [name = empty]
9425 { encoding = {TS1} }
9426 { }
9427
```

## 2.10 Additional kerning

Default unit is 1 em.

```
9428 %%% -----
9429 %%% ADDITIONAL KERNING
9430
```

A dummy list to be loaded when no context is active.

```
9431 \SetExtraKerning
9432 [name = empty]
9433 { encoding = {OT1,T1,T2A,LY1,OT4,QX,T5,TS1} }
9434 { }
9435
```

### 2.10.1 French

The ratio of `\fontdimen 2` to `\fontdimen 6` varies for different fonts, so that either the kerning of the colon (which should be a space, i.e., `\fontdimen 2`) or that of the other punctuation characters (TeX's `\thinspace`, i.e., one sixth of `\fontdimen 6`) may be inaccurate, depending on which unit we choose (space or 1em). For Times, for example, a thin space would be 665. I don't know whether French typography really wants a thin space, or rather (as it happens to turn out with CMR) half a space. (Wikipedia<sup>17</sup> claims it should be a quarter of an em, which seems too much to me; then again, it also says that this *was* a thin space in French typography.)

```
9436 \SetExtraKerning
9437 [name = french-default,
9438 context = french,
9439 unit = space]
9440 { encoding = {OT1,T1,LY1} }
9441 {
9442 : = {1000,}, % = \fontdimen2
9443 ; = {500,}, % - \thinspace
9444 ! = {500,},
9445 ? = {500,}
9446 }
9447
```

These settings have the disadvantage that a word following a left guillemet will not be hyphenated. This might be fixed in pdfTeX.

```
9448 \SetExtraKerning
9449 [name = french-guillemets,
9450 context = french-guillemets,
9451 load = french-default,
9452 unit = space]
9453 { encoding = {T1,LY1} }
9454 {
9455 \guillemotleft = { ,800}, % = 0.8\fontdimen2
9456 \guillemotright = {800,}
9457 }
9458
```

---

17 [https://fr.wikipedia.org/wiki/Espace\\_typographique](https://fr.wikipedia.org/wiki/Espace_typographique), 5 July 2007.

```
9459 \SetExtraKerning
9460 [name = french-guillemets-OT1,
9461 context = french-guillemets,
9462 load = french-default,
9463 unit = space]
9464 { encoding = OT1 }
9465 { }
9466
```

### 2.10.2 Turkish

```
9467 \SetExtraKerning
9468 [name = turkish,
9469 context = turkish]
9470 { encoding = {OT1,T1,LY1} }
9471 {
9472 : = {167, }, % = \thinspace
9473 ! = {167, },
9474 {=} = {167, }
9475 }
9476
9477 </m-t>
9478 </config>
```













9759 W = {Ŵ,Ŷ,Ŵ,Ŵ,Ŵ,Ŵ,  
9760 W}, % Cyrillic  
9761 X = {X̄,X̄,  
9762 X,X,X,X}, % Cyrillic  
9763 X, % Greek  
9764 X}, % Roman numeral  
9765 Y = {Ŷ,Ŷ,Ŷ,Ŷ,Ŷ,Ŷ,Ŷ,  
9766 Y,Y}, % Cyrillic  
9767 Z = {Z̄,Z̄,Z̄,Z̄,Z̄,Z̄,  
9768 Z}, % Greek  
9769 a = {ā,ā,ā,ā,ā,ā,ā,ā,ā,ā,ā,ā,ā,ā,ā,ā,ā,ā,ā,ā,  
9770 a,ā,ā}, % Cyrillic  
9771 b = {b,b,b},  
9772 c = {ç,ç,ç,ç,ç,  
9773 c,ç}, % Cyrillic  
9774 c}, % Roman numeral  
9775 d = {d̄,d̄,d̄,d̄,d̄,d̄,  
9776 d}, % Roman numeral  
9777 e = {è,è,è,è,è,è,è,è,è,è,è,è,è,è,è,è,è,  
9778 e,è,è,è}, % Cyrillic  
9779 f = {f̄,f̄,/f.long,/f.DEU,/f\_f},  
9780 fl = {ffl,/longs\_l,/longs\_long\_s\_l,/f\_l},  
9781 fi = {ffi,/longs\_i,/longs\_long\_s\_i,/f\_i},  
9782 /f.short = {/f\_f.short},  
9783 g = {ḡ,ḡ,ḡ,ḡ,ḡ,ḡ},  
9784 h = {h̄,h̄,h̄,h̄,h̄,h̄,h̄,h̄,  
9785 h,h}, % Cyrillic  
9786 i = {ī,ī,ī,ī,ī,ī,ī,ī,ī,ī,ī,ī,ī,ī,ī,ī,ī,ī,  
9787 i,ï}, % Cyrillic  
9788 i,ii,iii}, % Roman numeral  
9789 j = {j̄,j̄,  
9790 j}, % Cyrillic  
9791 k = {k̄,k̄,k̄,k̄,k̄,k̄},  
9792 l = {l̄,l̄,l̄,l̄,l̄,l̄,l̄,l̄,  
9793 l}, % palochka  
9794 l}, % Roman numeral  
9795 m = {m̄,m̄,m̄,  
9796 m}, % Roman numeral  
9797 n = {ñ,n̄,n̄,n̄,n̄,n̄,n̄,n̄,n̄}, % ñ  
9798 o = {ó,ó,ó,ó,ó,ó,ó,ó,ó,ó,ó,ó,ó,ó,ó,ó,ó,ó,  
9799 o,ö}, % Cyrillic  
9800 p = {p̄,p̄,  
9801 p,p}, % Cyrillic  
9802 q = {q̄}, % Cyrillic  
9803 r = {r̄,r̄,r̄,r̄,r̄,r̄,r̄,r̄},  
9804 s = {s̄,s̄,s̄,s̄,s̄,s̄,s̄,s̄,  
9805 s}, % Cyrillic  
9806 t = {t̄,t̄,t̄,t̄,t̄,t̄,t̄,t̄},  
9807 u = {ù,ù,ù,ù,ù,ù,ù,ù,ù,ù,ù,ù,ù,ù,ù,ù,ù,ù,  
9808 v = {v̄,v̄,  
9809 v}, % Roman numeral  
9810 w = {w̄,w̄,w̄,w̄,w̄,w̄,  
9811 w}, % Cyrillic  
9812 x = {x̄,x̄,  
9813 x,x}, % Cyrillic  
9814 x}, % Roman numeral  
9815 y = {ŷ,ŷ,ŷ,ŷ,ŷ,ŷ,ŷ,ŷ,  
9816 y,ÿ,ÿ,ÿ,ÿ}, % Cyrillic  
9817 z = {z̄,z̄,z̄,z̄,z̄,z̄},  
9818 Æ = {Æ,Æ,  
9819 Æ}, % Cyrillic  
9820 æ = {æ,æ,  
9821 æ}, % Cyrillic  
9822 DZ = {DZ̄},  
9823 Dz = {Dz̄},

9824 dz = {dž},  
 9825 % Smallcaps  
 9826 /a.sc = {/A.sc},  
 9827 /ae.sc = {/AE.sc},  
 9828 /d.sc = {/D.sc},  
 9829 /f.sc = {/F.sc},  
 9830 /g.sc = {/G.sc},  
 9831 /j.sc = {/J.sc},  
 9832 /l.sc = {/L.sc},  
 9833 /o.sc = {/O.sc},  
 9834 /oe.sc = {/OE.sc},  
 9835 /q.sc = {/Q.sc},  
 9836 /r.sc = {/R.sc},  
 9837 /t.sc = {/T.sc},  
 9838 /y.sc = {/Y.sc},  
 9839 % Cyrillic  
 9840 Г = {Г,Г,Г,Г},  
 9841 Ж = {Ж,Ж,Ж,Ж},  
 9842 З = {З,З},  
 9843 И = {И,И,И,И,И},  
 9844 К = {К,К,К,К,К,К},  
 9845 Л = {Л,Л,Л},  
 9846 П = {П},  
 9847 У = {У,У,У,У},  
 9848 Ц = {Ц,Ц},  
 9849 Ч = {Ч,Ч,Ч,Ч},  
 9850 Ш = {Ш},  
 9851 Ы = {Ы},  
 9852 Ь = {Ь},  
 9853 Э = {Э},  
 9854 В = {В},  
 9855 Ё = {Ё},  
 9856 Ò = {Ò},  
 9857 г = {г,г,г,г},  
 9858 ж = {ж,ж,ж,ж},  
 9859 з = {з,з},  
 9860 и = {и,и,и,и,и},  
 9861 к = {к,к,к,к}, % к,к  
 9862 л = {л,л,л},  
 9863 м = {м},  
 9864 н = {н,н,н,н}, % н  
 9865 п = {п},  
 9866 т = {т},  
 9867 ц = {ц},  
 9868 ч = {ч,ч,ч,ч},  
 9869 ш = {ш},  
 9870 ы = {ы},  
 9871 э = {э},  
 9872 ø = {ø,ø},  
 9873 v = {v},  
 9874 γ = {γ},  
 9875 e = {e},  
 9876 ə = {ə},  
 9877 % Greek  
 9878 Υ = {Υ,Υ,Υ,Υ},  
 9879 (l)Υ = {Υ,Υ,Υ,Υ,Υ,Υ,Υ,Υ},  
 9880 (l)Ω = {Ω,Ω,Ω,Ω,Ω,Ω,Ω,Ω,Ω,Ω,Ω,Ω,Ω,Ω,Ω,Ω},  
 9881 Ω = {Ω,Ω}, % math  
 9882 Δ = {Δ}, % math  
 9883 Π = {Π}, % math  
 9884 α = {α,α,α,α,α,α,α,α,α,α,α,α,α,α,α,α,α,α,α,α,α,α},  
 9885 ε = {ε,ε,ε,ε,ε,ε,ε,ε,ε,ε},  
 9886 η = {η,η,η,η,η,η,η,η,η,η,η,η,η,η,η,η,η,η,η,η,η,η},  
 9887 ι = {ι,ι,ι,ι,ι,ι,ι,ι,ι,ι,ι,ι,ι,ι,ι,ι,ι,ι,ι,ι,ι,ι},  
 9888 ο = {ο,ο,ο,ο,ο,ο,ο,ο,ο,ο,ο,ο,ο,ο,ο,ο,ο,ο,ο,ο,ο,ο},







```

9989 { encoding = {TU,EU1,EU2},
9990 family = {TU-empty} }
9991 { }
9992 </TU-empty>

```

## 3.2 Character protrusion

```

9993
9994 %%% -----
9995 %%% PROTRUSION
9996

```

### 3.2.1 Latin Modern Roman/New Computer Modern

```

9997 <*LatinModernRoman|NewComputerModern>
9998 \SetProtrusion
9999 <LatinModernRoman> [name = LMR-default]
10000 <NewComputerModern> [name = NCM-default]
10001 <LatinModernRoman> { encoding = {TU,EU1,EU2},
10002 <LatinModernRoman> family = Latin Modern Roman }
10003 <NewComputerModern> { }
10004 {
10005 A = {50,50},
10006 Æ = {50, },
10007 F = { ,50},
10008 J = {50, },
10009 K = { ,50},
10010 L = { ,50},
10011 T = {50,50},
10012 V = {50,50},
10013 W = {50,50},
10014 X = {50,50},
10015 Y = {50,50},
10016 k = { ,50},
10017 r = { ,50},
10018 t = { ,70},
10019 v = {50,50},
10020 w = {50,50},
10021 x = {50,50},
10022 y = {50,70},
10023 0 = { ,50},
10024 1 = {100,200},
10025 2 = {50,50},
10026 3 = {50,50},
10027 4 = {70,70},
10028 5 = { ,50},
10029 6 = { ,50},
10030 7 = {50,100},
10031 8 = { ,50},
10032 9 = { ,50},
10033 . = { ,700},
10034 {,} = { ,500},
10035 := { ,500},
10036 ; = { ,500},
10037 ! = { ,100},
10038 ? = { ,200},
10039 @ = {50,50},
10040 ~ = {200,250},
10041 \% = {50,50},
10042 * = {300,300},
10043 + = {250,250},
10044 - = {400,500}, % /hyphen
10045 - = {400,300}, % /endash
10046 — = {300,200}, % /emdash
10047 _ = {200,200}, % /underscore

```

```

10048 / = {200,300},
10049 /backslash = {200,300},
10050 ' = {300,400}, % /quotesingle
10051 ‘ = {300,400}, ’ = {300,400},
10052 “ = {300,300}, ” = {300,300},
10053 , = {400,400}, ,, = {400,400},
10054 ‹ = {400,400}, › = {300,500},
10055 « = {300,200}, » = {100,400},
10056 ¡ = {100, }, ¿ = {100, },
10057 (= {300, },) = { ,300},
10058 < = {200,100}, > = {100,200},
10059 /braceleft = {400,200}, /braceright = {200,400},
10060 /angleleft = {400, }, /angleright = { ,400},
10061 † = {100,100},
10062 ‡ = { 80, 80},
10063 • = {200,200},
10064 · = {400,450}, % / periodcentered
10065 °C = { 80, 50},
10066 ℄ = { , 50},
10067 ° = {400,400},
10068 ™ = {100,200},
10069 © = {100,100},
10070 ® = {100,100},
10071 ª = {100,200},
10072 º = {100,200},
10073 ¹ = {200,250},
10074 º = { 50,100},
10075 ³ = { 50,100},
10076 ¬ = {200, },
10077 − = {300,300},
10078 ± = {150,200},
10079 × = {150,250},
10080 ÷ = {150,250},
10081 € = {100, },
10082 (*LatinModernRoman)
10083 /one.oldstyle = {100,100},
10084 /two.oldstyle = { 50, 50},
10085 /three.oldstyle = { 30, 80},
10086 /four.oldstyle = { 50, 50},
10087 /seven.oldstyle = { 50, 80},
10088 (/LatinModernRoman)
10089 (*NewComputerModern)
10090 A = {50,50}, % /Alphatonos
10091 Å = {120,50}, %
10092 Ǻ = {120,50}, %
10093 ǻ = {80,50}, %
10094 Ǽ = {220,50}, %
10095 ǽ = {220,50}, %
10096 ǿ = {170,50}, %
10097 Ǿ = {170,50}, %
10098 ǿ = {190,50}, %
10099 ǿ = {190,50}, %
10100 ǿ = {150,50}, %
10101 ǿ = {80,50}, %
10102 ǿ = {220,50}, %
10103 ǿ = {220,50}, %
10104 ǿ = {170,50}, %
10105 ǿ = {170,50}, %
10106 ǿ = {210,50}, %
10107 ǿ = {210,50}, %
10108 /uni1FBC.alt = {,205}, % Alpha prosgegrammeni
10109 /uni1F88.alt = {50,190}, %Alpha psili prosgegrammeni
10110 /uni1F89.alt = {,200}, %Alpha dasia prosgegrammeni
10111 /uni1F8A.alt = {130,180}, %Alpha psili baria prosgegrammeni
10112 /uni1F8B.alt = {130,190}, %Alpha dasia baria prosgegrammeni

```

10113 /uni1F8C.alt = {100,190}, %Alpha psili oxia prosgegrammeni  
10114 /uni1F8D.alt = {70,190}, %Alpha dasia oxia prosgegrammeni  
10115 /uni1F8E.alt = {120,190}, %Alpha psili perispomeni prosgegrammeni  
10116 /uni1F8F.alt = {120,190}, %Alpha dasia perispomeni prosgegrammeni  
10117 %  
10118 /uni1FCC.alt = {205}, % Eta prosgegrammeni  
10119 /uni1F98.alt = {185,170}, %Eta psili prosgegrammeni  
10120 /uni1F99.alt = {185,170}, %Eta dasia prosgegrammeni  
10121 /uni1F9A.alt = {220,170}, %Eta psili baria prosgegrammeni  
10122 /uni1F9B.alt = {220,170}, %Eta dasia baria prosgegrammeni  
10123 /uni1F9C.alt = {220,170}, %Eta psili oxia prosgegrammeni  
10124 /uni1F9D.alt = {220,170}, %Eta dasia oxia prosgegrammeni  
10125 /uni1F9E.alt = {255,170}, %Eta psili perispomeni prosgegrammeni  
10126 /uni1F9F.alt = {255,170}, %Eta dasia perispomeni prosgegrammeni  
10127 %  
10128 O = {95,50}, %  
10129 *(NewComputerModern)*  
10130  $\Gamma = \{ \quad, 180 \}$ , % /Gamma  
10131 *(LatinModernRoman)*  $\Delta = \{100,100\}$ , % /Delta  
10132 *(NewComputerModern)*  $\Delta = \{50,50\}$ , % /Delta  
10133  $\Theta = \{ 50, 50 \}$ , % /Theta  
10134 *(LatinModernRoman)*  $\Lambda = \{100,100\}$ , % /Lambda  
10135 *(NewComputerModern)*  $\Lambda = \{50,50\}$ , % /Lambda  
10136 %  $\Xi = \{ \}$ , % /Xi  
10137 %  $\Pi = \{ \}$ , % /Pi  
10138  $\Sigma = \{ 50, 50 \}$ , % /Sigma  
10139 *(LatinModernRoman)*  $\Upsilon = \{100,100\}$ , % /Upsilon  
10140 *(NewComputerModern)*  $\Upsilon = \{80,80\}$ , % /Upsilon  
10141  $\Phi = \{ 50, 50 \}$ , % /Phi  
10142  $\Psi = \{ 50, 50 \}$ , % /Psi  
10143 *(\*NewComputerModern)*  
10144  $\Omega = \{ 20, 30 \}$ , % /Omega  
10145  $\Omega = \{150,30\}$ ,  
10146  $\Omega = \{220,30\}$ ,  
10147  $\Omega = \{205,30\}$ ,  
10148  $\Omega = \{285,30\}$ ,  
10149  $\Omega = \{285,30\}$ ,  
10150  $\Omega = \{270,30\}$ ,  
10151  $\Omega = \{270,30\}$ ,  
10152  $\Omega = \{310,30\}$ ,  
10153  $\Omega = \{310,30\}$ ,  
10154  $\Omega = \{205,30\}$ ,  
10155  $\Omega = \{205,30\}$ ,  
10156  $\Omega = \{285,30\}$ ,  
10157  $\Omega = \{285,30\}$ ,  
10158  $\Omega = \{270,30\}$ ,  
10159  $\Omega = \{270,30\}$ ,  
10160  $\Omega = \{310,30\}$ ,  
10161  $\Omega = \{310,30\}$ ,  
10162 /uni1FFC.alt = {230}, % Omega prosgegrammeni  
10163 /uni1FA8.alt = {185,190}, %Omega psili prosgegrammeni  
10164 /uni1FA9.alt = {185,190}, %Omega dasia prosgegrammeni  
10165 /uni1FAA.alt = {220,190}, %Omega psili baria prosgegrammeni  
10166 /uni1FAB.alt = {220,190}, %Omega dasia baria prosgegrammeni  
10167 /uni1FAC.alt = {220,190}, %Omega psili oxia prosgegrammeni  
10168 /uni1FAD.alt = {220,190}, %Omega dasia oxia prosgegrammeni  
10169 /uni1FAE.alt = {255,190}, %Omega psili perispomeni prosgegrammeni  
10170 /uni1FAF.alt = {255,190}, %Omega dasia perispomeni prosgegrammeni  
10171 %  
10172  $\alpha = \{,50\}$ ,  
10173  $\gamma = \{50,50\}$ ,  
10174  $\zeta = \{,50\}$ ,  
10175  $\vartheta = \{30,40\}$ ,  
10176  $\iota = \{,50\}$ ,  
10177  $\ddot{\iota} = \{-20,-30\}$ ,

```

10178 x = {50,50},
10179 λ = {50,50},
10180 v = {50,25},
10181 π = {50,50},
10182 σ = {,50},
10183 c = {,50},
10184 τ = {50,50},
10185 χ = {50,50},
10186 ψ = {50,50},
10187 % /uni1F98.alt = {,},

```

CMU Serif doesn't include \*.end glyphs, and the OldStyle numbers' names differ.

```

10188 }
10189
10190 \SetProtrusion
10191 [name = NCM-TU,
10192 load = NCM-default]
10193 { encoding = {TU,EU1,EU2},
10194 family = {New Computer Modern} }
10195 {
10196 /a.end = {,330},
10197 /e.end = {,350},
10198 /k.alt = { ,50},
10199 /r.end = {,300},
10200 /m.end = {,200},
10201 /n.end = {,300},
10202 /one.oldstyle = {100,100},
10203 /two.oldstyle = { 50, 50},
10204 /three.oldstyle = { 30, 80},
10205 /four.oldstyle = { 50, 50},
10206 /seven.oldstyle = { 50, 80},
10207 }
10208
10209 \SetProtrusion
10210 [name = CMU-TU,
10211 load = NCM-default]
10212 { encoding = {TU,EU1,EU2},
10213 family = {CMU Serif} }
10214 {
10215 /oneoldstyle = {100,100},
10216 /twooldstyle = { 50, 50},
10217 /threeoldstyle = { 30, 80},
10218 /fouroldstyle = { 50, 50},
10219 /sevenoldstyle = { 50, 80},
10220 </NewComputerModern>
10221 }
10222
10223 \SetProtrusion
10224 <LatinModernRoman> [name = LMR-it]
10225 <NewComputerModern> [name = NCM-it]
10226 <LatinModernRoman> { encoding = {TU,EU1,EU2},
10227 <LatinModernRoman> family = Latin Modern Roman,
10228 <LatinModernRoman> shape = {it,sl} }
10229 <NewComputerModern> { }
10230 {
10231 A = {125,100},
10232 Æ = {125,-55},
10233 B = {90,-40},
10234 C = {145,-75},
10235 D = {75,-28},
10236 E = {80,-55},
10237 F = {85,-80},
10238 G = {153,-15},
10239 H = {73,-60},
10240 I = {140,-120},

```

10241 IJ = {140,-80},  
10242 J = {135,-80},  
10243 K = {70,-30},  
10244 L = {87, 40},  
10245 M = {67,-45},  
10246 N = {75,-55},  
10247 O = {150,-30},  
10248 OE = {150,-55},  
10249 P = {82,-50},  
10250 Q = {150,-30},  
10251 R = {75, 15},  
10252 S = {90,-65},  
10253 \$ = {100,-20},  
10254 T = {220,-85},  
10255 U = {230,-55},  
10256 V = {260,-60},  
10257 W = {185,-55},  
10258 X = {70,-30},  
10259 Y = {250,-60},  
10260 Z = {90,-60},  
10261 a = {150,-10},  
10262 b = {170, },  
10263 c = {173,-10},  
10264 d = {150,-55},  
10265 e = {180, },  
10266 f = { , -250},  
10267 g = {150,-10},  
10268 h = {100, },  
10269 i = {210, },  
10270 ij = {210,-40},  
10271 j = { , -40},  
10272 k = {110,-50},  
10273 l = {240,-110},  
10274 m = {80, },  
10275 n = {115, },  
10276 o = {155, },  
10277 q = {170,-40},  
10278 r = {155,-40},  
10279 s = {130, },  
10280 t = {230,-10},  
10281 u = {120, },  
10282 v = {140,-25},  
10283 w = {98,-20},  
10284 x = {65,-40},  
10285 y = {130,-20},  
10286 z = {110,-80},  
10287 0 = {170,-85},  
10288 1 = {230,110},  
10289 2 = {130,-70},  
10290 3 = {140,-70},  
10291 4 = {130,80},  
10292 5 = {160, },  
10293 6 = {175,-30},  
10294 7 = {250,-150},  
10295 8 = {130,-40},  
10296 9 = {155,-80},  
10297 . = { ,500},  
10298 {,} = { ,450},  
10299 : = { ,300},  
10300 ; = { ,300},  
10301 & = {130,30},  
10302 \% = {180,50},  
10303 \* = {380,20},  
10304 + = {180,200},  
10305 @ = {180,10},

```

10306 ~ = {200,150},
10307 (= {300, },) = { ,70},
10308 / = {100,100},
10309 - = {500,300}, % /hyphen
10310 – = {500,300}, % /endash
10311 — = {400,170}, % /emdash
10312 _ = {100,200}, % /underscore
10313 ' = {300,400}, % /quotesingle
10314 " = {500,300},
10315 ‘ = {800,200}, ’ = {800,-20},
10316 “ = {540,100}, ” = {500,100},
10317 , = {300,700}, ,, = {200,600},
10318 ‹ = {500,300}, › = {400,400},
10319 « = {400,100}, » = {200,300},
10320 ¡ = {200, }, ¡ = {200, },
10321 < = {300,100}, > = {200,100},
10322 /backslash = {300,300},
10323 /braceleft = {400,100}, /braceright = {200,200},
10324 † = {200, 80},
10325 ‡ = {120, 80},
10326 • = {220,100},
10327 · = {550,300}, % / periodcentered
10328 °C = {170, },
10329 ¢ = {100, 50},
10330 ¶ = {200, },
10331 ° = {500,300},
10332 ™ = {200, 70},
10333 © = { 50, 70},
10334 ® = { 50, 70},
10335 º = {140,100},
10336 º = {140,100},
10337 ¹ = {400,150},
10338 º = {250, 80},
10339 º = {250, 80},
10340 ¬ = {250, 80},
10341 − = {300,200},
10342 ± = {150,170},
10343 × = {200,200},
10344 ÷ = {200,200},
10345 € = {150, },
10346 ⟨*LatinModernRoman⟩
10347 /one.oldstyle = {100,100},
10348 /two.oldstyle = {100, 80},
10349 /three.oldstyle = { 80, 50},
10350 /four.oldstyle = { 80, 80},
10351 /five.oldstyle = { 50, },
10352 /six.oldstyle = { 50, },
10353 /seven.oldstyle = { 80, 80},
10354 /eight.oldstyle = { 50, },
10355 ⟨/LatinModernRoman⟩
10356 Γ = {100,120}, % /Gamma
10357 Δ = {120,100}, % /Delta
10358 Θ = {120, 50}, % /Theta
10359 ⟨LatinModernRoman⟩ Λ = {130,100}, % /Lambda
10360 ⟨NewComputerModern⟩ Λ = {160,100}, % /Lambda
10361 Ξ = {100,}, % /Xi
10362 Π = {100,}, % /Pi
10363 Σ = {100, 50}, % /Sigma
10364 ⟨LatinModernRoman⟩ Υ = {180,100}, % /Upsilon
10365 ⟨NewComputerModern⟩ Υ = {260,100}, % /Upsilon
10366 Φ = {130, 70}, % /Phi
10367 Ψ = {130, 50}, % /Psi
10368 Ω = { 50,}, % /Omega
10369 ⟨*NewComputerModern⟩
10370 Α = {190,50}, %

```

10371  $\text{A} = \{220,50\}, \%$   
10372  $\text{A} = \{200,50\}, \%$   
10373  $\text{A} = \{300,50\}, \%$   
10374  $\text{A} = \{300,50\}, \%$   
10375  $\text{A} = \{300,50\}, \%$   
10376  $\text{A} = \{300,50\}, \%$   
10377  $\text{A} = \{320,50\}, \%$   
10378  $\text{A} = \{320,50\}, \%$   
10379  $\text{A} = \{200,50\}, \%$   
10380  $\text{A} = \{200,50\}, \%$   
10381  $\text{A} = \{300,50\}, \%$   
10382  $\text{A} = \{300,50\}, \%$   
10383  $\text{A} = \{300,50\}, \%$   
10384  $\text{A} = \{300,50\}, \%$   
10385  $\text{A} = \{320,50\}, \%$   
10386  $\text{A} = \{320,50\}, \%$   
10387  $/\text{uni1FBC.alt} = \{,205\}, \%$  Alpha prosgegrammeni  
10388  $/\text{uni1F88.alt} = \{50,190\}, \%$  Alpha psili prosgegrammeni  
10389  $/\text{uni1F89.alt} = \{,200\}, \%$  Alpha dasia prosgegrammeni  
10390  $/\text{uni1F8A.alt} = \{130,180\}, \%$  Alpha psili baria prosgegrammeni  
10391  $/\text{uni1F8B.alt} = \{130,190\}, \%$  Alpha dasia baria prosgegrammeni  
10392  $/\text{uni1F8C.alt} = \{100,190\}, \%$  Alpha psili oxia prosgegrammeni  
10393  $/\text{uni1F8D.alt} = \{70,190\}, \%$  Alpha dasia oxia prosgegrammeni  
10394  $/\text{uni1F8E.alt} = \{120,190\}, \%$  Alpha psili perispomeni prosgegrammeni  
10395  $/\text{uni1F8F.alt} = \{120,190\}, \%$  Alpha dasia perispomeni prosgegrammeni  
10396  $\%$   
10397  $/\text{uni1FCC.alt} = \{,205\}, \%$  Eta prosgegrammeni  
10398  $/\text{uni1F98.alt} = \{185,170\}, \%$  Eta psili prosgegrammeni  
10399  $/\text{uni1F99.alt} = \{185,170\}, \%$  Eta dasia prosgegrammeni  
10400  $/\text{uni1F9A.alt} = \{220,170\}, \%$  Eta psili baria prosgegrammeni  
10401  $/\text{uni1F9B.alt} = \{220,170\}, \%$  Eta dasia baria prosgegrammeni  
10402  $/\text{uni1F9C.alt} = \{220,170\}, \%$  Eta psili oxia prosgegrammeni  
10403  $/\text{uni1F9D.alt} = \{220,170\}, \%$  Eta dasia oxia prosgegrammeni  
10404  $/\text{uni1F9E.alt} = \{255,170\}, \%$  Eta psili perispomeni prosgegrammeni  
10405  $/\text{uni1F9F.alt} = \{255,170\}, \%$  Eta dasia perispomeni prosgegrammeni  
10406  $\%$   
10407  $\text{O} = \{95,50\}, \%$   
10408  $\text{O} = \{120, 30\}, \%$  /Omega  
10409  $\text{O} = \{160,30\},$   
10410  $\text{O} = \{250,30\},$   
10411  $\text{O} = \{250,30\},$   
10412  $\text{O} = \{300,30\},$   
10413  $\text{O} = \{300,30\},$   
10414  $\text{O} = \{300,30\},$   
10415  $\text{O} = \{300,30\},$   
10416  $\text{O} = \{330,30\},$   
10417  $\text{O} = \{330,30\},$   
10418  $\text{O} = \{30,30\},$   
10419  $\text{O} = \{230,30\},$   
10420  $\text{O} = \{230,30\},$   
10421  $\text{O} = \{300,30\},$   
10422  $\text{O} = \{300,30\},$   
10423  $\text{O} = \{300,30\},$   
10424  $\text{O} = \{300,30\},$   
10425  $\text{O} = \{330,30\},$   
10426  $\text{O} = \{330,30\},$   
10427  $/\text{uni1FFC.alt} = \{,230\}, \%$  Omega prosgegrammeni  
10428  $/\text{uni1FA8.alt} = \{185,190\}, \%$  Omega psili prosgegrammeni  
10429  $/\text{uni1FA9.alt} = \{185,190\}, \%$  Omega dasia prosgegrammeni  
10430  $/\text{uni1FAA.alt} = \{220,190\}, \%$  Omega psili baria prosgegrammeni  
10431  $/\text{uni1FAB.alt} = \{220,190\}, \%$  Omega dasia baria prosgegrammeni  
10432  $/\text{uni1FAC.alt} = \{220,190\}, \%$  Omega psili oxia prosgegrammeni  
10433  $/\text{uni1FAD.alt} = \{220,190\}, \%$  Omega dasia oxia prosgegrammeni  
10434  $/\text{uni1FAE.alt} = \{255,190\}, \%$  Omega psili perispomeni prosgegrammeni  
10435  $/\text{uni1FAF.alt} = \{255,190\}, \%$  Omega dasia perispomeni prosgegrammeni



```

10436 %
10437 α = {50,50},
10438 γ = {100,50},
10439 δ = {30,50},
10440 ε = {30,},
10441 ζ = {20,50},
10442 ϑ = {30,40},
10443 ι = {50,},
10444 ï = {-20,-30},
10445 κ = {50,50},
10446 λ = {-20,50},
10447 ν = {50,25},
10448 ο = {40,},
10449 π = {50,50},
10450 σ = {40,50},
10451 ς = {20,50},
10452 τ = {50,50},
10453 υ = {80,},
10454 φ = {80,},
10455 χ = {20,},
10456 ψ = {80,},
10457 % /uni1F98.alt = {,},
10458 }
10459
10460 \SetProtrusion
10461 [name = NCM-it-TU,
10462 load = NCM-it]
10463 { encoding = {TU,EU1,EU2},
10464 family = {New Computer Modern},
10465 shape = {it,s1} }
10466 {
10467 /a.end = {,330}, %Fix
10468 /e.end = {,350}, %Fix
10469 /k.alt = { ,50}, %Fix
10470 /r.end = {,300}, %Fix
10471 /m.end = {,200}, %Fix
10472 /n.end = {,300}, %Fix
10473 /one.oldstyle = {100,100},
10474 /two.oldstyle = {100, 80},
10475 /three.oldstyle = { 80, 50},
10476 /four.oldstyle = { 80, 80},
10477 /five.oldstyle = { 50, },
10478 /six.oldstyle = { 50, },
10479 /seven.oldstyle = { 80, 80},
10480 /eight.oldstyle = { 50, },
10481 }
10482
10483 \SetProtrusion
10484 [name = CMU-it-TU,
10485 load = NCM-it]
10486 { encoding = {TU,EU1,EU2},
10487 family = {CMU Serif},
10488 shape = {it,s1} }
10489 {
10490 /oneoldstyle = {100,100},
10491 /twooldstyle = {100, 80},
10492 /threeoldstyle = { 80, 50},
10493 /fouroldstyle = { 80, 80},
10494 /fiveoldstyle = { 50, },
10495 /sixoldstyle = { 50, },
10496 /sevenoldstyle = { 80, 80},
10497 /eightoldstyle = { 50, },
10498 </NewComputerModern>
10499 }
10500 </LatinModernRoman|NewComputerModern>

```

### 3.2.2 Charis SIL

```

10501 (*CharisSIL)
10502 \SetProtrusion
10503 [name = Charis-default]
10504 { encoding = {TU,EU1,EU2},
10505 family = Charis SIL }
10506 {
10507 A = {50,50},
10508 Æ = {50,50},
10509 C = {50, },
10510 D = { ,50},
10511 F = { ,50},
10512 G = {50, },
10513 J = {100, },
10514 K = { ,50},
10515 L = { ,50},
10516 Ḷ = { ,100},
10517 O = {50,50},
10518 Œ = {50, },
10519 P = { ,50},
10520 Q = {50,70},
10521 R = { ,50},
10522 ß = { ,40}, % capital sharp s
10523 T = {50,50},
10524 V = {50,50},
10525 W = {50,50},
10526 X = {50,50},
10527 Y = {50,50},
10528 k = { ,50},
10529 ḷ = { ,150},
10530 r = { ,50},
10531 t = { ,50},
10532 v = {50,50},
10533 w = {50,50},
10534 x = {50,50},
10535 y = { ,50},
10536 1 = {150,150},
10537 2 = {50,50},
10538 3 = {50, },
10539 4 = {100,50},
10540 6 = {50, },
10541 7 = {50,80},
10542 9 = {50,50},
10543 . = { ,600},
10544 {,} = { ,500},
10545 : = { ,400},
10546 ; = { ,300},
10547 ! = { ,100},
10548 ? = { ,200},
10549 @ = {50,50},
10550 ~ = {200,250},
10551 \% = { ,50},
10552 * = {300,300},
10553 + = {200,250},
10554 / = { ,200},
10555 /backslash = {150,200},
10556 | = {200,200},
10557 - = {400,500}, % hyphen
10558 - = {200,300}, % endash
10559 — = {150,250}, % emdash
10560 — = {200,200}, % Horizontal Bar = \texttwelveudash
10561 - = {150,150}, % Figure Dash = \textthreequartersemdash
10562 _ = {100,100},
10563 {=} = {100,100},

```

10564 ‘ = {300,400}, ’ = {300,400},  
10565 “ = {300,300}, ” = {300,300},  
10566 , = {400,400}, „ = {300,300},  
10567 ‹ = {400,300}, › = {300,400},  
10568 « = {200,200}, » = {150,300},  
10569 ¡ = {100, }, ¿ = {100, },  
10570 ( = {200, }, ) = { ,200},  
10571 < = {200,150}, > = {100,200},  
10572 [ = {100, }, ] = { ,100},  
10573 /braceleft = {200, }, /braceright = { ,300},  
10574 † = { 80, 80},  
10575 ‡ = {100,100},  
10576 • = {200,200},  
10577 ° = {150,200},  
10578 ™ = {150,150},  
10579 ¢ = { 50, },  
10580 £ = { 50, },  
10581 † = {200,200},  
10582 © = {100,100},  
10583 ® = {100,100},  
10584 º = {100,200},  
10585 ¸ = {200,200},  
10586 ¬ = {200, 50},  
10587 µ = { ,100},  
10588 ¶ = { ,100},  
10589 · = {300,400},  
10590 <sup>1</sup> = {200,300},  
10591 <sup>2</sup> = {100,200},  
10592 <sup>3</sup> = {100,200},  
10593 € = {100, },  
10594 ± = {150,200},  
10595 × = {200,200},  
10596 ÷ = {250,250},  
10597 /minus = {200,200},  
10598 − = {200,200},  
10599 % Cyrillic  
10600 Б = { ,50},  
10601 Г = { ,130},  
10602 Ж = {50,50},  
10603 З = {30,50},  
10604 Л = {50, },  
10605 У = {50,50},  
10606 Ф = {50,50},  
10607 Ч = {100, },  
10608 Ъ = { ,50},  
10609 б = { ,50},  
10610 Э = {50,50},  
10611 Ю = { ,40},  
10612 Я = {50, },  
10613 В = {50,50},  
10614 € = {50, },  
10615 Ъ = {50,100},  
10616 € = {50, },  
10617 Ъ = {50,50},  
10618 Ъ = { ,50},  
10619 Ъ = {50,50},  
10620 Ъ = {100,100},  
10621 Ъ = {50,50},  
10622 Ъ = { ,50},  
10623 б = { ,50},  
10624 Ъ = {50,80},  
10625 Ъ = { ,80},  
10626 Ъ = {50,50},  
10627 Ј = {50, },  
10628 ЈХ = {50,40},

```

10629 K = { ,50},
10630 Я = {50, },
10631 Лђ = { ,50},
10632 Ѓ = { ,50},
10633 đ = { ,100},
10634 б = {50,50},
10635 г = { ,70},
10636 к = { ,50},
10637 л = {50, },
10638 т = {50,50},
10639 ф = {50,50},
10640 ч = {50, },
10641 ъ = { ,50},
10642 ь = { ,50},
10643 э = { ,50},
10644 я = {50, },
10645 љ = {50, },
10646 њ = { ,50},
10647 џ = { ,50},
10648 v = {50,50},
10649 е = {50, },
10650 њ = { ,50},
10651 y = {50,50},
10652 Ђ = { ,50},
10653 Ѓ = { ,50},
10654 đ = { ,100},
10655 з = {100,100},
10656 з = {50,50},
10657 љ = {50,70},
10658 њ = { ,70},
10659 яе = {50,30},
10660 Лђ = { ,50},
10661 Ѓ = { ,50},
10662 % Д П Ц Ш Щ Ъ Ѓ Ђ Ѡ ѡ Тј Ц Ѣ З Э д
10663 % в д ж з и м н п ц ш ы ю љ е њ ц э е ѡ п з d e џ л ж р
10664 % Greek
10665 Δ = {50,50},
10666 Ψ = {50,50},
10667 γ = {70,70},
10668 λ = {40,70},
10669 π = {40,50},
10670 ρ = { ,50},
10671 σ = { ,50},
10672 χ = {50,50},
10673 }
10674
10675 \SetProtrusion
10676 [name = Charis-it]
10677 { encoding = {TU,EU1,EU2},
10678 family = Charis SIL,
10679 shape = {it,s1} }
10680 {
10681 C = {50, },
10682 G = {50, },
10683 J = {50, },
10684 L = {50,50},
10685 O = {50, },
10686 Œ = {50, },
10687 Q = {50, },
10688 S = {50, },
10689 $ = {50, },
10690 T = {70, },
10691 o = {50,50},
10692 p = { ,50},
10693 q = {50, },

```

```
10694 t = { ,50},
10695 w = { ,50},
10696 y = { ,50},
10697 1 = {150,100},
10698 3 = {50, },
10699 4 = {100, },
10700 6 = {50, },
10701 7 = {100, },
10702 . = { ,700},
10703 {,}= { ,600},
10704 : = { ,400},
10705 ; = { ,400},
10706 ? = { ,150},
10707 & = { ,80},
10708 \% = {50,50},
10709 * = {300,200},
10710 + = {250,250},
10711 @ = {80,50},
10712 ~ = {150,150},
10713 / = { ,150},
10714 /backslash = {150,150},
10715 - = {300,400}, % hyphen
10716 – = {200,300}, % endash
10717 — = {150,200}, % emdash
10718 _ = { ,100},
10719 {=} = {200,200},
10720 ± = {150,200},
10721 × = {250,250},
10722 ÷ = {250,250},
10723 ° = {150,200},
10724 · = {300,400},
10725 ‘ = {400,200}, ’ = {400,200},
10726 “ = {300,200}, ” = {400,200},
10727 , = {200,500}, ,, = {150,500},
10728 ‹ = {300,400}, › = {200,500},
10729 « = {200,300}, » = {150,400},
10730 (= {200, },) = { ,200},
10731 < = {200,200}, > = {200,200},
10732 /braceleft = {300, }, /braceright = { ,200},
10733 % Cyrillic
10734 Ж = {50,30},
10735 Л = {50, },
10736 У = {50,30},
10737 Ф = {50, },
10738 Ч = {100, },
10739 Ъ = { ,50},
10740 Ь = { ,50},
10741 Э = {50,50},
10742 Я = {50, },
10743 В = {50,50},
10744 Љ = {50,50},
10745 Ђ = {140,100},
10746 Ѓ = {70,50},
10747 Љ = {50,80},
10748 Њ = { ,80},
10749 Ћ = {50,50},
10750 г = {50,50},
10751 д = {50,30},
10752 м = {50, },
10753 ф = {50, },
10754 ч = {50, },
10755 ъ = { ,50},
10756 ь = { ,50},
10757 э = { ,50},
10758 я = {50, },
```

```

10759 њ = {50,50},
10760 њ = { ,50},
10761 v = {50,50},
10762 Ъ = { ,50},
10763 ѳ = {140,100},
10764 ϳ = {70,50},
10765 Ѵ = {50,70},
10766 ѵ = { ,70},
10767 % Greek
10768 Γ = { ,130},
10769 Δ = {50,50},
10770 Ψ = {50,50},
10771 γ = {70,70},
10772 λ = {40,70},
10773 π = {40,50},
10774 ρ = { ,50},
10775 σ = { ,50},
10776 χ = {50,50},
10777 }

```

The small caps glyph names in Charis SIL have changed with version 5.0 of the font. We try to get the names right both with LuaTeX (where we can simply query the font version) and with XeTeX (where we check for glyph name).

```

10778
10779 % quick and dirty -- maybe we'll promote this to a
10780 % regular key some time
10781 \define@key{MT@pr@c}{command}{\csname #1\endcsname}
10782
10783 % glyph names have changed with version 5.0 of Charis SIL:
10784 % before: /a.SC, /b.SC, ...
10785 % after: /a.sc, /b.sc, ...
10786 \ifx\MT@lua\undefined
10787 \gdef\MT@get@CHARIS@SC{
10788 % test whether glyph "a.sc" exists
10789 \ifnum\numexpr\XeTeXglyphindex "a.sc"\relax > 0
10790 \gdef\MT@CHARIS@SC{sc}%
10791 \else
10792 \gdef\MT@CHARIS@SC{SC}%
10793 \fi
10794 }
10795 \else
10796 \gdef\MT@get@CHARIS@SC{
10797 \gdef\MT@CHARIS@SC{\MT@lua{
10798 % check font version
10799 % -- why doesn't this work?:
10800 % f = font.getfont(font.current());
10801 % i = fontloader.info(f.filename);
10802 % if (tonumber(i.version) < 5) then;
10803 if (tonumber(fontloader.info(font.getfont(font.current()).filename).version) < 5) then;
10804 tex.print("SC");
10805 else;
10806 tex.print("sc");
10807 end
10808 }}
10809 }
10810 \fi
10811
10812 \SetProtrusion
10813 [name = Charis-sc,
10814 load = Charis-default,
10815 command = {MT@get@CHARIS@SC}]
10816 { encoding = {TU,EU1,EU2},
10817 family = Charis SIL,
10818 shape = {sc} }

```

```

10819 {
10820 % A = {100,100}, % etc., doesn't work with \textsc
10821 /a.\MT@CHARIS@SC = {100,100},
10822 /c.\MT@CHARIS@SC = {50, },
10823 /d.\MT@CHARIS@SC = { ,50},
10824 /f.\MT@CHARIS@SC = { ,50},
10825 /g.\MT@CHARIS@SC = {50, },
10826 /j.\MT@CHARIS@SC = {100, },
10827 /k.\MT@CHARIS@SC = { ,50},
10828 /l.\MT@CHARIS@SC = { ,50},
10829 /f_l.\MT@CHARIS@SC = { ,50},
10830 /o.\MT@CHARIS@SC = {50,50},
10831 /oe.\MT@CHARIS@SC = {50, },
10832 /q.\MT@CHARIS@SC = {50,70},
10833 /r.\MT@CHARIS@SC = { ,50},
10834 /t.\MT@CHARIS@SC = {50,100},
10835 /v.\MT@CHARIS@SC = {50,50},
10836 /w.\MT@CHARIS@SC = {50,50},
10837 /x.\MT@CHARIS@SC = {50,50},
10838 /y.\MT@CHARIS@SC = {50,50}
10839 }
10840 (<CharisSIL)

```

### 3.2.3 EB Garamond

```

10841 (<*EBGaramond)
10842 \SetProtrusion
10843 [name = EBGaramond-TU,
10844 load = EBGaramond-T1-LF]
10845 { encoding = {TU,EU1,EU2},
10846 family = EBGaramond }
10847 {
10848 /one.tosf = {150,150},
10849 /two.tosf = {50,50},
10850 /three.tosf = {50,50},
10851 /four.tosf = {50,50},
10852 /five.tosf = {50,50},
10853 /six.tosf = {50,50},
10854 /seven.tosf = {50,80},
10855 /eight.tosf = {50,50},
10856 /nine.tosf = {50,50},
10857 /one.lf = {50,50},
10858 /two.lf = {50,50},
10859 /four.lf = {50,50},
10860 /seven.lf = {50,50},
10861 /one.osf = {50,50},
10862 /two.osf = {50,50},
10863 /four.osf = {50,50},
10864 /seven.osf = {50,50},
10865 IV = { , 35},
10866 VI = { 35, },
10867 VII = { 30, },
10868 VIII = { 25, },
10869 IX = { , 35},
10870 XI = { 35, },
10871 XII = { 30, },
10872 iv = { , 25},
10873 vi = { 25, },
10874 vii = { 20, },
10875 viii = { 20, },
10876 ix = { , 25},
10877 xi = { 25, },
10878 xii = { 20, },
10879 % textcomp
10880 \textquotesingle = {400,500},
10881 _ = {200,250},

```

```

10882 f = { ,100},
10883 ℄ = { 50, },
10884 † = {100,100},
10885 ‡ = { 80, 80},
10886 • = { ,100},
10887 · = {300,400}, % periodcentered
10888 /twodotenleader = {150,200},
10889 /ellipsis = {100,150},
10890 °C = { 80, },
10891 ° = {400,400},
10892 ™ = {100,100},
10893 © = {100,100},
10894 ® = {100,100},
10895 ¢ = {200,200},
10896 ¢ = {200,200},
10897 1 = {200,200},
10898 2 = {200,200},
10899 3 = {200,200},
10900 ¬ = {200, },
10901 ¶ = { ,100},
10902 − = {300,300}, % minus
10903 ± = {150,200},
10904 × = {100,150},
10905 ÷ = {150,200},
10906 € = { 50,100},
10907 ¥ = { 50, 50},
10908 % Greek
10909 Γ = { ,150},
10910 Δ = {100,100},
10911 Θ = { 50, 50},
10912 Λ = {100,100},
10913 Ξ = { 50, 50},
10914 Υ = {100,100},
10915 Φ = { 50, 50},
10916 Ψ = { 50, 50},
10917 Ω = { , 50},
10918 ζ = { , 50},
10919 λ = { 50, 50},
10920 γ = { 50, 50},
10921 π = { 50, 50},
10922 ρ = { , 50},
10923 σ = { 50, 50},
10924 τ = { 50, 50},
10925 χ = { 50, 50},
10926 φ = { 50, 50},
10927 ρ = { 50, 50},
10928 ψ = { 50, 50},
10929 % Cyrillic
10930 Γ = { ,150},
10931 Д = { 50, 50},
10932 Ж = { 50, 50},
10933 К = { , 50},
10934 Л = { 50, },
10935 Ъ = { 50, 50},
10936 З = { 50, 50},
10937 У = { 50,100},
10938 Ф = { 50, 50},
10939 Ч = { 70, },
10940 Я = { 50, },
10941 Ъ = { 50, 50},
10942 Ь = { , 50},
10943 ж = { 50, 50},
10944 ф = { 50, 50},
10945 ъ = { 50, 50},
10946 Ѣ = { 50, 50},

```



```

10947 r = { , 50},
10948 V = { 50, 50},
10949 % other
10950 Ḋ = { , 50},
10951 ḃ = { , 50},
10952 Δ = {100,100},
10953 (i) = { 35, 65},
10954 (a) = { 30, 60},
10955 }
10956
10957 \SetProtrusion
10958 [name = EBGaramond-it-TU,
10959 load = EBGaramond-it-T1-LF]
10960 { encoding = {TU,EU1,EU2},
10961 family = EBGaramond,
10962 shape = it }
10963 {
10964 /zero.tosf = {150,150},
10965 /one.tosf = {150,150},
10966 /two.tosf = {80,80},
10967 /three.tosf = {50,80},
10968 /four.tosf = {50,80},
10969 /five.tosf = {50,80},
10970 /six.tosf = {50,50},
10971 /seven.tosf = {50,100},
10972 /eight.tosf = {50,50},
10973 /nine.tosf = {50,80},
10974 /one.lf = {50,50},
10975 /two.lf = {50,50},
10976 /three.lf = {80,50},
10977 /four.lf = {50,50},
10978 /five.lf = {50,50},
10979 /six.lf = {50,50},
10980 /seven.lf = {50,50},
10981 /eight.lf = {50,50},
10982 /nine.lf = {50, },
10983 /one.osf = {50,50},
10984 /two.osf = {50,50},
10985 /three.osf = { ,80},
10986 /four.osf = {50,50},
10987 /seven.osf = {50,50},
10988 % textcomp
10989 \textquotesingle = {800,100},
10990 − = {300,300}, % minus
10991 ¸ = {200,250},
10992 † = {200,100},
10993 ‡ = { 80, 80},
10994 • = {300, },
10995 °C = {200, },
10996 f = {100, },
10997 ℄ = {100, },
10998 ™ = {200, },
10999 © = {200,100},
11000 ® = {200,100},
11001 ¬ = {300, },
11002 ° = {500,100},
11003 ± = {200,150},
11004 ¹ = {300,100},
11005 ² = {300, },
11006 ³ = {300, },
11007 · = {300,500}, % periodcentered
11008 /twodotenleader = {150,300},
11009 /ellipsis = {100,200},
11010 € = {100, },
11011 × = {200,100},

```

```

11012 ÷ = {200,200},
11013 ¶ = { ,100},
11014 ª = {200,200},
11015 º = {200,200},
11016 ¥ = { 50, 50},
11017 % Greek
11018 Δ = {150, },
11019 Θ = { 50, },
11020 Λ = {150, },
11021 Υ = {100, 50},
11022 Φ = { 50, },
11023 Χ = { 50, },
11024 Ψ = {100, },
11025 Ω = { 50, },
11026 γ = { , 50},
11027 λ = { 50, },
11028 % Cyrillic
11029 Я = { 50, },
11030 Ч = {100, },
11031 З = {100, },
11032 % other
11033 Ъ = { 50, 50},
11034 ъ = { , 50},
11035 }
11036
11037 \SetProtrusion
11038 [name = EBGaramond-sc-TU,
11039 load = EBGaramond-TU]
11040 { encoding = {TU,EU1,EU2},
11041 family = EBGaramond,
11042 shape = sc }
11043 {
11044 a = {50,50},
11045 \ae = {50, },
11046 d = { ,50},
11047 f = { ,50},
11048 g = {50, },
11049 j = {50, },
11050 l = { ,50},
11051 o = {50,50},
11052 \oe = {50, },
11053 q = {50,70},
11054 r = { , 0},
11055 t = {50,50},
11056 y = {50,50},
11057 % Greek
11058 α = {50,50},
11059 γ = { ,50},
11060 δ = {50,50},
11061 λ = {50,50},
11062 ο = {50,50},
11063 τ = {50,50},
11064 υ = {50,50},
11065 ψ = {50,50},
11066 % Cyrillic
11067 τ = {50,50},
11068 }
11069
11070 \SetProtrusion
11071 [name = EBGaramond-scit-TU,
11072 load = EBGaramond-it-TU]
11073 { encoding = {TU,EU1,EU2},
11074 family = EBGaramond,
11075 shape = scit }

```

```

11076 {
11077 a = {50,50},
11078 \ae = {50, },
11079 d = { ,50},
11080 f = { ,50},
11081 g = {50, },
11082 j = {50, },
11083 l = { ,50},
11084 o = {50,50},
11085 \oe = {50, },
11086 q = {50,70},
11087 r = { , 0},
11088 t = {50,50},
11089 y = {50,50},
11090 % Greek
11091 α = {50,50},
11092 γ = { ,50},
11093 δ = {50,50},
11094 λ = {50,50},
11095 ο = {50,50},
11096 τ = {50,50},
11097 υ = {50,50},
11098 ψ = {50,50},
11099 % Cyrillic
11100 τ = {50,50},
11101 }
11102 </EBGaramond>

```

### 3.2.4 Palatino

```

11103 <*Palatino>
11104 \SetProtrusion
11105 [name = palatino-default]
11106 { encoding = {TU,EU1,EU2},
11107 family = {Palatino} }
11108 {
11109 A = {50,50},
11110 D = { ,50},
11111 J = {50, },
11112 K = { ,50},
11113 L = { ,50},
11114 O = {25, },
11115 T = {50,50},
11116 V = {50,50},
11117 W = {50,50},
11118 X = {50,50},
11119 Y = {50,50},
11120 b = { ,25},
11121 d = {25,30},
11122 f = { ,50},
11123 g = { ,100},
11124 k = { ,50},
11125 p = { ,50},
11126 q = {50, },
11127 r = { ,50},
11128 t = { ,50}, ◆ = { ,50}, ◆ = { ,50},
11129 v = {75,50},
11130 w = {50,50},
11131 x = {50,50},
11132 y = {50,70},
11133 1 = {100,50},
11134 2 = {25,50},
11135 4 = {50, },
11136 6 = {50, },
11137 9 = {25, },

```

```

11138 Æ = {100, },
11139 Œ = {25, },
11140 . = { ,700}, .. = { ,350}, ... = { ,150},
11141 {,} = { ,500},
11142 := { ,500},
11143 ; = { ,500},
11144 ! = { ,100}, !! = { ,100},
11145 ? = { ,200}, ʔ = { ,200},
11146 @ = {50,50},
11147 ~ = {200,250},
11148 & = {50,100},
11149 \% = {100,100},
11150 * = {200,200},
11151 + = {250,250},
11152 (= {100, },) = { ,300},
11153 / = {200,300},
11154 - = {400,500},
11155 \textendash = {300,300}, \textemdash = {200,200},
11156 \textquoteleft = {500,700}, \textquoteright = {500,700},
11157 \textquotedblleft = {300,400}, \textquotedblright = {300,400},
11158 \textbackslash = {200,300},
11159 \quotesinglbase = {400,400}, \quotedblbase = {400,400},
11160 \guilsinglleft = {400,400}, \guilsinglright = {300,500},
11161 \guillemotleft = {300,300}, \guillemotright = {200,400},
11162 \textexclamdown = {100, }, \textquestiondown = {100, },
11163 \textbraceleft = {400,200}, \textbraceright = {200,400},
11164 \textless = {200,100}, \textgreater = {100,200},
11165 ≤ = {200,100}, ≥ = {100,200},
11166 \textminus = {300,300},
11167 \texttrademark = {200,200},
11168 \textcopyright = {200,200},
11169 \textregistered = {200,200},
11170 \textdegree = {300,300},
11171 | = {450,500}, ¬ = {250,150},
11172 ¬ = {150,250},
11173 · = {850, 700},
11174 ¶ = {100,0},
11175 × = {150, 300},
11176 a = {300,300}, ° = {300,300},
11177 0 = {200,400},
11178 1 = {400,350}, 2 = {200,300}, 3 = {250,400},
11179 4 = {250,350}, 5 = {200,300}, 6 = {250,400},
11180 7 = {200,450}, 8 = {250,400}, 9 = {200,350},
11181 0 = {200,400},
11182 1 = {400,250}, 2 = {200,300}, 3 = {250,400},
11183 4 = {250,350}, 5 = {200,300}, 6 = {250,400},
11184 7 = {200,450}, 8 = {250,400}, 9 = {200,350},
11185 ± = {150,100}, ÷ = {300,300},
11186 þ = { ,25},
11187 ˙ = {300,450}, ˘ = {300,450},
11188 ˚ = {300,450}, ˛ = {300,450},
11189 † = {200,250}, ‡ = {200,250},
11190 π = {50, },
11191 f = { ,50},
11192 № = {100,150},
11193 \textservicemark = {100,200},
11194 - = {400,500}, - = {400,500}, - = {200,300},
11195 - = {205,305}, - = {200,300}, - = {50,150},
11196 ● = {125,200},
11197 % /a.sc = {50,50},
11198 }
11199
11200 \SetProtrusion
11201 [name = palatino-it]
11202 { encoding = {TU,EU1,EU2},

```

```

11203 family = {Palatino},
11204 shape = {it,sl} }
11205 {
11206 A = {50,50},
11207 Æ = {50, },
11208 B = {50, },
11209 C = {50, },
11210 D = {50,50},
11211 E = {50, },
11212 F = {50, },
11213 G = {50, },
11214 H = {50, },
11215 K = {50, },
11216 L = {50, },
11217 O = {50, },
11218 Œ = {50, },
11219 P = {50, },
11220 Q = {50, },
11221 R = {50, },
11222 S = {50, },
11223 $ = {50, },
11224 T = {100, },
11225 U = {50, },
11226 V = {100,50},
11227 W = {50, },
11228 X = {50, },
11229 Y = {100,50},
11230 b = { ,50},
11231 c = {25, },
11232 g = {75, },
11233 i = {25, },
11234 m = { ,50},
11235 n = { ,50},
11236 p = { ,25},
11237 q = {25, },
11238 x = { ,50},
11239 1 = {100, },
11240 2 = {50, },
11241 4 = {50, },
11242 7 = {50, },
11243 . = { ,500}, .. = { ,350}, ... = { ,200},
11244 {,} = { ,500},
11245 : = { ,300},
11246 ; = { ,300},
11247 ? = { ,300}, ¶ = { ,300},
11248 & = {50,50},
11249 \% = {100,100},
11250 * = {200,200},
11251 + = {150,200},
11252 @ = {50,50},
11253 ~ = {200,150},
11254 (= {200, },) = { ,200},
11255 / = {100,200},
11256 - = {300,500},
11257 \textendash = {300,300}, \textemdash = {200,200},
11258 \textquoteleft = {700,400}, \textquoteright = {700,400},
11259 \textquotedblleft = {500,300}, \textquotedblright = {500,300},
11260 _ = {100,100},
11261 \textbackslash = {100,200},
11262 \quotesinglbase = {500,500}, \quotedblbase = {400,400},
11263 \guilsinglleft = {400,400}, \guilsinglright = {300,500},
11264 \guillemotleft = {300,300}, \guillemotright = {300,300},
11265 \textexclamdown = {100, }, \textquestiondown = {200, },
11266 \textbraceleft = {200,100}, \textbraceright = {200,200},
11267 \textless = {300,100}, \textgreater = {200,100},

```

```

11268 ≤ = {200,100}, ≥ = {100,200},
11269 | = {450,500}, ¬ = {250,150},
11270 · = {850, 700},
11271 ¶ = {100,0},
11272 × = {150, 300},
11273 ° = {300,300}, ° = {300,250},
11274 ⁰ = {300,200},
11275 ¹ = {300,150}, ² = {350,200}, ³ = {250,150},
11276 ⁴ = {350,100}, ⁵ = {300, 50}, ⁶ = {400,100},
11277 ⁷ = {400, 50}, ⁸ = {250, 50}, ⁹ = {300, 50},
11278 ⁰ = {300,300},
11279 ¹ = {300,350}, ² = {300,150}, ³ = {250,250},
11280 ⁴ = {400,200}, ⁵ = {300,100}, ⁶ = {450,200},
11281 ⁷ = {450,150}, ⁸ = {400,250}, ⁹ = {400,200},
11282 ± = {150,100}, ÷ = {300,300},
11283 þ = { 50, },
11284 † = {250,200}, ‡ = {250,200},
11285 ⁺ = {300,450}, ⁻ = {300,450},
11286 ⁺ = {300,450}, ⁻ = {300,450},
11287 - = {300,500}, - = {300,500}, - = {100,300},
11288 - = {125,305}, - = {200,300}, - = {125,150},
11289 • = {125,200}

11290 }
11291
11292 \SetProtrusion
11293 [name = palatino-sc,
11294 load = palatino-default]
11295 { encoding = {TU,EU1,EU2},
11296 family = {Palatino},
11297 shape = sc }
11298 {
11299 a = {50,50},
11300 æ = {50, },
11301 b = { 0, 0},
11302 d = { 0, 0},
11303 f = { 0, 0},
11304 g = { 0, 0},
11305 j = {50, },
11306 l = { ,50},
11307 o = { 0, 0},
11308 p = { 0, 0},
11309 q = { 0, },
11310 r = { , 0},
11311 t = {50,50},
11312 y = {50,50},
11313 fl = { 0,50},
11314 ffl = { 0,50},
11315 ◊ = { 0,50},
11316 ◊ = { 0,50}

11317 }
11318 (/Palatino)

```

### 3.2.5 Basic glyph set

The protrusion settings will still be loaded from `microtype.cfg`.

```
11319 (TU-basic) %% No settings.
```

### 3.2.6 Empty glyph set

```

11320 (*TU-empty)
11321 \SetProtrusion
11322 [name = empty]
11323 { encoding = {TU,EU1,EU2},

```

```
11324 family = {TU-empty} }
11325 { }
11326 (</TU-empty>
11327
```

## 4 Auxiliary file for micro fine tuning

This file may be used to test protrusion and (less so) expansion settings.

```

11328 (*test)
11329 \documentclass{article}
11330 %% options are passed through to microtype
11331 \usepackage[stretch=50]{microtype-show}
11332
11333 %% options for microtype-show
11334 \ShowGlyphIndextrue
11335 \ShowMissingGlyphstrue
11336 \def\GlyphScaleFactor{2}
11337
11338 %% load any required font packages:
11339 \ifpdftex
11340 \usepackage[T1]{fontenc}
11341 \else
11342 \usepackage{fontspec}
11343 \fi
11344
11345 \begin{document}
11346 \microtypesetup{expansion=false}
11347
11348 %% load your font here:
11349
11350 \ShowCharacterInheritance
11351
11352 \newpage
11353 \ShowProtrusion
11354
11355 \newpage
11356 %% show single glyphs
11357 %\ShowDummyLine
11358 %\ShowProtrusionLineGlyph{A}
11359 %\ShowProtrusionLineIndex{27}
11360
11361 %% loop through all glyphs of the font;
11362 %% protrusion values are shown in 1000th of 1em
11363 \ShowProtrusionDefined
11364
11365 %\ShowProtrusionMissing
11366
11367 %\ShowProtrusionAll
11368
11369 \newpage %% -----
11370 This is the current font stretched by 5%, normal, and shrunk by 5%:
11371
11372 \newlength{\MTln}
11373 \newcommand*{\teststring}
11374 {ABCDEFGHIJKLMNQRSTUUVWXYZabcdefghijklmnopqrstuvwxyz}
11375 \settowidth{\MTln}{\teststring}
11376 \microtypesetup{expansion=true}
11377
11378 \bigskip\noindent\parbox{1.05\MTln}{\teststring\linebreak\\teststring}\par
11379 \bigskip\noindent\parbox{0.95\MTln}{\teststring}
11380 \end{document}
11381 (/test)

```

Needless to say that things may always be improved. For suggestions, mail to [w.m.l@gmx.net](mailto:w.m.l@gmx.net) or file an issue at <https://github.com/schlicht/microtype/issues>.



## A The title logo

This is `microtype-logo.dtx`. You may treat this file in three different ways:

- compile it by itself
- `\input` it in the body of a `dtx` file
- `\input` it in the preamble: it then provides the command `\printlogo`, which will do just that

The first two cases require the style file `microtype-doc.sty`, which can be generated from `microtype.ins` with:

```
\makefile{microtype-doc.sty}{docsty}
```

11382 *(\*logo)*

Here's how the logo on the title page was created.<sup>21</sup> It has nothing to do with `microtype`, actually, but uses `fontinst`. It is based on an experiment I posted to the `de.comp.text.tex` newsgroup.<sup>22</sup> It will show:

- the character
- the  $\TeX$  box
- the bounding box
- kerns

### A.1 Macros

To run this file,  $\TeX$  needs to find the `afm` file (either in the `TEXINPUTS` path, or in the current working directory).

First input `fontinst`.

11383 `\input fontinst.sty`

`bbox.sty` is an addition to `fontinst`, which makes dimensions of the bounding boxes available (and was written by Hàn Thế Thành, by the way). These dimensions are specified in the `afm` file, but not used by  $\TeX$ , which is why `fontinst` will discard them otherwise.

11384 `\input bbox.sty`

`\tempdim` Allocate some `dimen` registers.

11385 `\newdimen\tempdim`

`\fboxrulei` Frame width of the box as  $\TeX$  sees it.

11386 `\newdimen\fboxrulei`

11387 `\fboxrulei=0.1pt`

`\fboxruleii` Frame width of the bounding box.

11388 `\newdimen\fboxruleii`

11389 `\fboxruleii=0.1pt`

`\kernboxheight` Height of the box indicating the kern.

11390 `\newdimen\kernboxheight`

11391 `\kernboxheight=5pt`

`\scaletoe` An auxiliary macro. Return a dimension relative to the `em`-width of the font. Requires `e-TeX`.

11392 `\setcommand\scaletoe#1{\dimexpr #1 sp*\fontdimen6\font/1000\relax}`

`\showlogo` A `fontinst` incantation whose sole purpose is to produce the logo. Its argument is a string (letters only).

11393 `\fontinstcc`

11394 `\def\showlogo#1{%`

Some fonts do not specify the `\fontdimen6` (width of an `em`) in the `afm` file. In this case, use the font size, which is correct in most cases.

11395 `\ifdim\fontdimen6\font = 0pt`

11396 `\typeout{***-Warning:-no-fontdimen-6-specified-***^^J%`

11397 `***-setting-it-to-\pdffontsize\font \ifnum\pdfversion < 130 pt\fi-***}`

11398 `\fontdimen6\font=\pdffontsize\font \ifnum\pdfversion < 130 pt\fi\relax`

11399 `\fi`

11400 `\installfonts`

11401 `\input_metrics{\logofont,\metrics\printbbs{#1}\relax}`

<sup>21</sup> Note that the `logo` module will not be created when installing `microtype`. Instead, the source file `microtype-logo.dtx` is included as an attachment in the PDF file. If your PDF reader supports this, you can [click here](#) to extract it; alternatively, you may use the `pdftk` tool.

<sup>22</sup> Message ID: 42aa3687\$0\$24366\$9b4e6d93@newsread2.arcor-online.net

```

11402 \endinstallfonts
11403 }
11404 \normalcc
 Layers.
11405 \makeatletter
11406 \def\mtl@layer#1#2{\pdfliteral{/OC/#1 BDC}#2\pdfliteral{EMC}}
11407 \ifx\mt@objects\undefined\let\mt@objects\@empty\fi
11408 \ifx\mt@order\undefined\let\mt@order\@empty\fi
11409 \xdef\mt@order{\mt@order[(Logo)]}
11410 \let\mtl@resources\@empty
11411 \def\mtl@register#1{%
11412 \immediate\pdfobj{<< /Type/OCG /Name(#1) >>}
11413 \expandafter\xdef\csname mtl@#1\endcsname{\the\pdflastobj\space 0 R }
11414 \xdef\mt@objects{\mt@objects\csname mtl@#1\endcsname}
11415 \xdef\mt@order{\mt@order\csname mtl@#1\endcsname}
11416 \xdef\mtl@resources{\mtl@resources/#1 \csname mtl@#1\endcsname}}
11417 \mtl@register{canvas}
11418 \mtl@register{characters}
11419 \mtl@register{bounding-boxes}
11420 \mtl@register{TeX-boxes}
11421 \xdef\mt@order{\mt@order]}
11422 \global\let\mtl@objects\mt@objects
11423 \def\togglelayer#1#2{%
11424 \pdfstartlink width \wd\logobox height \ht\logobox depth \dp\logobox
11425 user{/Subtype/Link
11426 /BS << /Type/Border/W 0 >> /H/0
11427 /A << /S/SetOCGState
11428 /State[/Toggle \csname mtl@#1\endcsname] >>
11429 }#2\pdfendlink
11430 }

```

\printbbs Preparation.

```

11431 \setcommand\printbbs#1{%
11432 \setbox0\hbox{#1}%
11433 \leavevmode
11434 \kern-\fboxrulei
 The canvas in the natural width of the text minus protrusion, in color bgcolor.
11435 \mtl@layer{canvas}{%
11436 \getboundarychars#1\relax
11437 \tempdim=\dimexpr\wd0 - (\scalettoem{\lpcode\font\firstchar}+
11438 \scalettoem{\rptide\font\lastchar})\relax
11439 \kern\dimexpr\scalettoem{\lpcode\font\firstchar}\relax
11440 \lower\dimexpr\dp0+0.05em \relax \vbox{\color{bgcolor}%
11441 \hrule width \tempdim
11442 height \dimexpr\dp0+\ht0+0.15em\relax}%
11443 \kern-\tempdim

```

The baseline, in color blcolor.

```

11444 \vbox{\color{blcolor}%
11445 \hrule width \tempdim
11446 height \fboxrulei}%
11447 }%
11448 \kern-\dimexpr\wd0 -\scalettoem{\rptide\font\lastchar}\relax

```

The string.

```

11449 \printbbs #1\relax\relax
11450 }

```

\getboundarychars Get first ....

```

11451 \def\getboundarychars#1#2\relax{%
11452 \def\firstchar{`#1}%
11453 \getlastchar#1#2\relax
11454 }

```

\getlastchar ... and last character.

```

11455 \def\getlastchar#1#2{%

```

```

11456 \ifx\relax#2\relax
11457 \def\lastchar{`#1}%
11458 \else
11459 \expandafter\getlastchar
11460 \fi #2%
11461 }

```

`\printbss` Loop over all characters of the string.

```

11462 \def\printbss#1#2#3\relax{%
11463 \ifx\relax#1\relax
11464 \else
11465 \ifx\relax#2\relax
11466 \printbb{#1}{}%
11467 \else
11468 \printbb{#1}{#2}%
11469 \fi
11470 \expandafter\printbss
11471 \fi #2#3\relax
11472 }

```

`\printbb` Record the kern between the current and the following character, then print the character. `\kerning` is a fontinst command.

```

11473 \setcommand\printbb#1#2{%
11474 \setbox0\hbox{\kerning{#1}{#2}\xdef\thekern{\number\result}}%
11475 \showboxes{#1}%

```

This could be another application.

```

11476 % \quad
11477 % w: \the\scaletoe{\width{#1}},
11478 % bb: \the\scaletoe{\bbleft{#1}}/%
11479 % \the\scaletoe{\bbright{#1}},
11480 % \the\scaletoe{\number\numexpr\width{#1}-\bbright{#1}\relax}
11481 % h: \height{#1}/\bbtop{#1}, \bbbottom{#1}/\depth{#1}\par
11482 }

```

`\showboxes` Print the boxes for char `(#1)`. This won't work if `(#1)` isn't also the PostScript name of the glyph (e.g., 'comma' ≠ ',').

```

11483 \setcommand\showboxes#1{%
11484 \leavevmode
11485 \color{texcolor}%

```

We have to record the width of the glyph.

```

11486 \setbox0\hbox{\color{textcolor}{#1}}%
11487 \global\tempdim=\wd0\relax
11488 \kern-\fboxrulei

```

1. *The TeX box*: Print a frame in color `texcolor`. This frame shows the glyph as TeX sees it.

```

11489 \mtl@layer{TeX-boxes}{%
11490 \hbox{%
11491 \lower\dimexpr \dp0 + \fboxrulei\relax
11492 \hbox{%
11493 \vbox{%
11494 \hrule height\fboxrulei
11495 \hbox{%
11496 \vrule width\fboxrulei height \dimexpr\ht0 + 2\fboxrulei\relax
11497 %
11498 \vrule width\fboxrulei
11499 }%
11500 \hrule height\fboxrulei}}}%
11501 }%

```

2. *The character*: Now we step back and print the actual glyph. We hold it back until now, so that it will be printed on top of its box.

```

11502 \kern-\wd0
11503 \mtl@layer{characters}{\hbox{\box0}}%

```

Step back by the amount that the character's bounding box differs from the TeX box on the left side.

```

11504 \kern\dimexpr\scaletoe{\bbleft{#1}}-\tempdim-\fboxrulei\relax

```

3. *The bounding box*: will be printed in color `bbcolor`.

```

11505 \mtl@layer{bounding-boxes}{%
11506 {\color{bbcolor}%
11507 \hbox{%
11508 \lower\dimexpr-\scaletoe{\bbbottom{#1}}+\fboxruleii\relax
11509 \hbox{%
11510 \vbox{%
11511 \hrule height\fboxruleii
11512 \hbox to \dimexpr\scaletoe{\numexpr
11513 \bbright{#1}-\bbleft{#1}\relax}+2\fboxruleii\relax{%
11514 \vrule height \dimexpr\scaletoe{\numexpr
11515 \bbtop{#1}-\bbbottom{#1}\relax}%
11516 width\fboxruleii
11517 \hfill
11518 \vrule width\fboxruleii}%
11519 \hrule height\fboxruleii}}}%
11520 }%
11521 \kern-\dimexpr\fboxruleii+\fboxrulei\relax
11522 }%

```

4. *The kern*: We also print a small box in color `kerncolor` indicating the kerning between the current and the next character; filled for negative kerns, empty for positive kerns.

```

11523 \kern\scaletoe{\numexpr\width{#1}-\bbright{#1}\relax}%
11524 \mtl@layer{TeX-boxes}{%
11525 {\ifnum\thekern<0
11526 \color{kerncolor}%
11527 \kern\scaletoe{\thekern}%
11528 \lower\kernboxheight\hbox{\vrule width -\dimexpr\scaletoe{\thekern}\relax
11529 height \kernboxheight}%
11530 \kern\scaletoe{\thekern}%
11531 }else
11532 \color{texcolor}%
11533 \ifnum\thekern=0 \else
11534 \lower\kernboxheight
11535 \hbox{%
11536 \vbox{%
11537 % \hrule height\fboxrulei
11538 \hbox{%
11539 \vrule height \kernboxheight width\fboxrulei
11540 \kern\dimexpr\scaletoe{\thekern}-2\fboxrulei\relax
11541 \vrule width\fboxrulei
11542 }%
11543 \hrule height\fboxruleii}%
11544 \fi
11545 \fi
11546 }%
11547 }%
11548 % \kern-\fboxrulei
11549 }

```

`\printlogo`

```

11550 \newbox\logobox
11551 \def\printlogo{%
11552 \setbox\logobox=\hbox{\vbox{%
11553 \MakePercentComment

```

This is the Kepler MM font used in the logo.

```

11554 \def\logofont{pkpri9e10}
11555 \transformfont{\logofont}{\reencodefont{8r}{\fromafm{pkpmmri8a10}}}
11556 \font\thelogofont=\logofont\space at 82pt

```

This would load the italic Palatino font instead.

```

11557 %\def\logofont{pplri}
11558 %\transformfont{\logofont8r}{\reencodefont{8r}{\fromafm{\logofont8a}}}
11559 %\edef\logofont{\logofont8r}
11560 %\font\thelogofont=\logofont\space at 78pt

```

Load the font.

```
11561 \the\logofont
```

Protrusion values (overdone for didactic reasons).

```
11562 \lcode\font`M=96
```

```
11563 \rcode\font`e=46
```

Now we can generate the logo.

```
11564 \pdfliteral direct{/SXS gs}%
```

```
11565 \showlogo{Microtype}%
```

```
11566 % \rlap{\normalfont\normalsize\raisebox{55pt}{\footnotemark[1]}}%
```

```
11567 % \kern5pt\[\[3\baselineskip]
```

```
11568 % \long\def\@makefnmark##1{%
```

```
11569 % \leftskip 0pt
```

```
11570 % \parindent 0pt
```

```
11571 % \everypar{\parindent 0pt}%
```

```
11572 % \leavevmode\hbox to 15pt{\@thefnmark\hss}##1}
```

```
11573 % \footnotetext[1]{This graphic displays on a
```

```
11574 % \togglelayer{canvas}{canvas} the \togglelayer{characters}{characters},
```

```
11575 % their \togglelayer{bounding-boxes}{bounding boxes}
```

```
11576 % and \togglelayer{TeX-boxes}{\TeX\ boxes}.
```

```
11577 }}%
```

```
11578 \edef\logodimens{width \the\wd\logobox height \the\ht\logobox depth \the\dp\logobox}
```

```
11579 \immediate\pdfobjj<</Type/ExtGState /CA 0.6 /ca 0.6 /BM/Normal >>%
```

```
11580 \immediate\pdfxform
```

```
11581 attr {/Group <</Type/Group /S/Transparency /I true /CS/DeviceRGB >>}
```

```
11582 resources {/Properties <<\mtl@resources>>
```

```
11583 /ExtGState << /SXS \the\pdflastobj\space 0 R >> }
```

```
11584 \logobox
```

```
11585 % \vskip-2.5\baselineskip
```

```
11586 % \leavevmode
```

```
11587 % \togglelayer{characters}{%
```

```
11588 % \pdfrefxform\pdflastxform
```

```
11589 % }%
```

```
11590 \pdfannot\logodimens{%
```

```
11591 /Subtype/Widget /FT/Btn /T(Logo)
```

```
11592 %/F 4 % why did I say this?
```

```
11593 /AP << /N \the\pdflastxform\space 0 R >>
```

```
11594 /AA << /E << /S/SetOCGState /State[/Toggle \mtl@characters] >>
```

```
11595 /X << /S/SetOCGState /State[/Toggle \mtl@characters] >>
```

```
11596 /D << /S/SetOCGState /State[/Toggle \csname mtl@bounding-boxes\endcsname] >>
```

```
11597 /U << /S/SetOCGState /State[/Toggle \csname mtl@TeX-boxes\endcsname] >>
```

```
11598 >> }%
```

```
11599 \vspace{3\baselineskip}
```

```
11600 }
```

```
11601 \IfFileExists{pkpmmri8a10.afm}\relax{\def\printlogo{\MT@warning{File pkpmmri8a10.afm not found.}}
```

```
11602 \MessageBreak Cannot create logo}}}
```

Our font.

```
11603 \pdfmapline{+pkpmmri8r10 Kep1MM-It_385_575_10_ " TeXBase1Encoding ReEncodeFont " <8r.enc <pkpmmri8a10.pfb}
```

Define colours (thered and thegreen are copied from microtype.dtx).

```
11604 \def\mtdefinecolors{
```

```
11605 \definecolor{thered}{rgb}{0.65,0.04,0.07}
```

```
11606 \definecolor{thegreen}{rgb}{0.06,0.44,0.08}
```

```
11607 \colorlet{texcolor}{thegreen!50} % TeX boxes
```

```
11608 \colorlet{kerncolor}{texcolor} % negative kerns
```

```
11609 \colorlet{bbcolor}{thered!50} % bounding box
```

```
11610 \colorlet{bgcolor}{black!8} % canvas
```

```
11611 \colorlet{blcolor}{black!50} % baseline
```

```
11612 \colorlet{textcolor}{black!40} % text
```

```
11613 }
```

Use with microtype.dtx

```
11614 \ifx\documentclass\@twoclasseserror
```

```
11615 \usepackage{xcdraw}{xcolor}
```

```
11616 \mtdefinecolors
```

```
11617 \else
```

## A.2 Document

Now we can start the document.

```
11618 \documentclass[10pt,a4paper]{ltxdoc}
11619 \providecommand\MakePercentComment{\relax}
11620 \expandafter\def\csname ver@microtype.dtx\endcsname{2999/99/99}
 Re-use the preamble from microtype.dtx.
11621 \usepackage{microtype-doc}
11622 \usepackage{attachfile}
11623 \makeatletter
11624 \pdfcatalog{/OCProperties << /OCGs [\mt@objects] /D << /Order [\mt@order] >> >>}
11625 \makeatother
11626 \begin{document}
 You are currently reading this.
11627 \DocInput{microtype-logo.dtx}
11628 \newpage
11629 And here it is:\vspace{6\baselineskip}
11630 \begin{center}
11631 \printlogo
11632 \end{center}
11633 \expandafter\enddocument
11634 \fi
 That's it.
11635 </logo>
```

## B The letterspacing illustration

This is `microtype-lssample.dtx`. You may treat this file in three different ways:

- compile it by itself
- `\input` it in the body of a dtx file
- `\input` it in the preamble: it then provides the commands
  - `\lssample`: prints the letterspacing illustration
  - `\anchorarrow`: anchors an arrow for layer `<#1>`
  - `\showarrow`: toggles layer `<#1>` or `<#2>`, and prints `<#2>`

The first two cases require the style file `microtype-doc.sty`, which can be generated from `microtype.ins` with:

```
\makefile{microtype-doc.sty}{docsty}
```

```
11636 \ifx\lssample\undefined
11637 <*\lssample>
```

Upon popular request, here's how I've created the letterspacing illustration.<sup>23</sup>

### B.1 Macros

Rule width and image height and depth.

```
11638 \makeatletter
11639 \newdimen\lsamount
11640 \newdimen\lsrule
11641 \lsrule=0.2pt
11642 \def\lsheight{8pt}
11643 \def\lsdepth{12pt}
```

---

<sup>23</sup> Note that the `lssample` module will not be created when installing `microtype`. Instead, the source file `microtype-lssample.dtx` is included as an attachment in the PDF file. If your PDF reader supports this, you can [click here](#) to extract it; alternatively, you may use the `pdftk` tool.

Our font (Adobe Caslon).

```

11644 \def\lsfont{\fontfamily{paca}\selectfont}
 Loop over all letters in <#2>, letterspacing them by <#1>.
11645 \def\dols#1#2{\lssamount=#1\relax \dolss#2\enddols}
11646 \def\dolss#1#2\enddols{%
11647 \ifx\empty#2\empty\divide\lssamount 2\fi
11648 \ls{#1}%
11649 \ifx\empty#2\empty\else \dolss#2\enddols \fi
11650 }
 One tikz picture for each letter.
11651 \def\ls#1{%
11652 \begin{tikzpicture}[remember picture,line width=\lsrule]
11653 \tikzstyle{every node}=[inner sep=0pt]
 The bounding box.
11654 \mts@layer{stuff}{%
11655 \node[draw=thegrey,
11656 fill=theshade,
11657 outer sep=\lsrule,
11658 anchor=base,
11659 font=\lsfont]{};
11660 }
 The letter.
11661 \node[anchor=base,font=\lsfont](#1){#1};
 Two auxiliary coordinates.
11662 \path (#1.south west) ++(+.5\lsrule,-.5\lsrule) coordinate (#1L);
11663 \path (#1.base east) ++(-.5\lsrule,-\lsdepth) coordinate (#1R);
11664 \mts@layer{stuff}{%
 Now draw the normal character width,
11665 \draw[color=thered!75,
11666 fill=thered!30,
11667 outer sep=\lsrule]
11668 (#1L) rectangle (#1R);
11669 \ifdim\lssamount>0pt
11670 \path (#1.base east) ++(+.5\lssamount,-6pt) coordinate (#1_ls);
11671 \path (#1R) ++(\lssamount+\lsrule,\lsdepth) coordinate (#1E);
 and the letter space.
11672 \draw[color=thered,
11673 fill=thered!50,
11674 outer sep=\lsrule]
11675 (#1R) ++(+\lsrule,+0pt) rectangle (#1E);
11676 \fi
11677 }
11678 \end{tikzpicture}%
11679 \ignorespaces
11680 }
 Draw the interword space.
11681 \def\lssp#1#2#3#4{%
11682 \begin{tikzpicture}[remember picture,line width=\lsrule,inner sep=0pt]
11683 \mts@layer{stuff}{%
11684 \tikzstyle{every draw}=[anchor=bottom]
11685 \coordinate(#1space) at (#2/2,\lsdepth/2);
11686 \coordinate(#1stretch) at (#2+#3/2,+0pt);
11687 \coordinate(#1shrink) at (#2-#4/2,+0pt);
11688 \draw[color=thegreen,fill=thegreen!50,use as bounding box]
11689 (0,0) rectangle ++(#2,\lsdepth);
11690 \draw[color=thegreen,fill=thegreen!30]
11691 (+#2,-\lsrule) rectangle ++(+#3,-4pt+\lsrule);
11692 \draw[color=thegreen,fill=thegreen!50]
11693 (+#2,-\lsrule) rectangle ++(-#4,-4pt+\lsrule);
11694 \draw[->,line width=0.3pt,shorten <=0.5\lsrule,color=thegreen!50]

```

```

11695 (+#2,-2pt-.5\lsrule) -- ++(+#3,+0pt);
11696 \draw[->,line width=0.3pt,shorten <=0.5\lsrule,color=thegreen!30]
11697 (+#2,-2pt-.5\lsrule) -- ++(-#4,+0pt);
11698 }%
11699 \end{tikzpicture}%
11700 \ignorespaces
11701 }

Layers.
11702 \def\mts@layer#1#2{\pdfliteral page{/OC/#1 BDC}#2\pdfliteral page{EMC}}
11703 \def\mts@layer#1#2{\pdfliteral page{/OC/stuff BDC /OC/#1 BDC}#2\pdfliteral page{EMC EMC}}
11704 \ifx\mt@objects\undefined\let\mt@objects\@empty\fi
11705 \ifx\mt@order \undefined\let\mt@order \@empty\fi
11706 \xdef\mt@order{\mt@order[(Sheep)]}
11707 \let\mts@resources\@empty
11708 \def\mts@register#1{%
11709 \immediate\pdfobj{<< /Type/OCG /Name(#1) >>}
11710 \expandafter\xdef\csname mts@#1\endcsname{\the\pdfastobj\space 0 R }
11711 \xdef\mt@objects{\mt@objects\csname mts@#1\endcsname}
11712 \xdef\mt@order{\mt@order\csname mts@#1\endcsname}
11713 \xdef\mts@resources{\mts@resources/#1 \csname mts@#1\endcsname}}
11714 \mts@register{stuff}
11715 \mts@register{tracking}
11716 \mts@register{ispace}
11717 \mts@register{ospace}
11718 \mts@register{istretch}
11719 \mts@register{ishrink}
11720 \mts@register{ostretch}
11721 \mts@register{oshrink}
11722 \mts@register{okern}
11723 \mts@register{ligature}
11724 \mts@register{_compatibility}
11725 \xdef\mt@order{\mt@order]}

Anchor point for the arrow in the code.
11726 \newcommand\anchorarrow[1]{%
11727 \tikz[remember picture,overlay]\node(#1_c){};}

Add an arrow from code to image.
11728 \newcommand\add@arrow[5][left]{%
11729 \tikz[remember picture,overlay,bend angle=14,looseness=0.75,>=latex]{%
11730 \mts@layer{#3}{\draw[->,thick,color=the#2](#4) to[bend #1] (#5);}%
11731 }

Toggle layer.
11732 \def\toggle@layer#1#2#3{%
11733 \pdfstartlink
11734 user{/Subtype/Link
11735 /BS << /Type/Border/W 0 >> /H/0
11736 % /BS << /Type/Border/W 1 /S/D /D[4 1] >>
11737 % /C[0.7 0.7 0.7] /H/0
11738 /Contents(Click to Toggle!)
11739 /A << /S/SetOCGState
11740 /State[/Toggle \csname mts@#1\endcsname] >> }%
11741 \rlap{#2}%
11742 {\fboxsep=0pt \fboxrule=0pt
11743 \mts@layer{stuff}{%
11744 \rlap{\fcolorbox{white}{white}{\vphantom{kg}\color{the#3}#2}}}%
11745 \mts@layer{#1}{%
11746 \fcolorbox{white}{the#3!50}{\vphantom{kg}\color{white}#2}}%
11747 }%
11748 \pdfendlink
11749 }
11750 \newcommand\showarrow[2][]{%
11751 \ifx\relax#1\relax\def\@tempa{#2}\else\def\@tempa{#1}\fi
11752 \toggle@layer{\@tempa}{\itshape #2}}

```



The environment for our illustration.

```

11753 \def\ls@sample#1{%
11754 \parskip 4pt \parindent 0pt
11755 \par
11756 \vskip4pt
11757 {\leftskip 15pt
11758 \mt@pseudo@margin{\color{theblue}Click on the image to show the kerns
11759 and spacings involved. Click on emphasised words in the text below
11760 to reveal the relation of image and code.\strut}
11761 \mt@layer{compatibility}{%
11762 \mt@place{\rlap{\hskip-\marginparwidth \color{white}%
11763 \vrule width\dimexpr\hsize+\marginparwidth\relax height\mt@unvdimen}}
11764 \mt@pseudo@margin{\color{thered}%
11765 If you had a \acronym{PDF} viewer that understands
11766 \acronym{PDF}\,{\smaller1.5}, you could hide the arrows selectively.}}
11767 \vskip-\mt@unvdimen}%
11768 \vskip-4pt
11769 \setlength\fbxsep{4pt}%
11770 \leavevmode
11771 \pdfstartlink
11772 user{/Subtype/Link
11773 /BS << /Type/Border/W 0 >> /H/0
11774 /A << /S/SetOCGState
11775 /State[/Toggle \mts@stuff] >> }%
11776 \fcolorbox{theframe}{theshade}%
11777 {\fontsize{34}{38}\selectfont #1}%
11778 \pdfendlink
11779 \par\medskip
11780 }%
11781 \edef\x{\pdfpageresources{/Properties <<\mts@resources>>}}\x
11782 }

```

Now define the illustration to be used in the document.

```

11783 \def\lssample{%
11784 \ls@sample{%
11785 \dols{Opt}{Stop}
11786 \lssp{o}{0.45em}{0.25em}{0.15em}
11787 \dols{0.16em}{\stearing}\hskip-\dimexpr 0.08em+\lslrule\relax
11788 \lssp{i}{13.82pt}{4.65pt}{2.08pt}
11789 \dols{0.16em}{sheep}
11790 \dols{Opt}{!}
11791 }%

```

Don't forget to add the arrows.

```

11792 \vspace{-\baselineskip}
11793 \add@arrow{red} {tracking}{\lsamount_c.east}{a_ls}
11794 \add@arrow{red} {okern} {okernend_c.east}{p_ls}
11795 \add@arrow{green} {ospace} {ospace_c.east} {ospace}
11796 \add@arrow{green} {ispace} {ispace_c.center} {ispace}
11797 \add@arrow{green!75} {istretch} {istretch_c.east} {istretch.north}
11798 \add@arrow{green!75} {ishrink} {ishrink_c.west} {ishrink.north}
11799 \add@arrow{green!75} {ostretch} {ostretch_c.east} {ostretch.north}
11800 \add@arrow{green!75} {oshrink} {oshrink_c.east} {oshrink.north}
11801 \add@arrow[right]{grey}{ligature}{nolig_c.east} {st.center}
11802 }
11803 \fi

```

This is for use with microtype.dtx

```

11804 \ifx\documentclass\@twoclasseserror
11805 \usepackage{tikz}
11806 \else

```

## B.2 Document

```

11807 \documentclass[10pt,a4paper]{ltxdoc}
11808 \expandafter\def\csname ver@microtype.dtx\endcsname{2999/99/99}

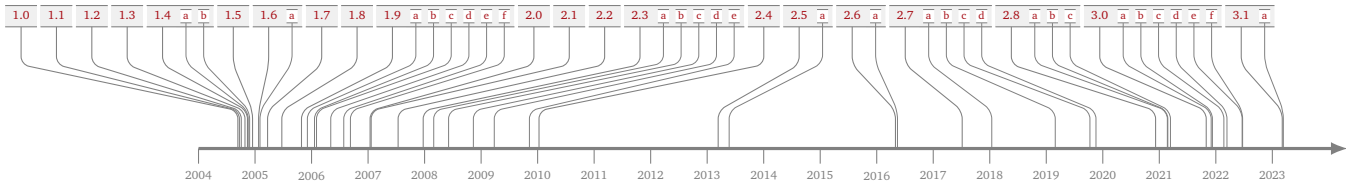
```

```

Re-use the preamble from microtype.dtx.
11809 \usepackage{microtype-doc}
11810 \usepackage{attachfile}
11811 \usepackage{tikz}
11812 \makeatletter
11813 \pdfcatalog{/OCProperties << /OCGs [\mt@objects]
11814 /D << /Order [\mt@order] /BaseState/OFF >> >> }
11815 \makeatother
11816 \begin{document}
You are currently reading this.
11817 \DocInput{microtype-1ssample.dtx}
Now show what we are able to do.
11818 \noindent
11819 Since a picture is worth a thousand words, probably even more if, in our
11820 case, it depicts a couple of letterspaced words, let's bring one to sum up
11821 these somewhat confusing options. Suppose you had the following settings
11822 (which I would in no way recommend; they are only for illustrative purposes):
11823 \begin{verbatim}
11824 \SetTracking
11825 [no ligatures = {"\anchorarrow{nolig}"f},
11826 spacing = {60"\anchorarrow{ispace}"0*,"%
11827 "-1"\anchorarrow{istretch}"00*," \anchorarrow{ishrink}"},
11828 outer spacing = {4"\anchorarrow{ospace}"50,"%
11829 "2"\anchorarrow{ostretch}"50,1"\anchorarrow{oshrink}"50},
11830 outer kerning = {"\anchorarrow{okernbegin}"*,"%
11831 \anchorarrow{okernend}"* }]
11832 { encoding = * }
11833 { 1"\anchorarrow{lsamount}"60 }
11834 \end{verbatim}
11835 and then write:
11836 \begin{verbatim}
11837 Stop \textls{stealing sheep}!
11838 \end{verbatim}
11839 this is the (typographically dubious) outcome:
11840
11841 \lssample
11842
11843 \noindent
11844 While the word 'Stop' is not letterspaced, the space between the letters in
11845 the other two words is expanded by the \showarrow[tracking]{tracking-amount}{red}
11846 of 160/1000\,em\,=\allowbreak\,0.16\,em.
11847 The \showarrow[ispace]{inner~space}{green} within the letterspaced text is
11848 increased by 60\%, while its \showarrow[istretch]{stretch}{green} amount is
11849 decreased by 10\% and the \showarrow[ishrink]{shrink}{green} amount is left
11850 untouched.
11851 The \showarrow[ospace]{outer~space}{green} (of 0.45\,em) immediately before the
11852 piece of text may \showarrow[ostretch]{stretch}{green} by 0.25\,em and
11853 \showarrow[oshrink]{shrink}{green} by 0.15\,em.
11854 Note that there is no outer space after the text, since the exclamation mark
11855 immediately follows; instead, the default \showarrow[okern]{outer~kern}{red}
11856 of half the letterspace amount (0.08\,em) is added.
11857 Furthermore, one \showarrow{ligature}{grey} wasn't broken up, because we
11858 neglected to specify the '~|s|' in the |no ligatures| key.
11859
11860 \expandafter\enddocument
11861 \fi
11862 </lssample>

```

## C Change history



Numbers prefixed with 'U' refer to the User manual.

### 2004/09/11 **Version 1.0**

General: Initial version . . . . . [U1](#)

### 2004/09/21 **Version 1.1**

|                                                                                                                          |     |                                                                                                                                    |     |
|--------------------------------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----|
| General: configuration file names in lowercase (suggested by <i>Harald Harders</i> ) . . . . .                           | 77  | <code>\MT@get@listname@</code> : don't check for empty attributes list . . . . .                                                   | 78  |
| remove 8-bit characters from the configuration files (suggested by <i>Harald Harders</i> ) . . . . .                     | 140 | <code>\MT@ifempty</code> : fix: use category code 12 for the percent character (reported by <i>Tom Kink</i> ) . . . . .            | 20  |
| Protrusion: add factors for some more characters . . . . .                                                               | 148 | <code>\MT@is@number</code> : numbers may also be specified in hexadecimal or octal (suggested by <i>Harald Harders</i> ) . . . . . | 84  |
| settings for Adobe Minion (contributed by <i>Harald Harders</i> ) . . . . .                                              | 149 | <code>\MT@pdftex@no</code> : fix: version check (reported by <i>Harald Harders</i> ) . . . . .                                     | 15  |
| <code>\DeclareCharacterInheritance</code> : new command: possibility to specify character inheritance . . . . .          | 110 | <code>\MT@permute</code> : don't use sets for empty encoding . . . . .                                                             | 113 |
| <code>\MT@declare@sets</code> : remove spaces around set name . . . . .                                                  | 96  | <code>\MT@setup@expansion</code> : issue an error instead of a warning, when pdfTeX version is too old for autoexpand . . . . .    | 129 |
| <code>\MT@find@file</code> : fix: also check whether the file for the base font family has already been loaded . . . . . | 77  | <code>\MT@split@codes</code> : fix: allow zero and negative values . . . . .                                                       | 44  |
| <code>\MT@get@basefamily</code> : only remove suffixes 'x' or 'j' . . . . .                                              | 78  | <code>\MT@use@set</code> : remove spaces around set name . . . . .                                                                 | 101 |

### 2004/10/03 **Version 1.2**

|                                                                                                         |     |                                                                                                                            |     |
|---------------------------------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------|-----|
| Font aliases: declare cmor as an alias of cmr . . . . .                                                 | 137 | <code>\MT@get@inh@list</code> : fix: set inheritance list \globally to \empty . . . . .                                    | 80  |
| Font sets: new: allmath and basicmath . . . . .                                                         | 136 | <code>\MT@get@listname@</code> : alternatively check for alias font name . . . . .                                         | 78  |
| Protrusion: add settings for Computer Modern Roman and Adobe Garamond in TS1 encoding . . . . .         | 179 | <code>\MT@get@size</code> : additional magic to catch some errors . . . . .                                                | 99  |
| add settings for Computer Modern Roman math symbols . . . . .                                           | 183 | <code>\MT@get@size@</code> : hijack <code>\set@fontsize</code> instead of <code>\setfontsize</code> . . . . .              | 99  |
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2005/10/28 **Version 1.9**

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2005/12/05 **Version 1.9a**

|                                                                                                                 |     |                                                                                                                                                           |     |
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2006/01/20 **Version 1.9b**

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2006/02/02 **Version 1.9c**

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2006/05/05 **Version 1.9d**

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2006/07/28 **Version 1.9e**

|                                                                                             |     |                                                                                         |     |
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2006/09/09 **Version 1.9f**

|                                                                                                        |     |                                                                                                |     |
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2007/01/14 **Version 2.0**

|                                                                                                            |     |                                                                                                      |     |
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2007/01/21 **Version 2.1**

|                                                                                                                               |    |                                                                                                         |    |
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2007/07/14 **Version 2.2**

|                                                                                                                                             |     |                                                                                                                                                                        |     |
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2007/12/23 **Version 2.3**

|                                                                                                                 |     |                                                                                                                        |     |
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| <code>\microtypecontext</code> : made robust (reported by <i>Stephan Hennig</i> ) . . . . .                   | 94 | <code>\MT@set@curr@os</code> : adjusting spaces made more reliable . . . . .                                                                               | 66  |
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| <code>\MT@in@clist</code> : don't use <code>\x</code> (reported by <i>Peter Meier</i> ) . . . . .             | 23 | <code>\MT@SetTracking</code> : sanity check for value . . . . .                                                                                            | 105 |
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2008/02/29 **Version 2.3a**

|                                                                                                                           |     |                                                                                                               |     |
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| Documentation: add hint about <code>babel</code> having to be loaded first . . . . .                                      | U28 | <code>\MT@getkey</code> : fix: <code>key=val</code> in class options list . . . . .                           | 126 |
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2008/06/04 **Version 2.3b**

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2008/11/11 **Version 2.3c**

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| Documentation: add hint about spacing being experimental . . . . .      | U27 | <code>\MT@detokenize@c</code> : fix: remove last space only (reported by <i>Ulrich Durr</i> ) . . . . .             | 20  |
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2009/03/27 **Version 2.3d**

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| move setup to the very end (for <i>Colin Rourke</i> ) . . . . .                        | 135 | <code>\MT@setup@expansion</code> : default step: 1 for <code>pdfT<sub>E</sub>X</code> versions $\geq 1.40$ . . . . . | 128 |
| <code>\ifMT@inannot</code> : use <code>pdftexcmds</code> for debugging . . . . .       | 7   | <code>\MT@tr@outer@r@%</code> : don't use <code>\x</code> (reported by <i>Ulrich Durr</i> ) . . . . .                | 72  |
| <code>\lssstyle</code> : disable for Lua <code>T<sub>E</sub>X</code> . . . . .         | 68  | fix: don't adjust in math mode (reported by <i>Christoph Bier</i> ) . . . . .                                        | 71  |
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| <code>\MT@check@active@set</code> : warning for missing default sets . . . . .         | 122 | <code>\textls</code> : make math mode aware . . . . .                                                                | 73  |
| <code>\MT@lua</code> : update for Lua <code>T<sub>E</sub>X</code> 0.36 . . . . .       | 16  |                                                                                                                      |     |
| <code>\MT@set@tr@codes</code> : allow zero tracking . . . . .                          | 64  |                                                                                                                      |     |
| <code>\MT@set@tr@zero</code> : fix: allow switching off tracking                       |     |                                                                                                                      |     |

2009/11/09 **Version 2.3e**

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| Font sets: <code>sc*</code> instead of <code>sc</code> in <code>smallcaps</code> set . . . . . | 136 | Protrusion: settings for T2A encoding (contributed by <i>Karl Karlsson</i> ) . . . . . | 155 |

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| Spacing: settings for T2A encoding (contributed by <i>Karl Karlsson</i> )                                                                                    | 197                 | <i>Marcin Borkowski</i>                                                                                                                                                | 27  |
| <code>\MT@fix@fontdimen@six</code> : fix: gobbling settings with tracking failed (reported by <i>Leo</i> )                                                   | 39                  | <code>\MT@tikz@setup</code> : compatibility with <code>tikz</code> (first reported by <i>Christian Stark</i> )                                                         | 29  |
| <code>\MT@setup@</code> : make space-unaware (requested by                                                                                                   |                     | <code>\MT@tr@outer@r@</code> : fix: set current kerning and spacing again (found by <i>Lars Rönnbäck</i> )                                                             | 72  |
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| 2010/01/10                                                                                                                                                   | <b>Version 2.4</b>  |                                                                                                                                                                        |     |
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| General: allow contexts for LuaTeX                                                                                                                           | 108                 | <code>\MT@define@code@key@family</code> : compatibility with <code>fontspec</code> : remove its internal counter (reported by <i>Till A. Heilmann</i> )                | 106 |
| disable ‘DVIPoutput’ option for XeTeX                                                                                                                        | 118                 | <code>\MT@define@code@key@font</code> : scrub <code>fontspec</code> feature count (found by <i>Meho R</i> )                                                            | 106 |
| fix: check whether ‘(file)/(line)’ list name already exists (reported by <i>Till A. Heilmann</i> )                                                           | 107                 | <code>\MT@do@font</code> : adapt for LuaTeX                                                                                                                            | 25  |
| letterspacing with LuaTeX 0.62                                                                                                                               | 64                  | adapt for XeTeX                                                                                                                                                        | 25  |
| new files: <code>microtype-pdftex.def</code> , <code>microtype-xetex.def</code> , <code>microtype-luatex.def</code> , containing engine-specific definitions | 13                  | <code>\MT@get@slot@</code> : adapt for LuaTeX (requested by <i>Georg Duffner</i> )                                                                                     | 82  |
| protrusion with XeTeX                                                                                                                                        | 15                  | adapt for XeTeX                                                                                                                                                        | 82  |
| restore <code>\space</code> inside listings (reported by <i>Rolf Dieterich</i> )                                                                             | 31                  | <code>\MT@if@outer@next</code> : fix: conflict with <code>amsmath</code> (reported by <i>Scott Pakin</i> )                                                             | 71  |
| Documentation: add hint about LuaTeX compatibility                                                                                                           | U28                 | <code>\MT@info@missing@char</code> : fix error message for XeTeX (reported by <i>Juan Acevedo</i> )                                                                    | 46  |
| add hint about spacing and <code>ragged2e</code>                                                                                                             | U27                 | <code>\MT@is@charx</code> : compatibility with <code>xunicode</code>                                                                                                   | 87  |
| add hint about dtx source code                                                                                                                               | U30                 | <code>\MT@ledmac@setup</code> : fix to work with XeTeX (reported by <i>Maïeul Rouquette</i> )                                                                          | 28  |
| include <code>microtype-logo.dtx</code> and <code>microtype-lssample.dtx</code>                                                                              | 233                 | <code>\MT@ls@set@ls</code> : allow formulas in optional argument to <code>\textls</code> (fix by <i>Heiko Oberdiek</i> )                                               | 73  |
| Font aliases: declare <code>lmsy</code> and <code>lmm</code> as aliases of <code>cmsy</code> resp. <code>cmm</code> (reported by <i>Jonas Hogstrom</i> )     | 137                 | <code>\MT@microtypecontext</code> : fix: ensure to set up math fonts (reported by <i>RazorXsr</i> )                                                                    | 94  |
| declare <code>zgmxc</code> etc. ( <code>garamondx</code> ) as aliases of <code>ugm</code>                                                                    | 139                 | <code>\MT@register@subst@font</code> : only register substituted font if it isn’t registered already (reported by <i>George Gratzner</i> and <i>Josep Maria Font</i> ) | 93  |
| declare Latin Modern Roman (OpenType version) as alias of <code>lmr</code> when <code>fontspec</code> is loaded                                              | 137                 | <code>\MT@register@subst@font@cx</code> : only register if it isn’t registered already                                                                                 | 93  |
| declare TeX Gyre Pagella, Asana Math, Palatino LT Std, and Palatino as aliases of Palatino Linotype (OpenType version)                                       | 138                 | <code>\MT@scrubfeatures</code> : compatibility with <code>fontspec</code> : remove its internal counter                                                                | 40  |
| Font sets: add EU1 and EU2 encodings                                                                                                                         | 136                 | <code>\MT@set@all@pr</code> : fix: remove space (found by <i>Meho R</i> )                                                                                              | 43  |
| Inheritance: add rudimentary list for EU1 and EU2                                                                                                            | 144                 | <code>\MT@set@pr@codes</code> : make info about generic settings encoding-specific (reported by <i>Sebastian Schubert</i> )                                            | 42  |
| Protrusion: add default lists for EU1 and EU2                                                                                                                | 153                 | <code>\MT@setup@spacing</code> : warning with <code>ragged2e</code> (reported by <i>Steffen Hoffmann</i> )                                                             | 131 |
| improvements to Computer Modern Roman italics (contributed by <i>Hendrik Vogt</i> )                                                                          | 159                 | <code>\MT@setupfont</code> : select font with <code>fontspec</code> (found by <i>Georg Duffner</i> )                                                                   | 37  |
| Tracking: add EU2 encoding to default list                                                                                                                   | 146                 | <code>\MT@setupfont@hook</code> : restore <code>\%</code> and <code>\#</code> when <code>mathastext</code> is loaded (found by <i>Seamus Bradley</i> )                 | 29  |
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| <code>\DeclareMicrotypeAlias</code> : ignore spaces                                                                                                          | 102                 |                                                                                                                                                                        |     |
| <code>\ifMT@nofamily</code> : info if settings are not family-specific (suggested by <i>Hàn Thê Thành</i> )                                                  | 42                  |                                                                                                                                                                        |     |
| <code>\LoadMicrotypeFile</code> : remove all spaces in font name                                                                                             | 102                 |                                                                                                                                                                        |     |
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| 2013/05/23                                                                                                                                                   | <b>Version 2.5a</b> |                                                                                                                                                                        |     |
| General: use <code>luatexbase</code> instead of <code>luatextra</code> (contributed by <i>Élie Roux</i> )                                                    | 18                  | tributed by <i>Élie Roux</i> )                                                                                                                                         | 83  |
| Documentation: add notes on typesetting the documentation                                                                                                    | U30                 | <code>\MT@led@unhbox@line</code> : simplified                                                                                                                          | 28  |
| include OpenType configuration files                                                                                                                         | 201                 | <code>\MT@ledmac@setup</code> : support for <code>eledmac</code>                                                                                                       | 28  |
| <code>\MT@afteraftergroup</code> : fix: get outer kerning and spacing of nested letterspacing right                                                          | 67                  | <code>\MT@ls@outer@k</code> : add marker for tightly nested letterspacing                                                                                              | 74  |
| <code>\MT@get@slot@</code> : adapt to <code>luaotfload v2.2</code> (con-                                                                                     |                     | <code>\MT@set@tr@codes</code> : fix: load font for <code>fontspec</code>                                                                                               | 66  |
|                                                                                                                                                              |                     | <code>\MT@xspace</code> : fix outer spacing problem with <code>xspace</code> (reported by <i>Dave</i> )                                                                | 72  |

2016/05/01 **Version 2.6**

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2021/02/22 **Version 2.8a**

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2021/02/25 **Version 2.8b**

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2021/03/14 **Version 2.8c**

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2021/10/31 **Version 3.0**

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2021/12/02 **Version 3.0a**

|                                                                                                                   |     |                                                                                                                                     |    |
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5. If the previously unreachable Current Maintainer becomes reachable once more within three months of a change completed under the terms of 3b or 4, then that Current Maintainer must become or remain the Current Maintainer upon request provided they then update their communication data within one month.

A change in the Current Maintainer does not, of itself, alter the fact that the Work is distributed under the LPPL license.

If you become the Current Maintainer of the Work, you should immediately provide, within the Work, a prominent and unambiguous statement of your status as Current Maintainer. You should also announce your new status to the same pertinent community as in 2b above.

## Whether and How to Distribute Works under This License

This section contains important instructions, examples, and recommendations for authors who are considering distributing their works under this license. These authors are addressed as ‘you’ in this section.

### Choosing This License or Another License

If for any part of your work you want or need to use *distribution* conditions that differ significantly from those in this license, then do not refer to this license anywhere in your work but, instead, distribute your work under a different license. You may use the text of this license as a model for your own license, but your license should not refer to the LPPL or otherwise give the impression that your work is distributed under the LPPL.

The document ‘modguide.tex’ in the base L<sup>A</sup>T<sub>E</sub>X distribution explains the motivation behind the conditions of this license. It explains, for example, why distributing L<sup>A</sup>T<sub>E</sub>X under the GNU General Public License (GPL) was considered inappropriate. Even if your work is unrelated to L<sup>A</sup>T<sub>E</sub>X, the discussion in ‘modguide.tex’ may still be relevant, and authors intending to distribute their works under any license are encouraged to read it.

### A Recommendation on Modification Without Distribution

It is wise never to modify a component of the Work, even for your own personal use, without also meeting the above conditions for distributing the modified component. While you might intend that such modifications will never be distributed, often this will happen by accident – you may forget that you have modified that component; or it may not occur to you when allowing others to access the modified version that you are thus distributing it and violating the conditions of this license in ways that could have legal implications and, worse, cause problems for the community. It is therefore usually in your best interest to keep your copy of the Work identical with the public one. Many works provide ways to control the behavior of that work without altering any of its licensed components.

### How to Use This License

To use this license, place in each of the components of your work both an explicit copyright notice including your name and the year the work was authored and/or last substantially modified. Include also a statement that the distribution and/or modification of that component is constrained by the conditions in this license.

Here is an example of such a notice and statement:

```
%% pig.dtx
%% Copyright 2005 M. Y. Name
%
% This work may be distributed and/or modified under the
% conditions of the LaTeX Project Public License, either version 1.3
% of this license or (at your option) any later version.
% The latest version of this license is in
% https://www.latex-project.org/lppl.txt
% and version 1.3 or later is part of all distributions of LaTeX
% version 2005/12/01 or later.
%
% This work has the LPPL maintenance status ‘maintained’.
%
% The Current Maintainer of this work is M. Y. Name.
%
% This work consists of the files pig.dtx and pig.ins
% and the derived file pig.sty.
```

Given such a notice and statement in a file, the conditions given in this license document would apply, with the ‘Work’ referring to the three files ‘pig.dtx’, ‘pig.ins’, and ‘pig.sty’ (the last being generated from ‘pig.dtx’ using ‘pig.ins’), the ‘Base Interpreter’ referring to any ‘L<sup>A</sup>T<sub>E</sub>X-Format’, and both ‘Copyright Holder’ and ‘Current Maintainer’ referring to the person ‘M. Y. Name’.

If you do not want the Maintenance section of LPPL to apply to your Work, change ‘maintained’ above into ‘author-maintained’. However, we recommend that you use ‘maintained’ as the Maintenance section was added in order to ensure that your Work remains useful to the community even when you can no longer maintain and support it yourself.

### Derived Works That Are Not Replacements

Several clauses of the LPPL specify means to provide reliability and stability for the user community. They therefore concern themselves with the case that a Derived Work is intended to be used as a (compatible or incompatible) replacement of the original Work. If this is not the case (e.g., if a few lines of code are reused for a completely different task), then clauses 6b and 6d shall not apply.

### Important Recommendations

#### Defining What Constitutes the Work

The LPPL requires that distributions of the Work contain all the files of the Work. It is therefore important that you provide a way for the licensee to determine which files constitute the Work. This could, for example, be achieved by explicitly listing all the files of the Work near the copyright notice of each file or by using a line such as:

```
% This work consists of all files listed in manifest.txt.
```

in that place. In the absence of an unequivocal list it might be impossible for the licensee to determine what is considered by you to comprise the Work and, in such a case, the licensee would be entitled to make reasonable conjectures as to which files comprise the Work.