

# The `cmtt`\* package

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## Contents

<b>1</b>	<b>Introductory note</b>	<b>1</b>	2.3	The encoding definitions file . . . . .	6
<b>2</b>	<b>Implementation</b>	<b>3</b>	<b>A</b>	<b>The GNU General Public License</b>	<b>7</b>
	2.1	The package . . . . .	3		
	2.2	The font definition file . .	5		

## 1 Introductory note

$\LaTeX$  has a rather cunning encoding handling system, which makes funny commands like accents work properly independent of the current font's actual layout. While this works rather well most of the time, the standard `tt` font has been rather left out of things.  $\LaTeX$  assumes that the Computer Modern Typewriter fonts have exactly the same layout as the more normal Computer Modern Roman family (i.e., that both conform to the `OT1` encoding). This plainly isn't true, since the Typewriter font contains a bunch of standard ASCII characters which are omitted from the standard Computer Modern fonts, such as curly braces `{` and `}`, and the backslash `\`; these are usually dug up from the maths fonts, which looks fine in normal text, but looks really odd in monospace text. Compare `\begin{document}`' to `\bgin{document}`', for example.

There are two possibilities for dealing with this problem. One is to use the `\verb` command, which works since all the extra characters in the Typewriter font are in the correct places, or use the DC fonts, which have a proper encoding set up which contains all of these special characters anyway.

Neither of these solutions is perfect. Using `\verb` causes all manner of little niggly problems: you can't use it in footnotes or section headings, for example. (There are of course workarounds for this sort of thing: the author's `footnote` package provides a `footnote` environment which will allow verbatim text, and verbatim text in section headings can be achieved if one is sufficiently  $\TeX$ nical.) Using the DC fonts is fine, although you actually lose a glyph or two. As far as the author is aware, the character `'` (an 'unsexed' single quote) is not present in the `T1`-encoded version of Computer Modern Typewriter, although it is hidden away in the original version. The author has found a need for this character in

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\*The `cmtt` package is currently at version 1.1, dated 25 May 1996.

computer listings, and was horrified to discover that it was replaced by a German single quote character (`\quotesinglbase`).

This package defines a special encoding for the Computer Modern Typewriter font, so that documents can take advantage of its ASCII characters without resorting to verbatim text. (The main advantage of the DC fonts, that words containing accents can be hyphenated, doesn't really apply to the Typewriter font, since it doesn't allow hyphenation by default anyway.)

There are several files you'll need to create:

`cmtt.sty` tells L<sup>A</sup>T<sub>E</sub>X that there's a new encoding. It also provides some options for customising some aspects of the encoding, and defines some useful commands.

`mttenc.def` describes the encoding to L<sup>A</sup>T<sub>E</sub>X: it sets up all the appropriate text commands so that they produce beautiful results.

`mttcmtt.fd` describes the re-encoded version of the font. this is more or less a copy of the file `ot1cmtt.fd`.

The package accepts some options which may be useful:

`override` overrides the meaning of the `\ttfamily` command (and therefore also the `\texttt` command too), making it the same as the new `\mttfamily` command. This isn't the default just in case the change breaks something in an unexpected way.

`t1` informs the package that you're using the T1 encoding, and therefore can borrow some accented characters from the DC version of Computer Modern Typewriter. This will probably be unnecessary, since the package attempts to work out what to do all by itself.

`ot1` forces the package *not* to use the DC version of the Computer Modern Typewriter font for funny accents. Only use this option if the package thinks it should use the DC Typewriter font when it shouldn't.

`\mttfamily` The command `\mttfamily` selects the properly-encoded Typewriter font. It's a declaration which works just like the `\ttfamily` command, except that commands like `\}` and `\_` use the characters from the font rather than choosing odd-looking versions from the maths fonts. All of the accent commands still work properly. In fact, some accent commands which didn't work before have been fixed. For example, saying `'\texttt{P\'a1 Erd\H os}'` would produce something truly appalling like 'Pá1 Erdø̂s', which is obviously ghastly. The new encoding handles this properly, and produces 'Pá1 Erdős'.<sup>1</sup>

`\textmtt` Font changing commands are much more convenient than the declarations, so a command `\textmtt` is provided: it just typesets its argument in the re-encoded Typewriter font.

`\mtt` Rather more excitingly, the `\mtt` command allows you to generate almost-verbatim text very easily, without any of the restrictions of the `\verb` command.

---

<sup>1</sup>This isn't quite perfect. The accent, which isn't actually present in the Typewriter font, is taken from the Computer Modern bold font, but it doesn't look too bad. However, if you pass the option `t1` to the `cmtt` package when you load it, the accent will be taken from the DC Typewriter font, and it will look totally wonderful.

This command was inspired by something which David Carlisle said to me in an email correspondence regarding the overuse of verbatim commands.

`\mtt` redefines several ‘short’ commands to typeset the obvious characters. The complete list is shown below: there are some oddities, so watch out.

<code>\</code>	<code>\</code>	<code>\{</code>	<code>{</code>	<code>\}</code>	<code>}</code>	<code>\_</code>	<code>_</code>	<code>\^</code>	<code>^</code>
<code>\\$</code>	<code>\$</code>	<code>\%</code>	<code>%</code>	<code>\&amp;</code>	<code>&amp;</code>	<code>\#</code>	<code>#</code>	<code>\~</code>	<code>~</code>
<code>\"</code>	<code>"</code>	<code>\'</code>	<code>'</code>	<code>\_</code>	<code>_</code>	<code>\ </code>	<code> </code>		

As well as redefining these commands, `\mtt` will endeavour to make single special characters display themselves in a verbatim-like way. This only works on ‘active’ characters (like `~`), and `\mtt` makes no attempt to change the category codes of any characters.

Among other things, you’ll probably noticed that several accent-making commands have been redefined. You can still use these accents through the `\a` command, by saying `\a'`, `\a^` and so on, as in the `tabbing` environment.

There are also some oddities in the table: `|` and `"` can be accessed easily without playing with silly commands. Well, that’s almost the case: these two characters are both often used as ‘short’ verbatim commands, so they are forced back to their normal meanings so you can type them.

Finally, a word on spacing. The `\_` command has been hijacked to produce a funny ‘visible space’ character. You can still produce multiple spaces by saying something like `\_{}\_{}...`, which is a bit contrived, but that’s tough. Also, `~` has been stolen so that you can type `~` characters (e.g., in URLs), so the only way you can type a nonbreaking space is by using the `\nobreakspace` command, which is a bit of a mouthful. There’s an abbreviation, though: `\nbsp` now means exactly the same thing.

Was that not all supremely useful? Oh, just a note: this document doesn’t use a single verbatim command or environment (except in the listings, where it’s unavoidable) – it’s all done with `\mtt`.

## 2 Implementation

### 2.1 The package

```

1 (*sty)
   I'll start with some options handling.
2 \newif\ifcmtt@override
3 \newif\ifcmtt@dcfonts
4 \def\@tempa{T1}\ifx\encodingdefault\@tempa
5   \cmtt@dcfontstrue
6 \fi
7 \DeclareOption{override}{\cmtt@overridetrue}
8 \DeclareOption{t1}{\cmtt@dcfontstrue}
9 \DeclareOption{ot1}{\cmtt@dcfontsfalse}
10 \ProcessOptions

```

This bit is really trivial. I’ll just declare the font encoding. Oh, that was easy.

```

11 \DeclareFontEncoding{mTT}{-}{-}

```

Wait: there's a problem. L<sup>A</sup>T<sub>E</sub>X will now complain bitterly that it can't find the font `mTT/cmr/m/n`, which is reasonable, since I haven't declared any such font. The following line should sort this out,

```
12 \DeclareFontSubstitution{mTT}{cmtt}{m}{n}
```

Now I'd better load all the text commands I'll need when in this funny font variant.

```
13 \input{mttenc.def}
```

`\mttfamily` Finally, I'll need to define a command which switches to this funny font, and a `\textmtt` `\text...` command for it.

```
14 \DeclareRobustCommand{\mttfamily}{%
15   \fontencoding{mTT}\fontfamily{\ttdefault}\selectfont%
16 }
17 \DeclareTextFontCommand{\textmtt}{\mttfamily}
```

If an override was requested, make `\ttfamily` the same as `\mttfamily`.

```
18 \ifcmtt@override
19   \let\ttfamily\mttfamily
20 \fi
```

Well, that's all that's needed for the font definition. Here's a command which will typeset its argument in the typewriter font, allowing easy access to all the funny characters, and printing them properly in the correct font (which `\{` doesn't do, for example).

`\mtt@setchar` This macro assigns the given meaning to the given control sequence. Also, if the character named in the control sequence is currently set active, it will set the active meaning of the character to the same value.

```
21 \def\mtt@setchar#1#2{%
22   \ifx#1#2\chardef#1'#1\else\let#1#2\fi%
23   \ifnum\catcode'#1=13%
24     \begingroup%
25       \lccode'\~='#1%
26       \lowercase{\endgroup\let~#1}%
27   \fi%
28 }
```

`\mtt@chars` This macro lists the various control sequences which should be set up, so that they can be easily added to.

```
29 \def\mtt@chars{%
30   \do\#\#%
31   \do\%\%%
32   \do\&\&%
33   \do\~\~%
34   \do\^ \^%
35   \do\' \textquotesingl%
36   \do\" \textquotedbl%
37   \do\| \textbar%
38   \do\$ \textdollar%
39   \do\_ \textunderscore%
40   \do\{ \textbraceleft%
41   \do\} \textbraceright%
```

```

42 \do\\textbackslash%
43 \do\ \textvisiblespace%
44 }

\mtt@do This just sets up all the special characters listed above. It's a simple abbreviation,
really.
45 \def\mtt@do{\let\do\mtt@setchar\mtt@chars}

\mtt And finally, the macro itself. Ta-da!
46 \DeclareRobustCommand\mtt[1]{\textmtt{\mtt@do#1}}

\@tabacckludge The otherwise almost totally perfect \@tabacckludge gets very upset when its
argument is an active character. (If you're wondering, this is the command which
is responsible for the behaviour of the \a command.) Adding a \string makes
everything work perfectly.
47 \def\@tabacckludge#1{%
48 \expandafter\@changed@cmd\csname\string#1\endcsname\relax%
49 }
50 \let\a\@tabacckludge

\nbsp Make an abbreviation for \nobreakspace.
51 \let\nbsp\nobreakspace

I think that's all that I have to do for the package. If there's any more to do,
I'll add it later.
52 </sty>

```

## 2.2 The font definition file

This is obviously copied almost verbatim from the file OT1cmtt.fd.

```

53 (*fd)
54 \DeclareFontFamily{mTT}{cmtt}{\hyphenchar\font\m@ne}
55 \DeclareFontShape{mTT}{cmtt}{m}{n}{
56 <5> <6> <7> <8> cmtt8
57 <9> cmtt9
58 <10> <10.95> cmtt10
59 <12> <14.4> <17.28> <20.74> <24.88> cmtt12
60 }{}
61 \DeclareFontShape{mTT}{cmtt}{m}{it}{
62 <5> <6> <7> <8> <9> <10> <10.95> <12> <14.4> <17.28> <20.74> <24.88>
63 cmitt10
64 }{}
65 \DeclareFontShape{mTT}{cmtt}{m}{sl}{
66 <5> <6> <7> <8> <9> <10> <10.95> <12> <14.4> <17.28> <20.74> <24.88>
67 cmsl10
68 }{}
69 \DeclareFontShape{mTT}{cmtt}{m}{sc}{
70 <5> <6> <7> <8> <9> <10> <10.95> <12> <14.4> <17.28> <20.74> <24.88>
71 cmtcsc10
72 }{}
73 \DeclareFontShape{mTT}{cmtt}{m}{ui} {<->sub * cmtt/m/it} {}

```

```

74 \DeclareFontShape{mTT}{cmtt}{bx}{n} {<->sub * cmtt/m/n} {}
75 \DeclareFontShape{mTT}{cmtt}{bx}{it} {<->sub * cmtt/m/it} {}
76 \DeclareFontShape{mTT}{cmtt}{bx}{ui} {<->sub * cmtt/m/it} {}
77 </fd>

```

### 2.3 The encoding definitions file

I've saved the trickiest bit until last. This file defines the mappings from text commands to glyphs in the font.

```
78 (*def)
```

First for some fun with accents. The `cmtt` font doesn't contain all of the accents which the other Computer Modern fonts do, because those slots contain the standard ASCII characters which usually have to be 'borrowed' from the maths fonts.

Anyway, there's a load which don't need any special treatment. These are chosen from the `OT1` encoding by default anyway, so I needn't bother unless I'm really bothered about speed. I'm not, so I'll save the memory.

Following the example of the `TEXbook`, I'll use the bold roman font for accents, so that they don't look really spindly. This is actually remarkably difficult to do, because the `NFSS` keeps getting in the way. I'll look after the old font name in a macro (it's handy that `NFSS` maintains this for me) and change to a known font, do the accent, change font back again, do the argument to the accent, and then close the group I did all of this in, so that no-one else notices what a naughty chap I am, really. This is startlingly evil.

```

79 \def\cmtt@accent#1#2{%
80   \let\old@font\font@name%
81   \ifcmtt@dcfonts%
82     \fontencoding{T1}\selectfont%
83   \else%
84     \usefont{OT1}{cmr}{bx}{n}%
85   \fi%
86   #1{\old@font#2}%
87 }}

```

And now for the actual offending accents.

```

88 \DeclareTextCommand{\H}{mTT}{\cmtt@accent\H}
89 \DeclareTextCommand{\.}{mTT}{\cmtt@accent\.}

```

The 'under' accents are all OK, so I shan't bother to define them either. Similarly, lots of the text symbol commands are fine as they are by default and I don't need to try and define them again.

This, then, is the remaining commands which really need sorting out. (By the way, the only reason I've redefined `\textellipsis` is because otherwise it will mess up the nice monospacing.)

```

90 \DeclareTextSymbol{\textbackslash}{mTT}{92}
91 \DeclareTextSymbol{\textbar}{mTT}{124}
92 \DeclareTextSymbol{\textbraceleft}{mTT}{123}
93 \DeclareTextSymbol{\textbraceright}{mTT}{125}
94 \DeclareTextSymbol{\textless}{mTT}{60}
95 \DeclareTextSymbol{\textgreater}{mTT}{62}
96 \DeclareTextSymbol{\textunderscore}{mTT}{95}

```

```
97 \DeclareTextSymbol{\textvisiblespace}{mTT}{32}
98 \DeclareTextCommand{\textellipsis}{mTT}{...}
99 \DeclareTextSymbol{\textquotedbl}{mTT}{34}
100 \DeclareTextSymbol{\textquotesingl}{mTT}{13}
```

That's all there is. Please return to your homes.

# Appendix

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The hypothetical commands `show w` and `show c` should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than `show w` and `show c`; they could even be mouse-clicks or menu items—whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a “copyright disclaimer” for the program, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the program ‘Gnomovision’ (which makes passes at compilers) written by James Hacker.

signature of Ty Coon, 1 April 1989  
 Ty Coon, President of Vice

This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Library General Public License instead of this License.

## Index

Numbers written in *italic* refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in *roman* refer to the code lines where the entry is used.

Symbols	
<code>\</code>	36
<code>\#</code>	30
<code>\\$</code>	38
<code>\%</code>	31
<code>\&amp;</code>	32
<code>\'</code>	35
<code>\.</code>	89
<code>\@changed@cmd</code>	48
<code>\@old@font</code>	80, 86
<code>\@tabacckludge</code>	<u>47</u>
<code>\@tempa</code>	4
<code>\{</code>	42
<code>\}</code>	40
<code>\}</code>	41
<code>\^</code>	33
<code>\_</code>	39
<code>\ </code>	37
<code>\~</code>	25, 34
<code>\_</code>	43
<b>A</b>	
<code>\a</code>	50
<b>C</b>	
<code>\chardef</code>	22
<code>\cmtt@accent</code>	79, 88, 89
<code>\cmtt@dcfontsfalse</code>	9
<code>\cmtt@dcfontstrue</code>	5, 8
<code>\cmtt@overridetrue</code>	7
<b>D</b>	
<code>\DeclareFontEncoding</code>	11
<code>\DeclareFontFamily</code>	54

