The file `cmfonts.fdd` for use with LaTeX 2ε.*

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1 Introduction

This file contains the external font information needed to load the Computer Modern fonts designed by Don Knuth and distributed with TeX.

From this file all `.fd` files (font definition files) for the Computer Modern fonts, both with old encoding (`OT1`) and Cork encoding (`T1`) are generated. The Cork encoded fonts are known under the name ec fonts.

2 Customization

If you plan to install the AMS font package or if you have it already installed, please note that within this package there are additional sizes of the Computer Modern symbol and math italic fonts. With the release of LaTeX 2ε, these AMS 'extracm' fonts have been included in the LaTeX font set. Therefore, the math `.fd` files produced here assume the presence of these AMS extensions.

For text fonts in `T1` encoding, the directive `new` selects the new (version 1.2) DC fonts.

For the text fonts in `OT1` and `U` encoding, the optional DOCSTRIP directive `ori` selects a conservatively generated set of font definition files, which means that only the basic font sizes coming with an old LaTeX 2.09 installation are included into the `\DeclareFontShape` commands. However, on many installations, people have added missing sizes by scaling up or down available Metafont sources. For example, the Computer Modern Roman italic font `cmti` is only available in the sizes 7, 8, 9, and 10pt. Nevertheless one could generate it for the sizes 5, and 6pt by using the source from `cmti7` scaled downwards. The corresponding enlarged font set is generated if the DOCSTRIP directive `ori` is not used.

When you generate the `.fd` files using the installation script `cmfonts.ins` distributed with LaTeX 2ε, the enlarged font set is selected. If you want to select the conservative set of `.fd` files, you have to replace statements like

```
\generateFile{OT1cmr.fd}{t}{\from{cmfonts.fdd}{fd,OT1cmr}}
```

with

```
\generateFile{OT1cmr.fd}{t}{\from{cmfonts.fdd}{fd,OT1cmr,ori}}
```

in the installation script, or more exactly by copying the installation script to a file with a new name and change that copy.

3 The `docstrip` modules

The following modules are used to direct `docstrip` in generating external files:

*This file has version number v2.5h, dated 2014/09/29.

driver	produce a documentation driver file
nowarn	produce `.fd` files that do not warn about substitutions
ori	make conservative `.fd` files
new	select version 1.2 DC fonts
ec	select EC fonts
fd	produce a font definition file (actually no longer used)
OMLccm	make Concrete Roman Math italic
OMLcmm	make Computer Modern Math italic
OMLcmr	make Computer Modern Roman (math italic encoding)
OMScmr	make Computer Modern Roman (math symbol encoding)
OMScmsy	make Computer Modern Symbols
OMXcmex	make Computer Modern large Symbols
OT1ccr	make Concrete Roman (old encoding)
OT1cmdh	make Computer Modern Dunhill (old encoding)
OT1cmfib	make Computer Modern Fibonacci (old encoding)
OT1cmfr	make Computer Modern Funny (old encoding)
OT1cmr	make Computer Modern Roman (old encoding)
OT1cmss	make Computer Modern Sans (old encoding)
OT1cmtt	make Computer Modern Typewriter (old encoding)
OT1cmvtt	make Computer Modern Variable Typewriter (old encoding)
OT2cmr	make Computer Modern Roman (old cyrillic encoding)
OT2cmss	make Computer Modern Sans (old cyrillic encoding)
T1ccr	make Concrete Roman (Cork encoding)
T1cmdh	make Computer Modern Dunhill (Cork encoding)
T1cmfib	make Computer Modern Fibonacci (Cork encoding)
T1cmfr	make Computer Modern Funny (Cork encoding)
T1cmr	make Computer Modern Roman (Cork encoding)
T1cmss	make Computer Modern Sans (Cork encoding)
T1cmtt	make Computer Modern Typewriter (Cork encoding)
T1cmvtt	make Computer Modern Variable Typewriter (Cork encoding)
TS1cmr	make Computer Modern Roman text companion fonts
TS1cmss	make Computer Modern Sans text companion fonts
TS1cmtt	make Computer Modern Typewriter text companion fonts
TS1cmvtt	make Computer Modern Variable Typewriter text companion fonts
Ucmr	make Computer Modern Roman (unknown encoding)
Ucmss	make Computer Modern Sans (unknown encoding)
Ucmtt	make Computer Modern Typewriter (unknown encoding)

A typical `docstrip` command file would then have entries like:

```
\generateFile{OT1cmr.fd}{t}{\from{cmfonts.fdd}{fd,OT1cmr}}
```

4 The font definition files

As always we begin by identifying the latest version of the files in the log file. The explicit spaces are necessary in an `.fd` file and the `\string` guards against situations where `, < or > is active.

4.1 Fonts with Cork encoding (T1)

We start with the DC-fonts. These are Computer Modern fonts reimplemented originally by Norbert Schwarz, and since release 1.2 by Jörg Knappen. You can get them from TEX archives and from TEX organizations. We strongly recommend that you use them because they are encoded in the approved standard encoding for text fonts.

4.1.1 Commands for fonts with the 'EC' naming scheme

Before the declarations for the individual fonts, first define some abbreviations that may be used as most of the fonts in the 'new' dc font distribution come in the same range of sizes. The same is true for the ec fonts, with a somewhat enlarged font size range.

```
⟨*new j ec⟩
⟨*! tt⟩
\providecommand{\EC@family}[5]{%
  \DeclareFontShape{#1}{#2}{#3}{#4}%
  {<5><6><7><8><9><10><10.95><12><14.4>%
⟨ec⟩    <17.28><20.74><24.88><29.86><35.83>genb*#5}{}}
⟨! ec⟩    <17.28><20.74><24.88>genb*#5}{}}
⟨/! tt⟩
```

For monospaced fonts, the normal interpolation breaks down below 8pt, so scale the 8pt fonts instead.

```
⟨*tt⟩
\providecommand{\EC@ttfamily}[5]{%
  \DeclareFontShape{#1}{#2}{#3}{#4}%
  {<5><6><7><8>#50800%
⟨ec⟩   <9><10><10.95><12><14.4><17.28><20.74><24.88><29.86>%
⟨ec⟩   <35.83>genb*#5}{}}
⟨! ec⟩   <9><10><10.95><12><14.4><17.28><20.74><24.88>genb*#5}{}}
⟨/tt⟩
⟨/new j ec⟩
```

4.1.2 The Computer Modern Roman

This family is available in the shapes `n`, `sl`, `it`, `sc`, and `ui`.

```
⟨*T1cmr⟩
\DeclareFontFamily{T1}{cmr}{}
⟨*! new&! ec⟩
\DeclareFontShape{T1}{cmr}{m}{n}{%
      <5><6><7><8><9>gen*dcr%
      <10><10.95>dcr10%
      <12><14.4>dcr12%
      <17.28><20.74><24.88>dcr17}{}
\DeclareFontShape{T1}{cmr}{m}{sl}{%
      <5><6><7><8>dcsl8%
      <9>dcsl9%
      <10><10.95>dcsl10%
      <12><14.4>dcsl12%
      <17.28><20.74><24.88>dcsl17%
      }{}
\DeclareFontShape{T1}{cmr}{m}{it}{%
      <5><6>dcti7%
      <7><8><9>gen*dcti%
      <10><10.95>dcti10%
      <12><14.4>dcti12%
      <17.28><20.74><24.88>dcti17%
      }{}
\DeclareFontShape{T1}{cmr}{m}{sc}{%
      <5><6><7><8><9><10><10.95>dccsc10%
      <12><14.4>dccsc12%
      <17.28><20.74><24.88>dccsc17%
      }{}
\DeclareFontShape{T1}{cmr}{m}{ui}{%
      <5><6>dcu7%
      <7><8><9>gen*dcu%
      <10><10.95>dcu10%
      <12><14.4>dcu12%
```

```
      <17.28><20.74><24.88>dcu17%
      }{}
```

There is a bold '`b`' series, but unfortunately only the normal shape is available in this series.

```
⟨+T1cmr⟩%%%%%%% bold series
\DeclareFontShape{T1}{cmr}{b}{n}{%
      <5><6><7><8><9>gen*dcb%
      <10><10.95>dcb10%
      <12><14.4>dcb12%
      <17.28><20.74><24.88>dcb17%
      }{}
```

Finally there is a bold extended series '`bx`' with the shapes `n`, `sl`, and `it`.

```
⟨+T1cmr⟩%%%%%%% bold extended series
\DeclareFontShape{T1}{cmr}{bx}{n}{%
      <5><6><7><8><9>gen*dcbx%
      <10><10.95>dcbx10%
      <12><14.4><17.28><20.74><24.88>dcbx12%
      }{}
\DeclareFontShape{T1}{cmr}{bx}{sl}{%
      <5><6><7><8><9>gen*dcbxsl%
      <10><10.95>dcbxsl10%
      <12><14.4><17.28><20.74><24.88>dcbxsl12%
      }{}
\DeclareFontShape{T1}{cmr}{bx}{it}{%
      <5><6><7><8><9><10><10.95>dcbxti10%
      <12><14.4>dcbxti12%
      <17.28><20.74><24.88>dcbxti17%
      }{}
⟨/!new&!ec⟩
```

```
⟨*new⟩
\EC@family{T1}{cmr}{m}{n}{dcr}
\EC@family{T1}{cmr}{m}{sl}{dcsl}
\EC@family{T1}{cmr}{m}{it}{dcti}
\EC@family{T1}{cmr}{m}{sc}{dccc}
\EC@family{T1}{cmr}{bx}{n}{dcbx}
\EC@family{T1}{cmr}{b}{n}{dcb}
\EC@family{T1}{cmr}{bx}{it}{dcbi}
\EC@family{T1}{cmr}{bx}{sl}{dcbl}
\EC@family{T1}{cmr}{m}{ui}{dcu}
⟨/new⟩
```

```
⟨*ec⟩
\EC@family{T1}{cmr}{m}{n}{ecrm}
\EC@family{T1}{cmr}{m}{sl}{ecsl}
\EC@family{T1}{cmr}{m}{it}{ecti}
\EC@family{T1}{cmr}{m}{sc}{eccc}
\EC@family{T1}{cmr}{bx}{n}{ecbx}
\EC@family{T1}{cmr}{b}{n}{ecrb}
\EC@family{T1}{cmr}{bx}{it}{ecbi}
\EC@family{T1}{cmr}{bx}{sl}{ecbl}
\EC@family{T1}{cmr}{bx}{sc}{ecxc}
\EC@family{T1}{cmr}{m}{ui}{ecui}
⟨/ec⟩
⟨/T1cmr⟩
```

4.1.3 Computer Modern Fibonacci

This family was created by Don Knuth as an experiment, supplying only Fibonacci numbers to the parameters of the Metafont sources of the Computer Modern Meta family.

```
⟨*T1cmfib⟩
```

```
\DeclareFontFamily{T1}{cmfib}{}
⟨*!new&!ec⟩
\DeclareFontShape{T1}{cmfib}{m}{n}{%
      <8><9><10><12>gen*dcfib%
      }{}
⟨/!new&!ec⟩
```

In fact these 'dcfb' fonts are currently withdrawn as they generate metafont errors.

```
⟨*new⟩
\EC@family{T1}{cmfib}{m}{n}{dcfb}
⟨/new⟩
⟨*ec⟩
\EC@family{T1}{cmfib}{m}{n}{ecfb}
\EC@family{T1}{cmfib}{m}{sl}{ecfs}
⟨/ec⟩
⟨/T1cmfib⟩
```

4.1.4 Computer Modern Funny (Roman)

This family was created by Don Knuth as another experiment.

```
⟨*T1cmfr⟩
\DeclareFontFamily{T1}{cmfr}{}
⟨*!new&!ec⟩
\DeclareFontShape{T1}{cmfr}{m}{n}{%
      <10>dcff10%
    }{}
\DeclareFontShape{T1}{cmfr}{m}{it}{%
      <10>dcfi10%
    }{}
⟨/!new&!ec⟩
⟨*new⟩
\EC@family{T1}{cmfr}{m}{n}{dcff}
\EC@family{T1}{cmfr}{m}{it}{dcfi}
⟨/new⟩
⟨*ec⟩
\EC@family{T1}{cmfr}{m}{n}{ecff}
\EC@family{T1}{cmfr}{m}{it}{ecfi}
⟨/ec⟩
⟨/T1cmfr⟩
```

4.1.5 Computer Modern Sans

```
⟨*T1cmss⟩
\DeclareFontFamily{T1}{cmss}{}
⟨*!new&!ec⟩
\DeclareFontShape{T1}{cmss}{m}{n}{%
      <5><6><7><8>dcss8%
      <9>dcss9%
      <10><10.95>dcss10%
      <12><14.4>dcss12%
      <17.28><20.74><24.88>dcss17%
      }{}
\DeclareFontShape{T1}{cmss}{m}{it}%
      {<->sub*cmss/m/sl}{}
\DeclareFontShape{T1}{cmss}{m}{sl}{%
      <5><6><7><8>dcssi8%
      <9>dcssi9%
      <10><10.95>dcssi10%
      <12><14.4>dcssi12%
      <17.28><20.74><24.88>dcssi17%
      }{}
⟨/!new&!ec⟩
```

```
⟨*new⟩
\EC@family{T1}{cmss}{m}{n}{dcss}
\EC@family{T1}{cmss}{m}{sl}{dcsi}
\EC@family{T1}{cmss}{m}{it}{dcsi}
\EC@family{T1}{cmss}{bx}{n}{dcsx}
\EC@family{T1}{cmss}{bx}{it}{dcso}
\EC@family{T1}{cmss}{bx}{sl}{dcso}
⟨/new⟩
⟨*ec⟩
\EC@family{T1}{cmss}{m}{n}{ecss}
\EC@family{T1}{cmss}{m}{sl}{ecsi}
\EC@family{T1}{cmss}{m}{it}{ecsi}
\EC@family{T1}{cmss}{bx}{n}{ecsx}
\EC@family{T1}{cmss}{bx}{it}{ecso}
\EC@family{T1}{cmss}{bx}{sl}{ecso}
⟨/ec⟩
```

The next substitution is very questionable.

```
⟨+T1cmss⟩%%%%%% Font/shape undefined, therefore substituted
\DeclareFontShape{T1}{cmss}{m}{sc}%
        {<->sub*cmr/m/sc}{}
```

The next font group is quite attractive for display.

```
⟨+T1cmss⟩%%%%%%% semibold condensed series
\DeclareFontShape{T1}{cmss}{sbc}{n}{%
      <5><6><7><8><9><10><10.95><12><14.4><17.28>%
      <20.74><24.88>%
⟨!ec⟩dcssdc10
⟨ec⟩ecssdc10
       }{}
⟨*!new&!ec⟩
⟨+T1cmss⟩%%%%%%%% bold extended series
\DeclareFontShape{T1}{cmss}{bx}{n}{%
      <5><6><7><8><9><10><10.95><12><14.4><17.28>%
      <20.74><24.88>dcssbx10%
      }{}
```

Another questionable substitution, but if we have the above we might as well have this one

```
⟨+T1cmss⟩%%%%%% Font/shape undefined, therefore substituted
\DeclareFontShape{T1}{cmss}{bx}{sc}%
        {<->sub*cmr/m/sc}{}
⟨/!new&!ec⟩
⟨/T1cmss⟩
```

4.1.6 Computer Modern Typewriter

Perhaps the best font in the Computer Modern suite.

```
⟨*T1cmtt⟩
\DeclareFontFamily{T1}{cmtt}{\hyphenchar \font\m@ne}
⟨*!new&!ec⟩
\DeclareFontShape{T1}{cmtt}{m}{n}{%
      <8><9>gen*dctt%
      <10><10.95>dctt10%
      <12><14.4><17.28><20.74><24.88>dctt12%
      }{}
\DeclareFontShape{T1}{cmtt}{m}{it}{%
      <8><9>gen*dcitt%
      <10><10.95>dcitt10%
      <12><14.4>dcitt12%
      <17.28><20.74><24.88>dcitt17%
      }{}
\DeclareFontShape{T1}{cmtt}{m}{sl}{%
      <8><9>gen*dcsltt%
```

```
        <10><10.95>dcsltt10%
        <12><14.4><17.28><20.74><24.88>dcsltt12%
        }{}
\DeclareFontShape{T1}{cmtt}{m}{sc}{%
        <10><10.95>dctcsc10%
        <12><14.4>dctcsc12%
        <17.28><20.74><24.88>dctcsc17%
        }{}
⟨/!new&!ec⟩
⟨*new⟩
\EC@ttfamily{T1}{cmtt}{m}{n}{dctt}
\EC@ttfamily{T1}{cmtt}{m}{sl}{dcst}
\EC@ttfamily{T1}{cmtt}{m}{it}{dcit}
\EC@ttfamily{T1}{cmtt}{m}{sc}{dctc}
```

Finally, we define substitutions for the series `bx`. It comes with or without a warning.

```
\DeclareFontShape{T1}{cmtt}{bx}{n}%
⟨-nowarn⟩   {<->sub*cmtt/m/n}{}
⟨+nowarn⟩   {<->ssub*cmtt/m/n}{}
\DeclareFontShape{T1}{cmtt}{bx}{it}%
⟨-nowarn⟩   {<->sub*cmtt/m/it}{}
⟨+nowarn⟩   {<->ssub*cmtt/m/it}{}
⟨/new⟩
⟨*ec⟩
\EC@ttfamily{T1}{cmtt}{m}{n}{ectt}
\EC@ttfamily{T1}{cmtt}{m}{sl}{ecst}
\EC@ttfamily{T1}{cmtt}{m}{it}{ecit}
\EC@ttfamily{T1}{cmtt}{m}{sc}{ectc}
```

Finally, we define substitutions for the series `bx`. It comes with or without a warning.

```
\DeclareFontShape{T1}{cmtt}{bx}{n}%
⟨-nowarn⟩   {<->sub*cmtt/m/n}{}
⟨+nowarn⟩   {<->ssub*cmtt/m/n}{}
\DeclareFontShape{T1}{cmtt}{bx}{it}%
⟨-nowarn⟩   {<->sub*cmtt/m/it}{}
⟨+nowarn⟩   {<->ssub*cmtt/m/it}{}
⟨/ec⟩
⟨/T1cmtt⟩
```

4.1.7 Computer Modern Variable Typewriter

The Computer Modern Variable Typewriter family is the proportional spaced version of the Computer Modern Typewriter family. It is implemented as a separate family to allow easy use in normal text, including changes of shape/series etc if available. This family also allows normal hyphenation.

In the first implementations for the Cork encoding only the normal shape is available. Starting with release 1.3 italic will be provided as well.

```
⟨*T1cmvtt⟩
\DeclareFontFamily{T1}{cmvtt}{}
⟨*!new&!ec⟩
\DeclareFontShape{T1}{cmvtt}{m}{n}{%
        <8><9>gen*dcvtt%
        <10><10.95>dcvtt10%
        <12><14.4><17.28><20.74><24.88>dcvtt12%
        }{}
⟨/!new&!ec⟩
```

With release 1.3 there will be an italic shape as well.

```
⟨*new⟩
\EC@ttfamily{T1}{cmvtt}{m}{n}{dcvt}
```

```
\EC@ttfamily{T1}{cmvtt}{m}{it}{dcvi}
⟨/new⟩
⟨*ec⟩
\EC@ttfamily{T1}{cmvtt}{m}{n}{ecvt}
\EC@ttfamily{T1}{cmvtt}{m}{it}{ecvi}
⟨/ec⟩
⟨/T1cmvtt⟩
```

4.1.8 Computer Modern Dunhill

The smoker's choice? Within the Cork encoding this font comes with a full size range by default but only with one series.

```
⟨*T1cmdh⟩
\DeclareFontFamily{T1}{cmdh}{}
⟨*!new&!ec⟩
\DeclareFontShape{T1}{cmdh}{m}{n}{%
      <5><6><7><8><9>gen*dcdunh%
      <10><10.95>dcdunh10%
      <12><14.4>dcdunh12%
      <17.28><20.74><24.88>dcdunh17}{}
⟨/!new&!ec⟩
⟨*new⟩
\EC@family{T1}{cmdh}{m}{n}{dcdh}
⟨/new⟩
⟨*ec⟩
\EC@family{T1}{cmdh}{m}{n}{ecdh}
⟨/ec⟩
⟨/T1cmdh⟩
```

4.1.9 Concrete Roman

A font near to Computer Modern Typewriter designed to go with the Euler Math fonts.

```
⟨*T1ccr⟩
\DeclareFontFamily{T1}{ccr}{}
\DeclareFontShape{T1}{ccr}{m}{n}{%
   <5><6><7><8><9><10><12>gen*dccr%
   <10.95>dccr11 <14.4>dccr14%
   <17.28><20.74><24.88>dccr17}{}
\DeclareFontShape{T1}{ccr}{m}{it}{%
   <10><10.95><12>dcti10}{}
\DeclareFontShape{T1}{ccr}{m}{sc}{%
   <10><10.95><12>dccsc10 }{}
```

Note the condensed slanted variant (not used).

```
%\DeclareFontShape{T1}{ccr}{c}{sl}{<9>dcslc9}{}
```

Finally a few substitution fonts for combinations not available. As suggested by Leslie Lamport and several others the substitution should warn by default. We control this my a DOCSTRIP module so that one can modify this behavior from the outside.

```
\DeclareFontShape{T1}{ccr}{bx}{sl}{%
⟨-nowarn⟩      <->sub*cmr/bx/it
⟨+nowarn⟩       <->ssub*cmr/bx/it
}{}
\DeclareFontShape{T1}{ccr}{bx}{n}{%
⟨-nowarn⟩      <->sub*cmr/bx/n
⟨+nowarn⟩       <->ssub*cmr/bx/n
}{}
\DeclareFontShape{T1}{ccr}{bx}{it}{%
⟨-nowarn⟩      <->sub*cmr/bx/it
⟨+nowarn⟩       <->ssub*cmr/bx/it
```

```
}{}
⟨/T1ccr⟩
```

4.1.10 The text companion fonts for T1 encoding

```
⟨*TS1cmr⟩
\DeclareFontFamily{TS1}{cmr}{\hyphenchar\font\m@ne}
⟨! ec⟩\EC@family{TS1}{cmr}{m}{n}{tcr}
⟨ec⟩\EC@family{TS1}{cmr}{m}{n}{tcrm}
\EC@family{TS1}{cmr}{m}{sl}{tcsl}
\EC@family{TS1}{cmr}{m}{it}{tcti}
\EC@family{TS1}{cmr}{bx}{n}{tcbx}
⟨! ec⟩\EC@family{TS1}{cmr}{b}{n}{tcb}
⟨ec⟩\EC@family{TS1}{cmr}{b}{n}{tcrb}
\EC@family{TS1}{cmr}{bx}{it}{tcbi}
\EC@family{TS1}{cmr}{bx}{sl}{tcbl}
⟨! ec⟩\EC@family{TS1}{cmr}{m}{ui}{tcu}
⟨ec⟩\EC@family{TS1}{cmr}{m}{ui}{tcui}
⟨/TS1cmr⟩
⟨*TS1cmss⟩
\DeclareFontFamily{TS1}{cmss}{\hyphenchar\font\m@ne}
\EC@family{TS1}{cmss}{m}{n}{tcss}
\EC@family{TS1}{cmss}{m}{sl}{tcsi}
\EC@family{TS1}{cmss}{m}{it}{tcsi}
\EC@family{TS1}{cmss}{bx}{n}{tcsx}
\EC@family{TS1}{cmss}{bx}{it}{tcso}
\EC@family{TS1}{cmss}{bx}{sl}{tcso}
⟨/TS1cmss⟩
⟨*TS1cmtt⟩
\DeclareFontFamily{TS1}{cmtt}{\hyphenchar\font\m@ne}
\EC@ttfamily{TS1}{cmtt}{m}{n}{tctt}
\EC@ttfamily{TS1}{cmtt}{m}{sl}{tcst}
\EC@ttfamily{TS1}{cmtt}{m}{it}{tcit}
⟨/TS1cmtt⟩
```

Again the italic shape is only available with release 1.3.

```
⟨*TS1cmvtt⟩
\DeclareFontFamily{TS1}{cmvtt}{}
\EC@ttfamily{TS1}{cmvtt}{m}{n}{tcvt}
\EC@ttfamily{TS1}{cmvtt}{m}{it}{tcvi}
⟨/TS1cmvtt⟩
```

4.2 Fonts with the old TEX text encoding (OT1)

Note that in contrast to the Cork encoding, which is fully defined, the old TEX text encoding isn't implemented consistent within all fonts. Most noticeably is that a dollar sign ($) in some fonts is replaced by a pound symbol (£) in others, which produced quite a number of bug fixes in the NFSS1. Also the typewriter fonts contain a few different characters which are not present in other fonts.

If one would use the philosophy of NFSS2 consequently all these would therefore be different encodings and font mixing would therefore be nearly impossible with older fonts. Therefore such encodings are considered the same but one should be remember that in some situations this may cause problems.

In other words, use T1 encoding whenever possible, the OT.. encodings will be removed in some future release.

4.2.1 Computer Modern Roman (OT1)

Beside the OT1 encoding we also define the same family as U encoded which is used for accepting old sources with stuff like \newmathalphabet in it.

```
⟨*OT1cmr, Ucmr⟩
⟨+OT1cmr⟩\DeclareFontFamily{OT1}{cmr}{\hyphenchar\font45 }
⟨+Ucmr⟩\DeclareFontFamily{U}{cmr}{\hyphenchar\font45 }
```

```
⟨+OT1cmr⟩\DeclareFontShape{OT1}{cmr}{m}{n}%
⟨+Ucmr⟩\DeclareFontShape{U}{cmr}{m}{n}%
      {<5><6><7><8><9><10><12>gen*cmr%
       <10.95>cmr10%
       <14.4>cmr12%
       <17.28><20.74><24.88>cmr17}{}
⟨+OT1cmr⟩\DeclareFontShape{OT1}{cmr}{m}{sl}%
⟨+Ucmr⟩\DeclareFontShape{U}{cmr}{m}{sl}%
      {%
⟨+ori⟩       <5-8>sub*cmr/m/n%
⟨-ori⟩      <5><6><7>cmsl8%
       <8><9>gen*cmsl%
       <10><10.95>cmsl10%
       <12><14.4><17.28><20.74><24.88>cmsl12%
       }{}
⟨+OT1cmr⟩\DeclareFontShape{OT1}{cmr}{m}{it}%
⟨+Ucmr⟩\DeclareFontShape{U}{cmr}{m}{it}%
      {%
⟨+ori⟩       <5-7>sub*cmr/m/n%
⟨+ori⟩       <7>cmti7%
⟨-ori⟩      <5><6><7>cmti7%
       <8>cmti8%
       <9>cmti9%
       <10><10.95>cmti10%
       <12><14.4><17.28><20.74><24.88>cmti12%
       }{}
⟨+OT1cmr⟩\DeclareFontShape{OT1}{cmr}{m}{sc}%
⟨+Ucmr⟩\DeclareFontShape{U}{cmr}{m}{sc}%
      {%
⟨+ori⟩       <5-8>sub*cmr/m/n%
⟨+ori⟩       <8><9><10><10.95><12>%
⟨+ori⟩       <14.4><17.28><20.74><24.88>cmcsc10%
⟨-ori⟩      <5><6><7><8><9><10><10.95><12>%
⟨-ori⟩      <14.4><17.28><20.74><24.88>cmcsc10%
       }{}
```

Here we try to cure the famous \$ → £ bug:

```
⟨+OT1cmr, Ucmr⟩% Warning: please note that the upright shape below is
⟨+OT1cmr, Ucmr⟩%          used for the \pounds symbol of LaTeX. So this
⟨+OT1cmr, Ucmr⟩%          font definition shouldn't be removed.
⟨+OT1cmr, Ucmr⟩%
⟨+ori⟩%          If cmu below 10pt is not available we substitute
⟨+ori⟩%          cmti as far as possible (sizes 7, 8, 9). This is
⟨+ori⟩%          done because cmu is used mainly for producing the
⟨+ori⟩%          the \pound symbol and it is better to get a slanted
⟨+ori⟩%          (or bigger) pound then to get a $ sign in such
⟨+ori⟩%          situations.
⟨+OT1cmr⟩\DeclareFontShape{OT1}{cmr}{m}{ui}
⟨+Ucmr⟩\DeclareFontShape{U}{cmr}{m}{ui}
   {
⟨+ori⟩       <7>subf*cmti7%
⟨+ori⟩       <8>subf*cmti8%
⟨+ori⟩       <9>subf*cmti9%
⟨+ori⟩       <10><10.95><12><14.4><17.28><20.74><24.88>cmu10%
⟨-ori⟩      <5><6><7><8><9><10><10.95><12>%
⟨-ori⟩      <14.4><17.28><20.74><24.88>cmu10%
       }{}
⟨+OT1cmr, Ucmr⟩%%%%%% bold series
⟨+OT1cmr⟩\DeclareFontShape{OT1}{cmr}{b}{n}
⟨+Ucmr⟩\DeclareFontShape{U}{cmr}{b}{n}%
      {%
⟨+ori⟩       <-10>sub*cmr/bx/n%
⟨+ori⟩       <10><10.95><12><14.4><17.28><20.74><24.88>cmb10%
```

```
⟨-ori⟩        <5><6><7><8><9><10><10.95><12>%
⟨-ori⟩        <14.4><17.28><20.74><24.88>cmb10%
        }{}
⟨+OT1cmr, Ucmr⟩%%%%%%% bold extended series
⟨+OT1cmr⟩\DeclareFontShape{OT1}{cmr}{bx}{n}
⟨+Ucmr⟩\DeclareFontShape{U}{cmr}{bx}{n}%
    {%
        <5><6><7><8><9>gen*cmbx%
        <10><10.95>cmbx10%
        <12><14.4><17.28><20.74><24.88>cmbx12%
        }{}
⟨+OT1cmr⟩\DeclareFontShape{OT1}{cmr}{bx}{sl}
⟨+Ucmr⟩\DeclareFontShape{U}{cmr}{bx}{sl}%
        {%
⟨+ori⟩        <-10>sub*cmr/bx/n%
⟨+ori⟩        <10><10.95><12><14.4><17.28><20.74><24.88>cmbxsl10%
⟨-ori⟩        <5><6><7><8><9>%
⟨-ori⟩        <10><10.95><12><14.4><17.28><20.74><24.88>cmbxsl10%
        }{}
⟨+OT1cmr⟩\DeclareFontShape{OT1}{cmr}{bx}{it}
⟨+Ucmr⟩\DeclareFontShape{U}{cmr}{bx}{it}%
        {%
⟨+ori⟩        <-10>sub*cmr/bx/n%
⟨+ori⟩        <10><10.95><12><14.4><17.28><20.74><24.88>cmbxti10%
⟨-ori⟩        <5><6><7><8><9>%
⟨-ori⟩        <10><10.95><12><14.4><17.28><20.74><24.88>cmbxti10%
        }{}
⟨+OT1cmr, Ucmr⟩% Again this is necessary for a correct \pounds symbol in
⟨+OT1cmr, Ucmr⟩% the cmr fonts Hopefully the dc/ec font layout will take
⟨+OT1cmr, Ucmr⟩% over soon.
⟨+OT1cmr, Ucmr⟩%
⟨+OT1cmr⟩\DeclareFontShape{OT1}{cmr}{bx}{ui}
⟨+Ucmr⟩\DeclareFontShape{U}{cmr}{bx}{ui}%
⟨-nowarn⟩        {<->sub*cmr/m/ui}{}
⟨+nowarn⟩        {<->ssub*cmr/m/ui}{}
⟨/OT1cmr, Ucmr⟩
```

4.2.2 Computer Modern Sans (OT1)

Same game for the Sans family.

```
⟨*OT1cmss, Ucmss⟩
⟨+OT1cmss⟩\DeclareFontFamily{OT1}{cmss}{\hyphenchar\font45 }
⟨+Ucmss⟩\DeclareFontFamily{U}{cmss}{\hyphenchar\font45 }
⟨+OT1cmss⟩\DeclareFontShape{OT1}{cmss}{m}{n}
⟨+Ucmss⟩\DeclareFontShape{U}{cmss}{m}{n}%
      {%
⟨+ori⟩        <-8>sub*cmr/m/n%
⟨+ori⟩        <8>cmss8%
⟨-ori⟩        <5><6><7><8>cmss8%
        <9>cmss9%
        <10><10.95>cmss10%
        <12><14.4>cmss12%
        <17.28><20.74><24.88>cmss17%
        }{}
⟨+OT1cmss, Ucmss⟩% Font undefined, therefore substituted
⟨+OT1cmss⟩\DeclareFontShape{OT1}{cmss}{m}{it}
⟨+Ucmss⟩\DeclareFontShape{U}{cmss}{m}{it}%
⟨-nowarn⟩        {<->sub*cmss/m/sl}{}
⟨+nowarn⟩        {<->ssub*cmss/m/sl}{}
⟨+OT1cmss⟩\DeclareFontShape{OT1}{cmss}{m}{sl}
⟨+Ucmss⟩\DeclareFontShape{U}{cmss}{m}{sl}%
     {%
```

```
⟨+ori⟩       <-8>sub*cmss/m/n%
⟨+ori⟩       <8><9>gen*cmssi%
⟨-ori⟩       <5><6><7><8>cmssi8<9>cmssi9%
       <10><10.95>cmssi10%
       <12><14.4>cmssi12%
       <17.28><20.74><24.88>cmssi17%
       }{}
⟨+OT1cmss, Ucmss⟩%%%%%% Font/shape undefined, therefore substituted
⟨+OT1cmss⟩\DeclareFontShape{OT1}{cmss}{m}{sc}
⟨+Ucmss⟩\DeclareFontShape{U}{cmss}{m}{sc}%
       {<->sub*cmr/m/sc}{}
⟨+OT1cmss, Ucmss⟩%%%%%% Font/shape undefined, therefore substituted
⟨+OT1cmss⟩\DeclareFontShape{OT1}{cmss}{m}{ui}
⟨+Ucmss⟩\DeclareFontShape{U}{cmss}{m}{ui}%
       {<->sub*cmr/m/ui}{}
⟨+OT1cmss, Ucmss⟩%%%%%%% semibold condensed series
⟨+OT1cmss⟩\DeclareFontShape{OT1}{cmss}{sbc}{n}
⟨+Ucmss⟩\DeclareFontShape{U}{cmss}{sbc}{n}%
     {%
⟨+ori⟩       <-10>sub*cmss/m/n%
⟨-ori⟩       <5><6><7><8><9>cmssdc10%
       <10><10.95><12><14.4><17.28><20.74><24.88>cmssdc10%
       }{}

⟨+OT1cmss, Ucmss⟩%%%%%%%% bold extended series
⟨+OT1cmss⟩\DeclareFontShape{OT1}{cmss}{bx}{n}
⟨+Ucmss⟩\DeclareFontShape{U}{cmss}{bx}{n}%
     {%
⟨+ori⟩       <-10>sub*cmss/m/n%
⟨-ori⟩       <5><6><7><8><9>cmssbx10%
       <10><10.95><12><14.4><17.28><20.74><24.88>cmssbx10%
       }{}
⟨+OT1cmss, Ucmss⟩%%%%%% Font/shape undefined, therefore substituted
⟨+OT1cmss⟩\DeclareFontShape{OT1}{cmss}{bx}{ui}
⟨+Ucmss⟩\DeclareFontShape{U}{cmss}{bx}{ui}%
       {<->sub*cmr/bx/ui}{}
⟨/OT1cmss, Ucmss⟩
```

4.2.3 Computer Modern Typewriter (OT1)

Notice that this encoding is in fact quite different and we shouldn't therefore substitute some other font group if the correct size or shape isn't available. Otherwise, we may end with a `\verb` suddenly producing a lot of funny chars instead of the desired ones.

```
⟨*OT1cmtt, Ucmtt⟩
⟨+OT1cmtt⟩\DeclareFontFamily{OT1}{cmtt}{\hyphenchar \font\m@ne}
⟨+Ucmtt⟩\DeclareFontFamily{U}{cmtt}{\hyphenchar \font\m@ne}
⟨+OT1cmtt⟩\DeclareFontShape{OT1}{cmtt}{m}{n}
⟨+Ucmtt⟩\DeclareFontShape{U}{cmtt}{m}{n}%
     {%
```

This substitution for `ori` is wrong and only in here because that was the way stuff has be set up in the old `lfonts.tex` file.

```
⟨+ori⟩       <-8>sub*cmr/m/n%
⟨+ori⟩       <8><9>gen*cmtt%
⟨-ori⟩       <5><6><7><8>cmtt8<9>cmtt9%
       <10><10.95>cmtt10%
       <12><14.4><17.28><20.74><24.88>cmtt12%
       }{}
⟨+OT1cmtt, Ucmtt⟩%%%%%% make sure subst shapes are available
⟨+OT1cmtt⟩\DeclareFontShape{OT1}{cmtt}{m}{it}
⟨+Ucmtt⟩\DeclareFontShape{U}{cmtt}{m}{it}%
```

```
      {%
```

The following substitution however is okay since both fonts have the same encoding.

```
⟨+ori⟩       <-10>sub*cmtt/m/n%
⟨-ori⟩       <5><6><7><8><9>%
       <10><10.95><12><14.4><17.28><20.74><24.88>cmitt10%
       }{}
⟨+OT1cmtt⟩\DeclareFontShape{OT1}{cmtt}{m}{sl}
⟨+Ucmtt⟩\DeclareFontShape{U}{cmtt}{m}{sl}%
      {%
⟨+ori⟩       <-10>sub*cmtt/m/n%
⟨-ori⟩       <5><6><7><8><9>%
       <10><10.95><12><14.4><17.28><20.74><24.88>cmsltt10%
       }{}
⟨+OT1cmtt⟩\DeclareFontShape{OT1}{cmtt}{m}{sc}
⟨+Ucmtt⟩\DeclareFontShape{U}{cmtt}{m}{sc}%
      {%
⟨+ori⟩       <-10>sub*cmtt/m/n%
⟨-ori⟩       <5><6><7><8><9>%
       <10><10.95><12><14.4><17.28><20.74><24.88>cmtcsc10%
       }{}
⟨+OT1cmtt⟩\DeclareFontShape{OT1}{cmtt}{m}{ui}
⟨+Ucmtt⟩\DeclareFontShape{U}{cmtt}{m}{ui}%
⟨-nowarn⟩   {<->sub*cmtt/m/it}{}
⟨+nowarn⟩   {<->ssub*cmtt/m/it}{}
⟨+OT1cmtt⟩\DeclareFontShape{OT1}{cmtt}{bx}{n}
⟨+Ucmtt⟩\DeclareFontShape{U}{cmtt}{bx}{n}%
⟨-nowarn⟩   {<->sub*cmtt/m/n}{}
⟨+nowarn⟩   {<->ssub*cmtt/m/n}{}
⟨+OT1cmtt⟩\DeclareFontShape{OT1}{cmtt}{bx}{it}
⟨+Ucmtt⟩\DeclareFontShape{U}{cmtt}{bx}{it}%
⟨-nowarn⟩   {<->sub*cmtt/m/it}{}
⟨+nowarn⟩   {<->ssub*cmtt/m/it}{}
⟨+OT1cmtt⟩\DeclareFontShape{OT1}{cmtt}{bx}{ui}
⟨+Ucmtt⟩\DeclareFontShape{U}{cmtt}{bx}{ui}%
⟨-nowarn⟩   {<->sub*cmtt/m/it}{}
⟨+nowarn⟩   {<->ssub*cmtt/m/it}{}
⟨/OT1cmtt, Ucmtt⟩
```

4.2.4 Computer Modern Variable Typewriter (OT1)

The Computer Modern Variable Typewriter family is the proportional spaced version of the Computer Modern Typewriter family. It is implemented as a separate family to allow easy use in normal text, including changes of shape/series etc if available. This family also allows normal hyphenation.

```
⟨*OT1cmvtt⟩
\DeclareFontFamily{OT1}{cmvtt}{\hyphenchar\font45 }
\DeclareFontShape{OT1}{cmvtt}{m}{n}%
      {%
       <5><6><7><8><9><10><10.95>%
       <12><14.4><17.28><20.74><24.88>cmvtt10%
       }{}
```

This font is probably not available to everybody as it is not part of the standard distribution. One might find it in `.../systems/knuth/local` on CTAN.

```
\DeclareFontShape{OT1}{cmvtt}{m}{it}%
      {%
       <5><6><7><8><9><10><10.95>%
       <12><14.4><17.28><20.74><24.88>cmvtti10%
       }{}
⟨/OT1cmvtt⟩
```

4.2.5 Computer Modern Funny (OT1)

```
⟨*OT1cmfr⟩
\DeclareFontFamily{OT1}{cmfr}{\hyphenchar\font45 }
\DeclareFontShape{OT1}{cmfr}{m}{n}{%
      <10>cmff10%
    }{}
\DeclareFontShape{OT1}{cmfr}{m}{it}{%
      <10>cmfi10%
    }{}
⟨/OT1cmfr⟩
```

4.2.6 Computer Modern Dunhill (OT1)

```
⟨*OT1cmdh⟩
\DeclareFontFamily{OT1}{cmdh}{\hyphenchar\font45 }
\DeclareFontShape{OT1}{cmdh}{m}{n}{%
      <10>cmdunh10%
    }{}
⟨/OT1cmdh⟩
```

4.2.7 Computer Modern Fibonacci (OT1)

```
⟨*OT1cmfib⟩
\DeclareFontFamily{OT1}{cmfib}{\hyphenchar\font45 }
\DeclareFontShape{OT1}{cmfib}{m}{n}{%
      <8>cmfib8%
    }{}
⟨/OT1cmfib⟩
```

4.3 Math fonts

4.3.1 Computer Modern Math italics

```
⟨*OMLcmm⟩
\DeclareFontFamily{OML}{cmm}{\skewchar\font127 }
\DeclareFontShape{OML}{cmm}{m}{it}%
     {<5><6><7><8><9>gen*cmmi%
      <10><10.95>cmmi10%
      <12><14.4><17.28><20.74><24.88>cmmi12%
      }{}
\DeclareFontShape{OML}{cmm}{b}{it}{%
      <5><6><7><8><9>gen*cmmib%
      <10><10.95><12><14.4><17.28><20.74><24.88>cmmib10%
      }{}
```

This will allow the `\oldstylenums` command to work within `\textbf`.

```
\DeclareFontShape{OML}{cmm}{bx}{it}%
   {<->ssub*cmm/b/it}{}
⟨/OMLcmm⟩
```

4.3.2 Computer Modern Roman Math italics

Some text symbols like 'oo' and '<' are kept in the OML encoding, so we need font substititutions from OML/cmr to OML/cmm.

```
⟨*OMLcmr⟩
\DeclareFontFamily{OML}{cmr}{\skewchar\font127 }
\DeclareFontShape{OML}{cmr}{m}{n}%
   {<->ssub*cmm/m/it}{}
\DeclareFontShape{OML}{cmr}{m}{it}%
   {<->ssub*cmm/m/it}{}
\DeclareFontShape{OML}{cmr}{m}{sl}%
   {<->ssub*cmm/m/it}{}
\DeclareFontShape{OML}{cmr}{m}{sc}%
   {<->ssub*cmm/m/it}{}
\DeclareFontShape{OML}{cmr}{bx}{n}%
   {<->ssub*cmm/b/it}{}
```

```
\DeclareFontShape{OML}{cmr}{bx}{it}%
   {<->ssub*cmm/b/it}{}
\DeclareFontShape{OML}{cmr}{bx}{sl}%
   {<->ssub*cmm/b/it}{}
\DeclareFontShape{OML}{cmr}{bx}{sc}%
   {<->ssub*cmm/b/it}{}
```
⟨/OMLcmr⟩

4.3.3 Computer Modern Math symbols

⟨*OMScmsy⟩
```
\DeclareFontFamily{OMS}{cmsy}{\skewchar\font48 }
\DeclareFontShape{OMS}{cmsy}{m}{n}{%
      <5><6><7><8><9><10>gen*cmsy%
      <10.95><12><14.4><17.28><20.74><24.88>cmsy10%
      }{}
\DeclareFontShape{OMS}{cmsy}{b}{n}{%
      <5><6><7><8><9>gen*cmbsy%
      <10><10.95><12><14.4><17.28><20.74><24.88>cmbsy10%
      }{}
```
⟨/OMScmsy⟩

4.3.4 Computer Modern Roman Math symbols

Some text symbols like '¶' and '†' are kept in the OMS encoding, so we need font substititutions from OMS/cmr to OMS/cmsy.

⟨*OMScmr⟩
```
\DeclareFontFamily{OMS}{cmr}{\skewchar\font48 }
\DeclareFontShape{OMS}{cmr}{m}{n}%
   {<->ssub*cmsy/m/n}{}
\DeclareFontShape{OMS}{cmr}{m}{it}%
   {<->ssub*cmsy/m/n}{}
\DeclareFontShape{OMS}{cmr}{m}{sl}%
   {<->ssub*cmsy/m/n}{}
\DeclareFontShape{OMS}{cmr}{m}{sc}%
   {<->ssub*cmsy/m/n}{}
\DeclareFontShape{OMS}{cmr}{bx}{n}%
   {<->ssub*cmsy/b/n}{}
\DeclareFontShape{OMS}{cmr}{bx}{it}%
   {<->ssub*cmsy/b/n}{}
\DeclareFontShape{OMS}{cmr}{bx}{sl}%
   {<->ssub*cmsy/b/n}{}
\DeclareFontShape{OMS}{cmr}{bx}{sc}%
   {<->ssub*cmsy/b/n}{}
```
⟨/OMScmr⟩

4.3.5 Computer Modern large symbols

⟨*OMXcmex⟩
```
\DeclareFontFamily{OMX}{cmex}{}
\DeclareFontShape{OMX}{cmex}{m}{n}{%
   <->sfixed*cmex10%
   }{}
```
⟨/OMXcmex⟩

4.3.6 Concrete Roman

⟨*OT1ccr⟩
```
\DeclareFontFamily{OT1}{ccr}{\hyphenchar\font45 }
\DeclareFontShape{OT1}{ccr}{m}{n}{%
   <5><6><7><8><9><10>gen*ccr%
   <10.95><12><14.4><17.28><20.74><24.88>ccr10}{}
\DeclareFontShape{OT1}{ccr}{m}{it}{%
   <10><10.95><12>ccti10}{}
```

```
\DeclareFontShape{OT1}{ccr}{m}{sc}{%
   <10><10.95><12>cccsc10}{}
\DeclareFontShape{OT1}{ccr}{m}{sl}{%
   <9>ccsl9%
   <10><10.95><12>ccsl10}{}
\DeclareFontShape{OT1}{ccr}{c}{sl}{<9>ccslc9}{}
```

Finally a few substitution fonts for combinations not available.

```
\DeclareFontShape{OT1}{ccr}{bx}{n}%
     {<->sub*cmr/bx/n}{}
\DeclareFontShape{OT1}{ccr}{bx}{sl}%
     {<->sub*cmr/bx/sl}{}
\DeclareFontShape{OT1}{ccr}{bx}{it}%
     {<->sub*cmr/bx/it}{}
```

⟨/OT1ccr⟩

4.3.7 Concrete Roman math italic

⟨*OMLccm⟩

```
\DeclareFontFamily{OML}{ccm}{\skewchar\font127 }
\DeclareFontShape{OML}{ccm}{m}{it}{%
   <10><10.95><12>ccmi10}{}
```

⟨/OMLccm⟩

4.3.8 Computer Modern Roman in OT2 encoding

These fonts are from the University of Washington. They do not belong into this file but at the moment there is no other place.

⟨*OT2cmr⟩

```
\DeclareFontFamily{OT2}{cmr}{\hyphenchar\font45 }
\DeclareFontShape{OT2}{cmr}{m}{n}{%
   <5><6><7><8><9>gen*wncyr%
   <10><10.95><12><14.4><17.28><20.74><24.88>wncyr10}{}
\DeclareFontShape{OT2}{cmr}{m}{it}{%
   <5><6><7><8><9>gen*wncyi%
   <10><10.95><12><14.4><17.28><20.74><24.88>wncyi10}{}
\DeclareFontShape{OT2}{cmr}{m}{sc}{%
   <5><6><7><8><9><10><10.95><12><14.4>%
   <17.28><20.74><24.88>wncysc10}{}
```

⟨+OT2cmr⟩`%%%%%%%%%%%% bold series`

```
\DeclareFontShape{OT2}{cmr}{b}{n}{%
   <5><6><7><8><9>gen*wncyb%
   <10><10.95><12><14.4><17.28><20.74><24.88>wncyb10}{}
```

⟨/OT2cmr⟩

4.3.9 Computer Modern Sans in OT2 encoding

Some more fonts from the University of Washington.

⟨*OT2cmss⟩

```
\DeclareFontFamily{OT2}{cmss}{\hyphenchar\font45 }
\DeclareFontShape{OT2}{cmss}{m}{n}{%
   <8><9>gen*wncyss%
   <10><10.95><12><14.4><17.28><20.74><24.88>wncyss10}{}
```

⟨/OT2cmss⟩

The next line goes into all files and in addition prevents DOCSTRIP from adding any further code from the main source file (such as a character table.

```
\endinput
```