

# The European Computer Modern Fonts

## — Documentation —

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## 1 Introduction

### 1.1 The dc fonts

In 1990 at the TUG meeting at Cork, Ireland, the european T<sub>E</sub>X user groups agreed on a 256 character incoding supporting many european languages with latin writing. This encoding is both an *internal encoding* for T<sub>E</sub>X and a *font encoding*. This double nature is a consequence of the fact, that both kind of encodings cannot be entirely separated within T<sub>E</sub>X.

The design goals of the Cork encoding are to allow as many languages as possible to be hyphenated correctly and to guarantee correct kerning for those languages. Therefore it includes many ready-made accented letters.

It also includes some innovative features, which have not become very popular yet, though they deserve to become so. First to mention is a special, zero width invisible character, the compound word mark (cwm). Its design purpose is to assist correct hyphenation at morpheme boundaries, which can occur in minimal pairs (e. g. german *Wachs-tube* vs. *Wach-stube*), if the previous example is typeset in *fraktur* different styles of the letter ‘s’ are needed.

In the new version dc 1.3 I have given the cwm a height, namely x-height, in order be function as a carrier of accents which are placed between letters like in the german abbreviation *-b<sup>ö</sup>g.* (*-burg*).

The second innovative feature is the separation of the two characters <hyphen> and <hyphenchar>. The hyphenchar is designed as a hanging hyphen, giving a smother text boundary.

The final version of the Cork encoded fonts will be called ec (European Computer Modern or Extended Computer Modern) fonts. The current version, dc 1.3, is the last intermediate step towards the final version. Note, that in the cause of bug fixes and improvements, the metrics may change. After the renaming to ec the metrics will remain stable, as the metrics of the cm fonts do.

## 1.2 The tc-fonts

The need for a text companion font was first articulated in the discussion of new 256 character mathematical fonts in 1993. In order to achieve a better orthogonality between text and math, some text symbols stored in the math fonts should be moved to the text companion fonts<sup>1</sup>. The text companion fonts are also the ideal place to store some new characters, like currency symbols.

There are now 108 characters in the tc fonts, including special uppercase versions of the accents, oldstyle digits, genealogical symbols, footnote symbols, currency symbols and other custom characters. The selection is unique and superior to most commercially available expert sets.

## 2 Supported languages

The following languages are supported by the Cork encoding: Afrikaans, Albanian, Breton, Croat, Czech, Danish, Dutch, English, Estonian, Faroese, Finnish, French, Frisian, Gaelic, Galician, German, Greenlandic, Hungarian, Icelandic, Irish (modern orthography), Italian, Letzeburgish, Lusatian (Sorbian), Norwegian, Polish, Portuguese, Rhaetian (Rumantsch), Rumanian, Slovak, Slovene, Spanish, Swedish, Turkish. Many non-european languages using the standard latin alphabet (e. g. Bahasa Indonesia, Suaheli) are also supported.

In europe, the following languages aren't supported: Azeri, Basque, Catalan, Esperanto, Irish (old orthography), Latvian, Lithuanian, Maltese, Sami, Welsh. Of course, Greek and all languages with cyrillic writing are outside the scope of the Cork encoding.

## 3 Standard Control Sequences

The following standard control sequences are assigned with L<sup>A</sup>T<sub>E</sub>X's T1 encoding for the dc fonts:

`\r` Ring accent (`\r u` gives `û`)  
`\k` Ogonek (`\k e` gives `ę`)  
`\dh`, `\DH` Icelandic letter edh (`ð`, `Ð`)  
`\dj`, `\DJ` Letter d with stroke (`đ`, `Đ`)  
`\ng`, `\NG` Letter eng (`ŋ`, `Ŋ`)  
`\th`, `\TH` Icelandic letter thorn (`þ`, `Þ`).

To load the tc fonts, use the `textcomp`-package, which provides control sequences for all the included symbols.

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<sup>1</sup>The archives of the math-font-discuss mailing list are available for ftp on `ftp.cogs.susx.ac.uk` in directory `pub/tex/mathfont`.

## 4 Ligatures

In the proportional fonts, the following ligatures are implemented:

```
-- - (en dash)
--- — (em dash)
‘ ‘ “ (english opening quotes, german closing quotes)
’ ’ ” (english and polish closing quotes)
, , „ (german and polish opening quotes)
<< « (french opening quotes)
>> » (french closing quotes)
! ‘ ¡ (spanish opening exclamation mark)
? ‘ ¿ (spanish opening question mark)
fi fi
ff ff
fl fl
ffi ffi
ffl ffl
```

In the typewriter fonts, the following ligatures are implemented:

```
-- - (en dash or number range dash)
--- -- (em dash)
‘ ‘ ‘ ‘ (english opening quotes, german closing quotes)
’ ’ ’ ’ (english and polish closing quotes)
, , , , (german and polish opening quotes)
<< << (french opening quotes)
>> >> (french closing quotes)
! ‘ ¡ (spanish opening exclamation mark)
? ‘ ¿ (spanish opening question mark)
```

The convention on the dashes suites british usage for number range dashes best and does not interfere with any other known usage. In verbatim mode, all ligatures are switched off.

## 5 Hints on usage

The `dc` fonts are intended for text usage in european languages. The Cork font encoding is selected with the command `\usepackage[T1]{fontenc}` in  $\text{\LaTeX} 2\epsilon$ .

The `tc` fonts are a multi-purpose font. Suggested usages include verbatim setting of latin-1 and latin-2 listings, avoiding the so-called “hidden math” in text mode (that’s the reason, why there are footnote symbols in), providing building blocks for virtual fonts (oldstyle digits are included for this reason), or just providing otherwise unavailable symbols (like the permille sign).

Some characters are primarily intended for verbatim listings, in plain text they may be replaced with macros. These characters include the raised digits, the fractions, the trademark sign, and the ordinal indicators.

For text fractions, the following macro is suggested (from the `TEXbook`, exercise 11.6):

```
\newcommand{\nicefrac}[2]{\leavevmode\kern.1em
\raise.5ex\hbox{\the\scriptfont0 #1}\kern-.1em
/\kern-.15em\lower.25ex\hbox{\the\scriptfont0 #2}}
```

It can produce arbitrary fractions and is not restricted to some simple cases, the output looks  $\frac{1}{2}$ ,  $\frac{5}{4}$ ,  $\frac{17}{42}$ .

For the ordinal indicators (<sup>o</sup> and <sup>a</sup>), the following macros are suggested (from `spanish.ldf`, `babel` bundle):

```
\newcommand{\ordmale}{\raise1ex\hbox{\underbar{\scriptsize o}}}  
\newcommand{\ordfemale}{\raise1ex\hbox{\underbar{\scriptsize a}}}
```

## 6 Naming of the font files

Currently, the extended computer modern font have the prefix `dc`. This prefix will changew to `ec` with the final release after another round of bug fixing. I hope to make the transition from `dc` to `ec` in about one year. The text companion fonts have the prefix `tc`, which is not subject to change. However, later releases may included more characters and therefore have different checksums. No characters shall be removed from the `tc` fonts.

Most of the `dc` fonts can be generated at any size one want in the range from 5pt to 100pt. For each size, a unique name is needed.

With the release 1.2 of the `dc` fonts, a new, more precise naming scheme is in effect. Since there are widely used operating sytems limiting the file name to 8 character (plus an extension of 3 characters) the following scheme is used:

- The first two letters (either `dc` or `tc` denote the encoding and the general design of the font.
- The one or two following letters denotes the family, shape, and series attributes of the font. E. g. `r` for roman, `bx` for bold extended, `ti` for text italic, or `bi` for bold extended italic. A complete overview is given at the end of this section.
- The following four digits give the design size in `TEX`'s points multiplied with 100. E. g 1000 denotes tex point, 1440 denotes magstep 2, i. e. 14.4 point, and 0500 denotes five point.

Here are the implemented styles:

**Roman family:** `r` roman, `b` bold, `bx` bold extended, `s1` slanted, `b1` bold extended slanted, `cc` caps and small caps, `xc` bold extended caps and small

caps, **sc** slanted caps and small caps, **oc** oblique (bold extended slanted) caps and small caps, **ti** (text) italic, **bi** bold extended italic, **u** unslanted italic, **ci** classical serif italic (new design).

**Sans serif family:** **ss** sans serif, **si** sans serif inclined (slanted), **sx** sans serif bold extended, **so** sans serif bold extended oblique (slanted).

**Typewriter family:** **tt** typewriter, **tc** typewriter caps and small caps, **st** slanted typewriter, **it** italic typewriter.

**Variable width typewriter family** **vt** variable width typewriter, **vi** variable width italic typewriter.

**Various other fonts:** **bm** variant bold roman, **dh** dunhill, **fb** Fibonacci parameters, **ff** funny, **fi** funny italic. Expect errors with the funny fonts, they aren't really worked out.

Here are some examples:

<b>dcr1000</b>	European computer modern roman at 10pt
<b>tcr1000</b>	Text companion symbols roman at 10pt
<b>dcss1728</b>	European computer modern sans serif at 17.28pt
<b>dcbx0900</b>	European computer modern roman bold extended at 9pt

Some remaining fonts come at one size only, those are

<b>dcssdc10</b>	sans serif demi-bold condensed
<b>dcsq8</b>	sans serif quotation
<b>dcqi8</b>	sans serif quotation inclined
<b>dclq8</b>	latex sans serif quotation
<b>dcli8</b>	latex sans serif quotation inclined
<b>dclb8</b>	latex sans serif quotation bold
<b>dclø8</b>	latex sans serif quotation oblique (bold inclined)
<b>idclq8</b>	invisible latex sans serif quotation
<b>idcli8</b>	invisible latex sans serif quotation inclined
<b>idclb8</b>	invisible latex sans serif quotation bold
<b>idclø8</b>	invisible latex sans serif quotation oblique.

The last eight fonts are for the `slides` document class, which replaces old `SLITEX`. They contain a special version of the capital letter 'T'.

## A The Cork Encoding

position description  
(octal)

---

Accents for lowercase letters

---

000	grave
001	acute
002	circumflex
003	tilde
004	umlaut

005 hungarian  
006 ring  
007 hachek  
010 breve  
011 macron  
012 dot above  
013 cedilla  
014 ogonek

---

Miscellaneous

---

015 single base quote  
016 single opening guillemet  
017 single closing guillemet  
020 english opening quotes  
021 english closing quotes  
022 base quotes  
023 opening guillemets  
024 closing guillemets  
025 en dash  
026 em dash  
027 compound word mark (invisible)  
030 perthousandzero  
031 dotless i  
032 dotless j  
033 ligature ff  
034 ligature fi  
035 ligature fl  
036 ligature ffi  
037 ligature ffl  
040 visible space

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ASCII

---

041 exclamation mark  
042 straight quotes  
043 hash mark  
044 dollar sign  
045 percent sign  
046 ampersand  
047 apostroph  
050 opening parentheses  
051 closing parentheses  
052 asterisk  
053 plus sign  
054 comma

055	hyphen (note: not minus sign)
056	full stop
057	solidus
060	digit 0
...	
071	digit 9
072	colon
073	semicolon
074	less than sign
075	equals sign
076	greater than sign
077	question mark
080	commercial at
081	capital letter A
...	
132	capital letter Z
133	opening square bracket
134	backslash
135	closing square bracket
136	ASCII circumflex
137	underscore
140	opening quote (not ASCII grave!)
141	lowercase letter a
...	
172	lowercase letter z
173	opening curly brace
174	vertical bar
175	closing curly brace
176	ASCII tilde
177	hyphenchar (hanging)

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Letters for eastern european languages (from latin-2)

---

200	capital letter A with breve
201	capital letter A with ogonek
202	capital letter C with acute
203	capital letter C with hachek
204	capital letter D with hachek
205	capital letter E with hachek
206	capital letter E with ogonek
207	capital letter G with breve
210	capital letter L with acute
211	capital letter L with hachek
212	capital letter crossed L
213	capital letter N with acute
214	capital letter N with hachek

215 capital letter Eng  
216 capital letter O with hungarian double acute  
217 capital letter R with acute  
220 capital letter R with hachek  
221 capital letter S with acute  
222 capital letter S with hachek  
223 capital letter S with cedilla  
224 capital letter T with hachek  
225 capital letter T with cedilla  
226 capital letter U with hungarian double acute  
227 capital letter U with ring  
230 capital letter Y with diaeresis  
231 capital letter Z with acute  
232 capital letter Z with hachek  
233 capital letter Z with dot  
234 capital letter IJ  
235 capital letter I with dot  
236 lowercase letter d with bar  
237 section sign  
240 lowercase letter a with breve  
241 lowercase letter a with ogonek  
242 lowercase letter c with acute  
243 lowercase letter c with hachek  
244 lowercase letter d with hachek  
245 lowercase letter e with hachek  
246 lowercase letter e with ogonek  
247 lowercase letter g with breve  
250 lowercase letter l with acute  
251 lowercase letter l with hachek  
252 lowercase letter crossed l  
253 lowercase letter n with acute  
254 lowercase letter n with hachek  
255 lowercase letter eng  
256 lowercase letter o with hungarian double acute  
257 lowercase letter r with acute  
260 lowercase letter r with hachek  
261 lowercase letter s with acute  
262 lowercase letter s with hachek  
263 lowercase letter s with cedilla  
264 lowercase letter t with hachek  
265 lowercase letter t with cedilla  
266 lowercase letter u with hungarain double acute  
267 lowercase letter u with ring  
270 lowercase letter y with diaeresis  
271 lowercase letter z with acute  
272 lowercase letter z with hachek



273	lowercase letter z with dot
274	lowercase letter ij
275	spanish inverted exclamation mark
276	spanish inverted question mark
277	pound sign

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Letters for western european languages (from latin-1)

---

300	capital letter A with grave
301	capital letter A with acute
302	capital letter A with circumflex
303	capital letter A with tilde
304	capital letter A with diaeresis
305	capital letter A with ring
306	capital letter AE
307	capital letter C with cedilla
310	capital letter E with grave
311	capital letter E with acute
312	capital letter E with circumflex
313	capital letter E with diaeresis
314	capital letter I with grave
315	capital letter I with acute
316	capital letter I with circumflex
317	capital letter I with diaeresis
320	capital letter Edh (D with bar)
321	capital letter N with tilde
322	capital letter O with grave
323	capital letter O with acute
324	capital letter O with circumflex
325	capital letter O with tilde
326	capital letter O with diaeresis
327	capital letter OE
330	capital letter O with slash
331	capital letter U with grave
332	capital letter U with acute
333	capital letter U with circumflex
334	capital letter U with diaeresis
335	capital letter Y with acute
336	capital letter Thorn
337	capital letter Sharp S (deviating from latin-1)
340	lowercase letter a with grave
341	lowercase letter a with acute
342	lowercase letter a with circumflex
343	lowercase letter a with tilde
344	lowercase letter a with diaeresis
345	lowercase letter a with ring

346	lowercase letter ae
347	lowercase letter c with cedilla
350	lowercase letter e with grave
351	lowercase letter e with acute
352	lowercase letter e with circumflex
353	lowercase letter e with diaeresis
354	lowercase letter i with grave
355	lowercase letter i with acute
356	lowercase letter i with circumflex
357	lowercase letter i with diaeresis
360	lowercase letter edh
361	lowercase letter n with tilde
362	lowercase letter o with grave
363	lowercase letter o with acute
364	lowercase letter o with circumflex
365	lowercase letter o with tilde
366	lowercase letter o with diaeresis
367	lowercase letter oe
370	lowercase letter o with slash
371	lowercase letter u with grave
372	lowercase letter u with acute
373	lowercase letter u with circumflex
374	lowercase letter u with diaeresis
375	lowercase letter y with acute
376	lowercase letter thorn
377	lowercase letter sharp s (deviating from latin-1)

## B The Text Companion Encoding

position description  
(octal)

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### Accents for capital letters

---

000	grave
001	acute
002	circumflex
003	tilde
004	umlaut
005	hungarian
006	ring
007	hachek
010	breve
011	macron
012	dot above

013 cedilla  
014 ogonek

---

Miscellaneous

---

015 base single straight quote  
022 base double straight quotes  
025 twelve u dash  
026 three quarters emdash  
027 capital cwm  
030 left pointing arrow  
031 right pointing arrow  
032 tie accent (lowercase)  
033 tie accent (capital)  
040 blank symbol  
044 dollar sign  
047 straight quote  
052 centered star  
054 comma  
056 full stop  
057 fraction

---

Oldstyle digits

---

060 oldstyle digit 0  
061 oldstyle digit 1  
062 oldstyle digit 2  
063 oldstyle digit 3  
064 oldstyle digit 4  
065 oldstyle digit 5  
066 oldstyle digit 6  
067 oldstyle digit 7  
070 oldstyle digit 8  
071 oldstyle digit 9

---

Miscellaneous

---

115 mho sign  
117 big circle  
127 ohm sign  
136 arrow up  
137 arrow down  
140 backtick (ASCII grave)  
142 born  
144 died  
154 leaf

155	married
156	musical note
176	low tilde
177	short equals

---

TS1-symbols

---

200	ASCII-style breve
201	ASCII-style hachek
202	double tick (ASCII double acute)
203	double backtick
204	dagger
205	ddagger
206	double vert
207	perthousand
210	bullet
211	centigrade
212	dollaroldstyle
213	centoldstyle
214	florin
215	colon
216	won
217	naira
220	guarani
221	peso
222	lira
223	recipe
224	interrobang
225	gnaborretni
226	dong sign
227	trademark

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Symbols from ISO-8859-1 (latin-1)

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242	cent
243	sterling
244	currency sign
245	yen
246	broken vertical bar
247	section sign
250	high dieresis
251	copyright
252	feminine ordinal indicator
254	logical not
256	circled R
257	macron

260	degree sign
261	plus-minus sign
262	superscript 2
263	superscript 3
264	tick (ASCII-style acute)
265	micro sign
266	pilcrow sign
267	centered dot
271	superscript 1
272	masculine ordinal indicator
274	fraction one quarter
275	fraction one half
276	fraction three quarters
326	multiplication sign (times)
366	division sign

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