The dc fonts 1.3: Move towards stability and completeness

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1 Intro

With the release 1.2 of the dc fonts and the first release of the tc fonts last year (1), a big step forward was made towards the final ec fonts. The ec fonts are designed to replace the cm fonts as the basic text fonts for LaTeX, and they will be as stable as the cm fonts are now.

The release 1.3 emphasises two points: stability and completeness. In order to achieve the first goal, there are only few new features included in this release, and there will be only bug fixes to the next release, which will be ec fonts version 1.0

2 Stability

About two dozens of bugs were reported after the release 1.2 of the dc fonts, some of them sleeping in the source code since the very first release in 1990, others newly introduced by new features and designs of the 1.2 release.

Most serious was a bug reported and analysed by Andreas Schwab: The metrics of several accented characters were resolution dependent. The reason was, that the character dimensions were set after drawing the letter.

The fix finally applied (thanks to Bogusław Jackowski) is to compute the character twice, once in a canonical sharp mode to fix its dimensions, and a second time in printer's mode to generate the actual letter. Note that it must be possible to switch the mode on the fly to use this method – one cannot load the current `modes.mf` 3.0 *after* `dxbase.mf` any longer.

The fine positioning of the accents was very much improved, and I appreciate a valuable contribution by Daniel Taupin for the french letters.

A whole bunch of other corrections were incorporated, including the improvements Knuth did to the cm fonts since 1990 (2).

3 Completeness

There are some new features added to the new release. Forst I want to mention there new characters added to the tc fonts: *comma*, *full stop*, and *capital cwm*. The first two were added to facilitate a macro for oldstyle digits using the text companion font in the following way:

```
\def\oldstyledigits#1{%
  {\fontencoding{TS1}\selectfont{#1}}}
```

This enables decimal separators in oldstyle numbers. There are now also italic oldstyle digits in the tc fonts, contributed by Gert-Jan Lockhorst.

1 2 3 4 5 6 7 8 9 0

Fig. 1: Italic oldstyle digits

The capital cwm was added, because I decided to give the the compound word mark a height of 1 ex. This adds a new functionality to this zero width invisible character: it can act as a carrier for accents placed 'between' letters, as used in the german -burg abbreviature.

b̆g

Fig. 2: German -burg abbreviature, input as `b\u\cwm g`

The capital cwm, of course, has the height of capital letters.

Scandinavian often have asked for a culturally correct italic æ – the design from the cm fonts aims for maximum difference to the italic œ, but looks unusual in a skandinavian context. Therefore, a new shape for the *æ* was added, designed to share its metric with the original design, and the two designs can be switched by setting a boolean variable in the parameter files.

æ æ

Fig. 3: New shape of the italic æ contrasted with the original one

There are many more kerning pairs added, for example 'nV' (nanovolt), 'Ay' (occurs very often in turkish proper names), 'Ad', and 'Ae'.

Ayşe

Fig. 4: Kerning for 'Ay' is added to release 1.3

Completeness also means, that some missing fonts were added to the new release, including `dcxc` Bold extended caps and small caps, `dcvi` Variable width italic typewriter, and bold SliTeX fonts.

4 New font dimensions

The dc fonts used to contain some additional font dimensions, which were never documented, and some of them have turned out to be unusable at all. The issue of additional font dimensions was brought up again on the `LATEX-L` mailing list for the LaTeX3 project.

The dc fonts contain now the following 9 additional font dimensions, most of them suggested and explained by Michael Downes.

fontdimen 8 *font_cap_height*, height of capital letters (not accented)

fontdimen 9 *font_asc_height*, height of lowercase letters with ascenders

fontdimen 10 *font_acc_cap_height*, height of accented capital letters

fontdimen 11 *font_desc_depth*, depth of lowercase letters with descenders

fontdimen 12 *font_max_height*, maximum height of any glyph in the font

fontdimen 13 *font_max_depth*, maximum depth of any glyph in the font

fontdimen 14 *font_digit_width*, width of the digits contained in the font, if the digits had different widths, the maximum width over all digits is taken

fontdimen 15 *font_cap_stem*, width of the stem of the capital 'I', can be used to determine the 'absolute boldness' of the font

fontdimen 16 *font_baselineskip*, suggested value of baselineskip to be used with the font

These new font dimensions can be read by TEX commands and used macros.

References

[1]Jörg Knappen, *The release 1.2 of the Cork encoded dc fonts and the text companion symbol fonts*, Proc. 9th European TeX conference, Arnhem 1995, 239.

[2]Donald E. Knuth, file `cm85.bug`.

A Font tables

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	`	´	ˆ	˜	¨	˝	˚	ˇ	˝0x
´01x	˘	¯	˙	¸	˛	'			
´02x			"			—	—		˝1x
´03x	←	→	⌢	⌢	⌢	⌢			
´04x	ƀ				$			'	˝2x
´05x			*		,	=	.	/	
´06x	0	1	2	3	4	5	6	7	˝3x
´07x	8	9			⟨	—	⟩		
´10x									˝4x
´11x						℧		◯	
´12x								Ω	˝5x
´13x				⟦		⟧	↑	↓	
´14x	`		⋆	o|o	†				˝6x
´15x				🍃		⚭	♪		
´16x									˝7x
´17x							~	=	
´20x	˘	ˇ	˝	‶	†	‡	‖	‰	˝8x
´21x	•	℃	$	₵	ƒ	₡	₩	₦	
´22x	₲	₱	₤	℞	‽	⸘	₫	™	˝9x
´23x	‱	¶	฿	№	⁒	℮	◦	℠	
´24x	⁅	⁆	¢	£	¤	¥	¦	§	˝Ax
´25x	¨	©	ª	℗	¬	℗	®	¯	
´26x	°	±	²	³	´	µ	¶	·	˝Bx
´27x	※	¹	º	√	¼	½	¾	€	
´32x							×		˝Dx
´33x									
´36x							÷		˝Fx
´37x									
	˝8	˝9	˝A	˝B	˝C	˝D	˝E	˝F	

The layout of the text companion font tcrm1000. The table shows the full set implemented in release ec1.0 of the `ec/tc` fonts, the encoding is named `TS1` within LATEX 2_ε.

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	`	´	ˆ	˜	¨	˝	˚	ˇ	˝0x
´01x	˘	¯	˙	¸	˛	‚	‹	›	
´02x	“	”	„	«	»	–	—		˝1x
´03x	₀	ı	ȷ	ﬀ	ﬁ	ﬂ	ﬃ	ﬄ	
´04x	␣	!	"	#	$	%	&	’	˝2x
´05x	(	)	*	+	,	-	.	/	
´06x	0	1	2	3	4	5	6	7	˝3x
´07x	8	9	:	;	<	=	>	?	
´10x	@	A	B	C	D	E	F	G	˝4x
´11x	H	I	J	K	L	M	N	O	
´12x	P	Q	R	S	T	U	V	W	˝5x
´13x	X	Y	Z	[	\	]	ˆ	_	
´14x	‘	a	b	c	d	e	f	g	˝6x
´15x	h	i	j	k	l	m	n	o	
´16x	p	q	r	s	t	u	v	w	˝7x
´17x	x	y	z	{	|	}	˜	-	
´20x	Ă	Ą	Ć	Č	Ď	Ě	Ę	Ğ	˝8x
´21x	Ĺ	Ľ	Ł	Ń	Ň	Ŋ	Ő	Ŕ	
´22x	Ř	Ś	Š	Ş	Ť	Ţ	Ű	Ů	˝9x
´23x	Ÿ	Ź	Ž	Ż	Ĳ	İ	đ	§	
´24x	ă	ą	ć	č	ď	ě	ę	ğ	˝Ax
´25x	ĺ	ľ	ł	ń	ň	ŋ	ő	ŕ	
´26x	ř	ś	š	ş	ť	ţ	ű	ů	˝Bx
´27x	ÿ	ź	ž	ż	ĳ	¡	¿	£	
´30x	À	Á	Â	Ã	Ä	Å	Æ	Ç	˝Cx
´31x	È	É	Ê	Ë	Ì	Í	Î	Ï	
´32x	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	Œ	˝Dx
´33x	Ø	Ù	Ú	Û	Ü	Ý	Þ	SS	
´34x	à	á	â	ã	ä	å	æ	ç	˝Ex
´35x	è	é	ê	ë	ì	í	î	ï	
´36x	ð	ñ	ò	ó	ô	õ	ö	œ	˝Fx
´37x	ø	ù	ú	û	ü	ý	þ	ß	
	˝8	˝9	˝A	˝B	˝C	˝D	˝E	˝F	

This picture shows the font ecrm1000. The encoding is LaTeX 2_ε's `T1` encoding. The compound word mark in position *´027* is an invisible character of zero width.

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	`	´	ˆ	˜	¨	˝	˚	ˇ	˝0x
´01x	˘	¯	˙	¸	˛	‚	‹	›	
´02x	“	”	„	«	»	–	—		˝1x
´03x	₀	ı	ȷ	ﬀ	ﬁ	ﬂ	ﬃ	ﬄ	
´04x	␣	!	"	#	$	%	&	’	˝2x
´05x	(	)	*	+	,	-	.	/	
´06x	0	1	2	3	4	5	6	7	˝3x
´07x	8	9	:	;	<	=	>	?	
´10x	@	A	B	C	D	E	F	G	˝4x
´11x	H	I	J	K	L	M	N	O	
´12x	P	Q	R	S	T	U	V	W	˝5x
´13x	X	Y	Z	[	\	]	ˆ	_	
´14x	‘	a	b	c	d	e	f	g	˝6x
´15x	h	i	j	k	l	m	n	o	
´16x	p	q	r	s	t	u	v	w	˝7x
´17x	x	y	z	{	|	}	˜	-	
´20x	Ɓ	Ɗ	Ɛ	Ǝ	Ƒ	Ě	Ɣ	Ħ	˝8x
´21x	Ƙ	Ɲ	Ɔ	Ń	Ʃ	Ŋ	Ʊ	Ƴ	
´22x	Ƈ	Ƥ	Š	Ṅ	Ṉ	Ṣ	Ʒ	Ŧ	˝9x
´23x	Ė	Ẹ	Ƭ	Ʈ	ʧ	ʄ	đ	‟	
´24x	ɓ	ɗ	ɛ	ə	ƒ	ě	ɣ	ħ	˝Ax
´25x	ƙ	ɲ	ɔ	ń	ʃ	ŋ	ʊ	ƴ	
´26x	ƈ	ƥ	š	ṅ	ṉ	ṣ	ʒ	ŧ	˝Bx
´27x	ė	ẹ	ƭ	ʈ	"	¡	¿	'	
´30x	Ɩ	Ị	Ɛ̃	Ã	Ḿ	Ɔ̃	Æ	Ç	˝Cx
´31x	È	É	Ê	Ë	E̱	Ē	Ẽ	Ĩ	
´32x	Ð	Ñ	Ò	Ȯ	Ô	Õ	Ö	Œ	˝Dx
´33x	Ø	Ọ	O̱	Ō	Ǒ	Ụ	Ũ	ˏ	
´34x	ɩ	ị	ɛ̃	ã	ḿ	ɔ̃	æ	ç	˝Ex
´35x	è	é	ê	ë	e̱	ē	ẽ	ĩ	
´36x	ɖ	ñ	ò	ȯ	ô	õ	ö	œ	˝Fx
´37x	ø	ọ	o̱	ō	ǒ	ụ	ũ	ß	
	˝8	˝9	˝A	˝B	˝C	˝D	˝E	˝F	

The aFrican Computer modern font fcr10. The fc encoding is now LaTeX 2_ε's `T4` encoding.