

The ETbb package—Edward Tufte’s version of Bembo

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Background

The fonts in this package were derived ultimately from the collection of fonts commissioned by Edward Tufte for his own books, and released in 2015 as ET-Bembo under the MIT license. (The sources for that collection were fonts using the family name ET-book.) That collection was enhanced in 2019 under the name XETBook by Daniel Benjamin Miller, and it is his package which was the starting point for ETbb, where the bb denotes the Berry abbreviation for Bembo. The final section of this document makes a detailed comparison with the earlier fbb package, which is also Bembo-like, derived from Cardo. The most significant differences are that ETbb has a regular upright that is about 20% darker than the corresponding fbb, and its ascender height is noticeably less. These differences make ETbb have a less spindly appearance that is closer in spirit to the print produced by traditional metal versions of Bembo.

Package properties

The package makes a number of changes to the XETBook fonts:

- The released version of ET-Bembo lacks kerning tables—a serious omission—rectified in ETbb.
- The scale has been increased by 3.36% so that the x-height of the upright regular face is 431, very close to Computer Modern and Libertine.
- The lining figures in some faces were reduced so as to be a bit less than the cap-heights.
- The lining figures in XETBook were proportional rather than tabular. I’ve added new tabular lining and old-style figures.
- Added superior letters and figures to all faces. E.g., `\textsu{ABCabc123}` renders as ^{ABCabc123}.
- Added inferior figures to all faces with baseline at -112em.
- Added denominator figures to all faces with baseline at 0em.
- The originals comprised glyphs in the Adobe Standard Encoding, forming a rather sparse subset of the T1 encoding. I’ve added accented and composite glyphs that provide complete coverage of the T1 encoding as well as many glyphs required in the orthography of a number Eastern European countries.
- Prior to version 1.02, coverage of TS1 encoding was meager. The coverage is now close to full. (See the table at the end of this document.)
- Small caps have been added to all faces.

- There is a new glyph for the German capital sharp S (ß, *großes eszett*, U+1E9E), approved in 2017 for optional use in German orthography. Small cap versions are also provided.
- The glyph capital P has been changed from its default closed shape, as used in almost all modern digital renderings of Bembo, to the more historically accurate open shape. See, for example, the reproduction of Pietro Bembo's *De Aetna* at <https://ia601405.us.archive.org/34/items/ita-bnc-ald-00000673-001/ita-bnc-ald-00000673-001.pdf>.
(A higher resolution rendering of a two-page sample is available from https://upload.wikimedia.org/wikipedia/commons/8/89/De_Aetna_1495.jpg.)

Package options and macros

This package has most of the same features and options as the fbb package and even includes the altP option, though that has no effect because the alternate P shapes in fbb are the default in ETbb.

In the original XETBook, the dollar and cent currency symbols were oldstyle. I've added the new style symbols and made them the default, but option osdollar to ETbb changes back to the oldstyle symbols.

Text figures may be selected from four types:

- Proportional lining (LF), selected by options lining, proportional [or p]; (lining, or lf, is the default figure style;)
- Tabular lining (TLF), selected by options lining [or lf], tabular [or t]; (tabular is the default figure alignment;)
- Proportional oldstyle (OsF), selected by option oldstyle [or osf], proportional [or p];
- Tabular oldstyle (TOsF), selected by options oldstyle [or osf], tabular [or t].
-

The package also defines macros that allow you use alternate figure styles locally:

Macro	result	comment
<code>\textlf{0123456789}</code>	0123456789	print 0123456789 in proportional lining figures
<code>\texttlf{0123456789}</code>	0123456789	print 0123456789 in tabular lining figures
<code>\textosf{0123456789}</code>	o123456789	print 0123456789 in proportional oldstyle figures
<code>\texttosf{0123456789}</code>	o123456789	print 0123456789 in tabular oldstyle figures
<code>\textsu{0123456789}</code>	0123456789	print 0123456789 in superior figures
<code>\textin{0123456789}</code>	0123456789	print 0123456789 in inferior figures
<code>\textde{0123456789}</code>	0123456789	print 0123456789 in denominator figures

The macro `\textlf{123}` is identical in effect to `{\lfstyle 123}`, and similarly for the other lining and oldstyle macros, while `\textsu{123}` has the same effect as `{\sufigures 123}` and `\textin{123}` has the same effect as `{\infigures 123}`. If you prefer typing longer names, you may use `\textinferior` as a synonym for `\textin`, and similarly for `\textsu`. Likewise, `\textde{123}` has the same effect as `{\defigures 123}` or `{\denomfigures 123}`, and you may use `\textdenom` as a synonym for `\textde`. Note the difference in baseline between `\textin` and `\textde`: ₁₂₃ versus 123.

The `\textfrac` macro constructs fractions using `\textsu` and `\textde` with baseline aligned with the text baseline. The behavior is somewhat configurable, there being two parameters available to control the kerns before and after the fraction solidus. The two parameters are passed as options to `ETbb`, named

```
foresolidus % default value -.04em
aftsolidus  % default value -.04em
```

(The values should always be em units in order to behave correctly with respect to scaling.)

EXAMPLE:

- `\textfrac[2]{17}{32}` renders as $2\frac{17}{32}$ with default settings. (The optional argument 2 will always print in lining figures, not matter the choice of the text figure style.)

Option `sup`s changes the form of footnote markers to use `ETbb`'s superior figures, unless you have re-defined the meaning of `\thefootnote` prior to loading `ETbb`. For more control over size, spacing and position of footnote markers, use the `superiors` package: E.g.,

```
\usepackage[supstfm=ETbb-Regular-sup-t1]{superiors}
```

Option `sharpS` replaces `SS` in the `T1` encoding by the new `U+1E9E` glyph and replaces the small cap `ss` by the small cap version of `U+1E9E`. Only figure-styles `TLF`, `LF`, `OsF` and `T0sF` are handled, and only in the `T1` encoding.

Option `scof` forces the use of `OsF` figures in a small caps block, no matter what the default figure settings.

There is a `scaled` [or `scale`] option (e.g., `scaled=.97`) that allow you to adjust the text size against, say, a math package.

A suggested math companion

This text package works well with `newtxmath` with the `libertine` option, because the latter has italics of the same italic angle as `ETbb` and of very similar `xheight` and weight. If you have the `MinionPro` fonts (version 2.0 or higher) and have set them up with `FontPro` and the `minion2newtx` CTAN package, then the `minion` option to `newtxmath` provides a very good math companion with better Greek letters than `libertine`. The suggested invocation for `libertine` math is:

```
% load babel package and options here
\usepackage[p,osf]{ETbb} % osf in text, tabular lining figures in math
\usepackage[scaled=.95,type1]{cabin} % sans serif in style of Gill Sans
\usepackage[varqu,varl]{zi4} % inconsolata typewriter
\usepackage[T1]{fontenc} % LY1 also works
\usepackage[libertine,vvarbb]{newtxmath}
%\usepackage[cal=boondoxo,bb=boondox,frak=boondox]{mathalfa}
```

Here is a short sample based on this preamble:

The typeset math below follows the ISO recommendations that only variables be set in italic. Note the use of upright shapes for d , e and π . (The first two are entered as `\mathrm{d}` and `\mathrm{e}`, and in fonts derived from `newtxmath` or `mtpro2`, the latter is entered as `\uppi`.)

Simplest form of the Central Limit Theorem: Let X_1, X_2, \dots be a sequence of iid random variables with mean 0 and variance 1 on a probability space $(\Omega, \mathcal{F}, \mathbb{P})$. Then

$$\mathbb{P}\left(\frac{X_1 + \dots + X_n}{\sqrt{n}} \leq y\right) \rightarrow \mathfrak{N}(y) := \int_{-\infty}^y \frac{e^{-t^2/2}}{\sqrt{2\pi}} dt \quad \text{as } n \rightarrow \infty,$$

or, equivalently, letting $S_n := \sum_1^n X_k$,

$$\mathbb{E}f(S_n/\sqrt{n}) \rightarrow \int_{-\infty}^{\infty} f(t) \frac{e^{-t^2/2}}{\sqrt{2\pi}} dt \quad \text{as } n \rightarrow \infty, \text{ for every } f \in \text{bC}(\mathbb{R}).$$

Glyphs in TS1 encoding

The layout of the TS1 encoded Text Companion font, which is rendered *in regular style only*, is as follows.

	'0	'1	'2	'3	'4	'5	'6	'7	
'00x	` 0	' 1	^ 2	~ 3	¨ 4	" 5	° 6	ˇ 7	"0x
'01x	˘ 8	¯ 9	· 10	, 11	¸ 12	, 13	14	15	
'02x	16	17	„ 18	19	20	— 21	— 22	23	"1x
'03x	← 24	→ 25	⌒ 26	⌒ 27	⌒ 28	⌒ 29	30	31	
'04x	℔ 32	33	34	35	\$ 36	37	38	' 39	"2x
'05x	40	41	* 42	43	, 44	= 45	. 46	/ 47	
'06x	○ 48	1 49	2 50	3 51	4 52	5 53	6 54	7 55	"3x
'07x	8 56	9 57	58	59	⟨ 60	— 61	⟩ 62	63	
'10x	64	65	66	67	68	69	70	71	"4x
'11x	72	73	74	75	76	⌚ 77	78	○ 79	
'12x	80	81	82	83	84	85	86	Ω 87	"5x
'13x	88	89	90	ℒ 91	92	ℒ 93	↑ 94	↓ 95	
'14x	˘ 96	97	★ 98	◊ 99	† 100	101	102	103	"6x
'15x	104	105	106	107	☞ 108	∞ 109	110	111	
'16x	112	113	114	115	116	117	118	119	"7x
'17x	120	121	122	123	124	125	~ 126	= 127	
'20x	ˇ 128	˘ 129	130	131	† 132	‡ 133	ℒ 134	‰ 135	"8x
'21x	• 136	°C 137	\$ 138	¢ 139	f 140	© 141	W 142	N 143	
'22x	G 144	P 145	£ 146	R 147	¶ 148	à 149	đ 150	™ 151	"9x
'23x	‰ 152	¶ 153	B 154	Nº 155	% 156	e 157	° 158	SM 159	
'24x	[160] 161	¢ 162	£ 163	¤ 164	¥ 165	! 166	§ 167	"Ax
'25x	¨ 168	© 169	ª 170	© 171	¬ 172	© 173	® 174	¯ 175	
'26x	° 176	± 177	² 178	³ 179	´ 180	μ 181	¶ 182	· 183	"Bx
'27x	※ 184	¹ 185	º 186	√ 187	¼ 188	½ 189	¾ 190	€ 191	
'32x	208	209	210	211	212	213	× 214	215	"Dx
'33x	216	217	218	219	220	221	222	223	

'36x	240	241	242	243	244	245	÷ 246	247	"Fx
'37x	248	249	250	251	252	253	254	255	
	"8	"9	"A	"B	"C	"D	"E	"F	


List of macros to access the TS1 symbols in text mode:
(The commented lines are in fbb but not ETbb.)

```
0 \capitalgrave
1 \capitalacute
2 \capitalcircumflex
3 \capitaltilde
4 \capitaldieresis
5 \capitalhungarumlaut
6 \capitalring
7 \capitalcaron
8 \capitalbreve
9 \capitalmacron
10 \capitaldotaccent
11 \capitalcedilla
12 \capitalogonek
13 \textquotestraightbase
18 \textquotestraightdblbase
21 \texttwelveudash
22 \textthreequartersemdash
23 \textcapitalcompwordmark
24 \textleftarrow
25 \textrightarrow
26 \t % tie accent, skewed right
27 \capitaltie % skewed right
28 \newtie % tie accent centered
29 \capitalnewtie % ditto
31 \textascendercompwordmark
32 \textblank
36 \textdollar
39 \textquotesingle
42 \textasteriskcentered
45 \textdblhyphen
47 \textfractionsolidus
48 \textzerooldstyle
49 \textoneoldstyle
50 \texttwooldstyle
49 \textthreeoldstyle
50 \textfouroldstyle
51 \textfiveoldstyle
52 \textsixoldstyle
53 \textsevenoldstyle
54 \texteightoldstyle
55 \textnineoldstyle
60 \textlangle
61 \textminus
62 \textrangle
77 \textmho
```

79 \textbigcircle
 87 \textohm
 91 \textlbrackdbl
 93 \textrbrackdbl
 94 \textuparrow
 95 \textdownarrow
 96 \textasciigrave
 98 \textborn
 99 \textdivorced
 100 \textdied
 108 \textleaf
 109 \textmarried
 %110 \textmusicalnote
 126 \texttildelow
 127 \textdblhyphenchar
 128 \textasciibreve
 129 \textasciicaron
 %130 \textacutedbl
 %131 \textgravedbl
 132 \textdagger
 133 \textdaggerdbl
 134 \textbardbl
 135 \textperthousand
 136 \textbullet
 137 \textcelsius
 138 \textdollaroldstyle
 139 \textcentoldstyle
 140 \textflorin
 141 \textcolonmonetary
 142 \textwon
 143 \textnaira
 144 \textguarani
 145 \textpeso
 146 \textlira
 147 \textrecipe
 148 \textinterrobang
 149 \textinterrobangdown
 150 \textdong
 151 \texttrademark
 152 \textpertenthousand
 153 \textpilcrow
 154 \textbaht
 155 \textnumero
 156 \textdiscount
 157 \textestimated
 158 \textopenbullet
 159 \textservicemark
 160 \textlquill

```

161 \textrquill
162 \textcent
163 \textsterling
164 \textcurrency
165 \textyen
166 \textbrokenbar
167 \textsection
168 \textasciidieresis
169 \textcopyright
170 \textordfeminine
171 \textcopyleft
172 \textlnot
173 \textcircledP
174 \textregistered
175 \textasciimacron
176 \textdegree
177 \textpm
178 \texttwosuperior
179 \textthreesuperior
180 \textasciiacute
181 \textmu
182 \textparagraph
183 \textperiodcentered
184 \textreferencemark
185 \textonesuperior
186 \textordmasculine
187 \textsurd
188 \textonequarter
189 \textonehalf
190 \textthreequarters
191 \texteuro
214 \texttimes
246 \textdiv
%
```

There is a macro `\textcircled` that may be used to construct a circled version of a single letter using `\textbigcircle`. The letter is always constructed from the small cap version, so, in effect, you can only construct circled uppercase letters: `\textcircled{M}` and `\textcircled{m}` have the same effect, namely .

Usage with fontspec

Because the package supplies a file named `ETbb.fontspec` whose contents list the `otf` files that correspond to each of Regular, Bold, Italic and BoldItalic, you may load `ETbb` with just

```

\usepackage{fontspec}
\setmainfont{ETbb}
```

Other than the usual choices of figure style, the only remaining choice available is through `StylisticSet=2`,

which substitutes the new Sharp S glyphs in place of the familiar β , SS and ss. See the table in the next section for details.

Selection of the new Sharp S in LaTeX

The following table summarizes the behavior of the text macros `\SS`, `\ss` and the macro `\MakeUppercase`.

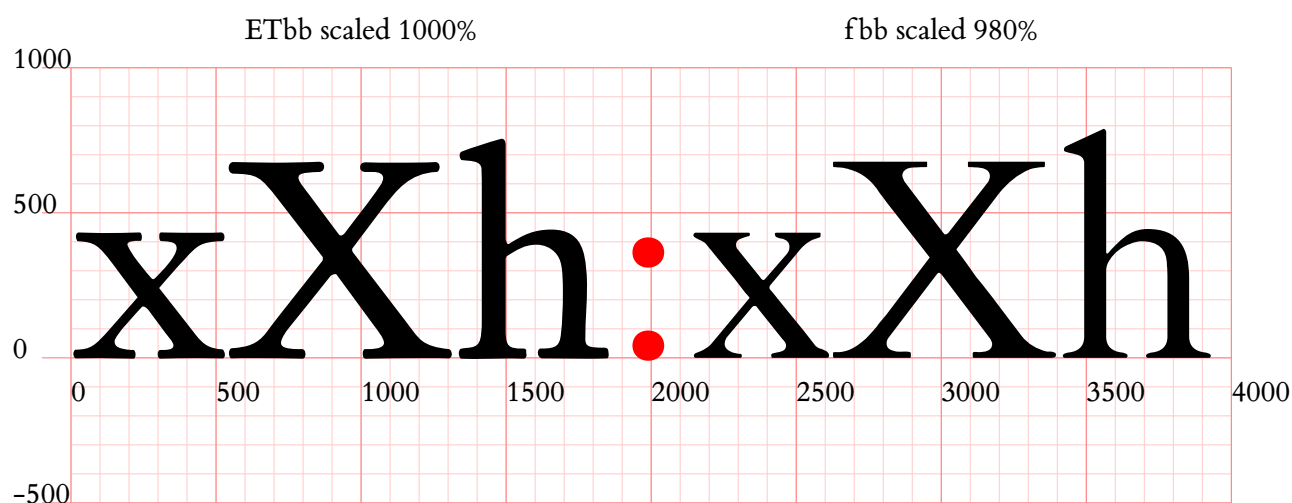
sharpS option	<code>\ss</code>	<code>\SS</code>	<code>\MakeUppercase{\ss}</code>	<code>\textsc{\ss}</code>
Not set	β	SS	SS	ss
sharpS	β	β	β	β

In unicode TeX, the behavior laid out in the table above is achieved using `StylisticSet=2`.

Detailed comparison with fbb

The following picture, in which the units are approximately in bp, shows some of the differences between ETbb-Regular and fbb-Regular, the first scaled up by 10 and the second by 9.8 so that their x-heights (and Cap-heights) are the same. From the picture below you can note the following.

- The serifs are much more substantial in ETbb.
- The ascenders are considerably higher in fbb—in fact, by 50 em units. Those very tall ascenders make for poor positioning of quotes, superscripts and the like.
- Stems are a little thicker (by about 10%) in ETbb.
- There is a slight bowing out in the letter h and similar letters like n of ETbb that is not present in fbb, making for more visual interest, IMO. This would not be of any importance at small print sizes.
- Overall, ETbb has lower contrast (ratio of thickest to thinnest strokes) than fbb, making for a more uniform gray appearance on the printed page.



The following page presents a comparison of a ETbb and fbb with identical text rendered in two columns. For me, there is no question that ETbb is the preferable font for document text.

ETbb on left, fbb on right, normalized to same x-height

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