

The garamondx package

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1 Overview

This package provides an extension of the `ugm` package, adding features that were once referred to as *expert*, whence the `x`. There has been a revision as of version 1.095 which may affect those using `babel`. See section 5 for details. The `ugm` fonts, (URW)++ GaramondNo8, are not free in the sense of GNU but are made available under the AFPL (Aladdin Free Public License), which is restrictive enough to prevent their distribution as part of T_EXLive. They may be downloaded using the `getnonfreefonts` script that used to be part of T_EXLive. Instructions for installation are laid out at

<http://tug.org/fonts/getnonfreefonts/>

The fonts in this package are derived ultimately from the `ugm` fonts, and so are also subject to the same AFPL license, the precise details of which are spelled out at

<http://www.artifex.com/downloads/doc/Public.htm>

In broad terms, the license allows unlimited use of the fonts by anyone, but does not permit any fee for their distribution. It also restricts those who modify the fonts to release them under the same license, and requires them to provide information about the changes and the identity of the modifier.

The `ugm` fonts on CTAN lack:

- a full set of f-ligatures (`f_f`, `f_f_i` and `f_f_l` are missing);
- small caps;
- old style figures.

The glyphs themselves are very close to those in Adobe's Stempel Garamond font package, which has many admirers, though they also lack the same f-ligatures. So, the goal here is to make a package which provides these missing features which should, in my opinion, be an essential part of any modern L^AT_EX font package.

The only glyph missing from the T1 encoding in this distribution is `perthousandzero`, which is only rarely present in PostScript fonts, and is almost never required as part of L^AT_EX packages.

The latest version contains a full rendition of the TS1 encoding in all styles. By default, the `textcomp` package is required by `garamondx.sty`, but the default version lacks a couple of features. To be able to make use of all TS1 features, load the packages thus:

```
\usepackage[full]{textcomp}  
\usepackage{garamondx}
```

2 Some History

Unlike most other fonts having Garamond as part of the name, the glyphs in this font are in fact digital renderings of fonts actually designed by Claude Garamond in the mid sixteenth century — most other Garamond fonts are closer to fonts designed by Jean Jannon some years later. The Stempel company owned the specimen from which they designed metal castings of the fonts in the 1920's. Early digital renderings include those by Bitstream under the name OriginalGaramond, and Stempel Garamond from Adobe, licensed from LinoType. (It appears that many of the deficiencies of fonts designed by LinoType were artifacts of the limitations of the machines for which the fonts were designed, and have in most cases not been corrected.)

The latest version (TrueType, not PostScript) of the official (URW)++ GaramondNo8 is available from

<ftp://mirror.cs.wisc.edu/pub/mirrors/ghost/AFPL/GhostPCL/urwfonts-8.71.tar.bz2>

which has a more extensive collection of glyphs than the PostScript versions. In particular, the f-ligatures are there, as well as the glyphs Eng, eng that are part of the T1 encoding under the names Ng, ng.

To my knowledge, there have been two fairly recent attempts to rework these fonts. The first, upon which this work is based, was by Gael Varoquaux, available at

<http://gael-varoquaux.info/computers/garamond/index.html>

His ggm package seems never to have been widely distributed, not having appeared on CTAN.

The second was an OpenType package by Rogério Brito and Khaled Hosny at

<https://github.com/rbrito/urw-garamond>

Brito seems to have made an effort to get (URW)++ to release the fonts under a less restrictive license, which does not appear to have been successful. Their project was aimed mainly towards users of LuaTeX and XeTeX, and remains incomplete.

What I kept from the ggm package was (a) a starting point for improved metrics; (b) the swash Q glyph, though not as the default Q.

3 New in this package

The most important items are (i) newly designed Small Cap fonts for Regular, Italic, Bold and Bold Italic; (ii) newly designed old style figures for each weight/style; (iii) a full set of f-ligatures; (iv) macros to allow customizations of the default figures and the default Q; (v) a full text companion font in each weight/style. For details of (i) and (ii), see the last section.

4 Package Options

The package uses T1 encoding by default—this is built into the package and need not be specified separately. Likewise, the `textcomp` package is loaded automatically, giving you access to many symbols not included in the T1 encoding. (It is better though to load `textcomp` with option `full` before loading `garamondx`.) The support files also admit LY1 encoding—just add the line

```
\usepackage[LY1]{fontenc}
```

after `\usepackage[...]{garamondx}`. The main reason some may prefer to use LY1 is that it has some vacant slots to which additional ligatures may be assigned. Currently, `fj` and `ffj` are available in LY1 but not T1, mainly of interest to those writing in Scandinavian languages. (Compare `fjord` with `fjord`, the latter being typeset with `{\fontencoding{T1}\selectfont fjord}`.)

- The option `scaled` may be used to scale all fonts by the specified number. Eg, `scaled=.9` scales all fonts to 90% of natural size. If you provide just the option `scaled` without a value, the default is 0.95, which is about the correct scaling to bring the Cap-height of GaramondNo8 down to .665em, about normal for a text font, but with a smaller than normal x-height that is typical of Garamond fonts.
- By default, the package uses lining figures 0123456789 rather than oldstyle figures 0123456789. The option `osf` forces the figure style to a modified oldstyle that I prefer, 0123456789, where the 1 looks like a lining figure 1 with a shortened stem, while the option `osfI` uses the more traditional oldstyle figures 0123456789, where the 1 looks like the letter I with a shortened stem. No matter which option you use:
 - `\textlf{1}` produces the lining figure 1;
 - `\textosf{1}` produces my preferred oldstyle 1;
 - `\textosfI{1}` produces the traditional oldstyle 1.
- The default version of the letter Q is the traditional one from GaramondNo8. It may be replaced everywhere by the swash version via the option `swashQ`, which gives you, e.g., Quoi?

Whether or not you have specified the option `swashQ`, you may print a swash Q in the current weight and shape by writing `\swashQ` — eg,

`\swashQ` uash.

produces Quash.

5 Using babel with garamondx

Recent version of `garamondx` have made use of `\AtEndPreamble` from the `etoolbox` package to apply the figure style options `osf`, `osfI` after all other preamble choices. This is useful to ensure that oldstyle figures are not specified until after all math packages have been loaded. It now appears that this macro can be incompatible with `babel` in some cases where the language choice involves an encoding other than T1. If you find when using `babel` that you get errors about corruption of your NFSS tables or find that some `babel` features do not work as expected,

you may need to use the `babel` option to `garamondx` and possibly rearrange the order of some macros. First of all, you should load `babel` before `garamondx`. When `garamondx.sty` runs, it sets a flag if it detects that `babel` has already been loaded, and modifies some commands. This flag may also be set by the option `babel`. If for some reason you must load `babel` after `garamondx`, specify the `babel` option when loading `garamondx`, but be aware that `babel` may not work as expected in this case.

Examples:

1:

```
% No math package
\usepackage[greek.polutonio,english]{babel}
\usepackage[osf]{garamondx} % or osfI
```

2:

```
% No math package (same effect as previous)
\usepackage[greek.polutonio,english]{babel}
\usepackage{garamondx}
\useosf % or \useosfI
```

3:

```
% with math package
\usepackage[greek.polutonio,english]{babel}
\usepackage{garamondx} % don't use options osf or osfI
\usepackage{garamondx,bigdelims}{newtxmath}
\useosf % or \useosfI, must follow math package
```

5.1 Examples

The following show the effects of some options that may apply only when the `babel` option is not specified:

```
\usepackage[scaled=.9,osf]{garamondx}% scaled to 90%, my oldstyle
\usepackage[scaled,osf]{garamondx}% scaled to 95%, my oldstyle
\usepackage[osfI]{garamondx}% traditional oldstyle
\usepackage[osfI,swashQ]{garamondx}% traditional oldstyle, all Q rendered as swash Q
```

6 Text effects under fontaxes

This package loads the `fontaxes` package in order to access italic small caps. You should pay attention to the fact that `fontaxes` modifies the behavior of some basic \LaTeX text macros such as `\textsc` and `\textup`. Under normal \LaTeX , some text effects are combined, so that, for example, `\textbf{\textit{a}}` produces bold italic a, while other effects are not, eg, `\textsc{\textup{a}}` has the same effect as `\textup{a}`, producing the letter a in upright, not small cap, style. With `fontaxes`, `\textsc{\textup{a}}` produces instead upright small cap a. It offers a macro `\textulc` that undoes small caps, so that, eg, `\textsc{\textulc{a}}` produces a in non-small cap mode, with whatever other style choices were in force, such as bold or italics.

7 Superior figures

The TrueType versions of GaramondNo8 have a full set of superior figures, unlike their PostScript counterparts. The superior figure glyphs in regular weight only have been copied to NewG8-sups.pfb and NewG8-sups.afm and provided with a tfm named NewG8-sups.tfm that can be used by the superiors package to provide adjustable footnote markers. See superiors-doc.pdf (you can find it in T_EXLive by typing texdoc superiors in a Terminal window.) The simplest invocation is

```
\usepackage[supstfm=NewG8-sups]{superiors}
```

8 Glyphs in TS1 encoding

The layout of the TS1 encoded Text Companion font, which is fully rendered in this package, is as follows. See below for the macros that invoke these glyphs. Though shown in regular weight, upright shape only, the glyphs are available in all weights and shapes.

	‘ ₀	‘ ₁	‘ ₂	‘ ₃	‘ ₄	‘ ₅	‘ ₆	‘ ₇	
‘ _{00x}	ˆ ₀	ˆ ₁	ˆ ₂	ˆ ₃	ˆ ₄	ˆ ₅	ˆ ₆	ˆ ₇	"0x
‘ _{01x}	ˆ ₈	ˆ ₉	ˆ ₁₀	ˆ ₁₁	ˆ ₁₂	ˆ ₁₃	ˆ ₁₄	ˆ ₁₅	
‘ _{02x}	ˆ ₁₆	ˆ ₁₇	ˆ ₁₈	ˆ ₁₉	ˆ ₂₀	ˆ ₂₁	ˆ ₂₂	ˆ ₂₃	"1x
‘ _{03x}	ˆ ₂₄	ˆ ₂₅	ˆ ₂₆	ˆ ₂₇	ˆ ₂₈	ˆ ₂₉	ˆ ₃₀	ˆ ₃₁	
‘ _{04x}	ˆ ₃₂	ˆ ₃₃	ˆ ₃₄	ˆ ₃₅	ˆ ₃₆	ˆ ₃₇	ˆ ₃₈	ˆ ₃₉	"2x
‘ _{05x}	ˆ ₄₀	ˆ ₄₁	ˆ ₄₂	ˆ ₄₃	ˆ ₄₄	ˆ ₄₅	ˆ ₄₆	ˆ ₄₇	
‘ _{06x}	ˆ ₄₈	ˆ ₄₉	ˆ ₅₀	ˆ ₅₁	ˆ ₅₂	ˆ ₅₃	ˆ ₅₄	ˆ ₅₅	"3x
‘ _{07x}	ˆ ₅₆	ˆ ₅₇	ˆ ₅₈	ˆ ₅₉	ˆ ₆₀	ˆ ₆₁	ˆ ₆₂	ˆ ₆₃	
‘ _{10x}	ˆ ₆₄	ˆ ₆₅	ˆ ₆₆	ˆ ₆₇	ˆ ₆₈	ˆ ₆₉	ˆ ₇₀	ˆ ₇₁	"4x
‘ _{11x}	ˆ ₇₂	ˆ ₇₃	ˆ ₇₄	ˆ ₇₅	ˆ ₇₆	ˆ ₇₇	ˆ ₇₈	ˆ ₇₉	
‘ _{12x}	ˆ ₈₀	ˆ ₈₁	ˆ ₈₂	ˆ ₈₃	ˆ ₈₄	ˆ ₈₅	ˆ ₈₆	ˆ ₈₇	"5x
‘ _{13x}	ˆ ₈₈	ˆ ₈₉	ˆ ₉₀	ˆ ₉₁	ˆ ₉₂	ˆ ₉₃	ˆ ₉₄	ˆ ₉₅	
‘ _{14x}	ˆ ₉₆	ˆ ₉₇	ˆ ₉₈	ˆ ₉₉	ˆ ₁₀₀	ˆ ₁₀₁	ˆ ₁₀₂	ˆ ₁₀₃	"6x
‘ _{15x}	ˆ ₁₀₄	ˆ ₁₀₅	ˆ ₁₀₆	ˆ ₁₀₇	ˆ ₁₀₈	ˆ ₁₀₉	ˆ ₁₁₀	ˆ ₁₁₁	
‘ _{16x}	ˆ ₁₁₂	ˆ ₁₁₃	ˆ ₁₁₄	ˆ ₁₁₅	ˆ ₁₁₆	ˆ ₁₁₇	ˆ ₁₁₈	ˆ ₁₁₉	"7x
‘ _{17x}	ˆ ₁₂₀	ˆ ₁₂₁	ˆ ₁₂₂	ˆ ₁₂₃	ˆ ₁₂₄	ˆ ₁₂₅	ˆ ₁₂₆	ˆ ₁₂₇	
‘ _{20x}	ˆ ₁₂₈	ˆ ₁₂₉	ˆ ₁₃₀	ˆ ₁₃₁	ˆ ₁₃₂	ˆ ₁₃₃	ˆ ₁₃₄	ˆ ₁₃₅	"8x
‘ _{21x}	ˆ ₁₃₆	ˆ ₁₃₇	ˆ ₁₃₈	ˆ ₁₃₉	ˆ ₁₄₀	ˆ ₁₄₁	ˆ ₁₄₂	ˆ ₁₄₃	
‘ _{22x}	ˆ ₁₄₄	ˆ ₁₄₅	ˆ ₁₄₆	ˆ ₁₄₇	ˆ ₁₄₈	ˆ ₁₄₉	ˆ ₁₅₀	ˆ ₁₅₁	"9x
‘ _{23x}	ˆ ₁₅₂	ˆ ₁₅₃	ˆ ₁₅₄	ˆ ₁₅₅	ˆ ₁₅₆	ˆ ₁₅₇	ˆ ₁₅₈	ˆ ₁₅₉	
‘ _{24x}	ˆ ₁₆₀	ˆ ₁₆₁	ˆ ₁₆₂	ˆ ₁₆₃	ˆ ₁₆₄	ˆ ₁₆₅	ˆ ₁₆₆	ˆ ₁₆₇	"Ax
‘ _{25x}	ˆ ₁₆₈	ˆ ₁₆₉	ˆ ₁₇₀	ˆ ₁₇₁	ˆ ₁₇₂	ˆ ₁₇₃	ˆ ₁₇₄	ˆ ₁₇₅	
‘ _{26x}	ˆ ₁₇₆	ˆ ₁₇₇	ˆ ₁₇₈	ˆ ₁₇₉	ˆ ₁₈₀	ˆ ₁₈₁	ˆ ₁₈₂	ˆ ₁₈₃	"Bx
‘ _{27x}	ˆ ₁₈₄	ˆ ₁₈₅	ˆ ₁₈₆	ˆ ₁₈₇	ˆ ₁₈₈	ˆ ₁₈₉	ˆ ₁₉₀	ˆ 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:

(Note that slots 0–12 and 26–29 are accents, used like `\t{a}` for a tie accent over the letter a. Slots 23 and 31 do not contain visible glyphs, but have heights indicated by their names.)

```

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 \textrightangle
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 ™.

9 Implementation details

9.1 Small Cap fonts

The small cap fonts were created from the capitals A–Z using FontForge to scale the sizes down uniformly to 67%, then boosting the horizontal and vertical stems up by 130%. The results provided a rough basis for the individual adjustments that had to be made to each glyph. Using FontForge, the stems were resized appropriately, often requiring a reworking of the shape. The end results are the only possible description of those transformations. Following the creation of those glyphs, appropriate metrics were created using FontForge, the end results of which are provided. The regular weight, upright shape, has been reworked much more than other weights, and looks considerably better, in my opinion. Making a small cap font from scratch takes some real work to get the glyphs, the metrics and the kerning right. In both the regular and bold upright shapes, standard accented glyphs are provided, as well as some special characters and a_e and o_e ligatures and the glyphs lslash and oslash.

The small cap macro `\textsc` cooperates with `\textbf` and `\textit`, so you may use, for example:

```
\textsc{Caps and Small Caps}
to produce CAPS AND SMALL CAPS,
\textit{\textsc{Caps and Small Caps}}
to produce CAPS AND SMALL CAPS,
\textbf{\textsc{Caps and Small Caps}}
to produce CAPS AND SMALL CAPS, and
\textbf{\textit{\textsc{Caps and Small Caps}}}
to produce CAPS AND SMALL CAPS.
```

9.2 Old style figures

The old style figures were created based on the existing lining figures, reducing the stem lengths of 0 and 1 to lower-case size using FontForge, and lowering the vertical positions of others. The shapes were then modified in FontForge to have more of a traditional oldstyle appearance — the end results show the transformations involved.

9.3 Text Companion glyphs

To provide full versions of the TS1 glyphs, a number of glyphs (tie accents, born, died, married, divorced, referencemark, numero, discount, estimated, copyleft, centoldstyle) were adapted from Computer Modern, though with weights appropriate to garamondx. The other glyphs were copied virtually from a small modification of glyphs from txfonts, which has an essentially full rendition of the Text Companion glyphs in all weights/styles.

10 Matching math packages

Paul Pichaureau's `mathdesign` package has an option `garamond` that sets text to `ugm` and math to his package that matches `ugm`. To use his math package with `garamondx` you write

```
\usepackage[full]{textcomp}
\usepackage[garamond]{mathdesign}
\usepackage{garamondx}
```

Another possibility is to use the `garamondx` option to `newtxmath`, which uses `garamondx` upper and lower cases italic letters, properly metrized for math, in place of the default Times italics. This requires version 1.06 or higher of the `newtxmath` package.

```
\usepackage[full]{textcomp}
\usepackage{garamondx} % defaults to lining figures, good for math
\usepackage[varqu,varl]{zi4}% typewriter font inconsolata
\usepackage[sf]{libertine}%biolinum as sans-serif
\usepackage[garamondx,cmbraces]{newtxmath}
\useosf % changes figure style in garamondx to osf for text, not math
```

Note that the last command, as well as its companion `\useosfI`, may only be used in the preamble, and must not precede `\usepackage{garamondx}`.

11 License

The fonts in this package are derived from the (URW)++ GaramondNo8 fonts which were released under the AFPL, and so the same holds for these fonts. The other support files are subject to the LaTeX Project Public License. See

<http://www.ctan.org/tex-archive/help/Catalogue/licenses.lppl.html>
for the details of that license.

The package and font modifications described above are Copyright Michael Sharpe, msharpe@ucsd.edu, October 1, 2013.

11.1 Font files covered by the AFPL

```
NewG8-Bol.afm
NewG8-Bol.pfb
NewG8-Bol-SC.afm
NewG8-Bol-SC.pfb
NewG8-BolIta.afm
NewG8-BolIta.pfb
NewG8-BolIta-SC.afm
NewG8-BolIta-SC.pfb
NewG8-Ita-SC.afm
NewG8-Ita-SC.pfb
NewG8-Ita.afm
```

NewG8-Ita.pfb
newG8-Osf-bol.afm
newG8-Osf-bol.pfb
newG8-Osf-bolita.afm
newG8-Osf-bolita.pfb
newG8-Osf-ita.afm
newG8-Osf-ita.pfb
newG8-Osf-reg.afm
newG8-Osf-reg.pfb
NewG8-Reg-SC.afm
NewG8-Reg-SC.pfb
NewG8-Reg.afm
NewG8-Reg.pfb
NewG8-sups.afm
NewG8-sups.pfb