

Greek in Proper ConT_EXt

T_EX has always had some support for typesetting Greek characters: most (all?) Greek letters are contained in the Computer-Modern math fonts. In ConT_EXt, one can use the iso-8859-7 encoding to write modern Greek.

However, if you want to typeset ancient (polytonic) Greek, you had to look for specialized solutions. Unlike modern “monotonic” Greek, ancient Greek uses three accents (acute ´, gravis ` , circumflex ~), two breathings (the “smooth” breathing ¨ and the “rough” breathing ˘), the dieresis or “trema” ¨ and one subscript character, the iota subscript (which only occurs with the vowels α η ω). These combine with each other and all seven Greek vowels, and for satisfying typographic results, these combinations have to be precomposed. A number of solutions exists for L^AT_EX; none of them works “out of the box” for ConT_EXt.

When I began to think about support for polytonic Greek in ConT_EXt, a number of requirements was obvious:

- Most users will want to mix shorter Greek passages with text in Roman alphabets. There has to be an easy and consistent way to switch between Roman and Greek passages.
- There should be a simple way to switch between several Greek fonts; every font should follow the same encoding and behave in the same way.
- Since different Roman fonts have different sizes, there has to be a simple way to scale the Greek font to adapt it to the size of the main bodyfont.

The next question was how Greek should be input into the T_EX source file. There are several handcrafted solutions for different operating systems and applications, but none of them is cross-platform portable, none can be called standard. Two ways were obvious as being standardized and portable; both have their advantages and drawbacks:

1. Babel input uses only ASCII-characters; these are mapped to (more or less) corresponding Greek characters. Accents are typed with the characters ` ´ ~, breathings with < >, iota subscript with |; combining these accents with vowels is achieved via T_EX’s internal ligature mechanism. Thus, >~a| would become ᾗ. Advantage: ASCII can be edited on any system, in any editor. This solution is highly backward-compatible. Drawbacks: If you have longer passages in Greek, reading your source file becomes pretty cumbersome. Moreover, since characters such as ~ are “active” characters in T_EX by default, babel has to rely on some catcode changes; making this work inside other commands (e.g., inside tables) demands some special considerations and may break in some special circumstances.
2. Unicode (utf-8) input allows you to type and see the Greek characters right in your source file. Advantages: Unicode is undoubtedly the future; it is cross-platform portable,

and it provides one precisely defined slot for every character. Drawbacks: not every system and every editor supports Unicode. But even if your computer does, you will still have to look for a proper keyboard driver that will allow you to write these Greek characters. I found the most convenient way of typing Unicode Greek was with emacs input methods: the method “greek babel” translates the keystrokes used to input Babel ASCII Greek into the corresponding Unicode characters; very new versions of Vim offer similar convenient solutions. Most importantly, however, T_EX is still limited to 256 characters per font, so making Unicode work in T_EX demands some trickery. The next generation of pdfT_EX will (hopefully) make this limit obsolete and allow T_EX to use Unicode encoded fonts without these limitations, but it will probably take a while until it is fully functional and implemented in distributions.

Note that the advantages that Unicode offers are only relative in one aspect: It is true that in order to use Babel, you have to memorize which ASCII character maps to which Greek character. But as long as you use a normal Western keyboard to write your T_EX-files, the same is true if you use Unicode; the only advantage is that you get immediate visual feedback. On the other hand, making Unicode work with editors like emacs is not trivial (for me, finding a fontspec that displays all Greek characters in an acceptable way still is something of a black art), so I find myself still writing Greek in Babel most of the time.

One last consideration about Babel vs. Unicode: some fonts have extensive kerning for Greek characters. As an example, let’s have a look at the Greek characters in the font GreekMinion: the lowercase omega is set closer to the uppercase Gamma than their normal bounding boxes suggest. Compare these two lines: in the first, you get the properly kerned characters; in the second, I have prevented this kerning.

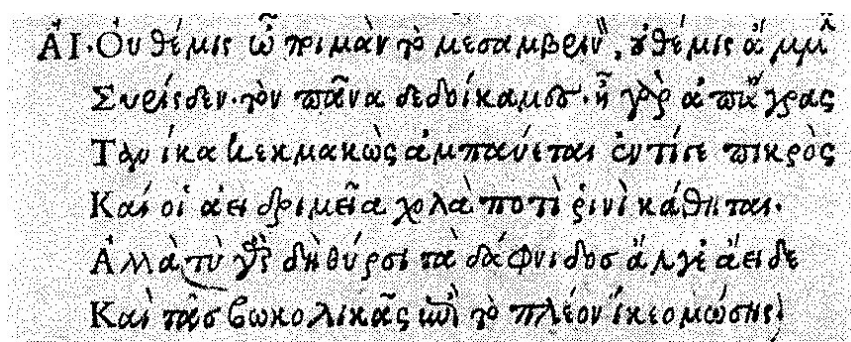
Γω

Γω

This kerning should also happen when the omega is accented. However, this will not work when you use Babel encoding: T_EX “sees” the characters G'w, so there is no kerning involved. By the time ' and w have merged to form a ligature, the kerning has already been done. So if you use a font that has these kerning instructions for Greek characters (most of the fonts actually don’t), you may be better off using Unicode because here kerning of accented characters will work.

1 Some Preliminary Remarks.

The first Greek fonts, developed in the Italian Renaissance, tried to imitate Greek handwriting as closely as possible. Hence (like early “Gothic” fonts), they contained a large number of ligatures and different letter-forms. (To give you an idea of this early typesetting, here is a specimen from the 1495 edition of Theocritus, printed by the most famous of all Renaissance printers, Aldus Manutius).



Aldus Manutius, edition of Theocritus, 1495

In the course of times, Greek fonts became simplified; they now contain glyphs for the 24 lower-case and upper-case letters of the Greek alphabet. Combinations of vowel + breathing/accent/iota subscript are generally not composed out of different glyphs, but precombined. Conventions in different areas vary as to additional letters: traditionally, we differentiate whether the letter sigma appears at the end of a word (ς) or within the word (σ). During the last years, fonts have become more popular that use only one “round” or “lunate” form of sigma (ς). In France, most Greek fonts have a special form for the letter beta within a word (β), using the “normal” form (β) only at the beginning of words. Moreover, the form of the circumflex accent can either be shaped like a tilde (\sim ω ; this seems to be the preferred way in German-speaking countries) or round, the so-called “Porsonian” form (\circ ω , after the English philologist Richard Porson, 1759–1808; this seems to be preferred in English-speaking countries).

An earlier version of the Greek module defined every font individually, without regard to font families. This had the unfortunate side-effect that the usual font switches such as `\bf`, `\bi` or `\em` simply would not work in Greek passages. The most recent version uses typescripts to organize the Greek fonts. Typescripts are a wonderful and clean solution, however, in certain complicated setups, and for reasons that I haven’t been able to understand completely, they will break. One problem should be pointed out: if you set up your main body font in an unusual size, you need to tell ConTEXt about it and define an environment. So if you need a bodyfont of 19.5pt, you need to put these lines into the preamble of your document **before** you define the bodyfont:

```
\starttypescript [serif] [default] [size]
\definebodyfont [19.5pt] [rm] [default]
\stoptypescript
```

If you use an unusual bodyfont size and want Greek text in your footnotes, you will need to set up their size explicitly (and add this size to the `\definebodyfont` typescript just described):

```
\setupfootnotes[bodyfont=14pt]
```

Nevertheless, I cannot exclude that this new method relying on typescripts may refuse to work in certain situations. For this case, I have included a version of the previous module called `t-oldgreek.tex` which still uses the old-fashioned, but more robust way of defining single fonts instead of entire font-families. The usage is identical to the new module. (Of course, if you use this old version, you will lose the convenience of the switches mentioned above.)

Some of the Greek fonts included in the module provide Roman, Italic, Bold, and BoldItalic variants, and the normal font switches such as `\bf`, `\bi` or `\em` work with these fonts. However, I want to caution against using them: there is a historical reason why “Greek italics” does not exist. At a very early date, typesetters distinguished between an upright (“Roman”) and slanted (“Italic”) form of Latin letters; both forms were mixed for graphical effect and to add emphasis to parts of the text; whence our use of “Italics.” This distinction has no historical existence for Greek fonts because here, “Roman” and “Italic” forms did not exist. Nevertheless, some of the fonts provide “italic” and “bold” variants (some even provide “bold italic,” which I consider really spurious); if they don’t exist, they are simply mapped to the normal “Roman” form, so font switches will simply not give any visual effect.¹

2 Installation

Installation is straightforward: unpack the zip archive in one of your `texmf`-trees. If you have added these files to a `texmf`-tree that uses `ls-R` files, you will need to rebuild this database by running `texhash` (if you don’t know what this means, run it anyway, it won’t hurt). After this, everything should be in its proper place. If your `ConTeXt`-installation has `\autoloadmapfilestrue` set in `cont-sys.tex`, the module will take care of loading the appropriate mapfiles. If you have not enabled this setting or if you want to make the fonts available to other `TEX`-applications, add the mapfile to the configuration of your postscript- and pdf-drivers:

```
sudo updmap-sys --enable Map tasgreek.map
```

3 Usage

Call the module in the preamble of your document and set up the necessary fonts:

```
\usemodule[ancientgreek][font=<name>,scale=<value>,altfont=<name>,altscale=<value>]
```

For the compatibility module `oldgreek`, this would be:

```
\usemodule[oldgreek][font=<name>,scale=<value>,altfont=<name>,altscale=<value>]
```

For the fonts, there are 31 values corresponding to the Greek fonts which the module enables:

¹ For the time being, I see no compelling reason to implement “sans serif” and/or “monospaced” fonts for typesetting ancient Greek, but if a user has such a compelling reason, (s)he can ask for it, and I’ll see what I can do.

Alkaios°
 Aristarcoj°
 Bosporost
 Bosporosnew°
 GaramondGreek°
 GDR†
 GFSArtemisia*
 GFSBodoniClassic*
 GFSElpi*
 GFSNeohellenic*
 GFSOlga*
 GFSPorson*
 GFSTheokritos*
 GreekAisa°
 GreekAsteria°
 GreekBodoni*
 GreekCanonica*
 GreekCardo°
 GreekDidot*
 GreekDioxipet†
 GreekGandhari°
 GreekGaramondPrem†
 GreekGentium*
 GreekKerkis°
 GreekLfb*
 GreekMinion°
 GreekPalatinot†
 GreekPorson†
 GreekSerif*
 GreekTimest†
 Ibycus*
 Kadmost†
 KadmosNew°
 Leipzig*
 NewHellenic†
 Teubner*
 Vusillus°

Some fonts are included; others are commercial or have a license that does not allow redistribution. For a quick glance, look at the symbols in the list above:

- * The font is included in the module.
- The font can be downloaded for free.
- † The font is commercial or currently unavailable.

The module contains all the necessary files for using all these fonts; if the fonts are commercial or downloadable, all you have to do is get the actual font files. The installation creates the directories `fonts/opentype/greek`, `fonts/truetype/greek`, and `fonts/type1/greek` in your `texmf-tree`; copy the fonts to the applicable directory. Everything else has been prepared; no further steps are necessary

What follows is a brief description of the fonts:²

Alkaios	<p>This is a very nice-looking TrueType-font that can be downloaded at Lucius Hartmann's homepage. It will mix very well with the usual Roman fonts such as Times or Garamond.</p> <p><i>Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά</i></p>
Aristarcoj	<p>A TrueType-font with a distinctive look, created by Russell Cottrell; it can be downloaded at Russell Cottrell's site. The site also contains a number of useful links for downloading other fonts.</p> <p><i>Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά</i></p>
Bosporos	<p>This font has been a long-time favorite with Macintosh users: it was distributed by the (now defunct) Allotype Typographics. If you still own a copy, just unpack the Macintosh format with a tool like <code>fondu</code> and copy the resulting <code>.pfb</code> file to the <code>fonts/type1</code> subdirectory.</p> <p><i>Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά</i></p>
BosporosNew	<p>The former owner of the rights to Bosporos has donated it to the American Philological Association; a (fully working) beta-version can be downloaded at the GreekKeys Page.</p> <p><i>Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά</i></p>
GaramondGreek	<p>can be downloaded from Carmelo Lupini's Laboratorio Pluri-disciplinare. This TrueType font aims to be a companion to Garamond-like Latin fonts. It has nice glyphs, but the kerning could be improved.</p> <p><i>Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά</i></p>
GDR	<p>This is a very unusual font: it is an attempt to recreate the famous "Greco du roi," designed in the 16th century by Claude Garamond.</p>

² In the font samples, some accents and breathings will appear dim when seen on the screen. This is a bug with some of the fonts; these glyphs will look ok when printed.

Although the font lacks the many alternate letterforms and the ligatures that were used in the Renaissance, the overall look is surprisingly like a Renaissance Greek text. The font is shareware; it can be downloaded at [University College London](#).

Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GFSArtemisia The fonts whose names begin with “GFS” have been digitized and/or created by the [Greek Font Society](#); since they are published under a free licence, I am very happy to include these fonts with the module. All of them are high-quality OpenType fonts. GFSArtemisia has been created by Takis Katsoulidis; it has a very distinctive, decorative look.

Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GFSBodoniClassic Despite its name, this font is not related to the GFSBodoni font; no italic or bold variants are available.

Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GFSElpis This font has been designed by Natasha Raissaki; it is designed to be readable even at low resolutions and is an excellent font for displaying polytonic Greek on the screen.

Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GFSNeohellenic This is an OpenType font family with Italic, Bold, and BoldItalic. It is inspired by the famous “New Hellenic” typeface designed by Victor Scholderer. It is accompanied by a sans-serif Latin font.

Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GFSOlga This font has very good-looking Greek characters (no Roman characters) that are designed after the famous Porson font (curiously, it has a tilde-shaped circumflex accent).

Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GFSPorson Another Greek Font Society font which takes its inspiration from Porsonian scripts; this one also has Porsonian accents.

Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GFSTheokritos An ornamental font offered by the Greek Font Society; certainly not suitable for normal Greek text, but maybe interesting as an unusual ornament.

Ἀνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GreekAisa Aisa Unicode is part of Stefan Hagel’s Multikey application for Microsoft Windows; downloadable at the [multikey website](#). It comes in regular, Italic, bold, and bold Italics shapes. If you download

the font, you will have a windows .exe file, but even if you're running a different OS, you can unpack it with unzip. I had to regenerate the fonts with fontforge to make them play with T_EX, but this may be different on a Windows-box.

ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GreekAsteria A very legible TrueType font (with a somewhat unusual encoding; it took me a while to get it working with the module). Asteria can be downloaded from [elpenor website](#). All the necessary files are included, but you'll have to download the font yourself.

ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GreekBodoni This is a very good OpenType font that can be downloaded from the [Greek Font Society](#). The Greek glyphs have a peculiar, decorative shape which may make it more suitable for single Greek words and letters than for longer stretches of Greek text. Full font family (no bold italic though). The font is included.

ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GreekCanonica A free font that can be downloaded from the [ellak website](#); has a clean, very professional look. Complete font family. The font is included.

ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GreekCardo Another TrueType-font; it has a very wide range of special characters. The typographical quality is a matter of taste. Download from [David J. Perry's website](#).

ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GreekDidot This is a very good OpenType font that can be downloaded from the [Greek Font Society](#). It has a good, Palatino-like Latin font (with expert features such as small caps and some expert ligatures) and very nice Greek glyphs. The font is included.

ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GreekDioxipe Yet another TrueType-font, somewhat similar to Alkaios, but it uses the "tilde"-form of the circumflex accent. In its normal design-size, Dioxipe is noticeably smaller than most Roman fonts, so you will need to scale it a bit. Dioxipe can be downloaded from the [elpenor website](#). Again, all the necessary files are included, but you'll have to download the font yourself.

ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GreekGandhari	<p>Gandhari Unicode is a font that was developed for editing Buddhist manuscripts, but it also contains a full polytonic Greek font. It can be downloaded at Early Buddhist Manuscript website.</p> <p>᾽Ανδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά</p>
GreekGaramondPrem	<p>Garamond Premier is a brand new commercial OpenType font available from adobe website; it aims to reproduce Renaissance letter forms. Reviews for the Greek characters have been very positive; personally, I find them too irregular for normal scholarly use.</p> <p>᾽Ανδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά</p>
GreekGentium	<p>This is a wonderful TrueType-font designed by Victor Gaultney; the new version of its license now allows including the font with this module. The special beauty of Gentium lies in the fact that Latin and Greek characters are drawn consistently: the Roman “M” and the uppercase Greek “Mu” will be identical if you use Gentium both for the Latin and Greek text. There are two variants, GreekGentium with the “tilde” circumflex, and GreekGentiumAlt with the “Porsonian” shape.</p> <p>᾽Ανδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά</p> <p>᾽Ανδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά</p>
GreekKerkis	<p>Kerkis is a Greek font based on URW Bookman; it is a full family. The font can be downloaded for free on CTAN and at the University of the Aegean. While the font is very popular for modern Greek, it is somewhat unusual for classical texts (for a while, it was the Greek typeface used by the <i>American Journal of Philology</i> though).</p> <p>᾽Ανδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά</p>
GreekLfb	<p>Lfb is a font designed by Laurie Field in METAFONT for use with plain T_EX; it is placed under the L^AT_EX Project Public License and can be downloaded from CTAN. I have simply converted it to type-1 format with the help of autotrace and adapted it for use with the Greek module.</p> <p>᾽Ανδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά</p>
GreekMinion	<p>The Minion font family comes with the free Adobe Reader software (downloadable at the adobe website) and contains the Greek Extended glyphs. Full font family.</p> <p>᾽Ανδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά</p>
GreekPalatino	<p>This font comes with the Windows operating system (it can also be downloaded at the elpenor website and other sites). Although</p>

it has been designed by the famous Hermann Zapf, the font has a number of odd-looking characters (see [Jeffrey Rusten's review](#)). Complete font-family.

Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GreekPorson

This is the original Porsonian font such as it has been used by many publishers (e.g., Oxford University Press) for a long time. It can be purchased from the [Monotype Corporation](#).

Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GreekSerif

This TrueType font has been developed for Debian Linux by Peter Hawkins and is now maintained by Primoz Peterlin. It has both a very nice Roman font and good looking Greek characters. It can be downloaded at the [savannah website](#). Complete font family. The font is included.

Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

GreekTimes

The latest version of the Macintosh OS, OS X 10.4 "Tiger," includes a version of the "Times" font that has glyphs for Greek extended. The font resides in System/Library/Fonts/Times.dfont. You will have to run this file through a utility such as fondu and copy the resulting .ttf files into the fonts/truetype/greek directory. Full font family.

Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

Ibycus

This Greek font was created by Pierre McKay for the Ibycus-package for L^AT_EX. It constitutes a full family; the font is included.

Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

Kadmos

This is one of the most familiar Greek fonts that goes very well with the normal Latin typefaces. Like Bosporos, it has been donated by its former owner to the APA; I include only metric files for those who happen to have older versions of the font.

Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

KadmosNew

The licensing situation is identical to BosporosNew; a fully functional beta version can be downloaded at [GreekKeys Page](#).

Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

Leipzig

This font was created by Claudio Beccari and is part of the CB-Greek fonts. I have used the type-1 version as it looks much nicer on screen; the font is included.

Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά

NewHellenic	<p>Another classical font: NewHellenic has been used by many publishers (e.g., Cambridge University Press) for a long time; it can also be purchased from the Monotype Corporation.</p> <p><i>Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά</i></p>
Teubner	<p>This is a font that I created myself after the Greek typeface used by the publishing house Teubner at the beginning of the twentieth century; it is included in the module.</p> <p><i>Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά</i></p>
Vusillus	<p>This font will look familiar to many as it is widely used on Windows systems. Vusillus has been designed by Ralph Hancock; it is part of the PC program Antioch; the italic font, for which support files have been included, is free and can be downloaded at Ralph Hancock's site.</p> <p><i>Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλά</i></p>

Some of the fonts had small problems which I had to fix in order to use them. When you run into such a problem (especially missing or odd-looking glyphs), please contact me, and I will tell you how you can modify the fonts. If you want to have a look at some samples, download the [myway](#) I made about producing the Greek modules.

After choosing your font, it will be necessary to adapt the scaling. As you know, Roman fonts look very different even at the same size: Lucida Bright at 10 pt is almost as big as Computer Modern at 12 pt. Since our Greek fonts will be mixed with Roman text, the module provides the ability to adapt the size of the Greek font: `[scale=1]` would correspond to the design size of the font; `[scale=.95]` would shrink the font to 95 %; `[scale=1.05]` magnify to 105 %. Just play around until the relation between both fonts looks right.

For nine out of these fonts (viz. Alkaios, Cardo, GreekDioxipe, GreekGentium and GreekGentiumAlt, GreekMinion, GreekPorson, Ibycus, Kadmos, and NewHellenic), an alternative with the “lunate” (rounded) shape of the letter sigma (without distinction between final and intermediate sigma) is available. Without making any changes to your input, you can choose this form by adding “lun” directly to the name of the font, e.g., `[font=GreekGentiumlun,scale=1.2]`. The font “Teubner” only has the round form, the other fonts do not include the lunate sigma.

After setting these values in the preamble, switching to Greek in the body of your documents is easy: use the command `\localgreek{...}` for shorter passages and the environment `\startgreek \stopgreek` for longer stretches (the corresponding commands for the alternate Greek font are `\localaltgreek{...}` for shorter passages and the environment `\startaltgreek \stopaltgreek` for longer stretches). It is safest not to include commands within these Greek passages: if, e.g., you want to leave a vertical space by writing `\blank[big]`, it is best to end Greek input by saying `\stopgreek` or closing the braces before the command.

Input according to the Babel standard has been around for quite a while, so I give just a brief description (you can find an extended discussion in the documentation to the “Teubner” package for L^AT_EX). First, you will have to memorize the correspondence between Greek letters and their ASCII equivalents:

A	B	G	D	E	Z	H	J	I	K	L	M	N	X	O	P	R	S	T	U	F	Q	Y	W
A	B	Γ	Δ	E	Z	H	Θ	I	K	Λ	M	N	Ξ	O	Π	P	Σ	T	Υ	Φ	X	Ψ	Ω
a	b	g	d	e	z	h	j	i	k	l	m	n	x	o	p	r	s	t	u	f	q	y	w
α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ	ν	ξ	ο	π	ρ	σ	τ	υ	φ	χ	ψ	ω

Accents, breathings, and iota subscript are written with ' ` ~ < > |; these can be combined as necessary. I provide just a few examples:

```
>e = ê
"~u = ũ
<~w| = ẁ
```

The original Greek encoding for L^AT_EX took care of the letter sigma: when it occurred at the end of a word, it would automatically be transformed into a final sigma ς. After some hesitation, I decided not to follow this approach: there are too many cases where users might want a “normal” sigma even in front of a space or a punctuation mark. In order to obtain a final sigma, type “c.”

Moreover, the module provides a couple of convenient commands to typeset symbols that are needed for writing ancient Greek or editing papyrological material:

```
\digamma Ϝ
\sampi ϝ
\stigma Ϛ
\koppa Ϟ
\lunars c
\lunarS C
\textbraceleft {
\textbraceright }
\halfbraceleft ⸀
\halfbraceright ⸁
\textdoublebracketleft ⸢ (can also be input by typing [[ in your source file)
\textdoublebracketright ⸣ (can also be input by typing ]] in your source file)
\crux †
```

In order to get an apostrophe, type ' '. For opening and closing quotes, type ((and)). To obtain the sublinear dot in papyrological or epigraphical editions, type an exclamation mark after the character: >a!n!'h!r! becomes ἀνὴρ.

Unicode input is intuitive: if you have a proper keyboard driver for input of Unicode Greek, just type away, but remember to include Greek passages between \localgreek

`{...}` or `\startgreek \stopgreek`. Of course, all the named glyphs are available for Unicode-input as well.

Please be advised that not all fonts contain all symbols or characters. Archaic number symbols, the papyrological double brackets or half brackets, or characters that do not occur in normal Attic morphology (like $\tilde{\epsilon}$) are not included in some of the fonts, so if you need those, you will have to experiment which font provides them (Ibycus, KadmosNew and GreekCardo are pretty complete).

Moreover, if you need such special symbols, using Babel input may be easier for you. Since they have not been assigned a Unicode value, they cannot be typed directly with a Unicode keyboard driver. However, if you want to use them in a Unicode file, there is a simple way to obtain them: every character in the Greek fonts can be accessed via a command name. Just open the file `enco-agr.tex` in your ConT_EXt directory, and you will find that, e.g., $\tilde{\epsilon}$ can also be accessed by typing `\greekepsilon siliperispomeni` in your source file.

4 Release History

01/2007: ver 1.0

New version of Aristarchoj font; added two new GFS fonts. The module has been pretty stable for a while, so I decided to call it ver 1.0...

11/2006: ver 0.99

Added some new GFS fonts; removed fonts that have become unavailable.

General cleanup of fonts and encodings.

04/2006: ver 0.98

Added the new GFSNeohellenic font.

Compatibility module `t-oldgreek` now also uses the new `moduleparameter` mechanism.

Cleaned up directory structure.

04/2006: ver 0.97

Module now uses the new `moduleparameter` mechanism.

Renamed from `t-greek` to `t-ancientgreek` to avoid clashes in namespace.

Hyphenation of polytonic Greek now works properly.

02/2006: ver 0.95

Supports more Greek fonts.

Greek are now defined as typefaces; normal font switches such as `\em` and `\bf` work within Greek text.

05/2005: ver 0.9

Initial release.