CARDO

A Unicode Font for
Biblical, Classical &
Mediæval Studies
and for Linguistics

USER'S MANUAL

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This manual is set in Cardo with Lucida Sans used for the headings.

Table of Contents

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Font file version .98
Manual version .98a
updated November 3, 2004

VERSION .98 is a major upgrade to Cardo with the inclusion of over 1400 additional characters, including for the first time characters outside the Basic Multilingual Plane:

- all the Greek characters proposed by the Thesaurus Linguae Graecae that have received final or tentative approval from the Unicode Technical Committee have been added, plus important glyph variants of these characters; about 200 characters
- some precomposed Greek epigraphical characters in the PUA are included
- a large number of variant forms of Greek letters for epigraphy and numismatics
- rare characters from the TLG database that were not proposed by the TLG for inclusion in Unicode
- the Old Italic block of Unicode is now included (but no glyph variants yet)
- the medievalist diacritical marks missing from the Combining Diacritics block have been added, along with all other combining marks in Unicode 4.0 and those slated for Unicode 4.1
- Cardo now is working to support the recommendations of the Medieval Unicode Font Initiative. Version .98 contains all the official Unicode characters found in the MUFI recommendation 1.0 as well as all of the PUA characters
- some of the IPA characters have been improved and the entire Spacing Modifier Letters range is now supported along with a few additional IPA characters (click symbols and arrows)
- a set of true small capitals and oldstyle (lining) numerals has been added, along with OpenType features to access them
- a number of other miscellaneous Unicode characters have been added
- the quality of the character outlines has been improved with the help of the Font Validator tool supplied by Microsoft Typography

The most recent version of Cardo may be obtained from http://scholarsfonts.net (note the new URL since the release of the last version). You will also find keyboard help and other font-related information there.

Plans for future versions include adding the Runic and Gothic blocks, possibly the new Coptic block and glyph variants for the Old Italic characters. I also hope to make an italic version of Cardo available (it will have fewer glyphs than the roman version but will be useful nonetheless).

Getting Started

Installation instructions are in the *readme2.txt* file included with the download. Please remember that the print quality will normally be better than the on screen display. In a future version I will do some hinting by hand and the on screen appearance will be improved. If you have Windows XP and an LCD monitor, the appearance of Cardo may be greatly improved if you turn on ClearType font smoothing. For directions, see http://scholarsfonts.net/cleartype.html. Mac OS X now offers a similar anti-aliasing technology.

If you wish to print the manual, it has been set up to come out correctly if your printer supports double-sided printing. Remember that your printer settings can affect the quality of the output.

The manual consists of two parts: the first presents some information about the origin and development of this font, while the second demonstrates the characters available.

Part I: About Cardo

GENERAL INFORMATION ABOUT CARDO

Cardo is a large Unicode font specifically designed for the needs of classicists, Biblical scholars, medievalists, and linguists. Since it may be used to prepare materials for publication, it also contains features that are required for high-quality typography, such as ligatures, text figures (also known as old style numerals), true small capitals and a variety of punctuation and space characters. It may also be used to document and discuss the features of Unicode that are applicable to the these disciplines, as we work to help colleagues understand the value (and limitations) of Unicode.

It is worth pointing out that Cardo now is in fact an OpenType font, even though it displays the older "TT" icon in Windows rather than the slanted "O" icon. See "Using the OpenType Features in Cardo" on page for more information.

Cardo is freely available, subject to the terms of use below. I do have one request: if you find the font useful, or if you have suggestions for improvement, please email me and tell me about what you are doing with Cardo (see Contact Information below). Knowing that people are using the font makes the time and effort I put into it worthwhile.

ORIGIN AND DESIGN

This font is my version of a typeface cut for the Renaissance printer Aldus Manutius and first used to print Pietro Bembo's book *De Aetna*. This font has been revived in modern times under several names (Bembo, Aetna, Aldine 401). I chose it mainly because it is a classic book face, suitable for scholarship, and also because it is easier to get various diacritics sized and positioned for legibility with this design than with some others. All characters were drawn by me after studying printed versions of the fonts referred to above.

I designed a number of additional characters not found in the samples I consulted (ezh, yogh, hwair, etc.) and added a large number of symbols that are useful for scholars.

The Greek characters were designed to appear well when mixed with the Latin letter-forms of Cardo. Designing Greek characters for such a purpose presents a different set of challenges than designing a standalone Greek font. While I do not believe that these are the most beautiful or elegant Greek characters ever designed, I do think they succeed in working with the Latin characters and, perhaps more important, are legible at text sizes. The accents have been placed farther from the base characters than is often done. This positioning will be obvious when Greek text is printed at large sizes; however, at normal text sizes the larger distance between base character and accent helps keep the accents clear.

The Hebrew letters, vowels, and accents are designed to match those found in the *Biblia Hebraica Stuttgartensia* (BHS) as closely as possible and so have no claim to originality. As with the Greek characters, the Hebrew vowels and accents have been made large enough to be easily legible at text sizes.

SYSTEM REQUIREMENTS

This is a large Unicode font.

For Windows, you need at least Windows 95 and a word processor that can handle Unicode-based documents: either Microsoft Word 97 / 2000 / 2002 (=XP) / 2003 or OpenOffice 1.0. (For more information about OpenOffice, a full-featured, open-source suite comparable to Microsoft Office that is attacting considerable interest these days, see www.openoffice.org ; note however that OpenOffice does not yet handle characters in the supplementary planes.)

You will also need a way to enter the Unicode characters that are not directly acessible from standard keyboards. Some applications provide their own mechanisms for entering characters, such as Word's Insert/Symbol or OpenOffice's Insert/Special Character. You can also use a plain text Unicode editor to enter the text and import it into a word processor or page layout program for final formatting. Two excellent editors are UniPad and Babel Pad (the latter is free). One can create custom keyboards such as my own keyboard utility; if you want to make your own, check out the Keyboard Layout Creator from Microsoft. Remember that in Microsoft Office applications you can enter a Unicode character by typing its hexadecimal number followed by ALT-x.

Cardo now contains characters located in Supplementary Multilingual Planes of Unicode. See below under "Accessing Characters in the Supplementary Planes" (page 6) for more details about how to use these characters.

You can browse the contents of any font and copy characters to the clipboard by using the Character Map utility that comes with Windows. Character Map does not support Unicode values beyond the Basic Multilingual Plane; an excellent alternative is Andrew West's BabelMap (free). If you want to use Hebrew in true right-to-left fashion, you

must have Word 2000 or XP running under Windows 2000 or XP. (One user has reported success with Hebrew using Word XP under Windows 98. Even so, later versions of Windows offer much better RTL support.) OpenOffice does not yet handle right-to-left scripts, although development of this feature is in progress.

On the Mac, you need OS X plus a Unicode-aware editor or keyboard utility. An excellent option is Mellel, a Unicode-based word processor designed for scholars. It supports OpenType beginning with version 1.8—this is a first for the Mac and a very exciting development. Mac Word 2004 is reported to handle Unicode text well, although I have not yet tried it; earlier versions (2001 and X) do not. OpenOffice for OS X is currently under development,[1] and I hope that it will work as well with Unicode on the Mac as it does under Windows. Nisus has developed a new version of Writer, claimed to be Unicode-capable, but I have not tried it yet.

There are several Mac plain text editors you can use, such as Apple's TextEdit (installed as part of a default OS X installation), SUE, or Pepper. With any of these, as with Mellel, you can use the Unicode Hex entry method (hold down OPTION while typing the four hexadecimal digits) or the Extended Roman keyboard. OS X 10.2 (but not any lower version) supports Hebrew and comes with a Hebrew keyboard as well as a monotonic Greek keyboard. OS 10.2 also makes it possible for users to add their own keyboard layouts, either by updating older keyboard resources or defining keyboard layouts as XML documents. See http://developer.apple.com/technotes/tn2002/tn2056.html . OS X's Character Palette also lets you see and copy any Unicode character. For information on GreekKeys and OS X, see http://ist-socrates.berkeley.edu/~pinax/GreekKeys.html , the new home page of GreekKeys.

For Linux systems: Cardo has been extensively tested on Mandrake 10.1 (with the 2.6.9 kernel and Kde 2.3.2). I have also had some other reports of success on Linux but do not have details.

If you are not clear about what all this means, see my booklet about word processing issues for scholars, which provides a good introduction to Unicode and other font issues.

COORDINATION WITH OTHER PROJECTS

This release of Cardo has been designed specifically to work with the following projects:
- THESAURUS LINGUAE GRAECAE DATABASE: Cardo .98 contains all the characters needed to print the texts in the TLG database. This covers all the Unicode characters that TLG has mapped to various Beta code entities, including the many characters recently proposed by the TLG staff and accepted into Unicode; glyph variants of some of these characters, particularly the Greek letters that are needed for printing acrophonic numerals and musical notation; and some characters that TLG did not consider appropriate for Unicode but which they feel would be useful to have available. See the TLG website http://www.tlg.uci.edu

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[1] You can experiment with Mac OpenOffice if you have OS 10.2 or higher and are comfortable using X11 products; the Aqua version, which looks and feels like other Mac products, is still under development.

for more details, including the full Beta Code manual and a quick reference guide which shows the Unicode value assigned by the TLG for each Beta code.

- MEDIEVAL UNICODE FONT INITIATIVE: Cardo .98 contains all the Unicode characters found in the Recommendation of the Medieval Unicode Font Initiative, version 1.0; it also contains all of the MUFI Private Use Area characters; see http://helmer.aksis.uib.no/mufi/ . There are some other fonts in development that will support the MUFI recommendation, and Cardo will be compatible with any such fonts. Please note that there is no chart in this manual that shows all the MUFI characters, since there are so many of them. Interested medievalists should see the PDF file available from the MUFI website.

CHARACTER REPERTOIRE

The following Unicode ranges are included (complete coverage unless otherwise noted):

- Basic Latin
- Latin-1 Supplement
- Latin Extended-A
- Latin Extended-B (selected characters for European languages and linguistics)
- IPA Extensions
- Spacing Modifier Letters
- Combining Diacritical Marks
- General Punctuation (selected characters)
- Latin Extended Additional (selected characters)
- Greek and Coptic
- Greek Extended
- Hebrew
- Miscellaneous Technical (selection including metrical characters)
- Supplemental Punctuation (New Testament critical signs, ancient editorial signs, etc.)
- Miscellaneous Symbols (signs of the zodiac etc.)
- Alphabetic Presentation Forms (except the Armenian characters)
- Old Italic
- Ancient Greek Numbers
- Ancient Greek Musical Notation

There are also many additional Unicode characters that are useful for scholars, such as double brackets, angle brackets, etc. that come from different areas of Unicode. The old style numerals, small capitals, and some ligatures are placed in the Private Use Area of Unicode; see Chart 6 below and the note that goes with it for more information about these characters. Chart 7 provides a list of the many miscellaneous Unicode characters that are useful for printing the Greek texts in the Thesaurus Linguae Graecae database.

Most of the new Greek characters in Cardo are the result of proposals made to the Unicode Technical Committee by the Thesaurus Linguae Graecae, directed by Dr. Maria Pantelia. These characters (marked with ** in the list above) have been accepted by the UTC but are only partway through the approval process for ISO 10646, the international standard that is developed in parallel with Unicode. It seems clear that the characters will be approved, but the codepoints given in this version of Cardo might be changed. Users

should proceed with caution until final approval is given, probably in 2005. See the TLG website for latest news on these characters.

LIMITATIONS AND KNOWN PROBLEMS

Character design and repertoire are not absolutely final. Please send me any comments that you have so that I can improve future versions. The most recent version will always be available from my web page http://scholarsfonts.net .

I have not yet done hand hinting of the characters. This means that on most systems the characters will print better than they will look on the screen. On screen at text sizes some stems will look uneven and so forth. On my system, I found that Cardo looks much better after I upgraded to Windows XP (with an LCD monitor), with the ClearType font smoothing turned on. Mac OS X now has a similar antialiasing feature available, and I am told that Linux also does a better job of rendering Cardo on screen than Windows.

ACCESSING CHARACTERS IN THE SUPPLEMENTARY PLANES

Note that the Old Italic, Ancient Greek Numbers, and Ancient Greek Musical Notation ranges are located in the Supplementary Multilingual Plane and that there are many glyph variants and rare characters in the Suplementary Private Area-A. The original design of Unicode provided for about 65,000 characters (now called the Basic Multilingual Plane or BMP). The designers anticipated that this might not be sufficient and allowed for 15 additional groups of 65,000 characters, referred to as supplementary planes. Some software still has not been updated to allow use of these characters. Windows NT, 2000, and XP and Mac OS X are the first operating systems to support supplementary characters. Even under these operating systems, some word processors give you access to the supplementary characters and some do not.

If your program does support supplementary characters, you may be able to enter a character's five digit Unicode value (e.g., 10140) or you may have to enter a pair of surrogate characters such as D800 DD40. Both scalar values and surrogate pairrs are given in the charts below. Under Windows, Notepad XP and Word XP and 2003 provide a convenient method of entering any Unicode character, including those in the supplementary planes: type the hexadecimal value followed by ALT-x. Under Mac OS X, Unicode-aware programs can use the hex entry method: hold down OPTION while typing the hex value.

Even the most recent version of Windows's Character Map and Word's Insert/Symbol do not show characters in the supplementary planes. Andrew West's BabelMap utility is an excellent alternative for those who need supplementary characters; go to http://uk.geocities.com/BabelStone1357/Software/BabelMap.html.

Some programs require that Uniscribe (a Windows component) be activated in order to see supplementary characters. In Windows XP, go to Start / Settings / Control Panel, double-click the "Regional and Language Options" icon, choose the Languages tab, and click in the box next to "Install files for complex scripts and right to left languages."

IMPORTANT CAUTION REGARDING THE PRIVATE USE AREA

Cardo .98 contains a large number of characters in the Private Use Area (PUA) and the Supplementary Private Area-A (SPA-A). Such characters charts <u>are not a part of the Unicode Standard</u>. Many of these are from the MUFI recommendation; others are glyph variants of TLG characters; some are precomposed combinations useful for Greek epigraphy; some are characters needed for high-quality typography, such as small capitals; and there are some other miscellaneous characters. All PUA characters are shaded in green in the charts below. For more information about problems with PUA characters and about alternatives (use of combining marks, OpenType features, and XML markup), see my book *Word Processing in Classical Languages*, available from <u>http://scholarsfonts.net</u>.

> Be aware that **using any characters in the Private Use Areas may cause problems when searching, sorting, spell-checking, copying text or exchanging data with others**. Use of such characters in databases is strongly discouraged. They may be used for the sake of appearance in printed documents where searching and sorting are not an issue.

The best way to use characters that are not part of Unicode, but are variants of characters in the standard, is via OpenType features (see next section). However, since few programs support OT features at the present time, the only way for most users to access non-Unicode characters is to place them in the Private Use Area. Some are found in the Private Use Area of the Basic Multilingual Plane, which begins at U+E000; others are found in the Supplementary Private Use Area-A (Plane 15), which begins at U+F0000 (see "Accessing Characters in the Supplementary Planes" on page 6). The text figures and small capitals are placed in the same codepoints that they occupy in fonts from Adobe Systems™ and some other vendors, but this use has no official sanction in Unicode. The small capitals with macron, small capital ezh, yogh, and wynn, and long-s ligatures are my own creation.

USING THE OPENTYPE FEATURES IN CARDO

By far the best way to access variant glyphs (including text figures and ligatures) is via OpenType features, which solves the problem mentioned in the paragraph above. OT fonts can change the appearance of text without affecting the underlying Unicode characters, thereby preserving the ability to search, sort, and spell-check text (although there aren't many spellcheckers for ancient languages). As of October 2004, only the InDesign page layout program and some other applications from Adobe Systems (cross-platform) and the Mellel word processor (Mac OS X) can take advantage of OT features. It is particularly worth noting that InDesign can generate PDF files which take advantage of OT features. Thus one can create a document that can be read using the freely available Adobe Reader and that incorporates glyph variants which can be searched using standard Unicode values. Version .98 of Cardo includes OT tables so that users of InDesign (and, we hope, other programs in the future) can make use of the following features:

Latin script
- small capitals
- standard ligatures
- discretionary ligatures (ct, st, Th)
- old style numerals
- historical forms (long s)

Greek script
- stylistic alternates: gives access to all alternate glyphs for a character
- stylistic set #1: automatically changes regular Greek capitals (serifed form) into a sans-serif form for use in inscriptions and acrophonic numerals

The InDesign screenshot below shows Sigma highlighted. The Glyphs palette shows all the variants of Sigma (note that some are retrograde). Double-clicking any of these variants changes the glyph shown but not the underlying Unicode value.

If you have access to InDesign, you can download a test document from my website http://scholarsfonts.net that provides more complete instructions and samples to try.

The next version of Windows, codenamed Longhorn and scheduled for release in 2006, will provide support for OT features at the system level. Note that Mac OS X does not support OT features; instead, it uses Apple's own AAT features which do many of the same things that OT does. Adobe products running under OS X, however, do have support for OT features, as does Mellel.

It is also worth noting that Cardo supplies the OT tables that are necessary for the Hebrew vowels and accents to work correctly. Windows automatically makes use of these tables and users do not need to think about them, but they are there.

USING THE GREEK CHARACTERS

Characters shaded in tan on the Greek charts (pages 23 and 24) should not be used. (You can, however, safely use the alternate forms of beta, theta, kappa and rho through the OT Stylistic Alternates feature.) Those shaded in turquoise are intended for scientific and mathematical use only; use the unshaded equivalents for Greek text.

If you need to use acrophonic numerals or ancient Greek musical notation in a document, you will need to use the sans-serif variants of the Greek alphabet found in the PUA. For example, the acrophonic numeral for 71 would display as ΓΔΔI using the standard Unicode values. Using the OpenType Stylistic Alternates feature or the variants in the PUA, it can be more properly displayed as ΓΔΔI. See previous section for more about OT features.

USING THE HEBREW CHARACTERS

For the Hebrew characters to work correctly, you must set up Hebrew support both in Windows and in Word; see the Appendix (page 47) if you need directions for doing this. On the Mac, you must have at least OS 10.2. The following applies to Windows:

If you are using the Hebrew characters, you must enter your text in this order:
        base letter – dagesh – sin/shin dot – vowel – accent
Windows itself does not care what order you use, as long as the base character comes first. However, when I constructed the OpenType tables, I used the order given above. There is no reason that additional OT tables could not be added to allow for other orders, but I do not have time to do this now. *If you have a Unicode Hebrew text that has been normalized to Form C, it will not work with Cardo* (because Form C requires a different order than the one mentioned above). I hope to add additional OT tables that will address this problem. For a furtive patah, enter the patah after the consonant and the OT lookup will move it to the right.

Unicode originally did not include the reversed nun character. This character is in the process of being added to the standard, probably at U+05C6. Earlier versions of Cardo had a reversed nun in the Private Use Area at U+F300, which I have retained for backwards comptibility, while adding the new codepoint.

On rare occasions in Hebrew one needs to use two cantillation marks over a single base character. As of July 2004, this is not possible in Windows; this is a problem with Windows, not with Cardo. Microsoft is aware of this and will fix the problem, possibly with Office 2003. (For the technically inclined: what's needed is an update to Uniscribe, a Windows component that handles low-level processing of characters.)

CONTACT INFORMATION

A current email address will always be available at http://scholarsfonts.net/contact ; as of October 2004, it is hospes@scholarsfonts.net, but this address will be changed if it starts to get a lot of spam. Please email me if you have questions or suggestions for improvement. I really would appreciate hearing reactions from users; such feedback will play a large role in determining the future development of this font.

Version .98 is a late beta version. In February 2005 it will be replaced by version 1.0. Please send any corrections or suggestions by January 31, 2004.

TERMS OF USE

While Cardo is a standard TrueType font and should not cause problems on your computer, under no circumstances will David J. Perry be liable for any problems that you encounter in using the font or for any loss or damage that results from its use. Downloading and installing the font indicates your acceptance of these terms. Use the font at your own risk.

This font is free for personal, non-commercial, or non-profit use. It may also be used to prepare camera-ready copy for papers that will appear in academic journals, even if the author of the paper receives remuneration for article. Any other commercial use (including the printing of books to be sold at a profit) requires the purchase of an appropriate license. Individuals may give copies to others, as long as all files from the original zip archive are kept together and none is altered. This software may not be posted on any web page, included in any compilation, or sold in any form without the express permission of David J. Perry. Those who wish to promote the use of this font are encouraged to put a link to my home page http://scholarsfonts.net on their web sites so that others may download it.

ACKNOWLEDGEMENTS

A number of people have been helpful in my work on Cardo: James Kass, Paul Nelson, Nick Nicholas, Patrick Rourke, Maria Pantelia, Richard Peevers, John Wells, Joop Jagers, Odd Einar Haugen, Juan-José Marcos, Edward C. D. Hopkins, and Rodney Decker as well as numerous contributors to the Unicode and OpenType mailing lists. Many thanks to all of them. I am responsible for any problems that remain.

Cardo is produced using FontLab, the most sophisticated font editor available today. I would also like to thank the Microsoft Typography Group, which has developed and made available to font developers two important tools: VOLT allows the addition of OpenType features and characters in the supplementary planes, while Font Validator performs very thorough checks on a completed font.

Part II: Character Repertoire

Cardo contains all the characters found in standard Windows and Macintosh fonts. I have not included charts for these characters in the manual; use them as you normally would.

For the characters beyond those found in standard fonts, there are two types of charts. The first set presents the characters in groups as they might be used for Latin, Old English, epigraphy, etc. (Of course there is some overlap between the charts.) The second set of charts presents the characters by Unicode range; here you will find all the Greek and Hebrew characters as well as all the characters from the Latin Extended-A block. You can search the charts using Acrobat Reader's Edit/Find command to see if a particular Unicode character you are interested in a included in the font.

The Greek block contains a number of alternate character shapes that should <u>not</u> be used in Greek text (they are intended for mathematical and scientific use, and may be used in that context). These are indicated with tan shading, as are some other characters that are now deprecated. U+03F7 / 03F8 are the letters Sho/sho, a character used when the Bactrian language was written in Greek script, and U+03F9 / 03FA are the archaic letters San/san. These two pairs along with the uppercase Lunate Sigma were added to the Unicode standard in version 4.0.

It should also be noted that Greek and Coptic have now been disunified in Unicode; we will make appropriate adjustments to Cardo after a new proposal for Coptic is adopted.

The original goal was to include most of the Unicode characters that might be useful for scholarly work. Some of the mathematical symbols and the astrological signs, which are found in Beta Code, and some metrical and epigraphical characters have also been included. In addition, I have included a number of characters that are useful for good-looking typography, such as the f- and long s-ligatures, old style numerals, and the various spaces. Version .98 has OpenType tables that will allow you apply ligatures, old style numerals, and true small capitals if you use Adobe's InDesign (or another program that supports OT typography for Latin-script languages, of which there are none as of July 2003). See the "Using the OpenType Features of Cardo" (page 7) for more information.

The combining diacritical marks in Unicode are not very useful with most of today's word processors and page layout programs, although they can be used on the web with clever programming. See Patrick Rourke's excellent page about using Greek on the web: http://www.stoa.org/unicode/. Mac OS 10.2 has added excellent support for combining marks along with several other improvements in its Unicode support. Microsoft Office for Windows 2003 does support them.

Table 1. Selected Combining Diacritical Marks in Unicode.

This table contains (with one exception) the combining marks that were pre–
sent in Cardo prior to version .71. Characters were added in version .71 to
complete this block of Unicode, except for the medievalist diacritic letters added
in Unicode 3.2; these have now been added in version .98. For a complete
chart of this range, see http://www.unicode.org/charts/PDF/U0300.pdf . Some
of the marks in the left column of the table may not line up right over their base
character. Please note that this is due to a limitation of Windows, not Cardo. A
glyph variant (two dots arranged vertically) of U+0323 is found at U+F01C5.

GLYPH	UNICODE	CHARACTER NAME
◌̀	U+0300	COMBINING GRAVE ACCENT
◌́	U+0301	COMBINING ACUTE ACCENT
◌̂	U+0302	COMBINING CIRCUMFLEX ACCENT
◌̃	U+0303	COMBINING TILDE
◌̄	U+0304	COMBINING MACRON
◌̅	U+0305	COMBINING OVERLINE
◌̆	U+0306	COMBINING BREVE
◌̇	U+0307	COMBINING DOT ABOVE
◌̈	U+0308	COMBINING DIAERESIS
◌̉	U+0309	COMBINING HOOK ABOVE
◌̊	U+030A	COMBINING RING ABOVE
◌̋	U+030B	COMBINING DOUBLE ACUTE
◌̌	U+030C	COMBINING CARON
◌̑	U+0311	COMBINING INVERTED BREVE (Beta #534)
◌̓	U+0313	COMBINING COMMA ABOVE (= smooth breathing)
◌̔	U+0314	COMBINING REVERSED COMMA ABOVE (= rough)
◌̣	U+0323	COMBINING DOT BELOW ◌ U+F0234 glyph variant in SPA–A
◌̥	U+0325	COMBINING RING BELOW
◌̦	U+0326	COMBINING COMMA BELOW
◌̧	U+0327	COMBINING CEDILLA
◌̨	U+0328	COMBINING OGONEK
◌̵	U+0335	COMBINING SHORT STROKE OVERLAY
◌̶	U+0336	COMBINING LONG STROKE OVERLAY
◌̸	U+0338	COMBINING LONG SOLIDUS OVERLAY
◌̓	U+0342	COMBINING GREEK PERISPOMENI
◌̔	U+0343	COMBINING GREEK KORONIS
◌ͅ	U+0345	COMBINING GREEK YPOGEGRAMMENI
◌͡	U+0361	COMBINING DOUBLE INVERTED BREVE (synizesis)

Table 2. Unicode Characters for Classical and Medieval Latin

GLYPH	UNICODE	CHARACTER NAME
Ā	U+0100	LATIN CAPITAL LETTER A WITH MACRON
ā	U+0101	LATIN SMALL LETTER A WITH MACRON
Ă	U+0102	LATIN CAPITAL LETTER A WITH BREVE
ă	U+0103	LATIN CAPITAL LETTER A WITH BREVE
Ē	U+0112	LATIN CAPITAL LETTER E WITH MACRON
ē	U+0113	LATIN SMALL LETTER E WITH MACRON
Ĕ	U+0114	LATIN CAPITAL LETTER E WITH BREVE
ĕ	U+0115	LATIN SMALL LETTER E WITH BREVE
Ī	U+012A	LATIN CAPITAL LETTER I WITH MACRON
ī	U+012B	LATIN SMALL LETTER I WITH MACRON
Ĭ	U+021C	LATIN CAPITAL LETTER I WITH BREVE
ĭ	U+021D	LATIN SMALL LETTER I WITH BREVE
Ō	U+014C	LATIN CAPITAL LETTER O WITH MACRON
ō	U+014D	LATIN SMALL LETTER O WITH MACRON
Ŏ	U+014E	LATIN CAPITAL LETTER O WITH BREVE
ŏ	U+014F	LATIN SMALL LETTER O WITH BREVE
Ū	U+016A	LATIN CAPITAL LETTER U WITH MACRON
ū	U+016B	LATIN SMALL LETTER U WITH MACRON
Ŭ	U+016C	LATIN CAPITAL LETTER U WITH BREVE
ŭ	U+016D	LATIN SMALL LETTER U WITH BREVE
Ȳ	U+0232	LATIN CAPITAL LETTER Y WITH MACRON [3.0]
ȳ	U+0233	LATIN SMALL LETTER Y WITH MACRON [3.0]
Æ	U+00C6	LATIN CAPITAL LETTER AE
æ	U+00E6	LATIN SMALL LETTER AE
Œ	U+0152	LATIN CAPITAL LIGATURE OE
œ	U+0153	LATIN SMALL LIGATURE OE
ſ	U+017F	LATIN SMALL LETTER LONG S
⁊	U+204A	TIRONIAN SIGN ET
†	U+2020	DAGGER
‡	U+2021	DOUBLE DAGGER
§	U+00A7	SECTION SIGN
¶	U+00B6	PILCROW SIGN
⁋	U+204B	REVERSED PILCROW SIGN
℟	U+211F	RESPONSE
℣	U+2123	VERSICLE
※	U+203B	REFERENCE MARK
⁁	U+2041	CARET INSERTION POINT
⁂	U+2042	ASTERISM

Table 3: Medieval Germanic Characters

GLYPH	UNICODE	CHARACTER NAME
Æ	U+00C6	LATIN CAPITAL LETTER AE
æ	U+00E6	LATIN SMALL LETTER AE
Ǽ	U+01FC	LATIN CAPITAL LETTER AE ACUTE
ǽ	U+01FD	LATIN SMALL LETTER AE ACUTE
Ǣ	U+01E2	LATIN CAPITAL LETTER AE WITH MACRON
ǣ	U+01E3	LATIN SMALL LETTER AE WITH MACRON
Ą	U+0104	LATIN CAPITAL LETTER A WITH OGONEK
ą	U+0105	LATIN SMALL LETTER A WITH OGONEK
Ǻ	U+01FA	LATIN CAPITAL LETTER A WITH RING AND ACUTE
ǻ	U+01FB	LATIN SMALL LETTER A WITH RING AND ACUTE
ƀ	U+0180	LATIN SMALL LETTER B WITH STROKE (Old Saxon)
Ċ	U+010A	LATIN CAPITAL LETTER C WITH DOT ABOVE
ċ	U+010B	LATIN SMALL LETTER C WITH DOT ABOVE
đ	U+0111	LATIN SMALL LETTER D WITH STROKE
Ę	U+0118	LATIN CAPITAL LETTER E WITH OGONEK
ę	U+0119	LATIN SMALL LETTER E WITH OGONEK
Ġ	U+0120	LATIN CAPITAL LETTER G WITH DOT ABOVE
ġ	U+0121	LATIN SMALL LETTER G WITH DOT ABOVE
Ǧ	U+01E6	LATIN CAPITAL LETTER G WITH CARON
ǧ	U+01E7	LATIN SMALL LETTER G WITH CARON
ħ	U+0127	LATIN SMALL LETTER H WITH STROKE
ǰ	U+01F0	LATIN CAPITAL LETTER J WITH CARON
κ	U+0138	LATIN SMALL LETTER KRA
Ƕ	U+01F6	LATIN CAPITAL LETTER HWAIR [3.0]
ƕ	U+0195	LATIN SMALL LETTER HV
Ŋ	U+014A	LATIN CAPITAL LETTER ENG
ŋ	U+014B	LATIN SMALL LETTER ENG
Ʀ	U+01A6	LATIN LETTER ÝR
ʀ	U+0280	LATIN SMALL CAPITAL LETTER R (used for lowercase ýr)
Œ	U+0152	LATIN CAPITAL LIGATURE OE
œ	U+0153	LATIN SMALL LIGATURE OE
Ǿ	U+01FE	LATIN CAPITAL LETTER O WITH SLASH AND ACUTE
ǿ	U+01FF	LATIN SMALL LETTER O WITH SLASH AND ACUTE
Ǫ	U+01EA	LATIN CAPITAL LETTER O WITH OGONEK
ǫ	U+01EB	LATIN SMALL LETTER O WITH OGONEK
Ǭ	U+01EC	LATIN CAPITAL LETTER O WITH OGONEK AND MACRON
ǭ	U+01ED	LATIN SMALL LETTER O WITH OGONEK AND MACRON
ſ	U+017F	LATIN SMALL LETTER LONG S

(table continued on next page)

GLYPH	UNICODE	CHARACTER NAME
Ð	U+00D0	LATIN CAPITAL LETTER ETH
ð	U+00F0	LATIN SMALL LETTER ETH
Þ	U+00FE	LATIN CAPITAL LETTER THORN
þ	U+00FE	LATIN SMALL LETTER THORN
Ƿ	U+01F7	LATIN CAPITAL LETTER WYNN
ƿ	U+01BF	LATIN [SMALL] LETTER WYNN
Ȝ	U+021C	LATIN CAPITAL LETTER YOGH
ȝ	U+021D	LATIN SMALL LETTER YOGH
Ƶ	U+01B5	LATIN CAPITAL LETTER Z WITH STROKE
ƶ	U+01B6	LATIN SMALL LETTER Z WITH STROKE
Ȥ	U+0244	LATIN CAPITAL LETTER Z WITH HOOK
ȥ	U+0245	LATIN SMALL LETTER Z WITH HOOK
Ʒ	U+01B7	LATIN CAPITAL LETTER EZH
ʒ	U+0292	LATIN SMALL LETTER EZH
χ	U+03C7	GREEK SMALL LETTER CHI
⁋	U+204B	REVERSED PILCROW SIGN
⁊	U+204A	TIRONIAN ET SIGN

Table 4. Epigraphic Characters in Unicode.

GLYPH	UNICODE	CHARACTER NAME
‹	U+2039	SINGLE LEFT–POINTING ANGLE QUOTATION MARK
›	U+203A	SINGLE RIGHT–POINTING ANGLE QUOTATION MARK
⟨	U+2329	LEFT–POINTING ANGLE BRACKET
⟩	U+232A	RIGHT–POINTING ANGLE BRACKET
⟦	U+301A	LEFT WHITE SQUARE BRACKET
⟧	U+301B	RIGHT WHITE SQUARE BRACKET
Ↄ	U+2183	ROMAN NUMERAL REVERSED ONE HUNDRED (3.0)
∞	U+221E	ROMAN NUMERAL ONE THOUSAND = INFINITY
ↀ	U+2180	ROMAN NUMERAL ONE THOUSAND
ↁ	U+2181	ROMAN NUMERAL FIVE THOUSAND
ↂ	U+2182	ROMAN NUMERAL TEN THOUSAND
Ⅎ	U+2132	TURNED CAPITAL F (Claudian digamma)
Ɔ	U+0186	CAPITAL LETTER OPEN O (Claudian BS/PS)
ɔ	U+0254	SMALL LETTER OPEN O (small Claudian BS/PS)
◌̣	U+0323	COMBINING DOT BELOW

Epigraphers and editors of critical editions often use dots below a letter to indi-
cate uncertain readings. Unicode includes a large number of such precomposed
combinations:

Ạ	1EA0	ạ	1EA1	Ḅ	1E04	ḅ	1E05	Ḍ	1E0C	ḍ	1E0D
Ẹ	1EB8	ẹ	1EB9	Ḥ	1E24	ḥ	1E25	Ḯ	1E2E	ḯ	1E2F
Ị	1ECA	ị	1ECB	Ḳ	1E32	ḳ	1E33	Ḷ	1E36	ḷ	1E37
Ṃ	1E42	ṃ	1E43	Ṇ	1E46	ṇ	1E47	Ọ	1ECC	ọ	1ECD
Ṛ	1E5A	ṛ	1E5B	Ṣ	1E62	ṣ	1E63	Ṭ	1E6C	ṭ	1E6D
Ụ	1EE4	ụ	1EE5	ṽ	1E7D	Ṿ	1E7E	ṿ	1E7F	Ẉ	1E88
ẉ	1E89	Ỵ	1EF4	ỵ	1EF5	Ẓ	1E92	ẓ	1E93		

To fill up the set of letters with underdots, Cardo contains the following which
implement the MUFI recommendation, using the PUA:

C̣	E066	c̣	E466	Đ̣	E08F	đ̣	E48F	F̣	E0EE	f̣	E4EE
G̣	E101	g̣	E501	J̣	E151	j̣	E551	P̣	E26D	p̣	E66D
Q̣	E288	q̣	E688								

The MUFI recommendation contains a number of other characters with under-
dot that are needed for medieval Nordic texts; most are ligatures or accented cha-
racters. Medievalists should check the MUFI documentation for the codepoints.
Cardo has all these characters.

Table 5. Characters for Macintosh OS and Computer Documentation

GLYPH	UNICODE	CHARACTER NAME
∂	U+2202	PARTIAL DIFFERENTIAL
Δ	U+2206	INCREMENT
∏	U+220F	N–ARY PRODUCT
∑	U+2211	N–ARY SUMMATION
−	U+2212	MINUS
√	U+221A	SQUARE ROOT also Beta ???
∞	U+221E	INFINITY also Beta ???
∫	U+222B	INTEGRAL
⌘	U+2318	PLACE OF INTEREST SIGN (= COMMAND KEY)
⌥	U+2325	OPTION KEY
◊	U+25CA	LOZENGE
◌	U+25CC	DOTTED CIRCLE also Beta ???
	U+F000	APPLE
�	U+FFFD	REPLACEMENT CHARACTER

Table 6. Characters for High-Quality Typography

Remember that characters shaded in green are in the Private Use Area; see page 7.

		TEXT FIGURES (OLD STYLE FIGURES)
0	U+F730	OLDSTYLE DIGIT ZERO
1	U+ F731	OLDSTYLE DIGIT ONE
2	U+ F732	OLDSTYLE DIGIT TWO
3	U+ F733	OLDSTYLE DIGIT THREE
4	U+ F734	OLDSTYLE DIGIT FOUR
5	U+ F735	OLDSTYLE DIGIT FIVE
6	U+ F736	OLDSTYLE DIGIT SIX
7	U+ F737	OLDSTYLE DIGIT SEVEN
8	U+F738	OLDSTYLE DIGIT EIGHT
9	U+F739	OLDSTYLE DIGIT NINE
		SPACES AND FORMATTING CHARACTERS
	U+2000	EN QUAD
	U+2001	EM QUAD
	U+2002	EN SPACE
	U+2003	EM SPACE
	U+2004	THREE-PER-EM SPACE (= thick space)
	U+2005	FOUR-PER-EM SPACE (= mid space)
	U+2006	SIX-PER-EM SPACE
	U+2007	FIGURE SPACE
	U+2008	PUNCTUATION SPACE
	U+2009	THIN SPACE (= 1/5 em)
	U+200A	HAIR SPACE
	U+200B	ZERO WIDTH SPACE
	U+200C	ZERO WIDTH NON-JOINER
	U+200D	ZERO WIDTH JOINER
	U+200E	LEFT-TO-RIGHT MARK
	U+200F	RIGHT-TO-LEFT MARK
	U+202F	NARROW NO-BREAK SPACE

		LIGATURES
ﬀ	U+FB00	LATIN SMALL LIGATURE FF
ﬁ	U+FB01	LATIN SMALL LIGATURE FI
ﬂ	U+FB02	LATIN SMALL LIGATURE FL
ﬃ	U+FB03	LATIN SMALL LIGATURE FFI
ﬄ	U+FB04	LATIN SMALL LIGATURE FFL
ﬅ	U+FB05	LATIN SMALL LIGATURE LONG S T
ﬆ	U+FB06	LATIN SMALL LIGATURE ST
		c_t (accessible only via OpenType feature)
		T_h (accessible only via OpenType feature)
ﬁ	U+E191	longs_i
ﬀ	U+E192	longs_longs
ﬂ	U+E193	longs_l
ﬃ	U+E194	longs_longs_i
ﬄ	U+E195	longs_longs_l

The Unicode values for the true small capitals in the Private Use Area are as follows:

A	F761	B	F762	C	F763	D	F764	E	F765	F	F766
G	F767	H	F768	I	F769	J	F76A	K	F76B	L	F76C
M	F76D	N	F76E	O	F76F	P	F770	Q	F771	R	F772
S	F773	T	F774	U	F775	V	F776	W	F777	X	F778
Y	F779	Z	F77A	Œ	F6FA	Þ	F77D	Ʒ	F77E	Ʒ	F77F
Ł	F6F9	Š	F6FD	Ž	F6FF	SS	F806				

À	F7E0	Á	F7E1	Â	F7E2	Ã	F7E3	Ä	F7E4	Å	F7E5
Æ	F7E6	Ç	F7E7								
È	F7E8	É	F7E9	Ê	F7EA	Ë	F7EB				
Ì	F7EC	Í	F7ED	Î	F7EE	Ï	F7EF	Ð	F7F0	Ñ	F7F1
Ò	F7F2	Ó	F7F3	Ô	F7F4	Õ	F7F5	Ö	F7F6	Ø	F7F8
Ù	F7F9	Ú	F7FA	Û	F7FB	Ü	F7FC				
Ý	F7FD	Þ	F7FE	Ÿ	F7FF						
Ā	F800	Ē	F801	Ī	F802	Ō	F803	Ū	F804	Ȳ	F805

!	F721	¡	F7A1	&	F726	?	F73F	¿	F7BF

Small cap versions of diacritics:

breve	F6F4	caron	F6F5	circumflex	F6F6
dotaccent	F6F7	dbl acute	F6F8	ogonek	F6FB
ring	F6FC	tilde	F6FE	dieresis	F7A8
macron	F7AF	acute	F7B4	cedilla	F7B8

Table 7. Miscellaneous Items for Beta Code: Beta Code Order

Cardo .98 contains all the Unicode characters that the staff of the Thesaurus Linguae Graecae has identified as appropriate equivalents for characters in their Beta Code system. Earlier versions of Cardo contained some of these characters and a chart showing their Beta Code equivalents. TLG has now published a quick reference guide showing the Unicode characters that should be used as equivalents of items in Beta Code; it is available in PDF (Adobe Acrobat) form at http://www.tlg.uci.edu/quickbeta.pdf. This guide supercedes the charts in earlier versions of the Cardo manual.

Note about Brackets

Earlier versions of the Unicode Standard included a number of brackets designed for use in East Asian typography (beginning at U+3008) and some people used them as critical signs in classical and medieval texts. Asian ideographs are designed to fit into a rectangle, and narrow characters such as brackets often have extra space added to make them fit the rectangle (referred to as "wide" forms). Unicode 4.0 states that the CJK brackets are to be considered wide characters and has encoded new, unambiguously narrow, brackets for mathematical and other uses. These should be used as editorial signs signs the CJK signs may cause spacing problems. I have not removed the Asian brackets from Cardo to preserve backwards compatibility, but they should not be used in the future.

Table 8. Ancient Greek Metrical Symbols

Codepoints for these characters may change until final approval is given in ISO 10646.

GLYPH	UNICODE	CHARATER NAME	BETA
⏑	U+23D1	METRICAL BREVE	%40
⏒	U+23D2	METRICAL LONG OVER SHORT	%44
⏓	U+23D3	METRICAL SHORT OVER LONG	%45
⏔	U+23D4	METRICAL LONG OVER TWO SHORTS	%46
⏕	U+23D5	METRICAL TWO SHORTS OVER LONG	%42
⏖	U+23D6	METRICALTWO SHORTS JOINED	%141
⏗	U+23D7	METRICAL TRISEME	
⏘	U+23D8	METRICAL TETRASEME	
⏙	U+23D9	METRICAL PENTASAME	

Table 9A. Supplemental Punctuation

Codepoints for these characters may change until final approval is given in ISO 10646.

⁜	U+205C	DOTTED CROSS
		⌓ U+F021E glyph variant in SPA–A
		⁜ U+F021F glyph variant in SPA–A

New Testament Editorial Symbols

⸀	U+2E00	RIGHT ANGLE SUBSTITUTION MARKER
⸁	U+2E01	RIGHT ANGLE DOTTED SUBSTITUTION MARKER
⸂	U+2E02	LEFT SUBSTITUTION BRACKET
⸃	U+2E03	RIGHT SUBSTITUTION BRACKET
⸄	U+2E04	LEFT DOTTED SUBSTITUTION BRACKET
⸅	U+2E05	RIGHT DOTTED SUBSTITUTION BRACKET
⸆	U+2E06	RAISED INTERPOLATION MARKER
⸇	U+2E07	RAISED DOTTED INTERPOLATION MARKER
⸈	U+2E08	DOTTED TRANSPOSITION MARKER
⸉	U+2E09	LEFT TRANSPOSITION BRACKET
⸊	U+2E0A	RIGHT TRANSPOSITION BRACKET
□	U+2E0B	RAISED SQUARE
⸍	U+2E0C	RAISED SMALL DIAGONAL UPPER LEFT TO LOWER RIGHT
⸍	U+2E0D	RAISED SMALL DIAGONAL LOWER LEFT TO UPPER RIGHT

Ancient Greek textual symbols

⸎	U+2E0E	EDITORIAL CORONIS
		𝟤 U+F0220 glyph variant in SPA–A
		⊢ U+F0221 glyph variant in SPA–A
		⸎ U+F0222 glyph variant in SPA–A
		⸎ U+F0223 glyph variant in SPA–A
		⸎ U+F0224 glyph variant in SPA–A
⸏	U+2E0F	PARAGRAPHOS
		⸏ U+F0230 glyph variant in SPA–A
		⸏ U+F0231 glyph variant in SPA–A
⸐	U+2E10	FORKED PARAGRAPHOS
		⸐ U+F0235 glyph variant in SPA–A
⸑	U+2E11	REVERSED FORKED PARAGRAPHOS
		⸑ U+F0236 glyph variant in SPA–A
⸒	U+2E12	HYPODIASTOLE
⸓	U+2E13	DOTTED OBELOS
⸔	U+2E14	DOWNARDS ANCORA
⸕	U+2E15	UPWARDS ANCORA
⸖	U+2E16	DOTTED RIGHT–POINTING ANGLE

Table 9B. Additional New Testament Sigla

ℵ	U+2135	ALEF SYMBOL	#722
𝔊	U+1D50A	MATHEMATICAL FRAKTUR CAPITAL G	#723
ℌ	U+210C	BLACK–LETTER CAPITAL H	#724
𝔐	U+1D510	MATHEMATICAL FRAKTUR CAPITAL M	#725
𝔓	U+1D513	MATHEMATICAL FRAKTUR CAPITAL P	n/a
l	U+1D459	MATHEMATICAL ITALIC SMALL L	n/a

Table 10. The Latin Extended-A Block of Unicode

	010	011	012	013	014	015	016	017
0	Ā 0100	đ 0110	Ġ 0120	İ 0130	l· 0140	Ő 0150	Š 0160	Ű 0170
1	ā 0101	đ 0111	ġ 0121	ı 0131	Ł 0141	ő 0151	š 0161	ű 0171 [3.0]
2	Ă 0102	Ē 0112	Ģ 0122	IJ 0132	ł 0142	Œ 0152	Ţ 0162	Ų 0172
3	ă 0103	ē 0113	ģ 0123	ij 0133	Ń 0143	œ 0153	ţ 0163	ų 0173
4	Ą 0104	Ĕ 0114	Ĥ 0124	Ĵ 0134	ń 0144	Ŕ 0154	Ť 0164	Ŵ 0174
5	ą 0105	ĕ 0115	ĥ 0125	ĵ 0135	Ņ 0145	ŕ 0155	ť 0165	ŵ 0175
6	Ć 0106	Ė 0116	Ħ 0126	Ķ 0136	ņ 0146	Ŗ 0156	Ŧ 0166	Ŷ 0176
7	ć 0107	ė 0117	ħ 0127	ķ 0137	Ň 0147	ŗ 0157	ŧ 0167	ŷ 0177
8	Ĉ 0108	Ę 0118	Ĩ 0128	ĸ 0138	ň 0148	Ř 0158	Ũ 0168	Ÿ 0178
9	ĉ 0109	ę 0119	ĩ 0129	Ĺ 0139	ʼn 0149	ř 0159	ũ 0169	Ź 0179
A	Ċ 010A	Ě 011A	Ī 012A	ĺ 013A	Ŋ 014A	Ś 015A	Ū 016A	ź 017A
B	ċ 010B	ě 011B	ī 012B	Ļ 013B	ŋ 014B	ś 015B	ū 016B	Ż 017B
C	Č 010C	Ĝ 011C	Ĭ 012C	ļ 013C	Ō 014C	Ŝ 015C	Ŭ 016C	ż 017C
D	č 010D	ĝ 011D	ĭ 012D	Ľ 013D	ō 014D	ŝ 015D	ŭ 016D	Ž 017D
E	Ď 010E	Ğ 011E	Į 012E	ľ 013E	Ŏ 014E	Ş 015E	Ů 016E	ž 017E
F	ď 010F	ğ 011F	į 012F	Ŀ 013F	ŏ 014F	ş 015F	ů 016F	ſ 017F

Table 11. The Greek and Coptic Block of Unicode

	037	038	039	03A	03B	03C	03D	03E	03F
0	0370	0380	ΐ 0390	Π 03A0	ΰ 03B0	π 03C0	ϐ 03D0	Ⲡ 03E0	ϰ 03F0
1	0371	0381	Α 0391	Ρ 03A1	α 03B1	ρ 03C1	ϑ 03D1	ⲗ 03E1 [3.0]	ϱ 03F1
2	0372	0382	Β 0392	03A2	β 03B2	ς 03C2	ϒ 03D2	Ⳛ 03E2	ϲ 03F2
3	0373	0383	Γ 0393	Σ 03A3	γ 03B3	σ 03C3	ϓ 03D3	ω 03E3	ϳ 03F3
4	ʹ 0374	΄ 0384	Δ 0394	Τ 03A4	δ 03B4	τ 03C4	ϔ 03D4	ϥ 03E4	ϴ 03F4 [3.2]
5	͵ 0375	΅ 0385	Ε 0395	Υ 03A5	ε 03B5	υ 03C5	ϕ 03D5	ϥ 03E5	ϵ 03F5 [3.2]
6	0376	Ά 0386	Ζ 0396	Φ 03A6	ζ 03B6	φ 03C6	ϖ 03D6	ϧ 03E6	϶ 03F6 [3.2]
7	0377	· 0387	Η 0397	Χ 03A7	η 03B7	χ 03C7	ϗ 03D7 [3.0]	ϧ 03E7	Ϸ 03F7
8	0378	Έ 0388	Θ 0398	Ψ 03A8	θ 03B8	ψ 03C8	Ϙ 03D8 [3.2]	ϩ 03E8	ϸ 03F8
9	0379	Ή 0389	Ι 0399	Ω 03A9	ι 03B9	ω 03C9	ϙ 03D9 [3.2]	ϩ 03E9	Ϲ 03F9
A	ͺ 037A	Ί 038A	Κ 039A	Ϊ 03AA	κ 03BA	ϊ 03CA	Ϛ 03DA	Ⳬ 03EA	Ϻ 03FA
B	037B	038B	Λ 039B	Ϋ 03AB	λ 03BB	ϋ 03CB	ϛ 03DB [3.0]	ⳬ 03EB	ϻ 03FB
C	037C	Ό 038C	Μ 039C	ά 03AC	μ 03BC	ό 03CC	Ϝ 03DC	Ⲥ 03EC	ϼ 03FC
D	037D	038D	Ν 039D	έ 03AD	ν 03BD	ύ 03CD	ϝ 03DD [3.0]	ⲥ 03ED	Ͻ 03FD
E	; 037E	Ύ 038E	Ξ 039E	ή 03AE	ξ 03BE	ώ 03CE	Ϟ 03DE	Ⳁ 03EE	Ͼ 03FE
F	037F	Ώ 038F	Ο 039F	ί 03AF	ο 03BF	03CF	ϟ 03DF [3.0]	ⳁ 03EF	Ͽ 03FF

Table 12. The Greek Extended Block of Unicode

	1F0	1F1	1F2	1F3	1F4	1F5	1F6	1F7
0	ἀ 1F00	ἐ 1F10	ἠ 1F20	ἰ 1F30	ὀ 1F40	ὐ 1F50	ὠ 1F60	ὰ 1F70
1	ἁ 1F01	ἑ 1F11	ἡ 1F21	ἱ 1F31	ὁ 1F41	ὑ 1F51	ὡ 1F61	ά 1F71
2	ἂ 1F02	ἒ 1F12	ἢ 1F22	ἲ 1F32	ὂ 1F42	ὒ 1F52	ὢ 1F62	ὲ 1F72
3	ἃ 1F03	ἓ 1F13	ἣ 1F23	ἳ 1F33	ὃ 1F43	ὓ 1F53	ὣ 1F63	έ 1F73
4	ἄ 1F04	ἔ 1F14	ἤ 1F24	ἴ 1F34	ὄ 1F44	ὔ 1F54	ὤ 1F64	ὴ 1F74
5	ἅ 1F05	ἕ 1F15	ἥ 1F25	ἵ 1F35	ὅ 1F45	ὕ 1F55	ὥ 1F65	ή 1F75
6	ἆ 1F06	1F16	ἦ 1F26	ἶ 1F36	1F46	ὖ 1F56	ὦ 1F66	ὶ 1F76
7	ἇ 1F07	1F17	ἧ 1F27	ἷ 1F37	1F47	ὗ 1F57	ὧ 1F67	ί 1F77
8	Ἀ 1F08	Ἐ 1F18	Ἠ 1F28	Ἰ 1F38	Ὀ 1F48	1F58	Ὠ 1F68	ὸ 1F78
9	Ἁ 1F09	Ἑ 1F19	Ἡ 1F29	Ἱ 1F39	Ὁ 1F49	Ὑ 1F59	Ὡ 1F69	ό 1F79
A	Ἂ 1F0A	Ἒ 1F1A	Ἢ 1F2A	Ἲ 1F3A	Ὂ 1F4A	1F5A	Ὢ 1F6A	ὺ 1F7A
B	Ἃ 1F0B	Ἓ 1F1B	Ἣ 1F2B	Ἳ 1F3B	Ὃ 1F4B	Ὓ 1F5B	Ὣ 1F6B	ύ 1F7B
C	Ἄ 1F0C	Ἔ 1F1C	Ἤ 1F2C	Ἴ 1F3C	Ὄ 1F4C	1F5C	Ὤ 1F6C	ὼ 1F7C
D	Ἅ 1F0D	Ἕ 1F1D	Ἥ 1F2D	Ἵ 1F3D	Ὅ 1F4D	Ὕ 1F5D	Ὥ 1F6D	ώ 1F7D
E	Ἆ 1F0E	1F1E	Ἦ 1F2E	Ἶ 1F3E	1F4E	1F5E	Ὦ 1F6E	1F7E
F	Ἇ 1F0F	1F1F	Ἧ 1F2F	Ἷ 1F3F	1F4F	Ὗ 1F5F	Ὧ 1F6F	1F7F

The Greek Extended Block continued

	1F8	1F9	1FA	1FB	1FC	1FD	1FE	1FF
0	ᾀ 1F80	ᾐ 1F90	ᾠ 1FA0	ᾰ 1FB0	῀ 1FC0	ῐ 1FD0	ῠ 1FE0	1FF0
1	ᾁ 1F81	ᾑ 1F91	ᾡ 1FA1	ᾱ 1FB1	῁ 1FC1	ῑ 1FD1	ῡ 1FE1	1FF1
2	ᾂ 1F82	ᾒ 1F92	ᾢ 1FA2	ᾲ 1FB2	ῂ 1FC2	ῒ 1FD2	ῢ 1FE2	ῲ 1FF2
3	ᾃ 1F83	ᾓ 1F93	ᾣ 1FA3	ᾳ 1FB3	ῃ 1FC3	ΐ 1FD3	ΰ 1FE3	ῳ 1FF3
4	ᾄ 1F84	ᾔ 1F94	ᾤ 1FA4	ά 1FB4	ή 1FC4	1FD4	ῤ 1FE4	ώ 1FF4
5	ᾅ 1F85	ᾕ 1F95	ᾥ 1FA5	1FB5	1FC5	1FD5	ῥ 1FE5	1FF5
6	ᾆ 1F86	ᾖ 1F96	ᾦ 1FA6	ᾶ 1FB6	ῆ 1FC6	ῖ 1FD6	ῦ 1FE6	ῶ 1FF6
7	ᾇ 1F87	ᾗ 1F97	ᾧ 1FA7	ᾷ 1FB7	ῇ 1FC7	ῗ 1FD7	ῧ 1FE7	ῷ 1FF7
8	ᾈ 1F88	ᾘ 1F98	ᾨ 1FA8	Ᾰ 1FB8	Ὲ 1FC8	Ῐ 1FD8	Ῠ 1FE8	Ὸ 1FF8
9	ᾉ 1F89	ᾙ 1F99	ᾩ 1FA9	Ᾱ 1FB9	Έ 1FC9	Ῑ 1FD9	Ῡ 1FE9	Ό 1FF9
A	ᾊ 1F8A	ᾚ 1F9A	ᾪ 1FAA	Ὰ 1FBA	Ὴ 1FCA	Ὶ 1FDA	Ὺ 1FEA	Ὼ 1FFA
B	ᾋ 1F8B	ᾛ 1F9B	ᾫ 1FAB	Ά 1FBB	Ή 1FCB	Ί 1FDB	Ύ 1FEB	Ώ 1FFB
C	ᾌ 1F8C	ᾜ 1F9C	ᾬ 1FAC	ᾼ 1FBC	ῌ 1FCC	1FDC	Ῥ 1FEC	ῼ 1FFC
D	ᾍ 1F8D	ᾝ 1F9D	ᾭ 1FAD	᾽ 1FBD	῍ 1FCD	῝ 1FDD	῭ 1FED	´ 1FFD
E	ᾎ 1F8E	ᾞ 1F9E	ᾮ 1FAE	ι 1FBE	῎ 1FCE	῞ 1FDE	΅ 1FEE	῾ 1FFE
F	ᾏ 1F8F	ᾟ 1F9F	ᾯ 1FAF	῿ 1FBF	῏ 1FCF	῟ 1FDF	` 1FEF	1FFF

Table 13. Supplementary Greek Characters

The characters in the following table may be of use to epigraphers and others. As in Table 6 above, the green shading indicates that these characters <u>are not a part of the Unicode standard</u> and so are placed in the Private Use Area. We regard the use of the PUA as a stopgap measure until Windows supports combining diacritical marks (for the vowels with diacritics) and until there are more applications that support OpenType alternate letterforms. See the warning about using PUA characters on page 7 above for more details.

Ꞩ	U+E197	
⚹	U+E198	GREEK DENARIUS SIGN
L	U+E199	GREEK ETOUS SYMBOL
h	U+E19B	GREEK EPIGRAPHICAL SMALL H
Ꞇ	U+E19C	GREEK LETTER SAN VARIANT / DISIGMA
Ɪ	U+E1A0	INVERTED IOTA WITH BREVE BELOW
ɪ	U+E1A1	INVERTED IOTA WITH TILDE BELOW
ʎ	U+E1A2	INVERTED UPSILON WITH BREVE BELOW
ʊ	U+E1A3	INVERTED UPSILON WITH TILDE BELOW
Ꞩ	U+E1A5	GREEK LETTER CAPITAL JOT
Ҝ	U+E1A6	GREEK CAPITAL KAI SYMBOL
ĕ	U+E1A9	GREEK LETTER EPSILON WITH BREVE
'P	U+E1AA	GREEK LETTER OMICRON WITH BREVE
'P	U+E1AB	GREEK CAPITAL LETTER RHO WITH PSILI
'Y	U+E1AC	GREEK CAPITAL LETTER UPSILON WITH PSILI
῍Y	U+E1AD	GREEK CAPITAL LETTER UPSILON WITH PSILI AND GRAVE
῎Y	U+E1AE	GREEK CAPITAL LETTER UPSILON WITH PSILI AND ACUTE
῏Y	U+E1AF	GREEK CAPITAL LETTER UPSILON WITH PSILI AND PERISPOMENI

Here are the other epsilon and omicron plus diacritic combinations:

ἐ̃ E1B0	ε̃̈ E1B1	ε̃̀ E1B2	ε̄ E1B3	έ E1B4	ὲ E1B5
ε̇̈ E1B6	ε̇ E1B7	ε̈̄ E1B8	ε̈̀ E1B9	ε̈̆ E1BA	ε̈̃ E1BB
῍E E1BC	῀E E1BD	Ē E1BE	Ĕ E1BF	õ E1C0	ö̃ E1C1
ö̃ E1C2	ō E1C3	ó E1C4	ò E1C5	ὀ E1C6	ὁ E1C7
ö̈ E1C8	ö̈ E1C9	ö̆ E1CA	ö̆ E1CB	῍O E1CC	῀O E1CD
Ō E1CE	Ŏ E1CF				

Table 14. Ancient Greek Numbers Block of Unicode

Codepoints for these characters may change until final approval is given in ISO 10646. There are a number of glyph variants, shaded in green, in the Supplementary Private Use Area–A. Since these characters are in a Private Use Area, users should exercise caution; see page 7 for more information. All these glyph variants are included in the Stylistic Alternates feature for those who are using Adobe In-Design, Mellel, or another program that can take advantage of OpenType features.

Ancient Greek Acrophonic Numerals

⊃	U+10140	D800 DD40	ATTIC ACROPHONIC SYMBOL ONE QUARTER
(	U+10141	D800 DD41	ATTIC ACROPHONIC SYMBOL ONE HALF
⊢	U+10142	D800 DD42	ATTIC ACROPHONIC SYMBOL ONE DRACHMA
Γ	U+10143	D800 DD43	ATTIC ACROPHONIC SYMBOL FIVE
Γᐱ	U+10144	D800 DD44	ATTIC ACROPHONIC SYMBOL FIFTY
⊩	U+10145	D800 DD45	ATTIC ACROPHONIC SYMBOL FIVE HUNDRED
Γˣ	U+10146	D800 DD46	ATTIC ACROPHONIC SYMBOL FIVE THOUSAND
Γᴹ	U+10147	D800 DD47	ATTIC ACROPHONIC SYMBOL FIFTY THOUSAND
Γᵀ	U+10148	D800 DD48	ATTIC ACROPHONIC SYMBOL FIVE TALENTS.
Δ	U+10149	D800 DD49	ATTIC ACROPHONIC SYMBOL TEN TALENTS.
Γᐱ	U+1014A	D800 DD4A	ATTIC ACROPHONIC SYMBOL FIFTY TALENTS
Ͱ	U+1014B	D800 DD4B	ATTIC ACROPHONIC SYMBOL ONE HUNDRED TALENTS.
⊩	U+1014C	D800 DD4C	ATTIC ACROPHONIC SYMBOL FIVE HUNDRED TALENTS ◲ U+F0204 glyph variant in SPA–A
Ҳ	U+1014D	D800 DD4D	ATTIC ACROPHONIC SYMBOL ONE THOUSAND TALENTS
Γˣᵀ	U+1014E	D800 DD4E	ATTIC ACROPHONIC SYMBOL FIVE THOUSAND TALENTS
Γᵀ	U+1014F	D800 DD4F	ATTIC ACROPHONIC SYMBOL FIVE STATERS
Δ꜐	U+10150	D800 DD50	ATTIC ACROPHONIC SYMBOL TEN STATERS
Γᐱ꜐	U+10151	D800 DD51	ATTIC ACROPHONIC SYMBOL FIFTY
Ͱ꜐	U+10152	D800 DD52	ATTIC ACROPHONIC SYMBOL ONE HUNDRED STATERS
⊩꜐	U+10153	D800 DD53	ATTIC ACROPHONIC SYMBOL FIVE HUNDRED STATERS
Ҳ꜐	U+10154	D800 DD54	ATTIC ACROPHONIC SYMBOL ONE THOUSAND STATERS
Μ꜐	U+10155	D800 DD55	ATTIC ACROPHONIC SYMBOL TEN THOUSAND STATERS
Γᴹ꜐	U+10156	D800 DD56	ATTIC ACROPHONIC SYMBOL FIFTY THOUSAND STATERS
ᐱᴹ	U+10157	D800 DD57	ATTIC ACROPHONIC SYMBOL TEN MNAS ◬ U+ F0205 glyph variant in SPA–A Ӎ U+ F0206 glyph variant in SPA–A Ӑ U+ F0207 glyph variant in SPA–A
Γ	U+10158	D800 DD58	HERAEUM ACROPHONIC SYMBOL ONE PLETHRON
▷	U+10159	D800 DD59	THESPIAN ACROPHONIC SYMBOL ONE
Ρ	U+1015A	D800 DD5A	HERMIONIAN ACROPHONIC SYMBOL ONE
⋮	U+1015B	D800 DD5B	EPIDAUREAN ACROPHONIC SYMBOL TWO.
Ϛ	U+1015C	D800 DD5C	THESPIAN ACROPHONIC SYMBOL TWO
⊏	U+1015D	D800 DD5D	CYRENAIC ACROPHONIC SYMBOL TWO DRACHMAS

Ξ	U+1015E	D800 DD5E	EPIDAUREAN ACROPHONIC SYMBOL TWO DRACHMAS
Γˉ	U+1015F	D800 DD5F	TROEZENIAN ACROPHONIC SYMBOL FIVE
Ƹ	U+10160	D800 DD60	TROEZENIAN ACROPHONIC SYMBOL TEN TYPE ONE
X	U+10161	D800 DD61	TROEZENIAN ACROPHONIC SYMBOL TEN TYPE TWO
Λ	U+10162	D800 DD62	HERMIONIAN ACROPHONIC SYMBOL TEN
Ϋ	U+10163	D800 DD63	MESSIANIAN ACROPHONIC SYMBOL TEN
Ð	U+10164	D800 DD64	THESPIAN ACROPHONIC SYMBOL TEN
Ð	U+10165	D800 DD65	THESPIAN ACROPHONIC SYMBOL THIRTY Ð U+F0208 glyph variant in SPA-A Ϸ U+F0209 glyph variant in SPA-A Ϸ U+F020A glyph variant in SPA-A Ь U+F020B glyph variant in SPA-A Ʀ U+F020C glyph variant in SPA-A
Γᵐ	U+10166	D800 DD66	TROEZENIAN ACROPHONIC SYMBOL FIFTY TYPE ONE
Γᴶ	U+10167	D800 DD67	TROEZENIAN ACROPHONIC SYMBOL FIFTY TYPE TWO
Ν	U+10168	D800 DD68	HERMIONIAN ACROPHONIC SYMBOL FIFTY
ΓE	U+10169	D800 DD69	THESPIAN ACROPHONIC SYMBOL FIFTY ΓE U+F020D glyph variant in SPA-A ΓE U+F020E glyph variant in SPA-A
ΗE	U+1016A	D800 DD6A	THESPIAN ACROPHONIC SYMBOL ONE HUNDRED
ΤΕ	U+1016B	D800 DD6B	THESPIAN ACROPHONIC SYMBOL THREE HUNDRED
Γᴸ	U+1016C	D800 DD6C	EPIDAUREAN ACROPHONIC SYMBOL FIVE HUNDRED
ΓU	U+1016D	D800 DD6D	TROEZENIAN ACROPHONIC SYMBOL FIVE HUNDRED
ΓΗE	U+1016E	D800 DD6E	THESPIAN ACROPHONIC SYMBOL FIVE HUNDRED Γ⁺E U+F020F glyph variant in SPA-A ΠE U+F0210 glyph variant in SPA-A
Γᴵ	U+1016F	D800 DD6F	CARYSTIAN ACROPHONIC SYMBOL FIVE HUNDRED
ΗΗ	U+10170	D800 DD70	NAXIAN ACROPHONIC SYMBOL FIVE HUNDRED
Ψ	U+10171	D800 DD71	THESPIAN ACROPHONIC SYMBOL ONE THOUSAND UNITS
Ϋ	U+10172	D800 DD72	THESPIAN ACROPHONIC SYMBOL FIVE THOUSAND UNITS
Π̂	U+10173	D800 DD73	DELPHIC ACROPHONIC SYMBOL FIVE MNAS
Γᴬ	U+10174	D800 DD74	STRATIAN ACROPHONIC SYMBOL FIFTY MNAS

The following are glyph variants of Unicode characters that are designed to be used in the printing of acrophonic numerals. They may be accessed through the Stylistic Alternates feature in programs that support OT features as well as through the SPA-A codepoints.

/	U+F0200	DB80 DE00	VARIANT OF U+002F SLASH, FOR 1/12 UNIT #804
>	U+F0201	DB80 DE01	VARIANT OF U+003E GREATER, FOR HALF DRACHMA SIGN #1337
<	U+F0202	DB80 DE02	VARIANT OF U+003C LESS, ONE HALF (NON-ATTIC USE)
O	U+F0203	DB80 DE03	VARIANT OF U+25EF LARGE CIRCLE, 4 DIFFERENT VALUES

The following characters are present in the Beta Code manual but are not found in any texts currently in the TLG database. They are included here in the SPA-A for the sake of completeness.

Η	U+F0211	DB80 DE11	PHYSCAN 100 MNAS
Μ	U+F0212	DB80 DE12	ACROPHONIC 10,000 TALENTS #819
Γᴶᴱ	U+F0213	DB80 DE13	ACROPHONIC 5,000 STATERS #828

Ancient Greek Papyrological Numbers

⦿	U+10175	D800 DD75	GREEK SYMBOL HALF TYPE ONE
			⦿ U+F0237 glyph variant in SPA–A
			◡ U+F0238 glyph variant in SPA–A
			↳ U+F0239 glyph variant in SPA–A
⦿	U+10176	D800 DD76	GREEK SYMBOL HALF TYPE TWO
ω	U+10177	D800 DD77	GREEK SYMBOL TWO–THIRDS
			Γ^δ U+F022E glyph variant in SPA–A
ℬ	U+10178	D800 DD78	GREEK SYMBOL THREE–QUARTERS
↳	U+10179	D800 DD79	GREEK SYMBOL YEAR
⪫	U+1017A	D800 DD7A	GREEK SYMBOL TALENT
⪦	U+1017B	D800 DD7B	GREEK SYMBOL DRACHMA
⁓	U+1017C	D800 DD7C	GREEK SYMBOL OBOL
			~ U+F0226 glyph variant in SPA–A
≈	U+1017D	D800 DD7D	GREEK SYMBOL TWO OBOLS
			≈ U+F0227 glyph variant in SPA–A
⌐	U+1017E	D800 DD7E	GREEK SYMBOL THREE OBOLS
Ϝ	U+1017F	D800 DD7F	GREEK SYMBOL FOUR OBOLS
Ϝ	U+10180	D800 DD80	GREEK SYMBOL FIVE OBOLS
⊦	U+10181	D800 DD81	GREEK SYMBOL METRETES
Ⱪ	U+10182	D800 DD82	GREEK SYMBOL KYATHOS BASE
ꝯ	U+10183	D800 DD83	GREEK SYMBOL LITRA
			ꝯ U+F0228 glyph variant in SPA–A
Γ^δ	U+10184	D800 DD84	GREEK SYMBOL OUNKIA
∞	U+10185	D800 DD85	GREEK SYMBOL XESTES
			ξ U+F0229 glyph variant in SPA–A
			ξ U+F022A glyph variant in SPA–A
⦿	U+10186	D800 DD86	GREEK SYMBOL ARTABE
			⦿ U+F022B glyph variant in SPA–A
			⦿ U+F022C glyph variant in SPA–A
℔	U+10187	D800 DD87	GREEK SYMBOL AROURA.
Γ^γ	U+10188	D800 DD88	GREEK SYMBOL GRAMMA
ꝗ	U+10189	D800 DD89	GREEK SYMBOL TRYBLION BASE

Table 15. Old Italic Block

Notes about Old Italic go here!

A	U+10300	D800 DF00	OLD ITALIC LETTER A
B	U+10301	D800 DF01	OLD ITALIC LETTER BE
C	U+10302	D800 DF02	OLD ITALIC LETTER KE
D	U+10303	D800 DF03	OLD ITALIC LETTER DE
E	U+10304	D800 DF04	OLD ITALIC LETTER E
F	U+10305	D800 DF05	OLD ITALIC LETTER VE
I	U+10306	D800 DF06	OLD ITALIC LETTER ZE
⊟	U+10307	D800 DF07	OLD ITALIC LETTER HE
⊗	U+10308	D800 DF08	OLD ITALIC LETTER THE
I	U+10309	D800 DF09	OLD ITALIC LETTER I
k	U+1030A	D800 DF0A	OLD ITALIC LETTER KA
L	U+1030B	D800 DF0B	OLD ITALIC LETTER EL
ᛖ	U+1030C	D800 DF0C	OLD ITALIC LETTER M
ᚼ	U+1030D	D800 DF0D	OLD ITALIC LETTER N
⊞	U+1030E	D800 DF0E	OLD ITALIC LETTER ESH
O	U+1030F	D800 DF0F	OLD ITALIC LETTER O
Γ	U+10310	D800 DF10	OLD ITALIC LETTER PE
M	U+10311	D800 DF11	OLD ITALIC LETTER SHE
Q	U+10312	D800 DF12	OLD ITALIC LETTER KU
P	U+10313	D800 DF13	OLD ITALIC LETTER ER
⌇	U+10314	D800 DF14	OLD ITALIC LETTER ES
T	U+10315	D800 DF15	OLD ITALIC LETTER TE
Y	U+10316	D800 DF16	OLD ITALIC LETTER U
X	U+10317	D800 DF17	OLD ITALIC LETTER EKS
Φ	U+10318	D800 DF18	OLD ITALIC LETTER PHE
Ψ	U+10319	D800 DF19	OLD ITALIC LETTER KHE
8	U+1031A	D800 DF1A	OLD ITALIC LETTER EF
P	U+1031B	D800 DF1B	OLD ITALIC LETTER ERS
b	U+1031C	D800 DF1C	OLD ITALIC LETTER CHE
⊣	U+1031D	D800 DF1D	OLD ITALIC LETTER II
V	U+1031E	D800 DF1E	OLD ITALIC LETTER UU
I	U+10320	D800 DF20	OLD ITALIC NUMERAL ONE
Λ	U+10321	D800 DF21	OLD ITALIC NUMERAL FIVE
X	U+10322	D800 DF22	OLD ITALIC NUMERAL TEN
↑	U+10323	D800 DF23	OLD ITALIC NUMERAL FIFTY

Table 16. Gothic Block

This block is planned for the next version of Cardo.

Table 17. Ancient Greek Musical Notation Block

Codepoints for these characters may change until final approval is given in ISO 10646.

			Ancient Greek vocalic notation
Ɔ	1D200	D834 DE00	GREEK VOCAL NOTATION SYMBOL 1
Ǝ	1D201	D834 DE01	GREEK VOCAL NOTATION SYMBOL 2
Ӿ	1D202	D834 DE02	GREEK VOCAL NOTATION SYMBOL 3
ᴅ	1D203	D834 DE03	GREEK VOCAL NOTATION SYMBOL 4
⋜	1D204	D834 DE04	GREEK VOCAL NOTATION SYMBOL 5
⅃	1D205	D834 DE05	GREEK VOCAL NOTATION SYMBOL 6
Ɛ	1D206	D834 DE06	GREEK VOCAL NOTATION SYMBOL 7
Ь	1D207	D834 DE07	GREEK VOCAL NOTATION SYMBOL 8
Ц	1D208	D834 DE08	GREEK VOCAL NOTATION SYMBOL 9
Ϙ	1D209	D834 DE09	GREEK VOCAL NOTATION SYMBOL 10
И	1D20A	D834 DE0A	GREEK VOCAL NOTATION SYMBOL 11
И	1D20B	D834 DE0B	GREEK VOCAL NOTATION SYMBOL 12
М	1D20C	D834 DE0C	GREEK VOCAL NOTATION SYMBOL 13
V	1D20D	D834 DE0D	GREEK VOCAL NOTATION SYMBOL 14
⋉	1D20E	D834 DE0E	GREEK VOCAL NOTATION SYMBOL 15
＼	1D20F	D834 DE0F	GREEK VOCAL NOTATION SYMBOL 16
⌒	1D210	D834 DE10	GREEK VOCAL NOTATION SYMBOL 17
⊢	1D211	D834 DE11	GREEK VOCAL NOTATION SYMBOL 18
�7	1D212	D834 DE12	GREEK VOCAL NOTATION SYMBOL 19
F	1D213	D834 DE13	GREEK VOCAL NOTATION SYMBOL 20
∇	1D214	D834 DE14	GREEK VOCAL NOTATION SYMBOL 21
⌐	1D215	D834 DE15	GREEK VOCAL NOTATION SYMBOL 22
R	1D216	D834 DE16	GREEK VOCAL NOTATION SYMBOL 23
Ɐ	1D217	D834 DE17	GREEK VOCAL NOTATION SYMBOL 24
ф	1D218	D834 DE18	GREEK VOCAL NOTATION SYMBOL 50
Ӿ	1D219	D834 DE19	GREEK VOCAL NOTATION SYMBOL 51
θ	1D21A	D834 DE1A	GREEK VOCAL NOTATION SYMBOL 52
γ	1D21B	D834 DE1B	GREEK VOCAL NOTATION SYMBOL 53
⊥	1D21C	D834 DE1C	GREEK VOCAL NOTATION SYMBOL 54
			Ancient Greek instrumental notation
Ɑ	1D21D	D834 DE1D	GREEK INSTRUMENTAL NOTATION SYMBOL 1
Ꞓ	1D21E	D834 DE1E	GREEK INSTRUMENTAL NOTATION SYMBOL 2
ᴘ	1D21F	D834 DE1F	GREEK INSTRUMENTAL NOTATION SYMBOL 4
Y	1D220	D834 DE20	GREEK INSTRUMENTAL NOTATION SYMBOL 5
Ɛ	1D221	D834 DE21	GREEK INSTRUMENTAL NOTATION SYMBOL 7
ω	1D222	D834 DE22	GREEK INSTRUMENTAL NOTATION SYMBOL 8
Ⴞ	1D223	D834 DE23	GREEK INSTRUMENTAL NOTATION SYMBOL 11
Ⴃ	1D224	D834 DE24	GREEK INSTRUMENTAL NOTATION SYMBOL 12
Ⴂ	1D225	D834 DE25	GREEK INSTRUMENTAL NOTATION SYMBOL 13

⊥	1D226	D834 DE26	GREEK INSTRUMENTAL NOTATION SYMBOL 14
ɯ	1D227	D834 DE27	GREEK INSTRUMENTAL NOTATION SYMBOL 17
Ǝ	1D228	D834 DE28	GREEK INSTRUMENTAL NOTATION SYMBOL 18
⊢	1D229	D834 DE29	GREEK INSTRUMENTAL NOTATION SYMBOL 19
L	1D22A	D834 DE2A	GREEK INSTRUMENTAL NOTATION SYMBOL 23
⅂	1D22B	D834 DE2B	GREEK INSTRUMENTAL NOTATION SYMBOL 24
Γ	1D22C	D834 DE2C	GREEK INSTRUMENTAL NOTATION SYMBOL 25
⌐	1D22D	D834 DE2D	GREEK INSTRUMENTAL NOTATION SYMBOL 26
˥	1D22E	D834 DE2E	GREEK INSTRUMENTAL NOTATION SYMBOL 27
ɥ	1D22F	D834 DE2F	GREEK INSTRUMENTAL NOTATION SYMBOL 29
Ⅎ	1D230	D834 DE30	GREEK INSTRUMENTAL NOTATION SYMBOL 30
U	1D231	D834 DE31	GREEK INSTRUMENTAL NOTATION SYMBOL 32
ʞ	1D232	D834 DE32	GREEK INSTRUMENTAL NOTATION SYMBOL 36
⊳	1D233	D834 DE33	GREEK INSTRUMENTAL NOTATION SYMBOL 37
⊲	1D234	D834 DE34	GREEK INSTRUMENTAL NOTATION SYMBOL 38
Λ	1D235	D834 DE35	GREEK INSTRUMENTAL NOTATION SYMBOL 39
<	1D236	D834 DE36	GREEK INSTRUMENTAL NOTATION SYMBOL 40
>	1D237	D834 DE37	GREEK INSTRUMENTAL NOTATION SYMBOL 42
⊏	1D238	D834 DE38	GREEK INSTRUMENTAL NOTATION SYMBOL 43
⊐	1D239	D834 DE39	GREEK INSTRUMENTAL NOTATION SYMBOL 45
╱	1D23A	D834 DE3A	GREEK INSTRUMENTAL NOTATION SYMBOL 47
╲	1D23B	D834 DE3B	GREEK INSTRUMENTAL NOTATION SYMBOL 48
⌐	1D23C	D834 DE3C	GREEK INSTRUMENTAL NOTATION SYMBOL 49 Z U+F0052 glyph variant in SPA–A
⟍	1D23D	D834 DE3D	GREEK INSTRUMENTAL NOTATION SYMBOL 50
⟍	1D23E	D834 DE3E	GREEK INSTRUMENTAL NOTATION SYMBOL 51
५	1D23F	D834 DE3F	GREEK INSTRUMENTAL NOTATION SYMBOL 52
⟋	1D240	D834 DE40	GREEK INSTRUMENTAL NOTATION SYMBOL 53
⟍	1D241	D834 DE41	GREEK INSTRUMENTAL NOTATION SYMBOL 54
FURTHER GREEK MUSICAL NOTATION SYMBOLS			
⊡	1D242	D834 DE42	GREEK MUSICAL TRISEME
⊡	1D243	D834 DE43	GREEK MUSICAL TETRASEME
⊟	1D244	D834 DE44	GREEK MUSICAL PENTASEME
∩	1D245	D834 DE45	GREEK MUSICAL LEIMMA

Table 18. Rare and Idiosyncratic Ancient Greek Musical Symbols

This table contains those musical symbols that are so rare or poorly understood that the TLG did not propose them for inclusion in Unicode. They are located in the Supplementary Private Use Area–A. The Beta Code value is given in the right–hand column.

⊸	F024A	uF024A	Archaic Musical Symbol 2a / 40a	#594
⊶	F024B	uF024B	Archaic Musical Symbol 2b / 40b	#601
ϐ	F024C	uF024C	Archaic Musical Symbol 4a / 6b	#595
ϙ	F024D	uF024D	Archaic Musical Symbol 4b / 6a	#596
⌐	F024E	uF024E	Archaic Musical Symbol 7b	#597
Δ	F024F	uF024F	Archaic Musical Symbol 10b / 9a (= Delta.01)	#598
⊐	F0250	uF0250	Archaic Musical Symbol 13a	#605
ᆿ	F0251	uF0251	Archaic Musical Symbol 15a	#606
ᅣ	F0252	uF0252	Archaic Musical Symbol 15b	#613
Ɔ	F0253	uF0253	Archaic Musical Symbol 16b / 17a	#608
ϵ	F0254	uF0254	Archaic Musical Symbol 16a / 17b	#607
ʏ	F0255	uF0255	Archaic Musical Symbol 18a / 19b	#609
ϒ	F0256	uF0256	Archaic Musical Symbol 18b / 19a	#610
∝	F0257	uF0257	Archaic Musical Symbol 20a	#611
ᴔ	F0258	uF0258	Archaic Musical Symbol 20b	#614
⋎	F0259	uF0259	Archaic Musical Symbol 23b / 24a	#612
ϝ	F025A	uF025A	Archaic Musical Symbol 46a	#620
ϳ	F025B	uF025B	Archaic Musical Symbol 46b	#626
⅂	F025C	uF025C	[reserved]	#568
Γ	F025D	uF025D	Idiosyncratic Musical Symbol	#571
⟋	F025E	uF025E	Instrumental Notation Symbol 53; see #675	#592
Ω	F025F	uF025F	Archaic Musical Symbol 32a	#617
℧	F0260	uF0260	Archaic Musical Symbol 32b	#623
⊻	F0261	uF0261	Archaic Musical Symbol 38a	#618
⊤	F0262	uF0262	Archaic Musical Symbol 33b	#625
λ	F0263	uF0263	Archaic Musical Symbol 44a	#619
μ	F0264	uF0264	Idiosyncratic Musical Symbol	#677
ϛ	F0265	uF0265	Idiosyncratic Musical Symbol	#680
⊓	F0266	uF0266	Idiosyncratic Musical Symbol	#681
⊐	F0267	uF0267	Idiosyncratic Musical Symbol	#682
✳	F0268	uF0268	Idiosyncratic Musical Symbol	#683
⊼	F0269	uF0269	Idiosyncratic Musical Symbol	#685
⊥	F026A	uF026A	Idiosyncratic Musical Symbol	#686
⋁	F026B	uF026B	Idiosyncratic Musical Symbol	#687

Table 19. Glyph Variants of Uppercase Greek Letters

This table lists the variants of Greek letters. The first glyph in each group is a sans-serif version of the standard Greek uppercase letter, designed to harmonize with the other characters in Cardo. These sans-serif forms are useful for printing acrophonic numerals, musical texts, and so forth. After the regular letterform come less common glyph shapes. This table is largely based on one compiled by Edward C. D. Hopkins showing the various glyphs found on ancient coins; see his website at http://www.parthia.com/fonts/glyphchart.htm.

There is a good deal of overlap among the variants; for example, Alpha sometimes appears in shapes that look like Delta, Lambda, or even Iota. In such cases cross-references are given in light print to the appropriate forms.

Some inscriptions and coins use retrograde glyphs; these come in a group after the standard glyphs. Not all characters need separate retrograde forms, of course (e.g., Omicron and Theta). Those who are using the SPA-A values to access the variants can get the retrograde forms by changing the third digit of the Unicode value from zero to one; for example, the retrograde version of ᗄ F0006 is ᘉ F0106.

Since these characters are in a Private Use Area, users should exercise caution; see page 7 for more information. All these glyph variants are included in the Stylistic Alternates feature for those who are using Adobe InDesign, Mellel, or another program that can take advantage of OpenType features.

Glyph	Code	Name	Retrograde
A	F0000	Alpha.01	
Λ	F0001	Alpha.02	
A	F0002	Alpha.03	F0102 ᗄ retrograde
Λ	F0003	Alpha.04	F0103 ᗄ retrograde
A	F0004	Alpha.05	F0104 ᗄ retrograde
A	F0005	Alpha.06	F0105 ᗄ retrograde
A	F0006	Alpha.07	F0106 ᘉ retrograde
A	F0007	Alpha.08	F0107 ᗄ retrograde
Δ		Alpha.09	= Delta.01
Λ		Alpha.10	= Lambda.01
I		Alpha.11	= Iota.01
B	F0010	Beta.01	F0110 ᗺ retrograde
Β	F0011	Beta.02	F0111 ᗺ retrograde
S		Beta.03	= Sigma.06 / F00C6 ᔕ retrograde
ᒑ	F0013	Beta.04	F0113 ᒬ retrograde
ᐯ	F0014	Beta.05	F0114 ᐱ retrograde
ᕁ	F0015	Beta.06	F0115 ᕴ retrograde
C		Beta.07	= Gamma.07 / F0126 Ɔ retrograde
□		Beta.08	= Omicron.02
I		Beta.09	= Iota.01
<		Beta.10	= Gamma.02 / F0121 > retrograde
ᔨ	F001A	Beta.11	F011A ᔪ retrograde

Γ	F0020	Gamma.01	F0120 ⌐ retrograde
<	F0021	Gamma.02	F0121 > retrograde
Ϝ	F0022	Gamma.03	F0122 ⌐ retrograde
L	F0023	Gamma.04	F0123 ⌐ retrograde
⌐	F0024	Gamma.05	F0124 ⌐ retrograde
Λ		Gamma.06	= Lambda.02 / Λ Lambda.02r retrograde
Ϲ	F0026	Gamma.07	F0126 Ͻ retrograde
Λ		Gamma.08	= Lambda.01
Δ	F0028	Delta.01	
▷	F0029	Delta.02	F0129 ◁ retrograde
D	F002A	Delta.03	F012A ⅅ retrograde
Λ		Delta.04	= Lambda.01
E	F0030	Epsilon.01	F0130 Ǝ retrograde
Ε	F0031	Epsilon.02	F0131 Ͽ retrograde
L		Epsilon.03	= Gamma.04 / ⌐ Gamma.04r retrograde
H		Epsilon.04	= Eta.07
ϴ	F0034	Epsilon.05	F0134 Ͽ retrograde
⋠	F0035	Epsilon.06	F0135 ⋟ retrograde
⋠	F0036	Epsilon.07	F0136 ⋟ retrograde
Ɛ	F0037	Epsilon.08	F0137 Ǝ retrograde
⋠	F0038	Epsilon.09	F0138 ⋟ retrograde
⋡	F0039	Epsilon.10	F0139 ⋢ retrograde
⌐	F003A	Epsilon.11	F013A ⌐ retrograde
I		Epsilon.12	= Iota.01
E	F003C	Epsilon.13	F013C Ǝ retrograde
⪜	F003D	Epsilon.14	F013D ⪝ retrograde
Ɛ	F003E	Epsilon.15	F013E Ͽ retrograde
≺	F003F	Epsilon.16	F013F ≻ retrograde
Ϛ	F0040	uni03DA.01	aka Stigma.01; F0140 Ͻ retrograde
Ϛ	F0041	uni03DA.02	aka Stigma.02; F0141 Ͼ retrograde
Ͷ	F0042	uni03DA.03	aka Stigma.03; F0142 retrograde
⌐		uni03DA.04	= Epsilon.11; aka Stigma.04
ᴦ	F0044	uni03DA.05	aka Stigma.05; F0144 ᴥ retrograde
Ϛ	F0045	uni03DA.06	aka Stigma.06; F0145 ⁇ retrograde
⨍	F0046	uni03DA.07	aka Stigma.07; F0146 ⟩ retrograde
F	F0048	uni03DC.01	aka Digamma.01; F0148 ⌐ retrograde
⌃	F0049	uni03DC.02	aka Digamma.02; F0149 ⌃ retrograde
⌐	F004A	uni03DC.03	aka Digamma.03; F014A ⌐ retrograde
⼸	F004B	uni03DC.04	aka Digamma.04; F014B ⼸ retrograde
Λ	F004C	uni03DC.05	aka Digamma.05; F014C Λ retrograde
ᴎ		uni03DC.06	= Nu.03; aka Digamma.06
N		uni03DC.07	= Nu.01; aka Digamma.07

Glyph	Code	Name	Notes
Ϻ	F004F	uni03DC.08	aka Digamma.08; F014F Ν retrograde
⋏	F0050	uni03DC.09	aka Digamma.09; F0150 ⋏ retrograde
Ζ	F0052	Zeta.01	F0152 ∑ retrograde
Ⅰ	F0053	Zeta.02	
‡	F0054	Zeta.03	
Η	F0056	Eta.01	
⊟	F0057	Eta.02	
目	F0058	Eta.03	
目	F0059	Eta.04	F0159 目 retrograde
Η	F005A	Eta.05	
Ħ	F005B	Eta.06	F015B Ħ retrograde
⊢	F005C	Eta.07	F015C ⊣ retrograde
E		Eta.08	= Epsilon.01 / Ⅎ Epsilon.01r retrograde
⊖	F0060	Theta.01	capital letter theta sans-serif
⊙	F0061	Theta.02	
⊖	F0062	Theta.03	
⊞	F0063	Theta.04	
⊠	F0064	Theta.05	
⊡	F0065	Theta.06	
⊕	F0066	Theta.07	
⊗	F0067	Theta.08	
⬖	F0068	Theta.09	
⬥	F0069	Theta.10	
⬖	F006A	Theta.11	
⬥	F006B	Theta.12	
⋮	F006C	Theta.13	
		Theta.14	= Eta.02
☐		Theta.15	= Omicron.02
Ι	F0070	Iota.01	
⩽	F0071	Iota.02	= Sigma.05 / ⩾ Sigma.05r retrograde
⌐	F0072	Iota.03	F0172 ⌐ retrograde
⋜	F0073	Iota.04	F0173 ⋝ retrograde
Ɛ	F0074	Iota.05	F0174 Ʒ retrograde
S		Iota.06	= Sigma.06 / Ƨ Sigma.06r retrograde
Ɫ	F0076	Iota.07	
Κ	F0077	Kappa.01	F0177 Ⱪ retrograde
Ⱪ	F0078	Kappa.02	F0178 ⱪ retrograde
Ν		Kappa.03	= Nu.01 / Ν Nu.01r retrograde
⋏		Kappa.04	= Eta.01 / ⋏ Eta.01r retrograde
+		Kappa.05	= Phi.02
		Kappa.06	= Nu.07
Ⱪ	F007D	Kappa.07	F017D Ⱪ retrograde

X		Kappa.08	= Chi.01
Ⅎ	F007F	Kappa.09	F017F ꓭ retrograde
Λ	F0080	Lambda.01	
⋀	F0081	Lambda.02	F0181 ⋀ retrograde
Γ		Lambda.03	= Gamma.01 / ꓶ Gamma.01 retrograde
Δ		Lambda.04	= Delta.01
∟		Lambda.05	= Gamma.04 / ⌐ Gamma.04r retrograde
⌐		Lambda.06	= Gamma.05 / ⌐ Gamma.05r retrograde
Ʌ	F0086	Lambda.07	F0186 ↓ retrograde
٧	F0087	Lambda.08	F0187 √ retrograde
Ϻ	F0088	Mu.01	
ϻ	F0089	Mu.02	
ᴟ	F008A	Mu.03	F018A ᴟ retrograde
ᴍ	F008B	Mu.04	F018B ᴍ retrograde
Π		Mu.05	= Pi.01
Ϻ	F008D	Mu.06	= u10311; separate glyph here for sorting
Ϻ	F008E	Mu.07	
Ν	F0090	Nu.01	F0190 ᴎ retrograde
ᴎ	F0091	Nu.02	F0191 ᴎ retrograde
ᴎ	F0092	Nu.03	F0192 ᴎ retrograde
ᴎ	F0093	Nu.04	F0193 ᴎ retrograde
X		Nu.05	= Chi.01
⋀		Nu.06	= Eta.01 / ⋀ Eta.01r retrograde
ᴎ	F0096	Nu.07	F0196 ᴎ retrograde
∟		Nu.08	= Iota.03 / ⌐ Iota.024 retrograde
Ξ	F0098	Xi.01	
Ⱶ		Xi.02	= Iota.07
Ƶ	F009A	Xi.03	F019A Ƶ retrograde
Ⱶ	F009B	Xi.04	
Ξ	F009C	Xi.05	
Ⱶ	F009D	Xi.06	
✛		Xi.07	= Phi.02
X		Xi.08	= Chi.01
		Xi.09	= Zeta.02
Ο	F00A1	Omicron.01	capital letter omicron sans-serif
▯	F00A2	Omicron.02	
●	F00A3	Omicron.03	
°	F00A4	Omicron.04	
◇	F00A5	Omicron.05	
Ω	F00A6	Omicron.06	
Θ		Omicron.07	= Theta.01
C		Omicron.08	= uni03F9.01 (lunate sigma.01)

Π	F00A9	Pi.01	capital letter pi sans-serif
Γ	F00AA	Pi.02	F01AA ⅂ retrograde
Π	F00AB	Pi.03	
Ρ		Pi.04	= Rho.08 / ٩ Rho.08r retrograde
ΙΙ	F00AD	Pi.05	
C		Pi.06	= uni03F9.01 / uni03F9.01r Ɔ retrograde
Ϻ		uni03FA.01	aka San.01; = Mu.06
Ϻ		uni03FA.02	aka San.02 ; = Mu.2
Ϙ	F00B2	uni03D8.01	aka Koppa.01
Ϙ	F00B3	uni03D8.02	aka Koppa.02
Υ	F00B4	uni03D8.03	aka Koppa.03
Ϙ	F00B5	uni03D8.04	aka Koppa.04
Φ	F00B6	uni03D8.05	aka Koppa.05
Ρ	F00B7	Rho.01	F01B7 ٩ retrograde
Ρ	F00B8	Rho.02	F01B8 ٩ retrograde
Η		Rho.03	= Eta.07
Γ	F00BA	Rho.04	F01BA ⅂ retrograde
Ι		Rho.05	= Iota.01
Ρ	F00BC	Rho.06	F01BC Я retrograde
Ρ	F00BD	Rho.07	F01BD Я retrograde
Ρ	F00BE	Rho.08	F01BE ٩ retrograde
R	F00BF	Rho.09	F01BF Я retrograde
Ρ	F00C0	Rho.10	F01C0 ٩ retrograde
Σ	F00C1	Sigma.01	F01C1 Ƨ retrograde
C	F00C2	uni03F9.01	aka Sigma.02; F01C2 Ɔ retrograde
Ϲ		Sigma.03	= Epsilon.11 / Ⅎ Epsilon 11r retrograde
Ι		Sigma.04	= Iota.01
Ƨ	F00C5	Sigma.05	F01C5 Ƨ retrograde
S	F00C6	Sigma.06	F01C6 Ƨ retrograde
Ϛ	F00C7	Sigma.07	F01C7 Ƹ retrograde
Ƽ	F00C8	Sigma.08	F01C8 Ƽ retrograde
Σ	F00C9	Sigma.09	F01C9 Ƹ retrograde
Ϛ	F00CA	Sigma.10	F01CA Ƨ retrograde
Þ	F00CB	uni03F7.01	aka Sho.01; F01CB ٩ retrograde
Τ	F00CC	Tau.01	
Ϯ	F00CD	Tau.02	F01CD Ϯ retrograde
Ι		Tau.03	= Iota.01
		Tau.04	= Eta.07
Υ	F00D0	Upsilon.01	
V	F00D1	Upsilon.02	
∇	F00D2	Upsilon.03	
Υ	F00D3	Upsilon.04	F01D3 Υ retrograde

Ꙋ	F00D4	Upsilon.05	F01D4 Ꙋ retrograde
∪	F00D5	Upsilon.06	
Φ	F00D6	Phi.01	capital letter phi sans–serif
✝	F00D7	Phi.02	
�III	F00D8	Phi.03	
I		Phi.04	= Iota.01
X		Phi.05	= Chi.01
		Phi.06	= Eta.07
⊘	F00DC	Phi.07	F01DC ⊘ retrograde
Φ	F00DE	Phi.08	
⊙		Phi.09	= Theta.02
·I·	F00DF	Phi.10	
X	F00E0	Chi.01	
↓	F00E1	Chi.02	
Ψ		Chi.03	= Psi. 02
✝		Chi.04	= Phi.02
Ψ	F00E4	Psi.01	capital letter psi sans–serif
Ψ	F00E5	Psi.02	
↓		Psi.03	= Chi.02
X		Psi.04	= Chi.01
Ж	F00E8	Psi.05	
Ж	F00E9	Psi.06	
Ω	F00EA	Omega.01	capital letter omega sans–serif
ω	F00EB	Omega.02	
⊙		Omega.03	= Theta.02
O		Omega.04	= Omicron.01
∧		Omega.05	= Lambda.01
Ш	F00EF	Omega.06	
Ꙍ	F00F0	Omega.07	
∩	F00F1	Omega.08	
º	F00F2	Omega.09	
○		Omega.10	= Omicron.04
℧	F00F4	Omega.11	
Ω	F00F5	Omega.12	
ꝺ	F00F6	uni03E0.01	aka Sampi.01; F01F6 ꝼ retrograde
⊤	F00F7	uni03E0.02	aka Sampi.02
Т		Sampi.03	= Tau.01
Ѱ	F00F9	uni03E0.04	aka Sampi.04

Table 20. Beta Code Characters not in Unicode

This table contains those characters found in texts in the TLG database that are so rare or poorly under-stood that the TLG did not propose them for inclusion in Unicode; in the Quick Beta manual they are marked "use PUA." In Cardo they are located in the Supplementary Private Use Area-A. The Beta Code value is given in the right-hand column. The drawing for some of these characters may be improved in future versions of Cardo.

=	F0270	uF0270	METRICAL LONG OVER LONG	%47
⏑	F0271	uF0271	METRICAL SHORT OVER SHORT	%48
⏖	F0272	uF0272	METRICAL TRIPLE SHORTS	%49
⏛	F0273	uF0273	METRICAL LONG WITH BRACKETED ICTUS	%139
☰	F0274	uF0274	METRICAL TRIPLE LONG	%140
÷	F0275	uF0275	TWO DASHES THREE DOTS CHARACTER	#107
☰	F0276	uF0276	THREE DASHES TWO DOTS CHARACTER	#108
=.	F0277	uF0277	TWO DASHES THREE DOTS CHARACTER ALT1	#124
÷	F0278	uF0278	TWO DASHES FOUR DOTS CHARACTER	#126
Λ	F0279	uF0279	MINUS SIGN	#166
ᴹᴹ	F027A	uF027A	MYRIAD OF MYRIAD SIGN	#167
ᴹᴹᴹ	F027B	uF027B	MYRIAD OF MYRIAD OF MYRIAD SIGN	#168
♀	F027C	uF027C	SIGN OF THE ZODIAC	#243
♑	F027D	uF027D	HEAVEN SIGN	#246
℧	F027E	uF027E	EARTH SIGN	#247
☾	F027F	uF027F	NEW MOON SYMBOL	#248
Ο̸Λ	F0280	uF0280	IDIOSYNCRATIC ABBREVIATION	#301
⊸	F0281	uF0281	DOT AND DASH EDITORIAL SIGN	#314
Ƶ	F0282	uF0282	UNKNOWN EDITORIAL CHARACTER	#466
Ⅲ	F0283	uF0283	ΠΙΘΑΝΟΝ ABBREVIATION	#501
℞	F0284	uF0284	PI-RHO ABBREVIATION	#503
☉	F0285	uF0285	WORM ON CIRCLE STANDING	#513
☉	F0286	uF0286	WORM ON CIRCLE CRAWLING	#514
⚕	F0287	uF0287	COLIC AMULET SYMBOL	#521
⌐	F0288	uF0288	ANCIENT EDITORIAL CHARACTER	#530
⏟	F0289	uF0289	UNKNOWN PAPYROLOGICAL CHARACTER	#535
ᵠ	F028A	uF028A	UNKNOWN PAPYROLOGICAL CHARACTER	#536
⋒	F028B	uF028B	UNKNOWN PAPYROLOGICAL CHARACTER	#537
℧	F028C	uF028C	UNKNOWN MANUSCRIPT CHARACTER	#538
đ	F028D	uF028D	Β᾽ΑΝΔΟΝ ΔΗΦΕΝΣΟΡΩΝ SYMBOL	#543
·∴·	F028E	uF028E	SYMBOL	#544
↲	F028F	uF028F	SYMBOL	#545
ƚ	F0290	uF0290	SYMBOL	#546

	F0291	uF0291	ψιλός SYMBOL	#547
	F0292	uF0292	UNKNOWN ABBREVIATION	#548
	F0293	uF0293	FOUR HORIZONTAL LINES	#549
	F0294	uF0294	EXILE SIGN	#552
	F0295	uF0295	ABOLITION OF LAW SYMBOL	#553
	F0296	uF0296	NEW TESTAMENT SYMBOL	#554
	F0297	uF0297	GENTILES SYMBOL	#555
	F0298	uF0298	PROMISE SYMBOL	#557
	F0299	uF0299	BIBLICAL AMBIGUITY SYMBOL	#558
	F029A	uF029A	FUTURE PROPHECY SYMBOL	#559
	F029B	uF029B	UNKNOWN ABBREVIATION	#693
	F029C	uF029C	UNKNOWN ABBREVIATION	#701
	F029D	uF029D	UNKNOWN EDITORIAL CHARACTER	#702
	F029E	uF029E	UNKNOWN EDITORIAL CHARACTER	#705
	F029F	uF029F	UNKNOWN EDITORIAL CHARACTER	#706
	F02A0	uF02A0	UNKNOWN EDITORIAL CHARACTER	#707
	F02A1	uF02A1	UNKNOWN EDITORIAL CHARACTER	#708
	F02A2	uF02A2	KRONOS SYMBOL	#712
	F02A3	uF02A3	ZEUS SYMBOL	#713
	F02A4	uF02A4	ARES SYMBOL	#714
	F02A5	uF02A5	APHRODITE SYMBOL	#715
	F02A6	uF02A6	HERMES SYMBOL	#716
	F02A7	uF02A7	MU-RHO ABBREVIATION	#1315
	F02A8	uF02A8	εἶναι ABBREVIATION	#1318
	F02A9	uF02A9		#1319
	F02AA	uF02AA	UNKNOWN ABBREVIATION	#1320
	F02AB	uF02AB		#1321
	F02AC	uF02AC	SEA ABBREVIATION	#1327
	F02AD	uF02AD	RIVER ABBREVIATION	#1328
	F02AE	uF02AE	IDIOSYNCRATIC PAPYROLOGICAL PUNCTUATINO	#1334
	F02AF	uF02AF	UNKNOWN ABBREVIATION	#1501
	F02B0	uF02B0	UNKNOWN ABBREVIATION	#1503
---	-----	-----	(see above)	#1504
	F02B1	uF02B1	UNKNOWN ABBREVIATION	#1505
	F02B2	uF02B2	UNKNOWN ABBREVIATION	#1506
	F02B3	uF02B3	UNKNOWN ABBREVIATION	#1509
	F02B4	uF02B4	ABBREVIATION	#1510
	F02B5	uF02B5	ABBREVIATION	#1511
	F02B6	uF02B6	εἶναι ABBREVIATION	#1515
	F02B7	uF02B7	UNKNOWN EDITORIAL CHARACTER	#1519
	F02B8	uF02B8	UNKNOWN ABBREVIATION	#1520

χ̂ε	F02B9	uF02B9	UNKNOWN ABBREVIATION	#1522
⧻	F02BA	uF02BA	ANCIENT EDITORIAL TEXTUAL HIGHLIGHTER	#1524
	-----	-----	(see above)	#1525
Symbols for Latin texts (not used by TLG); in Beta code order				
∶—	F02C0		Vitruvius	#152
∺	F02C1		Vitruvius	#153
∹	F02C2		Vitruvius	#155
∵∴	F02C3		Vitruvius	#157
÷	F02C4		Vitruvius	#158
≑	F02C5		Vitruvius	#159
∼	F02C6		Vitruvius	#160
IS	F02C7		Cato, De agri cultura	#1101
II	F02C8		Cato, De agri cultura	#1102
S	F02C9		Cato, De agri cultura	#1104
⹀	F02CA		Cato, De agri cultura	#1106
SS	F02CB			#1107
ꜩ	F02CC		Celsus, 5.22.8	#1112
Ɛ	F02CD		Celsus, 5.18.7	#1113
ꝗ	F02CE		Agrimensores 86.5	#1116
⅄	F02CF		Scribonius 71 (p. 40)	#1118
⌐	F02D0		Varro 0684.071 (p. 40)	#1120
ꝛ	F02D1		Varro0684.145 (p. 74); Scribonius	#1122
℮	F02D2		Servius, G. 1.205.15	#1123
Ⅽ	F02D3		Servius, A. 4.511.9	#1125
q	F02D4		Quadrantal: Volusius Maecianus (1285 001): 80	#1134
9	F02D5		Hemina: Volusius Maecianus (1285 001): 80	#1135

Table 21. International Phonetic Alphabet

	025	026	027	028	029	02A
0	ɐ 0250	ɠ 0260	ɰ 0270	ʀ 0280	ʐ 0290	ʠ 02A0
1	ɑ 0251	ɡ 0261	ɱ 0271	ʁ 0281	ʑ 0291	ʡ 02A1
2	ɒ 0252	ɢ 0262	ɲ 0272	ʂ 0282	ʒ 0292	ʢ 02A2
3	ɓ 0253	ɣ 0263	ɳ 0273	ʃ 0283	ʓ 0293	ʣ 02A3
4	ɔ 0254	ɤ 0264	ɴ 0274	ƒ 0284	ʔ 0294	ʤ 02A4
5	ɕ 0255	ɥ 0265	ɵ 0275	ʅ 0285	ʕ 0295	ʥ 02A5
6	ɖ 0256	ɦ 0266	Œ 0276	ʆ 0286	ʖ 0296	ʦ 02A6
7	ɗ 0257	ɧ 0267	ɷ 0277	ʇ 0287	ʗ 0297	ʧ 02A7
8	ə 0258	ɨ 0268	ɸ 0278	ʈ 0288	ʘ 0298	ʨ 02A8
9	ɚ 0259	ɩ 0269	ɹ 0279	ʉ 0289	ʙ 0299	ʩ 02A9
A	ɚ 025A	ɪ 026A	ɺ 027A	ʊ 028A	ʚ 029A	ʪ 02AA
B	ɛ 025B	ɫ 026B	ɻ 027B	ʋ 028B	ɢ̶ 029B	ʫ 02AB
C	ɜ 025C	ɬ 026C	ɼ 027C	ʌ 028C	ʜ 029C	ʬ 02AC
D	ɝ 025D	ɭ 026D	ɽ 027D	ʍ 028D	ʝ 029D	ʭ 02AD
E	ɞ 025E	ɮ 026E	ɾ 027E	ʎ 028E	ʞ 029E	ʮ 02AE
F	ɟ 025F	ɯ 026F	ɿ 027F	ʏ 028F	ʟ 029F	ʯ 02AF

Table 22. Spacing Modifier Letters

	02B	02C	02D	02E	02F
0	ʰ 02B0	ˀ 02C0	ː 02D0	ˠ 02E0	˰ 02F0
1	ɦ 02B1	ˁ 02C1	ˑ 02D1	ˡ 02E1	˱ 02F1
2	ʲ 02B2	˂ 02C2	˒ 02D2	ˢ 02E2	˲ 02F2
3	ʳ 02B3	˃ 02C3	˓ 02D3	ˣ 02E3	˳ 02F3
4	ʴ 02B4	˄ 02C4	˔ 02D4	ˤ 02E4	˴ 02F4
5	ʵ 02B5	˅ 02C5	˕ 02D5	˥ 02E5	˵ 02F5
6	ʶ 02B6	ˆ 02C6	˖ 02D6	˦ 02E6	˶ 02F6
7	ʷ 02B7	ˇ 02C7	˗ 02D7	˧ 02E7	˷ 02F7
8	ʸ 02B8	ˈ 02C8	˘ 02D8	˨ 02E8	˸ 02F8
9	ʹ 02B9	ˉ 02C9	˙ 02D9	˩ 02E9	˹ 02F9
A	ʺ 02BA	ˊ 02CA	˚ 02DA	˪ 02EA	˺ 02FA
B	ʻ 02BB	ˋ 02CB	˛ 02DB	˫ 02EB	˻ 02FB
C	ʼ 02BC	ˌ 02CC	˜ 02DC	ˬ 02EC	˼ 02FC
D	ʽ 02BD	ˍ 02CD	˝ 02DD	˭ 02ED	˽ 02FD
E	ʾ 02BE	ˎ 02CE	˞ 02DE	ˮ 02EE	˾ 02FE
F	ʿ 02BF	ˏ 02CF	˟ 02DF	˯ 02EF	˿ 02FF

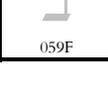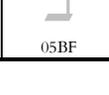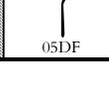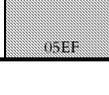## Table 23. Additional Characters for IPA

In addition to the IPA Extensions and Spacing Modifier Letters blocks, IPA also uses characters from the Combining Diacritical Marks and Greek ranges, all of which are also included in Cardo. The following additional characters used in IPA transcription are found in Cardo:

ǀ	U+01C0	LATIN LETTER DENTAL CLICK
ǁ	U+01C1	LATIN LETTER LATERAL CLICK
ǂ	U+01C2	LATIN LETTER ALVEOLAR CLICK
!	U+01C33	LATIN LETTER RETROFLEX CLICK
↑	U+2191	UPWARDS ARROW
↓	U+2193	DOWNWARDS ARROW
↗	U+2197	NORTH EAST ARROW
↘	U+2198	SOUTH EAST ARROW

Alphabetic Presentation Forms Range

There is no chart for the Alphabetic Presentation Forms block, mostly because the Hebrew characters there should normally not be used. However, all the characters are present in Cardo. For more, see http://www.unicode.org/charts/PDF/UFB00.pdf.

Table 24. The Hebrew Block

	059	05A	05B	05C	05D	05E	05F
0	▨ 0590	֠ 05A0	ְ 05B0	׀ 05C0	א 05D0	נ 05E0	װ 05F0
1	֑ 0591	֡ 05A1	ֱ 05B1	ׁ 05C1	ב 05D1	ס 05E1	ױ 05F1
2	֒ 0592	▨ 05A2	ֲ 05B2	ׂ 05C2	ג 05D2	ע 05E2	ײ 05F2
3	֓ 0593	֣ 05A3	ֳ 05B3	׃ 05C3	ד 05D3	ף 05E3	׳ 05F3
4	֔ 0594	֤ 05A4	ִ 05B4	ׄ 05C4	ה 05D4	פ 05E4	״ 05F4
5	֕ 0595	֥ 05A5	ֵ 05B5	▨ 05C5	ו 05D5	ץ 05E5	▨ 05F5
6	֖ 0596	֦ 05A6	ֶ 05B6	▨ 05C6	ז 05D6	צ 05E6	▨ 05F6
7	֗ 0597	֧ 05A7	ַ 05B7	▨ 05C7	ח 05D7	ק 05E7	▨ 05F7
8	֘ 0598	֨ 05A8	ָ 05B8	▨ 05C8	ט 05D8	ר 05E8	▨ 05F8
9	֙ 0599	֩ 05A9	ֹ 05B9	▨ 05C9	י 05D9	ש 05E9	▨ 05F9
A	֚ 059A	֪ 05AA	▨ 05BA	▨ 05CA	ך 05DA	ת 05EA	▨ 05FA
B	֛ 059B	֫ 05AB	ֻ 05BB	▨ 05CB	כ 05DB	▨ 05EB	▨ 05FB
C	֜ 059C	֬ 05AC	ּ 05BC	▨ 05CC	ל 05DC	▨ 05EC	▨ 05FC
D	֝ 059D	֭ 05AD	ֽ 05BD	▨ 05CD	ם 05DD	▨ 05ED	▨ 05FD
E	֞ 059E	֮ 05AE	־ 05BE	▨ 05CE	מ 05DE	▨ 05EE	▨ 05FE
F	֟ 059F	֯ 05AF	ֿ 05BF	▨ 05CF	ן 05DF	▨ 05EF	▨ 05FF
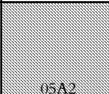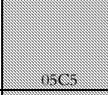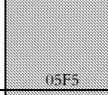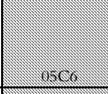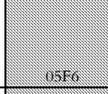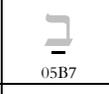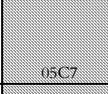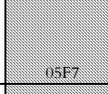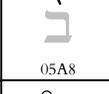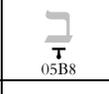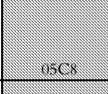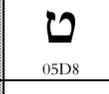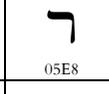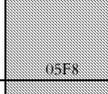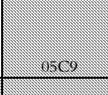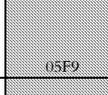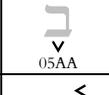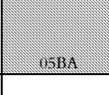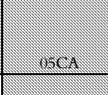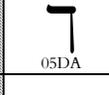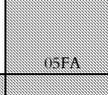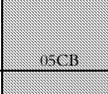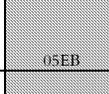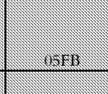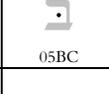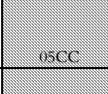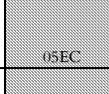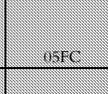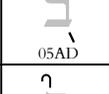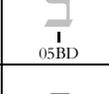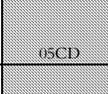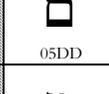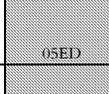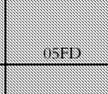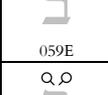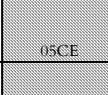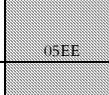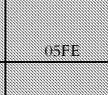
APPENDIX: SETTING UP HEBREW SUPPORT

I. Macintosh

Hebrew support is enabled with OS 10.2, so you must have at least this version of OS X. From the Apple menu, open System Preferences, look under the Personal section, and double-click on International. Under the Languages tab (leftmost one), edit the list of languages you want to see in menus; then under Input Menu on the right, add the keyboard(s) you want, including Hebrew. Click OK to exit.

II. Windows

Both Windows 2000 and Windows XP offer good support for Hebrew, although XP provides slightly better functionality.

Enabling support for Hebrew in Windows 2000 or XP provides right-to-left entry and basic Hebrew typing, and allows mixing of Hebrew and Latin-script languages. But some character shaping issues will still be problematic (e.g., when a sheva is typed after a final kaf, it will sit below the baseline instead of rising into the letter).

To solve these problems we need to use OpenType fonts. OpenType is a relatively new font format which extends the capabilities of TrueType and PostScript Type 1 fonts by letting the font maker specify how various characters can be positioned relative to each other; it is exactly the solution to the problem discussed in the previous paragraph. Windows 2000 was the first version that could make use of OT fonts, but its initial release did not include support for Hebrew. You can get OpenType support for Hebrew in one of the following ways:

> install Office XP on a Win2000 system   OR
> upgrade Win2000 to WinXP (or buy a new machine with XP); even if you still
>   have Office 2000 the Hebrew OT support will be present OR
> upgrade your version of Internet Explorer from 5 to 6

(What you actually need to do is update a Windows component called Uniscribe. This happens automatically when you take the steps described above. Uniscribe is a protected component of Windows, so only technically adept users should try to update it manually.)

Office XP ships with several Hebrew OT fonts; if you are still running Office 2000, you will need to obtain OT Hebrew fonts in some other way. Cardo is an OT font, and SIL has released a Unicode/OT version of their excellent Ezra font (see http://www.sil.org/computing/fonts/silhebruni/index.htm).

Here are directions for setting up Hebrew support. Be sure to have your original CD-ROMs for Windows and Office handy, as you will probably have to insert them at certain points.

A. Windows 2000

1. From the Start Menu, choose Settings / Control Panel / Regional Options; the General tab should be visible automatically. In the bottom half of the dialog box, under "Language Settings for the System" scroll down to find Hebrew and check the box.

2. Now add the ability to type in Hebrew. Still inside the Regional Options dialog, click on the Input Locales tab (farthest right). Click Add and scroll down the list until you see Hebrew. Highlight it and click OK. You normally want to see an indicator on the taskbar showing which language you are in, so make sure this box is checked.

3. Skip this step if you want to use the default Hebrew keyboard supplied by Microsoft. If you wish to associate a different keyboard with Hebrew, highlight Hebrew in the list of installed languages, click on Properties, and scroll down to select the keyboard you want and click OK.

B. Windows XP

1. From the Start Menu, choose Settings / Control Panel / Regional and Language Options; the Regional Options tab should be visible automatically.

2. Now add the ability to type in Hebrew. Click on the Languages tab (the center one). Click to place a checkmark next to the item that says "Install files for complex script and right-to-left languages." Click OK and Windows will add support for Hebrew and Arabic.

3. Return to Start / Settings / Control Panel / Regional and Language Options and select the Language tab. Click the "Details" button under Text Services and Input Languages. At the bottom click the "Preferences" button under Language Bar and make sure that "Show additional language icons in the taskbar" is checked; click OK.

4. Skip this step if you want to use the default Hebrew keyboard supplied by Microsoft. If you wish to associate a different keyboard with Hebrew, return to Start / Settings / Control Panel / Regional and Language Options and select the Language tab. Click the "Details" button under Text Services and Input Languages. Here you can see each language that you have installed and the keyboard(s) that are used with it, and add and remove any that you wish.

You can now switch back and forth between Hebrew and English by using LeftAlt-Shift; watch the indicator on the taskbar change as you do this. The keyboard that you associated with Hebrew in step 3 will be automatically activated whenever you switch to Hebrew this way. You can test this by opening WordPad (Start / Programs / Accessories) and typing some Hebrew. Most (but not quite all) vowel points should line up properly. Note that the insertion point changes shape to indicate whether you are typing right-to-left or left-to-right.

You have now completed the steps required by Windows itself. However, if you use Microsoft Word, there are two more things to do.

1. Choose Start / Programs / Microsoft Office Tools / Microsoft Office Language Settings. In Win2000, scroll down until you see Hebrew and check the box, then click OK. In WinXP, make sure that "All Scripts" is visible at the top of the list, then highlight Hebrew and click the Add button; click OK to finish. Word doesn't display Hebrew properly until you do this.

2. Word is set by default not to display vowel points. If you want to see them, from the Word menu choose Tools / Options and click on the Right-to-Left tab. Turn on display of vowels by checking the Diacritics box. Note that you can display the vowels and accents in a different color than the base letters if you wish.

3. Word also provides some other options for cursor control that you may wish to experiment with.