Proposal L2/02-318

PROPOSAL SUMMARY FORM

A. Administrative

1.Title:
Proposal for encoding Greek numerical characters in the UCS
2. Requester's name:
Thesaurus Linguae Graecae Project (University of California, Irvine)
3. Requester type:
Expert contribution
4. Submission date:
2002-11-07
5. Requester's reference
6. Completion
This is a complete proposal.

B. Technical - General

1a. The proposal is for addition of character(s) to a new block:
Name of the block:
Ancient Greek Numerical Characters
2. Number of characters in proposal:
17 new characters
3. Proposed category
Categories C
4. Proposed Level of Implementation (1, 2 or 3):
Level 1
5a. Character names provided?
Yes.
5b. Character names in accordance with guidelines
Yes.
5c. Character shapes reviewable?
Yes
6a. Who will provide the appropriate computerized font for publishing the standard?
TLG Project
6b. Fonts currently available.
None
6c. Font format
True Type
7a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided?
Yes
7b. Are published examples of use of proposed characters attached?
Yes.
8. Does the proposal address other aspects of character data processing
No.

C. Technical - Justification

1. Has this proposal for addition of character(s) been submitted before?

No.

2. Has contact been made to members of the user community

Yes.The TLG has been in contact with experts in the field of Classics. Earlier versions of this proposal have been posted online and received comments by members of the profession.

3. Information on the user community for the proposed characters

Scholarly community.

4. The context of use for the proposed characters (type of use; common or rare)

Use varies. Some characters are very common. Some appear less often.

5. Are the proposed characters in current use by the user community?

Yes. Characters are present primarily in ancient manuscripts and modern editions of Greek texts and used extensively by scholars of Greek.

6. After giving due considerations to the principles in *Principles and Procedures document*, must the proposed characters be entirely in the BMP?

No.

7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)?

Yes.

8. Can any of the proposed characters be considered a presentation form of an existing character or character sequence?

No.

9. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters?

No.

10. Can any of the proposed character(s) be considered to be similar (in appearance or function) to an existing character?

No.

11a. Does the proposal include use of combining characters and/or use of composite sequences

No.

12. Does the proposal contain characters with any special properties such as control function or similar semantics?

No.

13. Does the proposal contain any Ideographic compatibility character(s)?

No.

Proposal

This section of the proposal is divided into two subsections.

1. Alphabetic Numerals
2. Weights, Measures and Money

1. Alphabetic Numerals – Fractions

In order to display and discuss ancient Greek mathematical works accurately, two additional characters will need to be added to the Unicode Standard: the Greek Half and Greek Two-Thirds Signs. [1]

2. Weights, Measures and Money

Weights and Money

Ancient Greeks used the same terminology and abbreviations for weights and currency. Therefore both systems are discussed together in this section. The system had many local variations, but the Attic-Euboic system appears to have been dominant and this is the system presented in the table below:

Scale[2]	Nominal	Post-Hippias (standard)	Unicode
6000	Talent	*c*. 25.74kg	
200	(Large) Stater	*c*. 858.00g	03A3 or 03DE
100	Mna	*c*. 429.00g	
2	(Small) Stater/ Didrachmon	*c*. 8.58g	03A3 or 03DE
1	Drachma	*c*. 4.29g	
$^{1}/_{6}$	Obol	*c*. 0.72g	

Measures of Capacity

The ancient Greeks had two systems of measurement: one for wet, and one for dry products. The *kotyle*, which is the basic measure in both wet and dry systems, is made up of six *kyathoi* or four *oxybapha*. Its value is different depending on local variations, but it is roughly $^{1}/_{4}$l.[3]

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[1] Heath (Heath (1921:1) 41-2) writes: "The Greeks had a preference for expressing ordinary proper fractions as the sum of two or more submultiples... The orthodox sign for a submultiple was the letter for the corresponding number (the denominator) but with an accent instead of a horizontal stroke above it; thus γ□ = □ ... There were special signs for ½ namely ∠′ or C′, and for □, namely ↀ′. When a number of submultiples are written one after the other, the sum of them is meant, and similarly when they follow a whole number; e.g. ∠′δ′ = ½ ¼ or ¾ ...; κθ ↀ′ ιγ′ λθ′ = 29 □ $^{1}/_{13}$ $^{1}/_{39}$ or 29 $^{10}/_{13}$."

[2] This table is based on that in Viedebantt (1923) 38

[3] Pryce, F.N., Lang, M.L. & Vickers, M. in OCD[3] (1996) 943

The dry measures

Scale	Nominal	Approximate weight	Unicode
1/6	Kyathos	*c*.40ml	
1/4	Oxybaphon	*c*.60ml	No standard character
1	Kotyle	*c*.240ml	
4	Choinix	*c*.1l	No standard character
32	Hekteus	*c*.30l	No standard character
192	Medimnos	*c*.180l	No standard character

The liquid measures

Scale	Nominal	Approximate weight	Unicode
1/6	*Kyathos*	*c .40ml*	
1/4	*Oxybaphon*	*c. 60ml*	No standard character
1	*Kotyle*	*c. 240ml*	
6	Hemichous	*c*. 1.5l	No standard character
12	Chous	*c*. 3l	03C7 + <superscript> 03BF
144	Metretes	*c*. 35l	

Characters for Roman Weights and Measures

Three characters are included in this sub-section. These characters are the Greek characters used to represent weights (and occasionally also measures) in the Roman system. The Roman system is based on the *Libra* or *As*, of 327.45g. This is divided into 12 *Unciae*. The Greek translations for these terms are *Litra* for *Libra*, and *Ounkia*[4] for *Uncia*.

Bibliography

Avi-Yonah, M., "Abbreviations in Greek Inscriptions (The Near East, 200 B.C.-A.D. 1100)." in Oikonomides, A.N. (ed.), *Abbreviations in Greek: Inscriptions, Papyri, Manuscripts and Early Printed Books*. (Chicago 1974)

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Jeffery, L.H., *The Local Scripts of Archaic Greece* (Oxford, 1961)

Kirchner, J., *Inscriptiones Graecae* II/III.1 (Berlin, 1913)

Larfeld, W., *Handbuch der griechiscehn Epigraphik 2.2. Die attischen Inschriften* (Leipzig, 1902)

O. Montevecchi, *La Papirologia* (Milan, 1988)

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Pririe, J.W., Jeffery, L.H. & Johnston, A.W., "Alphabet, Greek" in *OCD*[3] (1996) 66

Pryce, F.N., Lang, M.L. & Vickers, M. "Measures" in OCD[3] (1996) 942-3

Radke, G., "Tryblion" in *Paulys Realencyclopädie der classischen Altertumswissenschaft* 2.13 (1939) 710-11

[4] Also *Onkia*. See LSJ 1268

Ancient Greek Numerical Characters: Characters Proposed

For full documentation, please see: http://www.tlg.uci.edu/Uni.prop.html

		Name	Comments
Alphabetic Numerals – Fractions			
1	∠	Greek Half Sign	Glyph variants: ∠, ◟, C, ◡, C̈, ⌒̈, S, ꜱ, S̈, ∟ and C◡′. 2220 is identical to one glyph variant, however this character has mathematical properties.
2	ω′	Greek Two-Thirds Sign	
Weights, Measures and Money: Standard Greek Weights and Money			
3	⊼	Greek Talent Sign	Glyph variants: ꝏ and ʃ′. 22BC and 2305 are similar to ⊼, however these two characters have mathematical properties.
4	⋖	Greek Drachma Sign	Glyph variants: <, Λ. 22D6, 003C and 039B are similar to three of the glyph variants; however 22D6 has mathematical properties.
5	∼	Greek Obol Sign	Glyph variants: ~, ∽ and \. Kenyon also records a fourth: –.[5] 007E, 223D, 005C and 2013 are similar to four glyph variants; however 223D has mathematical properties.
6	≈	Greek Two Obols Sign	Glyph variants: ≈, ≈, =.[6] 2248 is similar to one glyph variant, however this character has mathematical properties.
7	╭	Greek Three Obols Sign	Glyph variants: Γ, ╭, ʃ, T and ∿.[7] 0393, 03A4 and 223F are similar to three glyph variants, however 223F has mathematical properties.
8	ϝ	Greek Four Obols Sign	
9	⋵	Greek Five Obols Sign	
Weights, Measures and Money: Standard Greek Measures of Capacity			
10	Ŀ	Greek Metretes Sign	
11	K	Greek Kyathos Base Sign	
Weights, Measures and Money: Greek Characters for Roman Weights and Measures			
12	ℒ	Greek Litra Sign	Glyph variant: ℑ.
13	Γº	Greek Ounkia Sign	
14	ξ	Greek Xestes Sign	Glyph variants: ξ, [illegible], ∞, +, ξ, ξ, [illegible], [illegible], [illegible] and [illegible].
Weights, Measures and Money: Greek Characters for non-Graeco-Roman Measures			
15	÷	Greek Artabe Sign	Other glyph variants: <, ϟ, ⌒̣, ⌒̣, ÷ and ∼. 00F7 is similar to one glyph variant.
Weights, Measures and Money: Ancient Greek Medical Measures			
16	Γᵖ	Greek Gramma Sign	
17	ϑ	Greek Tryblion Base Sign	

[5] Kenyon (1974) 129

[6] Kenyon (1974) 129

[7] Bilabel (1923) 2308, 2314

TABLE xx01-3F: GREEK NUMERICAL CHARACTERS

	xx0	xx1	xx2	xx3
0	∠	ϙ		
1	ϖ			
2	⅄			
3	≺			
4	~			
5	≋			
6	⌠			
7	⌡			
8	⋐			
9	⊾			
A	K			
B	ℯ			
C	Γo			
D	ξ			
E	∘⁄∘			
F	Γϙ			

TABLE xx01-3F: GREEK NUMERICAL CHARACTERS

hex	Name
xx00	Greek Half Sign
xx01	Greek Two-Thirds Sign
xx02	Greek Talent Sign
xx03	Greek Drachma Sign
xx04	Greek Obol Sign
xx05	Greek Two Obols Sign
xx06	Greek Three Obols Sign
xx07	Greek Four Obols Sign
xx08	Greek Five Obols Sign
xx09	Greek Metretes Sign
xx0A	Greek Kyathos Base Sign
xx0B	Greek Litra Sign
xx0C	Greek Ounkia Sign
xx0D	Greek Xestes Sign
xx0E	Greek Artabe Sign
xx0F	Greek Gramma Sign
xx10	Greek Tryblion Base Sign
xx11	(The remaining codepoints are reserved for
xx12	Acrophonic Numerals)
xx13	
xx14	
xx15	
xx16	
xx17	
xx18	
xx19	
xx1A	
xx1B	
xx1C	
xx1D	
xx1E	
xx1F	
xx20	
xx21	
xx22	
xx23	
xx24	
xx25	
xx26	
xx27	
xx28	
xx29	
xx2A	
xx2B	
xx2C	
xx2D	
xx2E	
xx2F	
xx30	
xx31	
xx32	
xx33	
xx34	
xx35	
xx36	
xx37	
xx38	
xx39	
xx3A	
xx3B	