

ISO/IEC JTC 1/SC 2/WG 2
PROPOSAL SUMMARY FORM TO ACCOMPANY SUBMISSIONS
FOR ADDITIONS TO THE REPERTOIRE OF ISO/IEC 10646¹.

Please fill all the sections A, B and C below.

Please read Principles and Procedures Document (P & P) from <http://www.dkuug.dk/JTC1/SC2/WG2/docs/principles.html> for guidelines and details before filling this form.

Please ensure you are using the latest Form from <http://www.dkuug.dk/JTC1/SC2/WG2/docs/summaryform.html>.

See also <http://www.dkuug.dk/JTC1/SC2/WG2/docs/roadmaps.html> for latest Roadmaps.

A. Administrative

1. Title:	<i>Proposal to Add Ancient Roman Weights and Monetary Signs to UCS</i>
2. Requester's name:	<i>David J. Perry</i>
3. Requester type (Member body/Liaison/Individual contribution):	<i>Expert Contribution</i>
4. Submission date:	<i>May 5, 2006</i>
5. Requester's reference (if applicable):	
6. Choose one of the following:	
This is a complete proposal:	<i>XXX</i>
(or) More information will be provided later:	

B. Technical – General

1. Choose one of the following:	
a. This proposal is for a new script (set of characters):	
Proposed name of script:	
b. The proposal is for addition of character(s) to an existing block:	<i>XXX</i>
Name of the existing block:	<i>Ancient Numeric Systems, 10100–101FF</i>
2. Number of characters in proposal:	<i>11</i>
3. Proposed category (select one from below - see section 2.2 of P&P document):	
A-Contemporary	<input type="checkbox"/>
B.1-Specialized (small collection)	<input type="checkbox"/>
B.2-Specialized (large collection)	<input type="checkbox"/>
C-Major extinct	<input checked="" type="checkbox"/>
D-Attested extinct	<input type="checkbox"/>
E-Minor extinct	<input type="checkbox"/>
F-Archaic Hieroglyphic or Ideographic	<input type="checkbox"/>
G-Obscure or questionable usage symbols	<input type="checkbox"/>
4. Proposed Level of Implementation (1, 2 or 3) (see Annex K in P&P document):	<i>3</i>
Is a rationale provided for the choice?	
If Yes, reference:	
5. Is a repertoire including character names provided?	<i>Yes</i>
a. If YES, are the names in accordance with the “character naming guidelines” in Annex L of P&P document?	<i>Yes</i>
b. Are the character shapes attached in a legible form suitable for review?	<i>Yes</i>
6. Who will provide the appropriate computerized font (ordered preference: True Type, or PostScript format) for publishing the standard?	<i>David Perry</i>
If available now, identify source(s) for the font (include address, e-mail, ftp-site, etc.) and indicate the tools used:	<i>David Perry (hospes@scholarsfonts.net); Fontlab Studio 5.0</i>
7. References:	
a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided?	<i>Yes</i>
b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached?	<i>Yes</i>
8. Special encoding issues:	
Does the proposal address other aspects of character data processing (if applicable) such as input, presentation, sorting, searching, indexing, transliteration etc. (if yes please enclose information)?	<i>No</i>

9. Additional Information:

Submitters are invited to provide any additional information about Properties of the proposed Character(s) or Script that will assist in correct understanding of and correct linguistic processing of the proposed character(s) or script. Examples of such properties are: Casing information, Numeric information, Currency information, Display behaviour information such as line breaks, widths etc., Combining behaviour, Spacing behaviour, Directional behaviour, Default Collation behaviour, relevance in Mark Up contexts, Compatibility equivalence and other Unicode normalization related information. See the Unicode standard at <http://www.unicode.org> for such information on other scripts. Also see <http://www.unicode.org/Public/UNIDATA/UCD.html> and associated Unicode Technical Reports for information needed for consideration by the Unicode Technical Committee for inclusion in the Unicode Standard.

¹. Form number: N3002-F (Original 1994-10-14; Revised 1995-01, 1995-04, 1996-04, 1996-08, 1999-03, 2001-05, 2001-09, 2003-11, 2005-01, 2005-09, 2005-10)

C. Technical - Justification

1. Has this proposal for addition of character(s) been submitted before?	No
If YES explain	
2. Has contact been made to members of the user community (for example: National Body, user groups of the script or characters, other experts, etc.)?	Yes
If YES, with whom?	
Email discussion groups for epigraphy and Unicode issues in Classics	
If YES, available relevant documents:	
3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included?	
Reference:	
4. The context of use for the proposed characters (type of use; common or rare)	
Reference:	
Common among classical scholars, especially epigraphers	
5. Are the proposed characters in current use by the user community?	Yes
If YES, where? Reference:	
Scholarly publications (see examples in proposal)	
6. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP?	No
If YES, is a rationale provided?	
If YES, reference:	
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
If YES, is a rationale for its inclusion provided?	
If YES, reference:	
9. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters?	No
If YES, is a rationale for its inclusion provided?	
If YES, reference:	
10. Can any of the proposed character(s) be considered to be similar (in appearance or function) to an existing character?	Yes
If YES, is a rationale for its inclusion provided?	
If YES, reference:	
Discussion on page 5 of proposal.	
11. Does the proposal include use of combining characters and/or use of composite sequences?	No
If YES, is a rationale for such use provided?	
If YES, reference:	
Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided?	
If YES, reference:	
12. Does the proposal contain characters with any special properties such as control function or similar semantics?	No
If YES, describe in detail (include attachment if necessary)	
13. Does the proposal contain any Ideographic compatibility character(s)?	No
If YES, is the equivalent corresponding unified ideographic character(s) identified?	
If YES, reference:	

Proposal to Add Ancient Roman Weights and Monetary Signs to UCS

DRAFT THREE

Introduction

The ancient Romans used a variety of symbols to represent weights and values of their coinage. These symbols, many of which are currently not in the Universal Character Set, are found in literary texts and as well as in inscriptions and are needed to properly publish texts containing them.

Background on Roman Coinage

For a long time Romans of the early Republic did not use coins, relying on lumps of bronze (*aes rude*, “rough bronze”) as a medium of exchange. The first real coins for domestic use were introduced in the early 3rd century B.C. This is referred to as *aes graue*, “heavy bronze,” because the unit (*as*)² contained one pound³ of bronze. There were several smaller coins, also of cast bronze. This system continued in use until the economic problems caused by the Second Punic War (218–201 B.C.) caused the currency to collapse.

About 211 B.C., the Romans introduced a new system of coinage. Its unit was a bronze *as* weighing half the old one-pound coin, with silver coins valued at multiples of the *as*. This system remained in use for about 500 years, although the metallic content of both the bronze *as* and the silver coins was devalued repeatedly over time. At the time system was established, the relative values of the coins were as follows:

as, the basic unit, bronze coin; the *as* was divided into many smaller units, as shown in the chart below and Figure 1

sestertius, 2 ½ *asses* (the name derives from *semis tertius*; *semis* = ½, so the name means “one half [subtracted from] three,” i.e., two and a half); silver coin and the most common Roman accounting unit in the Republic and early Empire

quinarius, five *asses*; name derived from *quinque*, five; silver coin

denarius, ten *asses*; name derived from *decem*, ten; silver coin

Another bronze coin, the *dupondius* (“two pounder”) was introduced in the Republic, when the *as* was theoretically one pound, and had a value of two *asses*. It was not much used until the Empire, when it became common. There were also several other Roman coins produced over the centuries which never acquired special signs to represent them and so will not be discussed here.

² The word *as* carried the notion of a basic or indivisible unit, although the *as* coin was sometimes subdivided. Cf. Balbus, *De asse* 1: *Quidquid unum est et quod ex integrorum divisione remanet assem ratiocinatores vocant.* (“Whatever is one and which remains from the division of wholes, accountants call the unit.”) Under Roman law, a person might be *heres ex asse*, “heir to the whole estate.”

³ The Roman pound (*libra*, source of the modern sign £) contained 327.45 grams, .721 of an American pound.

Background on Roman Weights and Measures

The values of Roman coins need to be considered together with the units for Roman weights, since the Romans often used the same term for a subdivision of many different measures. For example, the term *uncia* essentially means “1/12th of anything:” a pound, a *iugerum* (~ acre), a foot, or an as. On the Republican *aes graue* coinage we do in fact find some of the same symbols used for weights, which is not surprising since the as at this time was a pound of bronze. The following table gives an overview of all the Roman units; note that the subdivisions are based on a duodecimal system, where the main unit is divided into twelve parts.⁴ The notation ++ in the Unicode column indicates that the symbol can be constructed by combining two or more characters and so does not need to be encoded separately.

NAME	AS	UNCIAE	UNICODE	GLYPH	VARS.
As	1	12	proposed		
Deunx	11/12	11	++	S==–	
Dextans	5/6	10	++	S==	
Dodrans	3/4	9	++	S=–	
Bes	2/3	8	++	S=	
Septunx	7/12	7	++	S–	
Semis	1/2	6	0053	S	
Quincunx	5/12	5	++	==–	
Triens	1/3	4	++	==	
Quadrans	1/4	3	++	=–	
Sextans	1/6	2	proposed	=	z, Z
Sescuncia	1/8	1½	++	Σ–	£–
Uncia	1/12	1	proposed	–	
Semuncia	1/24	1/2		Σ	€, £
Binae sextulae	1/36	1/3	++	ℷ ℷ	ll
Sicilicus	1/48	1/4	10140	Ɔ	
Sextula	1/72	1/6	proposed	ℷ	ς
Dimidia Sextula	1/144	1/12	proposed	ℷ	
Scripulum	1/288	1/24	2108	Θ	ƒ
Siliqua	1/1728	1/144	proposed	»	

⁴ The Romans preferred to divide almost everything into twelve parts rather than ten. Thus there were twelve months in the year, twelve hours in the day, twelve inches to a foot, and twelve ounces in the Roman pound.

The table above was organized to show Unicode equivalents, where such exist, and to separate out the glyph variants. For an unedited table from an epigraphical handbook, see Figure 1. Figure 2 shows some of these units on an inscription.

New Characters Proposed

The following characters are proposed for inclusion in the Universal Character Set. All other characters needed to represent the units in the table above, such as the letter S, are already encoded.

Units of Weight

- , = The uncia is shown by a horizontal line and the sextans by two lines, one on top of the other. These shapes are similar to the Aegean numbers one and two, U+10110 – and 10111 =, except that the lines are longer. The uncia has glyph variants including a dot (common on Republican coins), ı, ı̇, and ı̈. The sextans has a glyph variant z (probably the two lines formed without lifting the pen) or Z. Because of the range of glyph variants for the uncia and sextans, it is not appropriate to unify them with the Aegean numerals.
- ℥ The semuncia is denoted by ℥, with glyph variants Σ, Ξ, and € . It is thought that the character is a Sigma in origin; however, the variants ℥ and € are not found in Greek texts, so a separate semuncia character should be encoded.
- ⷀ The sextula (1/72 of an as or 1/6 of an uncia) is represented by a reversed S glyph. Binae sextulae is shown by two of these reversed S glyphs or by the glyph variant ll.
- ⷁ Dimidia sextula (1/144 of an as or 1/12 of an uncia) is shown by the symbol ⷁ.
- » The siliqua (1/1728 of an as or 1/144 of an uncia) is represented by the shape ».

(continued)

Monetary Units

- ⁄ The as was denoted by a slanted, crossed stroke (Figure 3). Glyph variants include a slanted stroke with a tick at the left: ⁄ (Figure 4) and a plain vertical stroke |.
- ℞ The dupondius is shown by the sign ℞, with a glyph variant 4 (both in Figure 3).
- ℞S The sestertius was represented by the symbol ℞S, standing for 2 ½ asses (Figures 3, 5, and 10). There are many glyph variants, including ℞S (Figure 7), SS (Figure 8), £ (Figure 3), and S . Some modern printers have used the letters HS to represent the sestertius sign which they did not have available in their fonts (Figure 9), but the letter H has nothing to do with the meaning of the symbol.
- ℥ The quinarius is represented by the symbol ℥, with a glyph variant S for semis, half a denarius (both in Figure 3).
- ℥ The denarius is consistently denoted by the symbol ℥ (Figures 3 and 5). Occasional glyph variations are found, such as X (Figure 4).

Reference Glyphs and Suggested Names

=	ROMAN SEXTANS SIGN
–	ROMAN UNCIA SIGN
℥	ROMAN SEMUNCIA SIGN
2	ROMAN SEXTULA SIGN
2	ROMAN DIMIDIA SEXTULA SIGN
»	ROMAN SILIQUA SIGN
℥	ROMAN DENARIUS SIGN
℥	ROMAN QUINARIUS SIGN
℞S	ROMAN SESTERTIUS SIGN
℞	ROMAN DUPONDIUS SIGN
⁄	ROMAN AS SIGN

Codepoint Assignments

It is suggested that these characters be placed in the Supplementary Multilingual Plane because they are part of an historic script. The range 10100–1018F already contains ancient Aegean and Greek numbers. It would be logical to locate these proposed Roman characters further up in the 101XX area.

Bibliography

- Cagnat, René. *Cours d'épigraphie Latine*. 3rd edition. Paris: Fortemoing, 1898.
- Capelli, Adriano. *Dizionario di abbreviature latine ed italiane*. Milano: Ulrico Hoepli, 1929, reprinted 1979.
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- Gordon, Arthur E. *Introduction to Latin Epigraphy*. Berkeley: University of California Press, 1982.
- Hornblower, Simon, and Spawforth, Anthony, edd. *The Oxford Classical Dictionary*. 3rd edition. Oxford and New York: Oxford University Press, 2003.
- Ricci, Serafino. *Epigrafia Latina*. Milano: Ulrico Hoepli, 1898.
- Sandys, John Edwin. *Latin Epigraphy: An Introduction to the Study of Latin Inscriptions*. Second edition, revised by S. G. Campbell. London, 1927; reprinted 1974 by Ares Publishers, Chicago.
- Vindolanda Tablets Online <http://vindolanda.csad.ox.ac.uk/>. This online edition now supercedes the earlier printed editions.

Acknowledgments

The following people and institutions were helpful in the preparation of this proposal: Deborah Anderson, Script Encoding Initiative; John Bodel, Brown University; Richard Peever, Thesaurus Linguae Graecae; Vassar College Library.

Figures

	As.	Once.	
<i>As.</i>	1	12	I
<i>Deunx</i>	$\frac{11}{12}$	11	S — — —
<i>Dextans</i>	$\frac{5}{6}$	10	S — —
<i>Dodrans</i>	$\frac{3}{4}$	9	S — —
<i>Bes</i>	$\frac{2}{3}$	8	S —
<i>Septunx</i>	$\frac{7}{12}$	7	S —
<i>Semis</i>	$\frac{1}{2}$	6	S
<i>Quincunx</i>	$\frac{5}{12}$	5	— — —
<i>Triens</i>	$\frac{1}{3}$	4	— — —
<i>Quadrans</i>	$\frac{1}{4}$	3	— — —
<i>Sextans</i>	$\frac{1}{6}$	2	— ou Z
<i>Sescuncia</i>	$\frac{1}{8}$	$1\frac{1}{2}$	£ — ou Σ —
<i>Uncia</i>	$\frac{1}{12}$	1	—
<i>Semuncia</i>	$\frac{1}{24}$	$\frac{1}{2}$	£ ou Σ ou €
<i>Duella</i>	$\frac{1}{36}$	$\frac{1}{3}$	22 ou u
<i>Sicilicus</i>	$\frac{1}{48}$	$\frac{1}{4}$	3
<i>Sextula</i>	$\frac{1}{72}$	$\frac{1}{6}$	2
<i>Dimidia sextula</i>	$\frac{1}{144}$	$\frac{1}{12}$	2
<i>Scripulum</i>	$\frac{1}{288}$	$\frac{1}{24}$	3 ou 7
<i>Siligua</i>	$\frac{1}{1728}$	$\frac{1}{144}$)

Figure 1. From Cagnat 1898 page 33; table of Roman weights.

LOCA·ADSIGNATA·IN·A·M·PHI·EATRO
 LAELIO·PLAVTIO·LAMIAQ·PACTVMEIOFRNTONE
 ACCEPTVM·AB·LABERIO·MAXIMO·PROCVRATORE·ET·RAEF·ANNONAE
 L·VENNVLEIO·APRONANO·MAG·CVRATORE·THYRSO
 FRATRIBVS·ARVALIBVS·MENIANO·I·CVN·XII·GRADIB·MARM·VIII
 GRAD·VIII·PED·V·5·F·PED·XXXIIIS·GRAD·I·VN·O·PED·XXIIS·ET·MEN

XI·PED·V·5·F·PED· - LXIIIS·5
 SVMMA·PED· - C·XXVIIIIS·5

Figure 2. From Ricci 1898, plate LXI. An inscription of ca. 80 A.D. showing the quadrans, semuncia, and sicilicus as well as the letter S = semis (line 6); deunx and sicilicus, deunx and semuncia (line 7); deunx and semuncia (line 8).

	As.	
As =	1	𐆆
Dupondius . . =	2	𐆆 = 𐆆
Sestertius . . =	2 1/2	𐆆S = 𐆆 ²
Quinarius . . =	5	𐆆 = S
Denarius . . . =	10	𐆆

Figure 3. Roman coin symbols from Cagnat, 1898, page 34. Footnote 2 (referenced next to the Sestertius variant) mentions that IS and SS with horizontal bars are also used for sestertii; for these, see Figures 7 and 8 below.

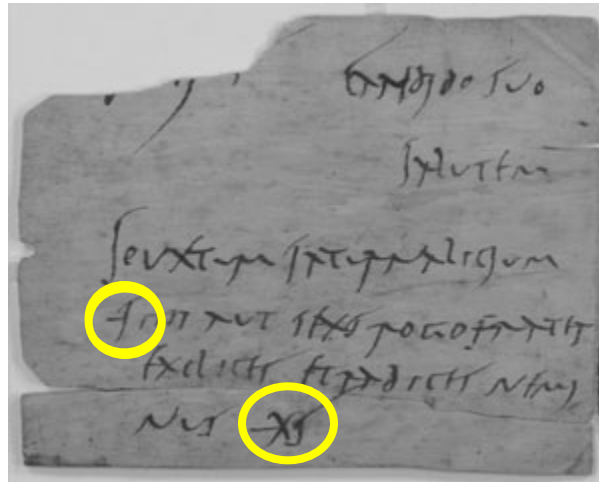


Figure 4. Vindolanda tablet 301 showing as and denarius signs plus the abbreviation S for semis

Candido suo
salutem
souxtum saturnalicium
/ iiii aut sexs rogo frater
explices et radices ne mi
nus X s(emis)

praesentes hora II usque / ad asse(m) dividiatur
(read dividantur) deducta oratione statu(a)e
/ et familiae Augustal(ium) HS (= sestertiis)
c(entum) n̄(ummi); quot (read quod) si ita /¹⁵
factum non erit, tum et HS (= sestertium) XL
m̄(ilia) n̄(ummum / dari rei p(ublicae) Os-
t(iensi or -sium) sub eadem condicione / qua(e)
s(upra) s(cripta) est. Ob cuius dedicatione(m)
dedit / decurionib(us) X (= denarios) V et Au-
gustalibus X V; / isque honore sibi habito
sumptum sta- /²⁰ tuae ordini Augustalium re-
misit [-it in ligature].

Figure 5. From Gordon 1982, p. 151.

(17) Quater (pe)cunia mea iuvi aerarium, ita ut sestertium
 milliens et quing(en)t(ien)s⁵ ad eos, qui praeerant
 aerario, detulerim. Et, M. Lepido et L. Arruntio
 cos., in aerarium militare, quod ex consilio m(eo)
 co(nstitut)um est⁶, ex quo praemia darentur militibus, qui vicena
 (aut plu)ra sti(pendi)a emeruissent **HS** milliens et septingenti(ens
 ex pa)t(rim)onio m(e)o detuli⁷.

Aerarium

6 A.D.

Figure 6. From Sandys 1927, p. 267.

Text (from photo): D(is) M(anibus) (up-
 per margin). / Ex codicillis triplicibus Popili /
 Heraclae, / G(aius) Popilius Heracla heredi-
 b(us) salut(em) (dicit). /⁵ Vos, heredes mei,
 rogo iubeoque / fideique vestrae committo uti /
 monumentum mihi faciatis in (monte) Vati-
 c(ano) / ad Circum, iuxta monumentum Ulpi /
 Narcissi, ex **HS** (= sestertium, gen. pl.) **VI**
n(ummu), in quam rem /¹⁰ numerabit No^{ia}
 Trophime **HS** **III** **n(ummu)** / et coheres ei **HS**
III **n(ummu)**; ibique reliquias / meas et Fadiae
 Maximae uxoris meae, / si quid ei humanitus
 acciderit, poni volo; / cuius monumenti ius lego

Figure 7. From Gordon 1982, p. 143.

Text: Cum sim colonus hortorum <h>olitorum qui sunt via Ostiensi, iuris / Collegi Magni Arkarum Divarum Faustinarum Matris et Piae, colens in / asse annuis **SS** = sestertium, gen. plu.) **XXVI** et quod excurrit per aliquod (read -quot) annos in ho/diernum pariator, deprecor tuam quoq(ue) iustitiam,

Figure 8. From Gordon 1982, p. 161.

NOTE.—**Sēstertium** (which may be a fossilised Gen. Pl. = **sēstertiōrum**) was modified by distributives (rarely by cardinals), thus: **bīna sēstertia**, 2000 sesterces. But in multiples of a million (**decīens centēna mīlia sēstertium**, i.e., **sēstertiōrum**), **centēna mīlia** was regularly omitted, and **sēstertium** declined as a neuter singular. HS stands as well for **sēstertius** as **sēstertium**; and the meaning is regulated by the form of the numeral; thus HS **vīginti** (XX) = 20 **sēsterti**; HS **vīcēna** (**XX**) = 20 **sēstertia**, i.e., 20,000 **sesterti**.

Figure 9. From Gildersleeve and Lodge, p. 493