ISO/IEC JTC1/SC2/WG2 N4276
L2/12-206
2012-06-06

Universal Multiple-Octet Coded Character Set
International Organization for Standardization
Organisation Internationale de Normalisation
Международная организация по стандартизации

Doc Type: **Working Group Document**
Title: **Proposal for encoding Meroitic numbers in the SMP of the UCS**
Source: **UC Berkeley Script Encoding Initiative (Universal Scripts Project)**
Author: **Michael Everson**
Status: **Liaison Contribution**
Action: **For consideration by JTC1/SC2/WG2 and UTC**
Date: **2012-06-06**

Document N3665 (2009-07-29) proposed a set of Meroitic numbers which were accepted for ballot. Information came to light during the ballot period that a new ostrakon had been discovered which would revise our understanding of the number system, and so the characters were removed from the ballot pending further study. This document makes use of that study and proposes characters to be encoded for Meroitic numbers.

N3665 said the following about Meroitic numbers:

> **5. Numbers.** Meroitic numbers are fairly well known, and are only found in Meroitic Cursive. Ones, tens, hundreds, and thousands are known; characters for 60, 90, and 900 are not yet known; neither are the numbers for 4,000, 6,000, 7,000, 8,000, and 9,000, though the number for 10,000 is cited in secondary literature (a number chart, see Figure 4). There is a system to the number shapes, as there are in Egyptian Hieratic, so gaps have been left in the code table for the numbers as yet unattested.

The abstract to Jochen Hallof's article on Ostrakon REM 2112 is as follows:

> Ostracon REM 2112 contains five lines of Meroitic figures. Written are: the units (1 to 9), the tenths (10 to 30), the hundreds (100 to 900), the thousands (5,000 to 9,000), the ten thousands (10,000 to 70,000) and the hundred thousands (500,000 to 900,000). With the help of this ostracon most of Meroitic figure signs can be determined exactly for the first time. Furthermore the ostracon shows that from 100 onwards the Meroitic figures are constructed by a basic sign to which one to four strokes or the signs of number 5 to 9 are added as multiplier. As a result most of the Meroitic texts with figures must be revised. Some of them are discussed at the end of this article.

Based on Hallof's analysis (and line drawings he made for a new Meroitic Cursive font for the letters as well as the numbers) it is now possible to revise the recommended repertoire of numbers and propose a complete set.

9. Unicode Character Properties.

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109BC;MEROITIC CURSIVE FRACTION ELEVEN TWELFTHS;No;0;R;;;;11/12;N;;;;;
109BD;MEROITIC CURSIVE FRACTION ONE HALF;No;0;R;;;;1/2;N;;;;;
109C0;MEROITIC CURSIVE NUMBER ONE;No;0;R;;;;1;N;;;;;
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109C1;MEROITIC CURSIVE NUMBER TWO;No;0;R;;;;2;N;;;;;
109C2;MEROITIC CURSIVE NUMBER THREE;No;0;R;;;;3;N;;;;;
109C3;MEROITIC CURSIVE NUMBER FOUR;No;0;R;;;;4;N;;;;;
109C4;MEROITIC CURSIVE NUMBER FIVE;No;0;R;;;;5;N;;;;;
109C5;MEROITIC CURSIVE NUMBER SIX;No;0;R;;;;6;N;;;;;
109C6;MEROITIC CURSIVE NUMBER SEVEN;No;0;R;;;;7;N;;;;;
109C7;MEROITIC CURSIVE NUMBER EIGHT;No;0;R;;;;8;N;;;;;
109C8;MEROITIC CURSIVE NUMBER NINE;No;0;R;;;;9;N;;;;;
109C9;MEROITIC CURSIVE NUMBER TEN;No;0;R;;;;10;N;;;;;
109CA;MEROITIC CURSIVE NUMBER TWENTY;No;0;R;;;;20;N;;;;;
109CB;MEROITIC CURSIVE NUMBER THIRTY;No;0;R;;;;30;N;;;;;
109CC;MEROITIC CURSIVE NUMBER FORTY;No;0;R;;;;40;N;;;;;
109CD;MEROITIC CURSIVE NUMBER FIFTY;No;0;R;;;;50;N;;;;;
109CE;MEROITIC CURSIVE NUMBER SIXTY;No;0;R;;;;60;N;;;;;
109CF;MEROITIC CURSIVE NUMBER SEVENTY;No;0;R;;;;70;N;;;;;
109D2;MEROITIC CURSIVE NUMBER ONE HUNDRED;No;0;R;;;;100;N;;;;;
109D3;MEROITIC CURSIVE NUMBER TWO HUNDRED;No;0;R;;;;200;N;;;;;
109D4;MEROITIC CURSIVE NUMBER THREE HUNDRED;No;0;R;;;;300;N;;;;;
109D5;MEROITIC CURSIVE NUMBER FOUR HUNDRED;No;0;R;;;;400;N;;;;;
109D6;MEROITIC CURSIVE NUMBER FIVE HUNDRED;No;0;R;;;;500;N;;;;;
109D7;MEROITIC CURSIVE NUMBER SIX HUNDRED;No;0;R;;;;600;N;;;;;
109D8;MEROITIC CURSIVE NUMBER SEVEN HUNDRED;No;0;R;;;;700;N;;;;;
109D9;MEROITIC CURSIVE NUMBER EIGHT HUNDRED;No;0;R;;;;800;N;;;;;
109DA;MEROITIC CURSIVE NUMBER NINE HUNDRED;No;0;R;;;;900;N;;;;;
109DB;MEROITIC CURSIVE NUMBER ONE THOUSAND;No;0;R;;;;1000;N;;;;;
109DC;MEROITIC CURSIVE NUMBER TWO THOUSAND;No;0;R;;;;2000;N;;;;;
109DD;MEROITIC CURSIVE NUMBER THREE THOUSAND;No;0;R;;;;3000;N;;;;;
109DE;MEROITIC CURSIVE NUMBER FOUR THOUSAND;No;0;R;;;;4000;N;;;;;
109DF;MEROITIC CURSIVE NUMBER FIVE THOUSAND;No;0;R;;;;5000;N;;;;;
109E0;MEROITIC CURSIVE NUMBER SIX THOUSAND;No;0;R;;;;6000;N;;;;;
109E1;MEROITIC CURSIVE NUMBER SEVEN THOUSAND;No;0;R;;;;7000;N;;;;;
109E2;MEROITIC CURSIVE NUMBER EIGHT THOUSAND;No;0;R;;;;8000;N;;;;;
109E3;MEROITIC CURSIVE NUMBER NINE THOUSAND;No;0;R;;;;9000;N;;;;;
109E4;MEROITIC CURSIVE NUMBER TEN THOUSAND;No;0;R;;;;10000;N;;;;;
109E5;MEROITIC CURSIVE NUMBER TWENTY THOUSAND;No;0;R;;;;20000;N;;;;;
109E6;MEROITIC CURSIVE NUMBER THIRTY THOUSAND;No;0;R;;;;30000;N;;;;;
109E7;MEROITIC CURSIVE NUMBER FORTY THOUSAND;No;0;R;;;;40000;N;;;;;
109E8;MEROITIC CURSIVE NUMBER FIFTY THOUSAND;No;0;R;;;;50000;N;;;;;
109E9;MEROITIC CURSIVE NUMBER SIXTY THOUSAND;No;0;R;;;;60000;N;;;;;
109EA;MEROITIC CURSIVE NUMBER SEVENTY THOUSAND;No;0;R;;;;70000;N;;;;;
109EB;MEROITIC CURSIVE NUMBER EIGHTY THOUSAND;No;0;R;;;;80000;N;;;;;
109EC;MEROITIC CURSIVE NUMBER NINETY THOUSAND;No;0;R;;;;90000;N;;;;;
109ED;MEROITIC CURSIVE NUMBER ONE HUNDRED THOUSAND;No;0;R;;;;100000;N;;;;;
109EE;MEROITIC CURSIVE NUMBER TWO HUNDRED THOUSAND;No;0;R;;;;200000;N;;;;;
109EF;MEROITIC CURSIVE NUMBER THREE HUNDRED THOUSAND;No;0;R;;;;300000;N;;;;;
109F0;MEROITIC CURSIVE NUMBER FOUR HUNDRED THOUSAND;No;0;R;;;;400000;N;;;;;
109F1;MEROITIC CURSIVE NUMBER FIVE HUNDRED THOUSAND;No;0;R;;;;500000;N;;;;;
109F2;MEROITIC CURSIVE NUMBER SIX HUNDRED THOUSAND;No;0;R;;;;600000;N;;;;;
109F3;MEROITIC CURSIVE NUMBER SEVEN HUNDRED THOUSAND;No;0;R;;;;700000;N;;;;;
109F4;MEROITIC CURSIVE NUMBER EIGHT HUNDRED THOUSAND;No;0;R;;;;800000;N;;;;;
109F5;MEROITIC CURSIVE NUMBER NINE HUNDRED THOUSAND;No;0;R;;;;900000;N;;;;;
109F6;MEROITIC CURSIVE FRACTION ONE TWELFTH;No;0;R;;;;1/12;N;;;;;
109F7;MEROITIC CURSIVE FRACTION TWO TWELFTHS;No;0;R;;;;2/12;N;;;;;
109F8;MEROITIC CURSIVE FRACTION THREE TWELFTHS;No;0;R;;;;3/12;N;;;;;
109F9;MEROITIC CURSIVE FRACTION FOUR TWELFTHS;No;0;R;;;;4/12;N;;;;;
109FA;MEROITIC CURSIVE FRACTION FIVE TWELFTHS;No;0;R;;;;5/12;N;;;;;
109FB;MEROITIC CURSIVE FRACTION SIX TWELFTHS;No;0;R;;;;6/12;N;;;;;
109FC;MEROITIC CURSIVE FRACTION SEVEN TWELFTHS;No;0;R;;;;7/12;N;;;;;
109FD;MEROITIC CURSIVE FRACTION EIGHT TWELFTHS;No;0;R;;;;8/12;N;;;;;
109FE;MEROITIC CURSIVE FRACTION NINE TWELFTHS;No;0;R;;;;9/12;N;;;;;
109FF;MEROITIC CURSIVE FRACTION TEN TWELFTHS;No;0;R;;;;10/12;N;;;;;
```

10. Bibliography.

Hallof, Jochen. 2009. “Ein meroitisches Zahlenostrakon aus Qasr Ibrim”, in *Beiträge zur Sudanforschung*, vol. 10.

11. Acknowledgements. This project was made possible in part by a grant from the U.S. National Endowment for the Humanities, which funded the which funded the Universal Scripts Project (part of the Script Encoding Initiative at UC Berkeley) in respect of the Meroitic encoding. Any views, findings, conclusions or recommendations expressed in this publication do not necessarily reflect those of the National Endowment for the Humanities.

Figures

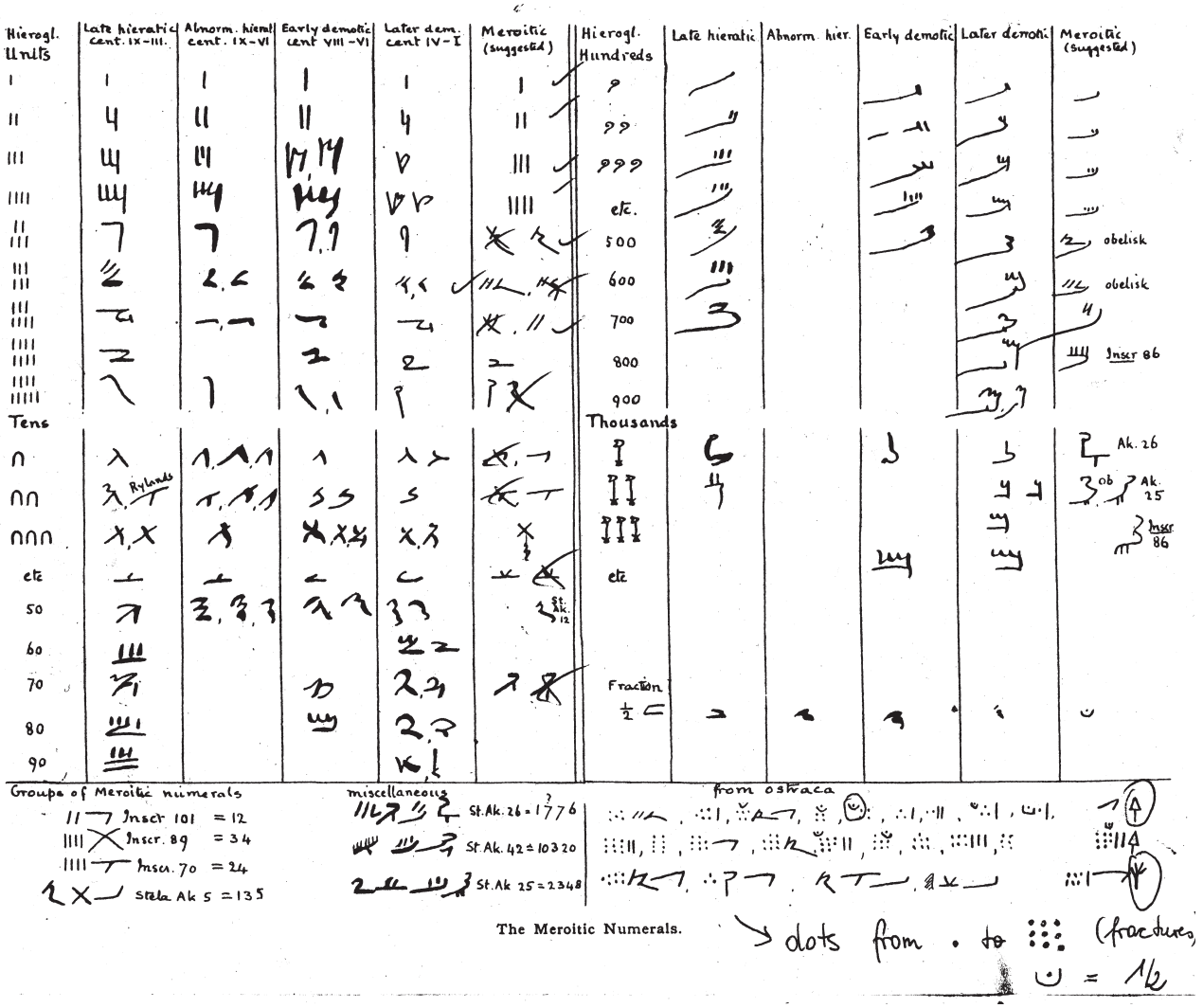


Figure 1. Table of Meroitic numbers prior to the discovery of the Qasr Ibrim ostrakon.

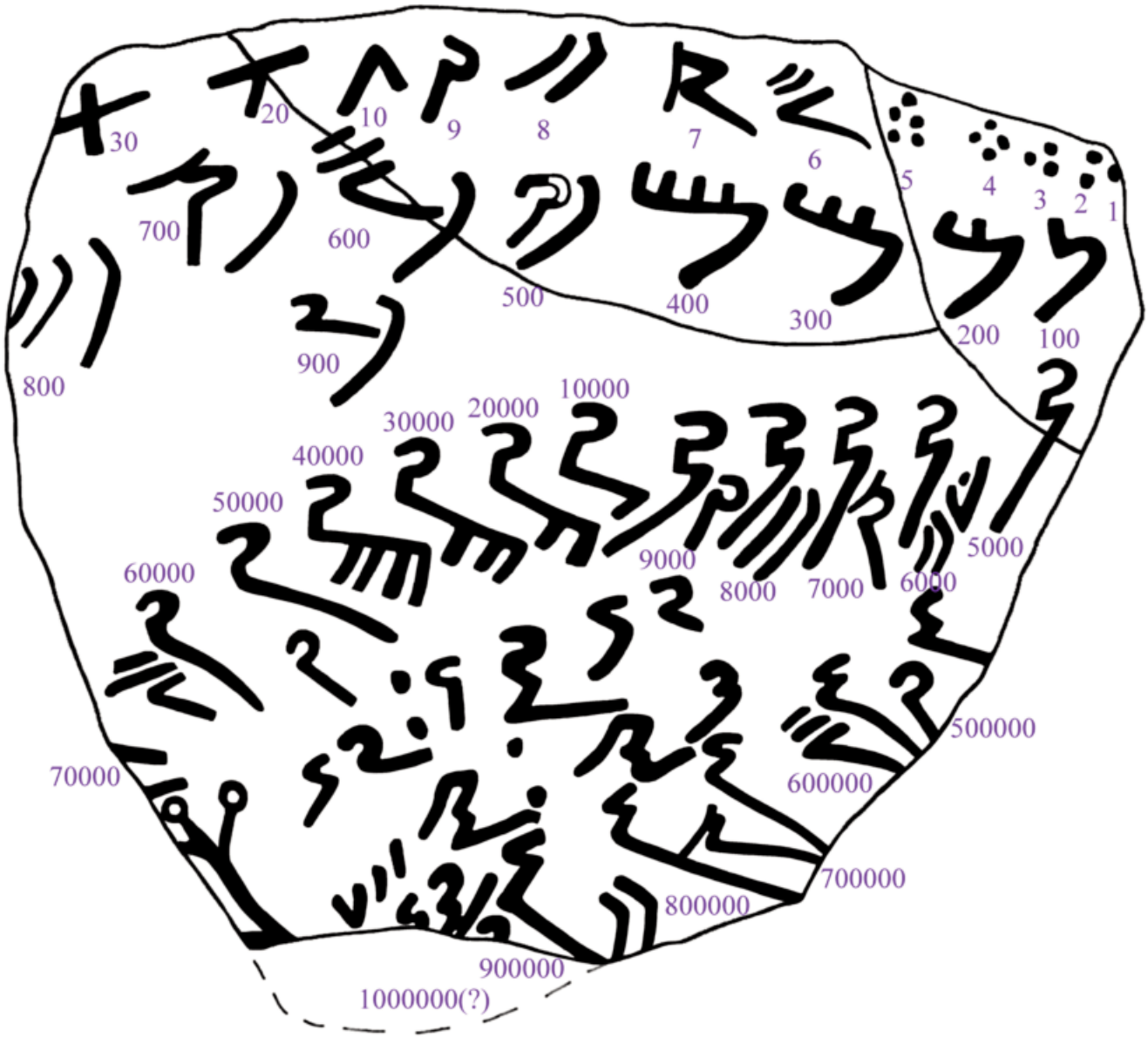
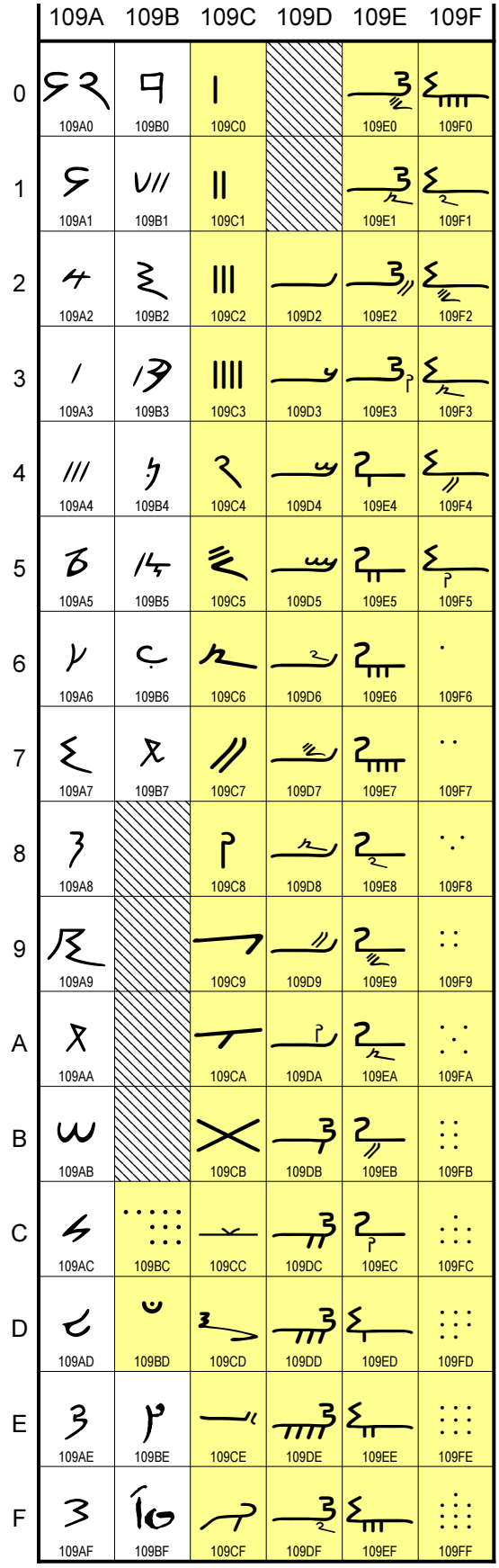


Figure 2. Ostrakon REM 2112 from Hallof 2009, here annotated by Hallof for this proposal.


109A 109B 109C 109D 109E 109F
0 109A0 109B0 109C0 109E0 109F0
1 109A1 109B1 109C1 109E1 109F1
2 109A2 109B2 109C2 109D2 109E2 109F2
3 109A3 109B3 109C3 109D3 109E3 109F3
4 109A4 109B4 109C4 109D4 109E4 109F4
5 109A5 109B5 109C5 109D5 109E5 109F5
6 109A6 109B6 109C6 109D6 109E6 109F6
7 109A7 109B7 109C7 109D7 109E7 109F7
8 109A8 109C8 109D8 109E8 109F8
9 109A9 109C9 109D9 109E9 109F9
A 109AA 109CA 109DA 109EA 109FA
B 109AB 109CB 109DB 109EB 109FB
C 109AC 109BC 109CC 109DC 109EC 109FC
D 109AD 109BD 109CD 109DD 109ED 109FD
E 109AE 109BE 109CE 109DE 109EE 109FE
F 109AF 109BF 109CF 109DF 109EF 109FF

Vowel letters

109A0 MEROITIC CURSIVE LETTER A
109A1 MEROITIC CURSIVE LETTER E
109A2 MEROITIC CURSIVE LETTER I
109A3 MEROITIC CURSIVE LETTER O

Consonant letters

109A4 MEROITIC CURSIVE LETTER YA
109A5 MEROITIC CURSIVE LETTER WA
109A6 MEROITIC CURSIVE LETTER BA
109A7 MEROITIC CURSIVE LETTER PA
109A8 MEROITIC CURSIVE LETTER MA
109A9 MEROITIC CURSIVE LETTER NA
109AA MEROITIC CURSIVE LETTER NE
109AB MEROITIC CURSIVE LETTER RA
109AC MEROITIC CURSIVE LETTER LA
109AD MEROITIC CURSIVE LETTER KHA
109AE MEROITIC CURSIVE LETTER HHA
109AF MEROITIC CURSIVE LETTER SA
109B0 MEROITIC CURSIVE LETTER ARCHAIC SA
109B1 MEROITIC CURSIVE LETTER SE
109B2 MEROITIC CURSIVE LETTER KA
109B3 MEROITIC CURSIVE LETTER QA
109B4 MEROITIC CURSIVE LETTER TA
109B5 MEROITIC CURSIVE LETTER TE
109B6 MEROITIC CURSIVE LETTER TO
109B7 MEROITIC CURSIVE LETTER DA

Numbers

109BC MEROITIC CURSIVE FRACTION ELEVEN TWELFTHS
109BD MEROITIC CURSIVE FRACTION ONE HALF

Demotic logograms

109BE MEROITIC CURSIVE LOGOGRAM RMT
109BF MEROITIC CURSIVE LOGOGRAM IMN

Numbers

Ones

109C0 MEROITIC CURSIVE NUMBER ONE
109C1 MEROITIC CURSIVE NUMBER TWO
109C2 MEROITIC CURSIVE NUMBER THREE
109C3 MEROITIC CURSIVE NUMBER FOUR
109C4 MEROITIC CURSIVE NUMBER FIVE
109C5 MEROITIC CURSIVE NUMBER SIX
109C6 MEROITIC CURSIVE NUMBER SEVEN
109C7 MEROITIC CURSIVE NUMBER EIGHT
109C8 MEROITIC CURSIVE NUMBER NINE

Tens

109C9 MEROITIC CURSIVE NUMBER TEN
109CA MEROITIC CURSIVE NUMBER TWENTY
109CB MEROITIC CURSIVE NUMBER THIRTY
109CC MEROITIC CURSIVE NUMBER FORTY
109CD MEROITIC CURSIVE NUMBER FIFTY
109CE MEROITIC CURSIVE NUMBER SIXTY
109CF MEROITIC CURSIVE NUMBER SEVENTY

Hundreds

109D2 MEROITIC CURSIVE NUMBER ONE HUNDRED
109D3 MEROITIC CURSIVE NUMBER TWO HUNDRED
109D4 MEROITIC CURSIVE NUMBER THREE HUNDRED
109D5 MEROITIC CURSIVE NUMBER FOUR HUNDRED
109D6 MEROITIC CURSIVE NUMBER FIVE HUNDRED
109D7 MEROITIC CURSIVE NUMBER SIX HUNDRED
109D8 MEROITIC CURSIVE NUMBER SEVEN HUNDRED
109D9 MEROITIC CURSIVE NUMBER EIGHT HUNDRED
109DA MEROITIC CURSIVE NUMBER NINE HUNDRED

Thousands

109DB MEROITIC CURSIVE NUMBER ONE THOUSAND
109DC MEROITIC CURSIVE NUMBER TWO THOUSAND
109DD MEROITIC CURSIVE NUMBER THREE THOUSAND
109DE MEROITIC CURSIVE NUMBER FOUR THOUSAND
109DF MEROITIC CURSIVE NUMBER FIVE THOUSAND
109E0 MEROITIC CURSIVE NUMBER SIX THOUSAND
109E1 MEROITIC CURSIVE NUMBER SEVEN THOUSAND
109E2 MEROITIC CURSIVE NUMBER EIGHT THOUSAND
109E3 MEROITIC CURSIVE NUMBER NINE THOUSAND

Ten thousands

109E4 MEROITIC CURSIVE NUMBER TEN THOUSAND
109E5 MEROITIC CURSIVE NUMBER TWENTY THOUSAND
109E6 MEROITIC CURSIVE NUMBER THIRTY THOUSAND
109E7 MEROITIC CURSIVE NUMBER FORTY THOUSAND
109E8 MEROITIC CURSIVE NUMBER FIFTY THOUSAND
109E9 MEROITIC CURSIVE NUMBER SIXTY THOUSAND
109EA MEROITIC CURSIVE NUMBER SEVENTY THOUSAND
109EB MEROITIC CURSIVE NUMBER EIGHTY THOUSAND
109EC MEROITIC CURSIVE NUMBER NINETY THOUSAND

Hundred thousands

109ED MEROITIC CURSIVE NUMBER ONE HUNDRED THOUSAND
109EE MEROITIC CURSIVE NUMBER TWO HUNDRED THOUSAND
109EF MEROITIC CURSIVE NUMBER THREE HUNDRED THOUSAND
109F0 MEROITIC CURSIVE NUMBER FOUR HUNDRED THOUSAND
109F1 MEROITIC CURSIVE NUMBER FIVE HUNDRED THOUSAND
109F2 MEROITIC CURSIVE NUMBER SIX HUNDRED THOUSAND
109F3 MEROITIC CURSIVE NUMBER SEVEN HUNDRED THOUSAND
109F4 MEROITIC CURSIVE NUMBER EIGHT HUNDRED THOUSAND
109F5 MEROITIC CURSIVE NUMBER NINE HUNDRED THOUSAND

Fractions

109F6 MEROITIC CURSIVE FRACTION ONE TWELFTH
109F7 MEROITIC CURSIVE FRACTION TWO TWELFTHS
109F8 MEROITIC CURSIVE FRACTION THREE TWELFTHS
109F9 MEROITIC CURSIVE FRACTION FOUR TWELFTHS
109FA MEROITIC CURSIVE FRACTION FIVE TWELFTHS
109FB MEROITIC CURSIVE FRACTION SIX TWELFTHS
109FC MEROITIC CURSIVE FRACTION SEVEN TWELFTHS

109FD	⁝⁝·	MEROITIC CURSIVE FRACTION EIGHT TWELFTHS
109FE	⁝⁝⁝	MEROITIC CURSIVE FRACTION NINE TWELFTHS
109FF	⁝⁝⁝·	MEROITIC CURSIVE FRACTION TEN TWELFTHS

A. Administrative

1. Title

Proposal for encoding Meroitic numbers in the SMP of the UCS

2. Requester's name

UC Berkeley Script Encoding Initiative (Universal Scripts Project)

3. Requester type (Member body/Liaison/Individual contribution)

Liaison contribution.

4. Submission date

2012-06-06

5. Requester's reference (if applicable)

6. Choose one of the following:

6a. This is a complete proposal

No.

6b. More information will be provided later

Yes.

B. Technical – General

1. Choose one of the following:

1a. This proposal is for a new script (set of characters)

No.

1b. Proposed name of script

1c. The proposal is for addition of character(s) to an existing block

Yes.

1d. Name of the existing block

Meroitic Cursive.

2. Number of characters in proposal

64.

3. Proposed category (A-Contemporary; B.1-Specialized (small collection); B.2-Specialized (large collection); C-Major extinct; D-Attested extinct; E-Minor extinct; F-Archaic Hieroglyphic or Ideographic; G-Obscure or questionable usage symbols)

Category E.

4a. Is a repertoire including character names provided?

Yes.

4b. If YES, are the names in accordance with the "character naming guidelines" in Annex L of P&P document?

Yes.

4c. Are the character shapes attached in a legible form suitable for review?

Yes.

5a. Who will provide the appropriate computerized font (ordered preference: True Type, or PostScript format) for publishing the standard?

Michael Everson.

5b. If available now, identify source(s) for the font (include address, e-mail, ftp-site, etc.) and indicate the tools used:

Michael Everson, Fontographer.

6a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided?

Yes.

6b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached?

Yes.

7. 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)?

Yes.

8. 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 Unicode Character Database http://www.unicode.org/Public/UNIDATA/ UnicodeCharacterDatabase.html and associated Unicode Technical Reports for information needed for consideration by the Unicode Technical Committee for inclusion in the Unicode Standard.

See above.

C. Technical – Justification

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

No.

2a. 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.

2b. If YES, with whom?

Jochen Hallof, Michael Zach

2c. 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?

Small community, scholars and historians.

4a. The context of use for the proposed characters (type of use; common or rare)
Scholarly use.
4b. Reference
5a. Are the proposed characters in current use by the user community?
Yes.
5b. If YES, where?
Worldwide.
6a. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP?
No.
6b. If YES, is a rationale provided?
6c. If YES, reference
7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)?
Yes.
8a. Can any of the proposed characters be considered a presentation form of an existing character or character sequence?
No.
8b. If YES, is a rationale for its inclusion provided?
8c. If YES, reference
9a. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters?
No.
9b. If YES, is a rationale for its inclusion provided?
9c. If YES, reference
10a. Can any of the proposed character(s) be considered to be similar (in appearance or function) to an existing character?
No.
10b. If YES, is a rationale for its inclusion provided?
10c. If YES, reference
11a. Does the proposal include use of combining characters and/or use of composite sequences (see clauses 4.12 and 4.14 in ISO/IEC 10646-1: 2000)?
No.
11b. If YES, is a rationale for such use provided?
11c. If YES, reference
11d. Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided?
No.
11e. If YES, reference
12a. Does the proposal contain characters with any special properties such as control function or similar semantics?
No.
12b. If YES, describe in detail (include attachment if necessary)
13a. Does the proposal contain any Ideographic compatibility character(s)?
No.
13b. If YES, is the equivalent corresponding unified ideographic character(s) identified?