

ISO/IEC JTC1/SC2/WG2  
Universal Multiple-Octet Coded Character Set  
International Organization for Standardization  
Organisation Internationale de Normalisation  
Международная организация по стандартизации  
國際標準化組織

## Title: Revised proposal to encode Egyptian hieroglyphs in Plane 1 of the UCS

Doc Type: Working Group Document

Source: Richard Cook, Michael Everson, Rick McGowan, Robert Richmond

Status: Individual Contribution

Action: For consideration by JTC1/SC2/WG2 and UTC

Date: 2005-10-24

This proposal focuses on the “Gardiner/Oxford” subset of the characters proposed in JTC1/SC2/WG2 N1944 (Michael Everson 1999). The character set of the current proposal is defined on the basis of mappings to works by Sir Alan H. Gardiner, published from 1927 to 1957.

This proposal includes, in addition to the code charts and names list, a mapping table (L2/05-312) connecting the proposed code points to the character forms and identifiers in 59 scanned pages of source documents (L2/05-313). The proposed character names derive from the source identifiers. The suggested code point range begins as in the Road Map, in Plane 01 at [U+14000].

Gardiner’s ground-breaking Egyptological work has served as the basis for a number of custom encodings of Egyptian hieroglyphs. The source mappings and identifiers in this proposal permit researchers to map their existing character collections to this, for future extension of the repertory and mapping database.

This proposal provides components for cartouche building (GD28:11\*), but does not address text processing issues relating to character positioning or contextual deformation (stacking, scaling, rotation, flipping) or other kinds of grouping (as in composite number forms). Such issues may be addressed at a later stage of development, though some are perhaps best addressed outside of the character encoding process.

## Glyphs and Repertory

With regard to the forms of the characters in the repertory, Gardiner wrote (1928:11): “[...] the forms of the signs chosen to be the staple of the new font [by Mr. and Mrs. de Garis Davies, and J. W. Bilton of Bannerman & Son] are taken from the Eighteenth Dynasty tombs at Thebes. These are admirably fitted for reproducing texts in Middle Egyptian, the classical period of the language ranging from Dyn. XI down to the end of Dyn. XVIII.”

The proposal code charts employ a new version of the *InScribe* font of *Saqqara Technology Ltd.* (Oxford, U.K.), which adheres closely to the forms appearing in the source texts. The *InScribe* font and software, in development since 1994, are used in preparation of publications of the *Griffith Institute*, Ashmolean Museum, Oxford.

Some forms in the GD57 Sign List (p.442-543) exhibit slight variation in comparison with signs in the GD57 “Index to the foregoing Sign List” (p.544-548). GD28:45 contains a list of 25 “Superseded Sorts”, forms that the typesetters were instructed *not* to use. These changes were not always applied consistently in subsequent editions of the *Grammar*, although the GD57 *Index* includes only the preferred forms. The character forms

in the *InScribe* font used in this proposal reflect the preferred forms in each case.

Duplicates in the *GD57 Index* (p.544ff) were identified, checking the *InScribe* font against the *Cleo* font. There are a total of 765 signs with unique identifiers in the *GD57 Index*, and the mapping database marks them each as such.

In addition to those 765, we have collected a total of 201 unique additional Gardiner characters, occurring either in the body of *GD57*, or in one of the supplemental sources (*GD28*,*GD29*,*GD31*,*GD53*). Out of these 201 characters, 7 are characters appearing in the body of *GD57* that did not appear in the *GD57 Index*.

In addition, 18 characters are included from the Oxford Ashmolean Museum's *Griffith Institute's* "Topographic Bibliography" (see *GD13*, *GITB*).

This gives the total of (765+201+18=) 984 characters constituting the "Gardiner/Oxford" set in this proposal.

## Names, Mappings, Ordering

Each character in this proposal has at least one source-mapping in the mapping table, and in many cases there are multiple mappings, allowing a character's appearance in the set to be tracked over time.

The proposed character names derive from the source identifiers. Where *GD* identifiers employ one or more asterisks "\*", sequential alphabetic codes are substituted, in accordance with usage in common Egyptological custom encodings (e.g. *Hieroglyphica*, *InScribe*). Thus, "A14\*" (*GD57*) becomes "A14A". The mapping table includes, in addition to source mappings, specific indication of which source mapping the proposed character name derives from, and how the identifier may have been adapted in the name (e.g. to satisfy uniqueness and other naming requirements).

Characters are ordered by means of their names, sorted by (1) the leading alphabetic string [with "AA" sorting after "Z", as in *GD57*], (2) numeric, (3) trailing alphabetic. Characters are then assigned sequentially to the first 984 code points in the block, beginning at [U+14000], and ending at [U+143D7].

## Bibliography

GARDINER, SIR ALAN HENDERSON (1879-1963)

**GD57:** *Egyptian Grammar*. Ashmolean Museum, Oxford: *Griffith Institute*, 1957 [3rd edition; 2nd edition 1950; first published 1927.] ISBN:0-900416-35-1.

**GD53:** "Supplement to The Catalogue of the Hieroglyphic Printing Type, showing acquisitions to December 1953." Oxford University Press, 1954.

**GD31:** "Additions to the hieroglyphic fount (1931)". *Journal of Egyptian Archeology*. Volume XVII. London: The Egypt Exploration Society, 1931.

**GD29:** "Additions to the new hieroglyphic fount (1928)". *Journal of Egyptian Archeology*. Volume XV. London: The Egypt Exploration Society, 1929. [10 new signs.]

**GD28:** "Catalogue of the Egyptian Hieroglyphic Printing Type from matrices owned and controlled by Dr. Alan H. Gardiner, in two sizes (18 point, 12 point) with intermediate forms". Oxford University Press, 1928.

**GD27:** See *GD57*.

**GD13:** *A Topographical Catalogue of the Private Tombs of Thebes*. (Gardiner & Arthur E.P. Weigall.) London: Bernard Quaritch, 1913.

PORTER, BERTHA (1852-1941)

**GITB:** *Topographical Bibliography of Ancient Egyptian Hieroglyphic Texts, Statues, Reliefs and Paintings*. Bertha Porter and Rosalind Louisa Beaufort Moss, assisted by Ethel W. Burney, now edited by Jaromir Malek. [8 volumes, at present.] Oxford: Clarendon Press, 1927-51, 2d ed. 1960-4. (a.k.a. *Griffith Institute Topographical Bibliography*. First published in 1934 by the Clarendon Press, Oxford. Re-issued by the *Griffith Institute*, Oxford, 1968.) <<http://www.ashmol.ox.ac.uk/gri/3.html>>

EVERSON, MICHAEL

**N2132:** Response to comments on the question of encoding Egyptian hieroglyphs in the UCS (N2096). 1999-10-04.

**N1944:** Encoding Egyptian Hieroglyphs in Plane 1 of the UCS. 1999-01-09. <<http://std.dkuug.dk/JTC1/SC2/WG2/docs/n1944.pdf>>

**N1637:** Proposal to encode Basic Egyptian Hieroglyphs in Plane 1. 1997-09-18.

**N1636:** Encoding Egyptian Hieroglyphs in ISO/IEC 10646-2. 1997-08-25.

## Acknowledgements

Michael Everson of *Evertime* <<http://www.evertime.com/>> laid the groundwork for this proposal in N1944, and Michael provided the 59 pages of scanned Gardiner sources. Bob Richmond of *Saqqara Technology Ltd.* <<http://www.gameset.com/>> provided raw mapping data, and furnished the BMP PUA *InScribe* font used in the code charts. Cleo Huggins provided a set of 8-bit fonts for the basic GD57 *Index* set, and several other fonts for additional characters not mapped in this proposal. Ken Lunde of *Adobe Systems Inc.* <<http://www.adobe.com/>> combined Cleo's fonts into a single OpenType font of 976 characters in Plane 15 PUA (U+F0000..U+F0300) used to proof the basic GD57 *Index* glyphs in the *InScribe* font. Jaromir Malek of the *Griffith Institute* provided invaluable assistance in consultation with Bob Richmond. Debbie Anderson of the *Script Encoding Initiative* (SEI) at UC Berkeley and Rick McGowan initiated and coordinated the project and source materials, and kept us on schedule for October 24. Richard Cook prepared the proposal, databases, code charts, and mapping tables, checking everything against his 15-year-old copy of GD57 and the source PDFs.

This proposal was made possible in part by a grant to the *Universal Scripts Project* (part of the SEI) from the U.S. *National Endowment for the Humanities* (NEH), Division of Preservation and Access, Grant Number PA-51171. Opinions, findings, conclusions, and/or recommendations expressed in this proposal do not necessarily reflect the views of NEH.

This proposal was typeset in Mac OS X, using Adobe InDesign CS 3.0.1, with code charts generated in conjunction with Perl v5.8.1-RC3 built for darwin-thread-multi-2level.

## A. Administrative

1. TITLE:

*Proposal to encode Egyptian hieroglyphs in Plane 1 of the UCS*

2. REQUESTERS NAMES:

Richard Cook, Michael Everson, Rick McGowan, Robert Richmond

3. REQUESTER TYPE:

Individual Contribution.

4. SUBMISSION DATE:

2005-10-23.

5. REQUESTER'S REFERENCE

N2132, N1944, N1637, N1636.

6A. COMPLETION

This is not a final proposal.

6B. MORE INFORMATION TO BE PROVIDED?

Yes.

## B. Technical - General

1A. NEW SCRIPT? NAME?

Yes. Egyptian Hieroglyphs.

1B. ADDITION OF CHARACTERS TO EXISTING BLOCK? NAME?

No.

2. NUMBER OF CHARACTERS

984.

3. PROPOSED CATEGORY

Category F.

4. PROPOSED LEVEL OF IMPLEMENTATION AND RATIONALE

Level 1.

5A. CHARACTER NAMES INCLUDED IN PROPOSAL?

Yes.

5B. CHARACTER NAMES IN ACCORDANCE WITH GUIDELINES?

Yes.

5C. CHARACTER SHAPES REVIEWABLE?

Yes (see below).

6A. WHO WILL PROVIDE COMPUTERIZED FONT?

Requesters.

6B. FONT CURRENTLY AVAILABLE?

Yes.

6C. FONT FORMAT?

TrueType.

7A. ARE REFERENCES (TO OTHER CHARACTER SETS, DICTIONARIES, DESCRIPTIVE TEXTS, ETC.) PROVIDED?

Yes, mapping table, scans, and source bibliography.

7B. ARE PUBLISHED EXAMPLES (SUCH AS SAMPLES FROM NEWSPAPERS, MAGAZINES, OR OTHER SOURCES) OF USE OF PROPOSED CHARACTERS ATTACHED?

Yes, see mapping table and scans: L2/05-312, L2/05-313.

8. DOES THE PROPOSAL ADDRESS OTHER ASPECTS OF CHARACTER DATA PROCESSING?

Yes (see above).

## C. Technical -- Justification

1. CONTACT WITH THE USER COMMUNITY?

Yes. See (L2:02288,02290,02281,02295).

2. INFORMATION ON THE USER COMMUNITY?

Scholarly community and enthusiasts.

3A. THE CONTEXT OF USE FOR THE PROPOSED CHARACTERS?

Used to write Ancient Egyptian, primarily of the Middle Kingdom period (see above).

3B. REFERENCE

See *Bibliography* above.

4A. PROPOSED CHARACTERS IN CURRENT USE?

Yes

4B. WHERE?

By scholars worldwide.

5A. CHARACTERS SHOULD BE ENCODED ENTIRELY IN BMP?

No. Positions [U+14000] .. [U+156FF] in Plane 1 are proposed for the block.

5B. RATIONALE

See Roadmap.

6. SHOULD CHARACTERS BE KEPT IN A CONTINUOUS RANGE?

Yes.

7A. CAN THE CHARACTERS BE CONSIDERED A PRESENTATION FORM OF AN EXISTING CHARACTER OR CHARACTER SEQUENCE?

No.

7B. WHERE?

N.A.

7C. REFERENCE

N.A.

8A. CAN ANY OF THE CHARACTERS BE CONSIDERED TO BE SIMILAR (IN APPEARANCE OR FUNCTION) TO AN EXISTING CHARACTER?

Perhaps in appearance, but not in function.

8B. WHERE?

N.A.

8C. REFERENCE

N.A.

9A. COMBINING CHARACTERS OR USE OF COMPOSITE SEQUENCES INCLUDED?

No.

9B. LIST OF COMPOSITE SEQUENCES AND THEIR CORRESPONDING GLYPH IMAGES PROVIDED?

No.

10. CHARACTERS WITH ANY SPECIAL PROPERTIES SUCH AS CONTROL FUNCTION, ETC. INCLUDED?

No.



















































































	1400	1401	1402	1403	1404	1405	1406	1407	1408	1409	140A	140B	140C	140D	140E	140F
0	 e000	 e010	 e020	 e030	 e041	 e052	 e068	 e080	 e090	 e0a0	 e0b0	 e0c1	 e0d8	 e0e9	 e0f9	 e11c
1	 e001	 e011	 e021	 e031	 e042	 e053	 e069	 e081	 e091	 e0a1	 e0b1	 e0c2	 e0d9	 e0ea	 e0fa	 e11d
2	 e002	 e012	 e022	 e032	 e043	 e054	 e06a	 e082	 e092	 e0a2	 e0b2	 e0c3	 e0db	 e0eb	 e0fb	 e11e
3	 e003	 e013	 e023	 e033	 e044	 e055	 e06b	 e083	 e093	 e0a3	 e0b3	 e0c4	 e0dc	 e0ec	 e0fc	 e11f
4	 e004	 e014	 e024	 e034	 e045	 e056	 e06c	 e084	 e094	 e0a4	 e0b4	 e0c5	 e0dd	 e0ed	 e110	 e120
5	 e005	 e015	 e025	 e036	 e046	 e057	 e06d	 e085	 e095	 e0a5	 e0b5	 e0c6	 e0de	 e0ee	 e111	 e121
6	 e006	 e016	 e026	 e037	 e047	 e058	 e06e	 e086	 e096	 e0a6	 e0b6	 e0c7	 e0df	 e0ef	 e112	 e122
7	 e007	 e017	 e027	 e038	 e048	 e059	 e06f	 e087	 e097	 e0a7	 e0b7	 e0c8	 e0e0	 e0f0	 e113	 e123
8	 e008	 e018	 e028	 e039	 e049	 e060	 e070	 e088	 e098	 e0a8	 e0b8	 e0d0	 e0e1	 e0f1	 e114	 e124
9	 e009	 e019	 e029	 e03a	 e04a	 e061	 e071	 e089	 e099	 e0a9	 e0b9	 e0d1	 e0e2	 e0f2	 e115	 e125
A	 e00a	 e01a	 e02a	 e03b	 e04b	 e062	 e072	 e08a	 e09a	 e0aa	 e0bb	 e0d2	 e0e3	 e0f3	 e116	 e126
B	 e00b	 e01b	 e02b	 e03c	 e04c	 e063	 e073	 e08b	 e09b	 e0ab	 e0bc	 e0d3	 e0e4	 e0f4	 e117	 e127
C	 e00c	 e01c	 e02c	 e03d	 e04d	 e064	 e074	 e08c	 e09c	 e0ac	 e0bd	 e0d4	 e0e5	 e0f5	 e118	 e128
D	 e00d	 e01d	 e02d	 e03e	 e04e	 e065	 e075	 e08d	 e09d	 e0ad	 e0be	 e0d5	 e0e6	 e0f6	 e119	 e129
E	 e00e	 e01e	 e02e	 e03f	 e050	 e066	 e076	 e08e	 e09e	 e0ae	 e0bf	 e0d6	 e0e7	 e0f7	 e11a	 e12a
F	 e00f	 e01f	 e02f	 e040	 e051	 e067	 e525	 e08f	 e09f	 e0af	 e0c0	 e0d7	 e0e8	 e0f8	 e11b	 e12b



	1410	1411	1412	1413	1414	1415	1416	1417	1418	1419	141A	141B	141C	141D	141E	141F
0	 e12c	 e13c	 e14c	 e16d	 e17d	 e18e	 e19f	 e1c5	 e1e2	 e1f9	 e237	 e21d	 e22e	 e244	 e254	 e264
1	 e12d	 e13d	 e14d	 e16e	 e17e	 e18f	 e1a0	 e1c6	 e1e3	 e1fa	 e20e	 e21e	 e22f	 e245	 e255	 e265
2	 e12e	 e13e	 e14e	 e16f	 e180	 e190	 e1b0	 e1c7	 e1e5	 e200	 e20f	 e21f	 e230	 e246	 e256	 e266
3	 e12f	 e13f	 e160	 e170	 e181	 e191	 e1b1	 e1c8	 e1e6	 e201	 e210	 e220	 e231	 e247	 e257	 e267
4	 e130	 e140	 e161	 e171	 e182	 e192	 e1b2	 e1c9	 e1e7	 e202	 e211	 e221	 e232	 e248	 e258	 e268
5	 e131	 e141	 e162	 e172	 e183	 e194	 e1b3	 e1ca	 e1e8	 e203	 e212	 e222	 e233	 e249	 e259	 e269
6	 e132	 e142	 e163	 e173	 e184	 e195	 e1b4	 e1cb	 e1e9	 e204	 e213	 e223	 e234	 e24a	 e25a	 e26a
7	 e133	 e143	 e164	 e174	 e185	 e196	 e1b5	 e1cc	 e1f0	 e205	 e214	 e224	 e235	 e24b	 e25b	 e26b
8	 e134	 e144	 e165	 e175	 e186	 e197	 e1b6	 e1cd	 e1f1	 e206	 e215	 e225	 e236	 e24c	 e25c	 e26c
9	 e135	 e145	 e166	 e176	 e187	 e198	 e1b7	 e1ce	 e1f2	 e207	 e216	 e226	 e238	 e24d	 e25d	 e26d
A	 e136	 e146	 e167	 e177	 e188	 e199	 e1b8	 e1cf	 e1f3	 e208	 e217	 e227	 e239	 e24e	 e25e	 e26e
B	 e137	 e147	 e168	 e178	 e189	 e19a	 e1c0	 e1d0	 e1f4	 e209	 e218	 e228	 e23a	 e24f	 e25f	 e26f
C	 e138	 e148	 e169	 e179	 e18a	 e19b	 e1c1	 e1d1	 e1f5	 e20a	 e219	 e229	 e240	 e250	 e260	 e270
D	 e139	 e149	 e16a	 e17a	 e18b	 e19c	 e1c2	 e1d2	 e1f6	 e20b	 e21a	 e22b	 e241	 e251	 e261	 e271
E	 e13a	 e14a	 e16b	 e17b	 e18c	 e19d	 e1c3	 e1e0	 e1f7	 e20c	 e21b	 e22c	 e242	 e252	 e262	 e272
F	 e13b	 e14b	 e16c	 e17c	 e18d	 e19e	 e1c4	 e1e1	 e1f8	 e20d	 e21c	 e22d	 e243	 e253	 e263	 e273



	1420	1421	1422	1423	1424	1425	1426	1427	1428	1429	142A	142B	142C	142D	142E	142F
0	e274	e33f	e359	e369	e28f	e29f	e2af	e2bf	e2dc	e307	e317	e385	e395	e3a5	e3c0	e3d0
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2	e331	e341	e35b	e281	e291	e2a1	e2b1	e2c1	e2e0	e309	e319	e387	e397	e3a7	e3c2	e3d2
3	e332	e342	e35c	e282	e292	e2a2	e2b2	e2c2	e2e1	e30a	e31a	e388	e398	e3a8	e3c3	e3d3
4	e333	e343	e35d	e283	e293	e2a3	e2b3	e2d0	e2e2	e30b	e31b	e389	e399	e3a9	e3c4	e3d4
5	e334	e344	e35e	e284	e294	e2a4	e2b4	e2d1	e2e3	e30c	e31c	e38a	e39a	e3aa	e3c5	e3d5
6	e335	e345	e35f	e285	e295	e2a5	e2b5	e2d2	e2e4	e30d	e31d	e38b	e39b	e3ab	e3c6	e3d6
7	e336	e350	e360	e286	e296	e2a7	e2b6	e2d3	e2e5	e30e	e31e	e38c	e39c	e3ac	e3c7	e3d7
8	e337	e351	e361	e287	e297	e2a6	e2b7	e2d4	e2e6	e30f	e31f	e38d	e39d	e3ad	e3c8	e3d8
9	e338	e352	e362	e288	e298	e2a8	e2b8	e2d5	e300	e310	e321	e38e	e39e	e3ae	e3c9	e3d9
A	e339	e353	e363	e289	e299	e2a9	e2b9	e2d6	e301	e311	e322	e38f	e39f	e3af	e3ca	e3da
B	e33a	e354	e364	e28a	e29a	e2aa	e2ba	e2d7	e302	e312	e380	e390	e3a0	e3b0	e3cb	e3db
C	e33b	e355	e365	e28b	e29b	e2ab	e2bb	e2d8	e303	e313	e381	e391	e3a1	e3b2	e3cc	e3dc
D	e33c	e356	e366	e28c	e29c	e2ac	e2bc	e2d9	e304	e314	e382	e392	e3a2	e3b3	e3cd	e3dd
E	e33d	e357	e367	e28d	e29d	e2ad	e2bd	e2da	e305	e315	e383	e393	e3a3	e3b1	e3ce	e3de
F	e33e	e358	e368	e28e	e29e	e2ae	e2be	e2db	e306	e316	e384	e394	e3a4	e0ba	e3cf	e3df

	1430	1431	1432	1433	1434	1435	1436	1437	1438	1439	143A	143B	143C	143D	143E	143F
0	 e3e0	 e403	 e413	 e423	 e445	 e453	 e462	 e481	 e491	 e4a2	 e4b9	 e4cf	 e4df	 e4f0		
1	 e3e1	 e404	 e414	 e424	 e446	 e454	 e463	 e482	 e492	 e4a3	 e4c0	 e4d0	 e4e1	 e4f1		
2	 e3e2	 e405	 e415	 e425	 e447	 e455	 e464	 e483	 e493	 e4a4	 e4c1	 e4d1	 e4e2	 e4f2		
3	 e3e4	 e406	 e416	 e426	 e448	 e456	 e465	 e484	 e494	 e4a5	 e4c2	 e4d2	 e4e3	 e4f3		
4	 e3e5	 e407	 e417	 e427	 e449	 e642	 e466	 e485	 e495	 e4a6	 e4c3	 e4d3	 e4e4	 e4f4		
5	 e3e6	 e408	 e418	 e428	 e44a	 e457	 e467	 e486	 e496	 e4a7	 e4c4	 e4d4	 e4e5	 e4f5		
6	 e3e7	 e409	 e419	 e429	 e44b	 e458	 e468	 e487	 e497	 e4a8	 e4c5	 e4d5	 e4e6	 e4f7		
7	 e3e8	 e40a	 e41a	 e42a	 e684	 e459	 e469	 e488	 e498	 e4b0	 e4c6	 e4d6	 e4e7	 e4f6		
8	 e3e9	 e40b	 e41b	 e42b	 e685	 e45a	 e46a	 e489	 e499	 e4b1	 e4c7	 e4d7	 e4e8			
9	 e3ea	 e40c	 e41c	 e42c	 e44c	 e45b	 e46b	 e48a	 e49a	 e4b2	 e4c8	 e4d8	 e4e9			
A	 e3eb	 e40d	 e41d	 e42d	 e44d	 e45c	 e46c	 e48b	 e49b	 e4b3	 e4c9	 e4d9	 e4ea			
B	 e3ec	 e40e	 e41e	 e440	 e44e	 e45d	 e46d	 e48c	 e49c	 e4b4	 e4ca	 e4da	 e4eb			
C	 e3ee	 e40f	 e41f	 e441	 e44f	 e45e	 e46e	 e48d	 e49d	 e4b5	 e4cb	 e4db	 e4ec			
D	 e400	 e410	 e420	 e442	 e450	 e45f	 e46f	 e48e	 e49e	 e4b6	 e4cc	 e4dc	 e4ed			
E	 e401	 e411	 e421	 e443	 e451	 e460	 e470	 e48f	 e4a0	 e4b7	 e4cd	 e4dd	 e4ee			
F	 e402	 e412	 e422	 e444	 e452	 e461	 e480	 e490	 e4a1	 e4b8	 e4ce	 e4de	 e4ef			





























































