

Title: Preliminary Proposal to Encode the Mongolian Square Script in ISO/IEC 10646
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Action: For consideration by UTC and WG2
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1 Introduction

This is a preliminary proposal to encode the Mongolian Square script in the Universal Character Set (ISO/IEC 10646). The script was previously named ‘Xawtaa Dorboljin’ and was described in ‘Preliminary Proposal to Encode the Xewtee Dorboljin Script in ISO/IEC 10646’ (N3956 L2/10-411). The name has been changed to its English equivalent in order to assist in recognition and to adhere to UCS naming conventions.

This document is a revision of N3956 and replaces it. The major change is the encoding model for vowels. Independent characters have been replaced with a vowel-carrier letter and a set of combining signs. This was done to align the encoding model for Mongolian Square Script with its sister script Soyombo (see N4026 L2/11-125). Additional changes include minor revisions to character names and properties. Some outstanding issues are identified in Section 6.

The Mongolian Square Script bears some resemblance to the Phags-pa seal and book scripts. An detailed analysis of this relationship is forthcoming.

The Mongolian Square font used here is based upon the font developed by Oliver Corff in November 2001 for his ‘‘Xäwtää Dörböljin for L^AT_EX 2_ε’’ package. Some modifications have been made to Corff’s font and new glyphs added by the present author. A new font is being developed to accompany the formal proposal.

2 Background

The Mongolian Square Script (Mongolian: Хэвтээ Дөрвөлжин бичиг *Xäwtää Dörböljin*) is an alphasyllabary based upon the Brahmi model. It is also known as the ‘Mongolian Horizontal Square Script’. The script was used for writing Mongolian, as well as Sanskrit and Tibetan. It was developed by Zanabazar, the first spiritual leader of Tibetan Buddhism in Mongolia, who also developed the Soyombo script. Mongolian Square was inspired by the Tibetan script and has graphical similarities to Phags-pa and its variant forms (see tables 1 and 2).

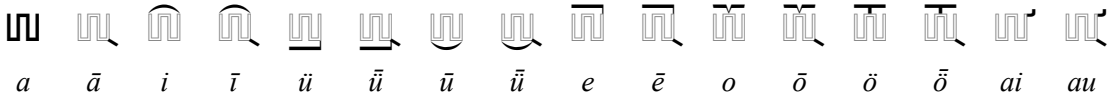
3 Writing System


3.1 Vowels

The basic set of vowels is:

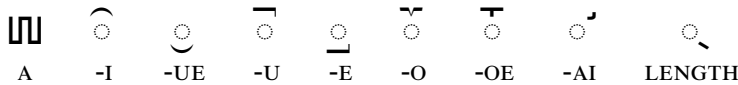
<i>a</i>	<i>ā</i>	<i>i</i>	<i>ī</i>	<i>ü</i>	<i>ū</i>	<i>u</i>	<i>ū</i>	<i>e</i>	<i>ē</i>	<i>o</i>	<i>ō</i>	<i>ö</i>	<i>ō</i>	<i>ai</i>	<i>au</i>


The graphical decomposition of these vowel letters is:

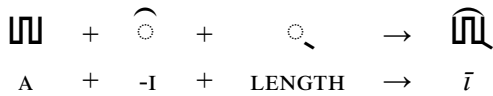







Mongolian Square vowel letters and signs follow the Tibetan system of representing independent vowels by writing dependent signs with a ‘vowel-carrier’, ie. U+0F68 TIBETAN LETTER A. As illustrated, the letter  *a* functions as a vowel-carrier letter. The above decomposition indicates that basic vowels are indicated using unique combining signs. Long vowels are produced by writing the vowel sign and a length mark.



All independent and dependent vowels may be written using the following set of characters (the ‘-’ is an abbreviation for ‘VOWEL SIGN’):




The  LENGTH MARK is written after the vowel sign:



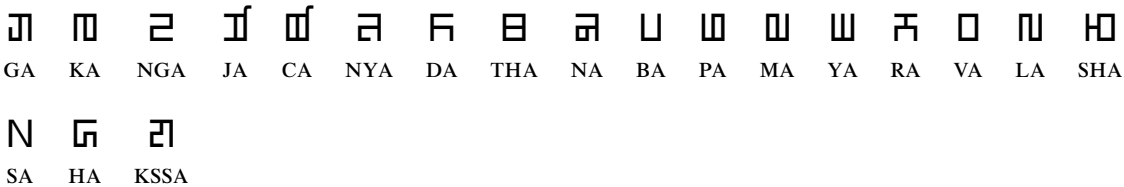
The Sanskrit vocalic letters *r̄, ṝ, ḹ, ḻ̄* are not written using distinct characters. They are represented using characters with approximate phonetic values:  RA +  VOWEL SIGN I and  LA +  VOWEL SIGN I, respectively, with  LENGTH for long forms.

There are variant forms of some vowel signs:  -OE is also written as .

There is an additional vowel letter used for writing Tibetan:  SMALL A.

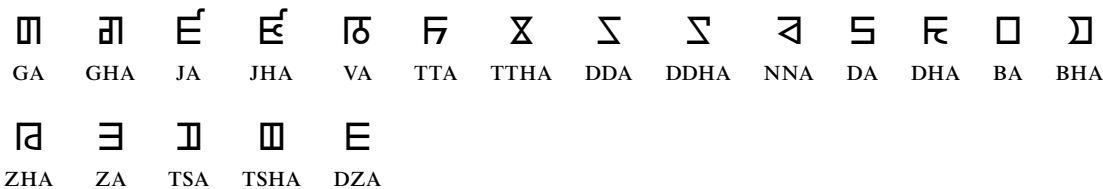
3.2 Consonant Letters

The basic set of consonant letters is:



Although it is a conjunct, the letter  KSSA is grouped with basic consonants letters.

Additional consonant letters used for writing Sanskrit, Tibetan, Chinese, and other languages:



The letter  BA is shown in charts as also representing VA, which has the distinct glyph .

3.3 Virāma

The sign ◌ VIRAMA behaves similar to the character in other Brahmi-based scripts.

3.4 Consonant Conjuncts

Consonant conjuncts are represented using atomic ligatures and stacking.

The following ligatures are given as part of the regular character inventory in charts of Mongolian Square:












					
KYA	KHYA	GLA	RGA	SGA	LGA

Other conjuncts are represented by stacking the consonant letters, in a manner similar to Tibetan:


NYA + DZA

3.5 Final Consonants

Coda consonants are represented using ◌ VIRAMA. The following consonants may appear as codas:

										
-g	-k	-ng	-d	-n	-b	-m	-r	-l	-sh	-s


3.6 Nasalization

Nasalization is indicated using ◌ ANUSVARA. The script also has the ◌ NASAL MARK, which represents *-ān*.

3.7 Punctuation



The script uses | DANDA for punctuation. A double DANDA is not attested.

3.8 Head Mark

The  HEAD MARK is used for marking the beginning and end of a text section.

3.9 Variants

There are variant forms for some consonant letters:

Regular			
Variant			
	GHA	DHA	VA

These are to be managed at the font level.

4 Character Names

Character names are aligned with those of Soyombo (see N4026 L2/11-125).

5 Character Properties

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11880;MONGOLIAN SQUARE LETTER A;Lo;0;L;;;;N;;;;;
11881;MONGOLIAN SQUARE LETTER GA;Lo;0;L;;;;N;;;;;
11882;MONGOLIAN SQUARE LETTER KA;Lo;0;L;;;;N;;;;;
11883;MONGOLIAN SQUARE LETTER NGA;Lo;0;L;;;;N;;;;;
11884;MONGOLIAN SQUARE LETTER JA;Lo;0;L;;;;N;;;;;
11885;MONGOLIAN SQUARE LETTER CA;Lo;0;L;;;;N;;;;;
11886;MONGOLIAN SQUARE LETTER NYA;Lo;0;L;;;;N;;;;;
11887;MONGOLIAN SQUARE LETTER DA;Lo;0;L;;;;N;;;;;
11888;MONGOLIAN SQUARE LETTER TA;Lo;0;L;;;;N;;;;;
11889;MONGOLIAN SQUARE LETTER NA;Lo;0;L;;;;N;;;;;
1188A;MONGOLIAN SQUARE LETTER BA;Lo;0;L;;;;N;;;;;
1188B;MONGOLIAN SQUARE LETTER PA;Lo;0;L;;;;N;;;;;
1188C;MONGOLIAN SQUARE LETTER MA;Lo;0;L;;;;N;;;;;
1188D;MONGOLIAN SQUARE LETTER YA;Lo;0;L;;;;N;;;;;
1188E;MONGOLIAN SQUARE LETTER RA;Lo;0;L;;;;N;;;;;
1188F;MONGOLIAN SQUARE LETTER LA;Lo;0;L;;;;N;;;;;
11890;MONGOLIAN SQUARE LETTER VA;Lo;0;L;;;;N;;;;;
11891;MONGOLIAN SQUARE LETTER SHA;Lo;0;L;;;;N;;;;;
11892;MONGOLIAN SQUARE LETTER SA;Lo;0;L;;;;N;;;;;
11893;MONGOLIAN SQUARE LETTER HA;Lo;0;L;;;;N;;;;;
11894;MONGOLIAN SQUARE LETTER KSSA;Lo;0;L;;;;N;;;;;
11895;MONGOLIAN SQUARE VOWEL SIGN I;Mn;0;NSM;;;;N;;;;;
11896;MONGOLIAN SQUARE VOWEL SIGN U;Mn;0;NSM;;;;N;;;;;
11897;MONGOLIAN SQUARE VOWEL SIGN UE;Mn;0;NSM;;;;N;;;;;
11898;MONGOLIAN SQUARE VOWEL SIGN E;Mn;0;NSM;;;;N;;;;;
11899;MONGOLIAN SQUARE VOWEL SIGN O;Mn;0;NSM;;;;N;;;;;
1189A;MONGOLIAN SQUARE VOWEL SIGN OE;Mn;0;NSM;;;;N;;;;;
1189B;MONGOLIAN SQUARE VOWEL SIGN AI;Mn;0;NSM;;;;N;;;;;
1189C;MONGOLIAN SQUARE VOWEL LENGTH MARK;Mn;0;NSM;;;;N;;;;;
1189D;MONGOLIAN SQUARE LETTER GALIG TTA;Lo;0;L;;;;N;;;;;
1189E;MONGOLIAN SQUARE LETTER GALIG TTHA;Lo;0;L;;;;N;;;;;
1189F;MONGOLIAN SQUARE LETTER GALIG DDA;Lo;0;L;;;;N;;;;;
118A0;MONGOLIAN SQUARE LETTER GALIG DDHA;Lo;0;L;;;;N;;;;;
118A1;MONGOLIAN SQUARE LETTER GALIG NNA;Lo;0;L;;;;N;;;;;
118A2;MONGOLIAN SQUARE LETTER ZHA;Lo;0;L;;;;N;;;;;
118A3;MONGOLIAN SQUARE LETTER ZA;Lo;0;L;;;;N;;;;;
118A4;MONGOLIAN SQUARE LETTER GALIG GA;Lo;0;L;;;;N;;;;;
118A5;MONGOLIAN SQUARE LETTER GALIG GHA;Lo;0;L;;;;N;;;;;
118A6;MONGOLIAN SQUARE LETTER GALIG JA;Lo;0;L;;;;N;;;;;
118A7;MONGOLIAN SQUARE LETTER GALIG JHA;Lo;0;L;;;;N;;;;;
118A8;MONGOLIAN SQUARE LETTER GALIG VA;Lo;0;L;;;;N;;;;;
118A9;MONGOLIAN SQUARE LETTER GALIG DA;Lo;0;L;;;;N;;;;;
118AA;MONGOLIAN SQUARE LETTER GALIG DHA;Lo;0;L;;;;N;;;;;
118AB;MONGOLIAN SQUARE LETTER GALIG BA;Lo;0;L;;;;N;;;;;
118AC;MONGOLIAN SQUARE LETTER GALIG BHA;Lo;0;L;;;;N;;;;;
118AD;MONGOLIAN SQUARE LETTER SMALL A;Lo;0;L;;;;N;;;;;
118AE;MONGOLIAN SQUARE LETTER TSA;Lo;0;L;;;;N;;;;;
118AF;MONGOLIAN SQUARE LETTER TSHA;Lo;0;L;;;;N;;;;;
118B0;MONGOLIAN SQUARE LETTER DZA;Lo;0;L;;;;N;;;;;
118B1;MONGOLIAN SQUARE LIGATURE KRA;Lo;0;L;;;;N;;;;;
118B2;MONGOLIAN SQUARE LIGATURE KHYA;Lo;0;L;;;;N;;;;;
118B3;MONGOLIAN SQUARE LIGATURE GLA;Lo;0;L;;;;N;;;;;
118B4;MONGOLIAN SQUARE LIGATURE RGA;Lo;0;L;;;;N;;;;;

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118B5;MONGOLIAN SQUARE LIGATURE SGA;Lo;0;L;;;;N;;;;;
118B6;MONGOLIAN SQUARE LIGATURE LGA;Lo;0;L;;;;N;;;;;
118B7;MONGOLIAN SQUARE ANUSVARA;Mn;0;NSM;;;;N;;;;;
118B8;MONGOLIAN SQUARE VIRAMA;Mn;9;NSM;;;;N;;;;;
118B9;MONGOLIAN SQUARE NASAL MARK;Mn;0;NSM;;;;N;;;;;
118BA;MONGOLIAN SQUARE DANDA;Po;0;L;;;;N;;;;;
118BB;MONGOLIAN SQUARE HEAD MARK;Po;0;ON;;;;N;;;;;

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6 Issues

1. **Script Name** The script is currently named 'Mongolian Square Script'. A more correct name would be 'Mongolian Horizontal Square Script'. Which is appropriate?
2. **Encoding Model** The encoding model needs to be determined. The writing of conjuncts through the stacking of consonant letters may suggest that the script be aligned with the model used for Tibetan or Phags-pa.
3. **Punctuation** The script has a | DANDA. Further research is required to identify if a DOUBLE DANDA is attested.

7 References

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- . 2011b. "Revised Preliminary Proposal to Encode Soyombo in the UCS". N4026 L2/11-125. April 25, 2011. <http://std.dkuug.dk/jtc1/sc2/wg2/docs/n4026.pdf>
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8 Acknowledgments

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

































	1188	1189	118A	118B
0	 11880	 11890	 118A0	 118B0
1	 11881	 11891	 118A1	 118B1
2	 11882	 11892	 118A2	 118B2
3	 11883	 11893	 118A3	 118B3
4	 11884	 11894	 118A4	 118B4
5	 11885	 11895	 118A5	 118B5
6	 11886	 11896	 118A6	 118B6
7	 11887	 11897	 118A7	 118B7
8	 11888	 11898	 118A8	 118B8
9	 11889	 11899	 118A9	 118B9
A	 1188A	 1189A	 118AA	 118BA
B	 1188B	 1189B	 118AB	 118BB
C	 1188C	 1189C	 118AC	
D	 1188D	 1189D	 118AD	
E	 1188E	 1189E	 118AE	
F	 1188F	 1189F	 118AF	

Figure 1: Proposed code chart for Mongolian Square.

Vowel carrier

11880 𐠢 MONGOLIAN SQUARE LETTER A

Consonants

11881 𐠣 MONGOLIAN SQUARE LETTER GA
• Used for Sanskrit ka

11882 𐠤 MONGOLIAN SQUARE LETTER KA
• Used for Sanskrit kha

11883 𐠥 MONGOLIAN SQUARE LETTER NGA

11884 𐠦 MONGOLIAN SQUARE LETTER JA
• Used for Sanskrit ca

11885 𐠧 MONGOLIAN SQUARE LETTER CA
• Used for Sanskrit cha

11886 𐠨 MONGOLIAN SQUARE LETTER NYA

11887 𐠩 MONGOLIAN SQUARE LETTER DA
• Used for Sanskrit ta

11888 𐠪 MONGOLIAN SQUARE LETTER TA
• Used for Sanskrit tha

11889 𐠫 MONGOLIAN SQUARE LETTER NA

1188A 𐠬 MONGOLIAN SQUARE LETTER BA
• Used for Sanskrit pa

1188B 𐠭 MONGOLIAN SQUARE LETTER PA
• Used for Sanskrit pha

1188C 𐠮 MONGOLIAN SQUARE LETTER MA

1188D 𐠯 MONGOLIAN SQUARE LETTER YA

1188E 𐠰 MONGOLIAN SQUARE LETTER RA

1188F 𐠱 MONGOLIAN SQUARE LETTER LA

11890 𐠲 MONGOLIAN SQUARE LETTER VA

11891 𐠳 MONGOLIAN SQUARE LETTER SHA

11892 𐠴 MONGOLIAN SQUARE LETTER SA

11893 𐠵 MONGOLIAN SQUARE LETTER HA

Consonant conjunct

11894 𐠶 MONGOLIAN SQUARE LETTER KSSA

Vowel signs

11895 𐠷 MONGOLIAN SQUARE VOWEL LENGTH MARK

11896 𐠸 MONGOLIAN SQUARE VOWEL SIGN I

11897 𐠹 MONGOLIAN SQUARE VOWEL SIGN U

11898 𐠺 MONGOLIAN SQUARE VOWEL SIGN UE

11899 𐠻 MONGOLIAN SQUARE VOWEL SIGN E

1189A 𐠼 MONGOLIAN SQUARE VOWEL SIGN O

1189B 𐠽 MONGOLIAN SQUARE VOWEL SIGN OE

1189C 𐠾 MONGOLIAN SQUARE VOWEL SIGN AI

Consonants

1189D 𐠿 MONGOLIAN SQUARE LETTER GALIG TTA

1189E 𐡀 MONGOLIAN SQUARE LETTER GALIG TTHA

1189F 𐡁 MONGOLIAN SQUARE LETTER GALIG DDA

118A0 𐡂 MONGOLIAN SQUARE LETTER GALIG DDHA

118A1 𐡃 MONGOLIAN SQUARE LETTER GALIG NNA

118A2 𐡄 MONGOLIAN SQUARE LETTER GALIG ZHA

118A3 𐡅 MONGOLIAN SQUARE LETTER GALIG ZA

118A4 𐡆 MONGOLIAN SQUARE LETTER GALIG GA

118A5 𐡇 MONGOLIAN SQUARE LETTER GALIG GHA

118A6 𐡈 MONGOLIAN SQUARE LETTER GALIG JA

118A7 𐡉 MONGOLIAN SQUARE LETTER GALIG JHA

118A8 𐡊 MONGOLIAN SQUARE LETTER GALIG VA

118A9 𐡋 MONGOLIAN SQUARE LETTER GALIG DA

118AA 𐡌 MONGOLIAN SQUARE LETTER GALIG DHA

118AB 𐡍 MONGOLIAN SQUARE LETTER GALIG BA

118AC 𐡎 MONGOLIAN SQUARE LETTER GALIG BHA

Additions for Tibetan

118AD 𐡏 MONGOLIAN SQUARE LETTER SMALL A

118AE 𐡐 MONGOLIAN SQUARE LETTER TSA

118AF 𐡑 MONGOLIAN SQUARE LETTER TSHA

118B0 𐡒 MONGOLIAN SQUARE LETTER DZA

Consonant conjuncts

118B1 𐡓 MONGOLIAN SQUARE LIGATURE KRA

118B2 𐡔 MONGOLIAN SQUARE LIGATURE KHYA

118B3 𐡕 MONGOLIAN SQUARE LIGATURE GLA

118B4 𐡖 MONGOLIAN SQUARE LIGATURE RGA

118B5 𐡗 MONGOLIAN SQUARE LIGATURE SGA

118B6 𐡘 MONGOLIAN SQUARE LIGATURE LGA

Various Signs

118B7 𐡙 MONGOLIAN SQUARE ANUSVARA

118B8 𐡚 MONGOLIAN SQUARE VIRAMA

118B9 𐡛 MONGOLIAN SQUARE NASAL MARK

Punctuation

118BA 𐡜 MONGOLIAN SQUARE DANDA

Symbols

118BB 𐡝 MONGOLIAN SQUARE HEAD MARK

Figure 2: Proposed names list for Mongolian Square.

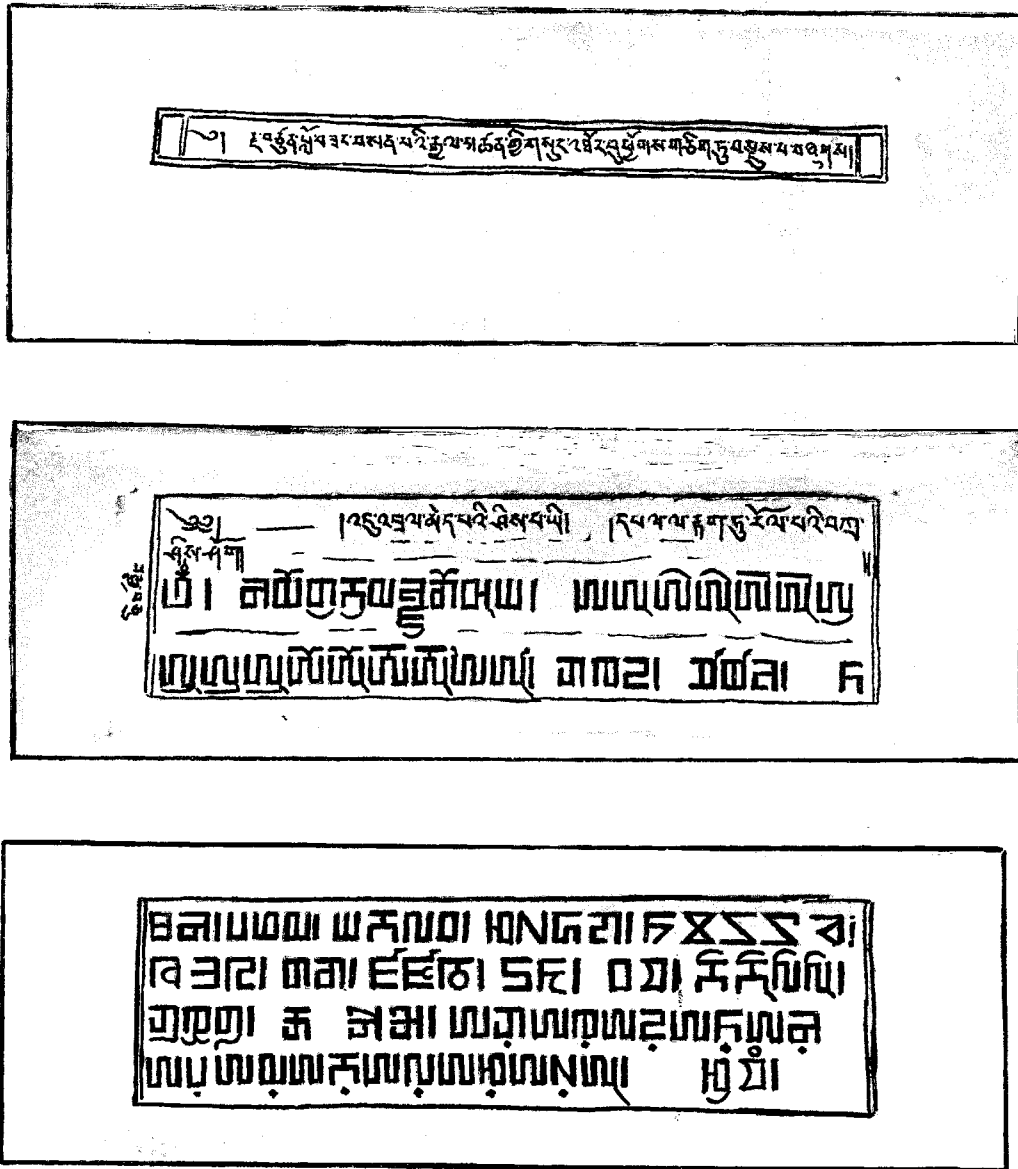


Figure 5: Some manuscripts written in Mongolian Square (from Shagdarsürüng 2001: 171).

	A	B	C	D		A	B	C	D
GA	ᠭᠠ	ᠭᠡ	ᠭᠢ	ᠭᠣ	TSHA	ᠲᠰᠬᠠ	ᠲᠰᠬᠡ	ᠲᠰᠬᠢ	ᠲᠰᠬᠣ
KA	ᠬᠠ	ᠬᠡ	ᠬᠢ	ᠬᠣ	DZA	ᠳᠵᠠ	ᠳᠵᠡ	ᠳᠵᠢ	ᠳᠵᠣ
GALIG GA	ᠭᠠᠯᠢᠭᠭᠠ	ᠭᠠᠯᠢᠭᠭᠡ	ᠭᠠᠯᠢᠭᠭᠢ	ᠭᠠᠯᠢᠭᠭᠣ	GALIG VA	ᠶᠠᠯᠢᠭᠦᠠ	ᠶᠠᠯᠢᠭᠦᠡ	ᠶᠠᠯᠢᠭᠦᠢ	ᠶᠠᠯᠢᠭᠦᠣ
GALIG GHA	ᠭᠠᠯᠢᠭᠭᠠᠬᠠ	—	—	ᠭᠠᠯᠢᠭᠭᠠᠬᠣ	ZHA	ᠵᠬᠠ	ᠵᠬᠡ	ᠵᠬᠢ	ᠵᠬᠣ
NGA	ᠨᠭᠠ	ᠨᠭᠡ	ᠨᠭᠢ	ᠨᠭᠣ	ZA	ᠵᠠ	ᠵᠡ	ᠵᠢ	ᠵᠣ
JA	ᠵᠠ	ᠵᠡ	ᠵᠢ	ᠵᠣ	SMALL A	ᠵᠠ	ᠵᠡ	ᠵᠢ	ᠵᠣ
CA	ᠴᠠ	ᠴᠡ	ᠴᠢ	ᠴᠣ	YA	ᠶᠠ	ᠶᠡ	ᠶᠢ	ᠶᠣ
GALIG JA	ᠵᠠᠯᠢᠭᠵᠠ	ᠵᠠᠯᠢᠭᠵᠡ	ᠵᠠᠯᠢᠭᠵᠢ	ᠵᠠᠯᠢᠭᠵᠣ	RA	ᠷᠠ	ᠷᠡ	ᠷᠢ	ᠷᠣ
GALIG JHA	ᠵᠠᠯᠢᠭᠵᠠᠬᠠ	—	—	ᠵᠠᠯᠢᠭᠵᠠᠬᠣ	LA	ᠯᠠ	ᠯᠡ	ᠯᠢ	ᠯᠣ
NYA	ᠨᠶᠠ	ᠨᠶᠡ	ᠨᠶᠢ	ᠨᠶᠣ	SHA	ᠰᠬᠠ	ᠰᠬᠡ	ᠰᠬᠢ	ᠰᠬᠣ
DA	ᠳᠠ	ᠳᠡ	ᠳᠢ	ᠳᠣ	SA	ᠰᠠ	ᠰᠡ	ᠰᠢ	ᠰᠣ
TA	ᠲᠠ	ᠲᠡ	ᠲᠢ	ᠲᠣ	HA	ᠬᠠ	ᠬᠡ	ᠬᠢ	ᠬᠣ
GALIG DA	ᠳᠠᠯᠢᠭᠳᠠ	ᠳᠠᠯᠢᠭᠳᠡ	ᠳᠠᠯᠢᠭᠳᠢ	ᠳᠠᠯᠢᠭᠳᠣ	QA	—	ᠳᠠ	ᠳᠡ	—
GALIG DHA	ᠳᠠᠯᠢᠭᠳᠠᠬᠠ	—	—	ᠳᠠᠯᠢᠭᠳᠠᠬᠣ	XA	—	ᠳᠠ	ᠳᠡ	—
NA	ᠨᠠ	ᠨᠡ	ᠨᠢ	ᠨᠣ	FA	—	ᠳᠠ	ᠳᠡ	—
BA	ᠪᠠ	ᠪᠡ	ᠪᠢ	ᠪᠣ	GGA	—	ᠳᠠ	ᠳᠡ	—
PA	ᠫᠠ	ᠫᠡ	ᠫᠢ	ᠫᠣ	TTA	ᠲᠲᠠ	ᠲᠲᠡ	ᠲᠲᠢ	ᠲᠲᠣ
GALIG BA	ᠪᠠᠯᠢᠭᠪᠠ	ᠪᠠᠯᠢᠭᠪᠡ	ᠪᠠᠯᠢᠭᠪᠢ	ᠪᠠᠯᠢᠭᠪᠣ	TTHA	ᠲᠲᠬᠠ	ᠲᠲᠬᠡ	ᠲᠲᠬᠢ	ᠲᠲᠬᠣ
GALIG BHA	ᠪᠠᠯᠢᠭᠪᠠᠬᠠ	—	—	ᠪᠠᠯᠢᠭᠪᠠᠬᠣ	DDA	ᠳᠳᠠ	ᠳᠳᠡ	ᠳᠳᠢ	ᠳᠳᠣ
MA	ᠮᠠ	ᠮᠡ	ᠮᠢ	ᠮᠣ	DDHA	ᠳᠳᠠᠬᠠ	—	—	ᠳᠳᠠᠬᠣ
TSA	ᠲᠰᠠ	ᠲᠰᠡ	ᠲᠰᠢ	ᠲᠰᠣ	NNA	ᠨᠨᠠ	ᠨᠨᠡ	ᠨᠨᠢ	ᠨᠨᠣ

Table 1: Comparison of consonant letters of (A) Mongolian Square script, (B) Phags-pa seal script, (C) Phags-pa book script, and (D) Tibetan.

	A	B	C	D
A				
AA		—	—	
I				
II		—	—	
E				
EE		—	—	
U				
UU		—	—	
UE		—	—	—
UUE		—	—	—
O				
OO		—	—	
OE		—	—	—
OOE		—	—	—
AU		—	—	—
AI		—	—	—

Table 2: Comparison of vowel letters of (A) Mongolian Square script, (B) Phags-pa seal script, (C) Phags-pa book script, and (D) Tibetan.