

Proposal to update the code charts for Mongolian

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Issue

The Mongolian encoding is complex and the code chart (UTC 2013b) does not adequately convey how users should access basic glyphs that are available via this encoding. One complicating factor is that, like Arabic, Mongolian script has positional forms for most letters. A second factor is that Mongolian words are subject to vowel harmony which means that within a single word, vowels and some consonants are consistently either masculine or feminine.¹ The masculine and feminine letters can have different glyph shapes. There can also be other types of glyph variation.

The Mongolian encoding relies on context and OpenType lookups to determine and select the correct glyph shape from the available options. Positional variants can be reliably invoked based on the position of a glyph in a word. For illustrative purposes, the positional forms can also be triggered using a Zero Width Joiner (U+200D) on one or both sides of a Mongolian code point. The masculine and feminine glyph variants cannot always be determined based on context. Therefore, three Mongolian Free Variation Selectors (U+180B, U+180C, U+180D) are included in the Mongolian block to select particular glyph forms. These variation selectors may invoke a specialized form of Mongolian letter. The combination of positional forms and glyph variants leads to a matrix of sixteen potential forms for each code point. There are no Mongolian letters that require all sixteen forms, most need significantly fewer. One of the most complex letters is U+182D MONGOLIAN LETTER GA:

U+182D	Base	Variant 1	Variant 2	Variant 3
Isolate				
Initial				
Medial				
Final				

Note that throughout this document Mongolian characters are illustrated rotated 90° counter-clockwise, i.e., in horizontal format.

The positional alternates will be familiar to users. The correct variation sequences needed to invoke a particular variant are not intuitive. The range of possible glyphs available for a single code point are not currently illustrated in the Mongolian code charts. The most complete documentation available for these sequence is a publication by Prof. Quejingzhabu (2000). This publication is difficult for implementers to obtain and improvements over the past 14 years means this set is now out-of-date. As a result, users and

¹ The consonants that exhibit gender are: 182C MONGOLIAN QA; 182D MONGOLIAN GA; 184D TODO QA; 184E TODO GA; 1863 SIBE KA; 1864 SIBE GA; 1865 SIBE HA; and 1874 MANCHU KA.

implementers of the standard do not have access to an authoritative list of the required variation sequences for Mongolian and their expected graphic output.

Proposal

Users and implementers of the standard need a reliable and accessible resource that defines the Mongolian variation sequences.

- The authors propose that all defined variant forms for each code point in the Mongolian block should be listed and illustrated in the Mongolian chart (UTC 2013b). The attached file is a suggested way of including information from StandardizedVariants.txt (UTC 2013c) in the Mongolian chart. Comments on characters included in NamesList.txt (UTC 2013d) have not been included in this sample, but should continue to be shown immediately following the code point they qualify.
- The authors of this proposal have been working with Prof. Quejingzhabu to ensure that the encoding of sequences is done correctly and aligns with his work. This effort has resulted in numerous changes and improvements to sequences already published in Quejingzhabu 2000. Consequently, StandardizedVariants.txt (UTC 2013c) should be updated to be consistent with the set of variants described in this document.

Issues

1. If we illustrate all of the distinct sequences used by the encoding then we need to address how the Birga variants should be encoded. This is addressed in a separate document (L2/14-030).
2. The current proposal identifies positional variant sequences using ZWJ (U+200D) to illustrate invocation of a particular positional form. This could be misconstrued as a requirement that ZWJ is needed to shape every positional form. Given that most users will understand the positional forms intuitively, and the Mongolian chapter describes how to invoke the positional forms using ZWJ we should consider whether illustrating sequences with ZWJ in the code charts is appropriate.
3. Head form acts as both a presentation form for the code point and illustrates the isolate or first isolate form. This should be made clear in the Mongolian chapter (UTC 2013a). In the charts that follow first isolate forms are marked with an asterisk (*).

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Punctuation

1800	᠎	MONGOLIAN BIRGA		
1801	᠎᠎᠎	MONGOLIAN ELLIPSIS		
1802	᠎	MONGOLIAN COMMA		
1803	᠎᠎	MONGOLIAN FULL STOP		
1804	᠎	MONGOLIAN COLON		
1805	᠎᠎᠎᠎	MONGOLIAN FOUR DOTS		
1806	᠎	MONGOLIAN TODO SOFT HYPHEN		
1807	᠎	MONGOLIAN SIBE SYLLABLE BOUNDARY MARKER		
1808	᠎	MONGOLIAN MANCHU COMMA		
1809	᠎᠎	MONGOLIAN MANCHU FULL STOP		
180A	᠎	MONGOLIAN NIRUGU		
	ZWJ+180A+ZWJ	᠎		Medial Form
	ZWJ+180A	᠎		Final Form

Format controls

180B		MONGOLIAN FREE VARIATION SELECTOR ONE		
180C		MONGOLIAN FREE VARIATION SELECTOR TWO		
180D		MONGOLIAN FREE VARIATION SELECTOR THREE		
180E		MONGOLIAN VOWEL SEPARATOR		

Digits

1810	᠐	MONGOLIAN DIGIT ZERO		
1811	᠑	MONGOLIAN DIGIT ONE		
1812	᠒	MONGOLIAN DIGIT TWO		
1813	᠓	MONGOLIAN DIGIT THREE		
1814	᠔	MONGOLIAN DIGIT FOUR		
1815	᠕	MONGOLIAN DIGIT FIVE		
1816	᠖	MONGOLIAN DIGIT SIX		
1817	᠗	MONGOLIAN DIGIT SEVEN		
1818	᠘	MONGOLIAN DIGIT EIGHT		
1819	᠙	MONGOLIAN DIGIT NINE		

Basic letters

1820	᠎	MONGOLIAN LETTER A*		
	1820+FVS1	᠎		Second Isolate Form
	1820+ZWJ	᠎		First Initial Form
	ZWJ+1820+ZWJ	᠎		First Medial Form
	ZWJ+1820+FVS1+ZWJ	᠎		Second Medial Form
	ZWJ+1820+FVS2+ZWJ	᠎		Third Medial Form
	ZWJ+1820	᠎		First Final Form
	ZWJ+1820+FVS1	᠎		Second Final Form
1821	᠎	MONGOLIAN LETTER E		
	1821+ZWJ	᠎		First Initial Form
	1821+FVS1+ZWJ	᠎		Second Initial Form

	ZWJ+1821+ZWJ	᠎		Medial Form
	ZWJ+1821	᠎		First Final Form
	ZWJ+1821+FVS1	᠎		Second Final Form
1822	᠎	MONGOLIAN LETTER I		
	1822+ZWJ	᠎		Initial Form
	ZWJ+1822+ZWJ	᠎		First Medial Form
	ZWJ+1822+FVS1+ZWJ	᠎		Second Medial Form
	1822+ZWJ	᠎		Final Form
1823	᠎	MONGOLIAN LETTER O		
	1823+ZWJ	᠎		Initial Form
	ZWJ+1823+ZWJ	᠎		First Medial Form
	ZWJ+1823+FVS1+ZWJ	᠎		Second Medial Form
	ZWJ+1823	᠎		First Final Form
	ZWJ+1823+FVS1	᠎		Second Final Form
1824	᠎	MONGOLIAN LETTER U		
	1824+FVS1	᠎		Isolate Form
	1824+ZWJ	᠎		Initial Form
	ZWJ+1824+ZWJ	᠎		First Medial Form
	ZWJ+1824+FVS1+ZWJ	᠎		Second Medial Form
	ZWJ+1824	᠎		First Final Form
	ZWJ+1824+FVS1	᠎		Second Final Form
1825	᠎	MONGOLIAN LETTER OE		
	1825+ZWJ	᠎		Initial Form
	ZWJ+1825+ZWJ	᠎		First Medial Form
	ZWJ+1825+FVS1+ZWJ	᠎		Second Medial Form
	ZWJ+1825+FVS2+ZWJ	᠎		Third Medial Form
	ZWJ+1825	᠎		First Final Form
	ZWJ+1825+FVS1	᠎		Second Final Form
1826	᠎	MONGOLIAN LETTER UE		
	1826+FVS1	᠎		First Isolate Form
	1826+FVS2	᠎		Second Isolate Form
	1826+ZWJ	᠎		Initial Form
	ZWJ+1826+ZWJ	᠎		First Medial Form
	ZWJ+1826+FVS1+ZWJ	᠎		Second Medial Form
	ZWJ+1826+FVS2+ZWJ	᠎		Third Medial Form
	ZWJ+1826	᠎		First Final Form
	ZWJ+1826+FVS1	᠎		Second Final Form
1827	᠎	MONGOLIAN LETTER EE		
	1827+ZWJ	᠎		Initial Form
	ZWJ+1827+ZWJ	᠎		Medial Form
	ZWJ+1827	᠎		Final Form
1828	᠎	MONGOLIAN LETTER NA		
	1828+ZWJ	᠎		First Initial Form
	1828+FVS1+ZWJ	᠎		Second Initial Form
	ZWJ+1828+ZWJ	᠎		First Medial Form
	ZWJ+1828+FVS1+ZWJ	᠎		Second Medial Form
	ZWJ+1828+FVS2+ZWJ	᠎		Third Medial Form

ZWJ+1828	ᠠ	First Final Form	ZWJ+1830	ᠠ	First Final Form
ZWJ+1828+FVS1	ᠡ	Second Final Form	ZWJ+1830+FVS1	ᠢ	Second Final Form
1829 ᠢ MONGOLIAN LETTER ANG			ZWJ+1830+FVS2	ᠣ	Third Final Form
1829+ZWJ	ᠢ	Initial Form	1831 ᠣ MONGOLIAN LETTER SHA		
ZWJ+1829+ZWJ	ᠣ	Medial Form	1831+ZWJ	ᠣ	Initial Form
ZWJ+1829	ᠣ	Final Form	ZWJ+1831+ZWJ	ᠣ	Medial Form
182A ᠣ MONGOLIAN LETTER BA			ZWJ+1831	ᠣ	Final Form
182A+ZWJ	ᠣ	Initial Form	1832 ᠣ MONGOLIAN LETTER TA		
ZWJ+182A+ZWJ	ᠣ	Medial Form	1832+ZWJ	ᠣ	Initial Form
ZWJ+182A	ᠣ	First Final Form	ZWJ+1832+ZWJ	ᠣ	First Medial Form
ZWJ+182A+FVS1	ᠣ	Second Final Form	ZWJ+1832+FVS1+ZWJ	ᠣ	Second Medial Form
182B ᠣ MONGOLIAN LETTER PA			ZWJ+1832+ZWJ	ᠣ	Final Form
182B+ZWJ	ᠣ	Initial Form	1833 ᠣ MONGOLIAN LETTER DA		
ZWJ+182B+ZWJ	ᠣ	Medial Form	1833+ZWJ	ᠣ	First Initial Form
ZWJ+182B	ᠣ	Final Form	1833+FVS1+ZWJ	ᠣ	Second Initial Form
182C ᠣ MONGOLIAN LETTER QA*			ZWJ+1833+ZWJ	ᠣ	First Medial Form
182C+FVS1	ᠣ	Second Isolate Form	ZWJ+1833+FVS1+ZWJ	ᠣ	Second Medial Form
182C+FVS2	ᠣ	Third Isolate Form	ZWJ+1833	ᠣ	First Final Form
182C+ZWJ	ᠣ	First Initial Form	ZWJ+1833+FVS1	ᠣ	Second Final Form
182C+FVS1+ZWJ	ᠣ	Second Initial Form	1834 ᠣ MONGOLIAN LETTER CHA		
ZWJ+182C+ZWJ	ᠣ	First Medial Form	1834+ZWJ	ᠣ	Initial Form
ZWJ+182C+FVS1+ZWJ	ᠣ	Second Medial Form	ZWJ+1834+ZWJ	ᠣ	Medial Form
ZWJ+182C	ᠣ	First Final Form	ZWJ+1834	ᠣ	Final Form
ZWJ+182C+FVS1	ᠣ	Second Final Form	1835 ᠣ MONGOLIAN LETTER JA		
182D ᠣ MONGOLIAN LETTER GA*			1835+ZWJ	ᠣ	Initial Form
182D+FVS1	ᠣ	Second Isolate Form	ZWJ+1835+ZWJ	ᠣ	First Medial Form
182D+FVS2	ᠣ	Third Isolate Form	ZWJ+1835+FVS1+ZWJ	ᠣ	Second Medial Form
182D+ZWJ	ᠣ	First Initial Form	ZWJ+1835	ᠣ	Final Form
182D+FVS1+ZWJ	ᠣ	Second Initial Form	1836 ᠣ MONGOLIAN LETTER YA		
ZWJ+182D+ZWJ	ᠣ	First Medial Form	1836+ZWJ	ᠣ	First Initial Form
ZWJ+182D+FVS1+ZWJ	ᠣ	Second Medial Form	1836+FVS1+ZWJ	ᠣ	Second Initial Form
ZWJ+182D+FVS3+ZWJ	ᠣ	Fourth Medial Form	ZWJ+1836+ZWJ	ᠣ	First Medial Form
ZWJ+182D	ᠣ	First Final Form	ZWJ+1836+FVS1+ZWJ	ᠣ	Second Medial Form
ZWJ+182D+FVS1	ᠣ	Second Final Form	ZWJ+1836	ᠣ	First Final Form
ZWJ+182D+FVS2	ᠣ	Third Final Form	1837 ᠣ MONGOLIAN LETTER RA		
ZWJ+182D+FVS3	ᠣ	Fourth Final Form	1837+ZWJ	ᠣ	Initial Form
182E ᠣ MONGOLIAN LETTER MA			ZWJ+1837+ZWJ	ᠣ	Medial Form
182E+ZWJ	ᠣ	Initial Form	ZWJ+1837	ᠣ	Final Form
ZWJ+182E+ZWJ	ᠣ	Medial Form	1838 ᠣ MONGOLIAN LETTER WA		
ZWJ+182E	ᠣ	Final Form	1838+ZWJ	ᠣ	Initial Form
182F ᠣ MONGOLIAN LETTER LA			ZWJ+1838+ZWJ	ᠣ	First Medial Form
182F+ZWJ	ᠣ	Initial Form	ZWJ+1838+FVS1+ZWJ	ᠣ	Second Medial Form
ZWJ+182F+ZWJ	ᠣ	Medial Form	ZWJ+1838	ᠣ	First Final Form
ZWJ+182F	ᠣ	Final Form	ZWJ+1838+FVS1	ᠣ	Second Final Form
1830 ᠣ MONGOLIAN LETTER SA			1839 ᠣ MONGOLIAN LETTER FA		
1830+ZWJ	ᠣ	Initial Form	1839+ZWJ	ᠣ	Initial Form
ZWJ+1830+ZWJ	ᠣ	Medial Form	ZWJ+1839+ZWJ	ᠣ	Medial Form

ZWJ+1839	᠊	Final Form
183A	᠊	MONGOLIAN LETTER KA
183A+ZWJ	᠊	Initial Form
ZWJ+183A+ZWJ	᠊	Medial Form
ZWJ+183A	᠊	Final Form
183B	᠊	MONGOLIAN LETTER KHA
183B+ZWJ	᠊	Initial Form
ZWJ+183B+ZWJ	᠊	Medial Form
ZWJ+183B	᠊	Final Form
183C	᠊	MONGOLIAN LETTER TSA
183C+ZWJ	᠊	Initial Form
ZWJ+183C+ZWJ	᠊	Medial Form
ZWJ+183C	᠊	Final Form
183D	᠊	MONGOLIAN LETTER ZA
183D+ZWJ	᠊	Initial Form
ZWJ+183D+ZWJ	᠊	Medial Form
ZWJ+183D	᠊	Final Form
183E	᠊	MONGOLIAN LETTER HAA
183E+ZWJ	᠊	Initial Form
ZWJ+183E+ZWJ	᠊	Medial Form
ZWJ+183E	᠊	Final Form
183F	᠊	MONGOLIAN LETTER ZRA
183F+ZWJ	᠊	Initial Form
ZWJ+183F+ZWJ	᠊	Medial Form
ZWJ+183F	᠊	Final Form
1840	᠊	MONGOLIAN LETTER LHA
1840+ZWJ	᠊	Initial Form
ZWJ+1840+ZWJ	᠊	Medial Form
ZWJ+1840	᠊	Final Form
1841	᠊	MONGOLIAN LETTER ZHI
1841+ZWJ	᠊	Initial Form
ZWJ+1841+ZWJ	᠊	Medial Form
ZWJ+1841	᠊	Final Form
1842	᠊	MONGOLIAN LETTER CHI
1842+ZWJ	᠊	Initial Form
ZWJ+1842+ZWJ	᠊	Medial Form
ZWJ+1842	᠊	Final Form

Todo letters

1843	᠊	MONGOLIAN LETTER TODO LONG VOWEL SIGN
1843+ZWJ	᠊	Initial Form
ZWJ+1843+ZWJ	᠊	Medial Form
ZWJ+1843	᠊	Final Form
1844	᠊	MONGOLIAN LETTER TODO E
1844+ZWJ	᠊	Initial Form
ZWJ+1844+ZWJ	᠊	First Medial Form
ZWJ+1844+FVS1+ZWJ	᠊	Second Medial Form

ZWJ+1844	᠊	Final Form
1845	᠊	MONGOLIAN LETTER TODO I
1845+ZWJ	᠊	Initial Form
ZWJ+1845+ZWJ	᠊	First Medial Form
ZWJ+1845+FVS1+ZWJ	᠊	Second Medial Form
ZWJ+1845	᠊	Final Form
1846	᠊	MONGOLIAN LETTER TODO O
1846+ZWJ	᠊	Initial Form
ZWJ+1846+ZWJ	᠊	First Medial Form
ZWJ+1846+FVS1+ZWJ	᠊	Second Medial Form
ZWJ+1846	᠊	Final Form
1847	᠊	MONGOLIAN LETTER TODO U*
1847+FVS1	᠊	Second Isolate Form
1847+ZWJ	᠊	Initial Form
ZWJ+1847+ZWJ	᠊	First Medial Form
ZWJ+1847+FVS1+ZWJ	᠊	Second Medial Form
ZWJ+1847+FVS2+ZWJ	᠊	Third Medial Form
ZWJ+1847	᠊	First Final Form
ZWJ+1847+FVS1	᠊	Second Final Form
1848	᠊	MONGOLIAN LETTER TODO OE
1848+ZWJ	᠊	Initial Form
ZWJ+1848+ZWJ	᠊	First Medial Form
ZWJ+1848+FVS1+ZWJ	᠊	Second Medial Form
ZWJ+1848	᠊	Final Form
1849	᠊	MONGOLIAN LETTER TODO UE*
1849+FVS1	᠊	Second Isolate Form
1849+ZWJ	᠊	Initial Form
ZWJ+1849+ZWJ	᠊	First Medial Form
ZWJ+1849+FVS1+ZWJ	᠊	Second Medial Form
ZWJ+1849	᠊	Final Form
184A	᠊	MONGOLIAN LETTER TODO ANG
184A+ZWJ	᠊	Initial Form
ZWJ+184A+ZWJ	᠊	Medial Form
ZWJ+184A	᠊	Final Form
184B	᠊	MONGOLIAN LETTER TODO BA
184B+ZWJ	᠊	Initial Form
ZWJ+184B+ZWJ	᠊	Medial Form
ZWJ+184B	᠊	Final Form
184C	᠊	MONGOLIAN LETTER TODO PA
184C+ZWJ	᠊	Initial Form
ZWJ+184C+ZWJ	᠊	Medial Form
ZWJ+184C	᠊	Final Form
184D	᠊	MONGOLIAN LETTER TODO QA
184D+ZWJ	᠊	First Initial Form
184D+FVS1+ZWJ	᠊	Second Initial Form
ZWJ+184D+ZWJ	᠊	First Medial Form
ZWJ+184D+FVS1+ZWJ	᠊	Second Medial Form

ZWJ+184D	ᠣ	Final Form
184E	ᠤ	MONGOLIAN LETTER TODO GA
184E+FVS1	ᠤ	Isolate Form
184E+ZWJ	ᠤ	Initial Form
ZWJ+184E+ZWJ	ᠤ	First Medial Form
ZWJ+184E+FVS1+ZWJ	ᠤ	Second Medial Form
ZWJ+184E	ᠤ	Final Form
184F	ᠥ	MONGOLIAN LETTER TODO MA
184F+ZWJ	ᠥ	Initial Form
ZWJ+184F+ZWJ	ᠥ	Medial Form
ZWJ+184F	ᠥ	Final Form
1850	ᠨ	MONGOLIAN LETTER TODO TA
1850+ZWJ	ᠨ	Initial Form
ZWJ+1850+ZWJ	ᠨ	Medial Form
ZWJ+1850	ᠨ	Final Form
1851	ᠮ	MONGOLIAN LETTER TODO DA
1851+ZWJ	ᠮ	Initial Form
ZWJ+1851+ZWJ	ᠮ	Medial Form
ZWJ+1851	ᠮ	Final Form
1852	ᠪ	MONGOLIAN LETTER TODO CHA
1852+ZWJ	ᠪ	Initial Form
ZWJ+1852+ZWJ	ᠪ	Medial Form
ZWJ+1852	ᠪ	Final Form
1853	ᠬ	MONGOLIAN LETTER TODO JA
1853+ZWJ	ᠬ	Initial Form
ZWJ+1853+ZWJ	ᠬ	Medial Form
ZWJ+1853	ᠬ	Final Form
1854	ᠳ	MONGOLIAN LETTER TODO TSA
1854+ZWJ	ᠳ	Initial Form
ZWJ+1854+ZWJ	ᠳ	Medial Form
ZWJ+1854	ᠳ	Final Form
1855	ᠷ	MONGOLIAN LETTER TODO YA
1855+ZWJ	ᠷ	Initial Form
ZWJ+1855+ZWJ	ᠷ	Medial Form
ZWJ+1855	ᠷ	Final Form
1856	ᠰ	MONGOLIAN LETTER TODO WA
1856+ZWJ	ᠰ	Initial Form
ZWJ+1856+ZWJ	ᠰ	Medial Form
ZWJ+1856	ᠰ	Final Form
1857	ᠠ	MONGOLIAN LETTER TODO KA
1857+ZWJ	ᠠ	Initial Form
ZWJ+1857+ZWJ	ᠠ	Medial Form
ZWJ+1857	ᠠ	Final Form
1858	ᠨ	MONGOLIAN LETTER TODO GAA
1858+ZWJ	ᠨ	Initial Form
ZWJ+1858+ZWJ	ᠨ	Medial Form
ZWJ+1858	ᠨ	Final Form

1859	ᠬ	MONGOLIAN LETTER TODO HAA
1859+ZWJ	ᠬ	Initial Form
ZWJ+1859+ZWJ	ᠬ	Medial Form
ZWJ+1859	ᠬ	Final Form
185A	ᠢ	MONGOLIAN LETTER TODO JIA
185A+ZWJ	ᠢ	Initial Form
ZWJ+185A+ZWJ	ᠢ	Medial Form
ZWJ+185A	ᠢ	Final Form
185B	ᠨ	MONGOLIAN LETTER TODO NIA
185B+ZWJ	ᠨ	Initial Form
ZWJ+185B+ZWJ	ᠨ	Medial Form
ZWJ+185B	ᠨ	Final Form
185C	ᠳ	MONGOLIAN LETTER TODO DZA
185C+ZWJ	ᠳ	Initial Form
ZWJ+185C+ZWJ	ᠳ	Medial Form
ZWJ+185C	ᠳ	Final Form

Sibe letters

185D	ᠳ	MONGOLIAN LETTER SIBE E
185D+FVS1	ᠳ	Isolate Form
185D+ZWJ	ᠳ	Initial Form
ZWJ+185D+ZWJ	ᠳ	First Medial Form
ZWJ+185D+FVS1+ZWJ	ᠳ	Second Medial Form
ZWJ+185D	ᠳ	First Final Form
ZWJ+185D+FVS1	ᠳ	Second Final Form
185E	ᠰ	MONGOLIAN LETTER SIBE I
185E+FVS1	ᠰ	Isolate Form
185E+ZWJ	ᠰ	Initial Form
ZWJ+185E+ZWJ	ᠰ	First Medial Form
ZWJ+185E+FVS1+ZWJ	ᠰ	Second Medial Form
ZWJ+185E+FVS2+ZWJ	ᠰ	Third Medial Form
ZWJ+185E	ᠰ	First Final Form
ZWJ+185E+FVS1	ᠰ	Second Final Form
ZWJ+185E+FVS2	ᠰ	Third Final Form
185F	ᠳ	MONGOLIAN LETTER SIBE IY
185F+ZWJ	ᠳ	Initial Form
ZWJ+185F+ZWJ	ᠳ	Medial Form
ZWJ+185F	ᠳ	Final Form
1860	ᠳ	MONGOLIAN LETTER SIBE UE
1860+ZWJ	ᠳ	Initial Form
ZWJ+1860+ZWJ	ᠳ	First Medial Form
ZWJ+1860+FVS1+ZWJ	ᠳ	Second Medial Form
ZWJ+1860	ᠳ	First Final Form
ZWJ+1860+FVS1	ᠳ	Second Final Form
ZWJ+1860+FVS2	ᠳ	Third Final Form
1861	ᠳ	MONGOLIAN LETTER SIBE U
1861+FVS1	ᠳ	Isolate Form

1861+ZWJ	ᠠ	Initial Form
ZWJ+1861+ZWJ	ᠡ	Medial Form
ZWJ+1861	ᠢ	Final Form
1862 ᠨ MONGOLIAN LETTER SIBE ANG		
1862+ZWJ	ᠨ	Initial Form
ZWJ+1862+ZWJ	ᠯ	Medial Form
ZWJ+1862	ᠭ	Final Form
1863 ᠬ MONGOLIAN LETTER SIBE KA		
1863+FVS1	ᠬ	Isolate Form
1863+ZWJ	ᠬᠡ	Initial Form
ZWJ+1863+ZWJ	ᠬᠢ	First Medial Form
ZWJ+1863+FVS1+ZWJ	ᠬᠣ	Second Medial Form
ZWJ+1863	ᠬᠤ	Final Form
1864 ᠭ MONGOLIAN LETTER SIBE GA		
1864+FVS1	ᠭ	Isolate Form
1864+ZWJ	ᠭᠡ	Initial Form
ZWJ+1864+ZWJ	ᠭᠢ	Medial Form
ZWJ+1864	ᠭᠤ	Final Form
1865 ᠬᠡ MONGOLIAN LETTER SIBE HA		
1865+FVS1	ᠬᠡ	Isolate Form
1865+ZWJ	ᠬᠡᠦ	Initial Form
ZWJ+1865+ZWJ	ᠬᠡᠮ	Medial Form
ZWJ+1865	ᠬᠡᠮᠤ	Final Form
1866 ᠮ MONGOLIAN LETTER SIBE PA		
1866+ZWJ	ᠮ	Initial Form
ZWJ+1866+ZWJ	ᠮᠡ	Medial Form
ZWJ+1866	ᠮᠤ	Final Form
1867 ᠰ MONGOLIAN LETTER SIBE SHA		
1867+ZWJ	ᠰ	Initial Form
ZWJ+1867+ZWJ	ᠰᠡ	Medial Form
ZWJ+1867	ᠰᠤ	Final Form
1868 ᠲ MONGOLIAN LETTER SIBE TA		
1868+ZWJ	ᠲ	First Initial Form
1868+FVS1+ZWJ	ᠲᠡ	Second Initial Form
ZWJ+1868+ZWJ	ᠲᠢ	First Medial Form
ZWJ+1868+FVS1+ZWJ	ᠲᠣ	Second Medial Form
ZWJ+1868+FVS2+ZWJ	ᠲᠤ	Third Medial Form
ZWJ+1868	ᠲᠥ	Final Form
1869 ᠳ MONGOLIAN LETTER SIBE DA		
1869+ZWJ	ᠳ	First Initial Form
1869+FVS1+ZWJ	ᠳᠡ	Second Initial Form
ZWJ+1869+ZWJ	ᠳᠢ	First Medial Form
ZWJ+1869+FVS1+ZWJ	ᠳᠣ	Second Medial Form
ZWJ+1869	ᠳᠥ	Final Form
186A ᠵ MONGOLIAN LETTER SIBE JA		
186A+ZWJ	ᠵ	Initial Form
ZWJ+186A+ZWJ	ᠶ	Medial Form

ZWJ+186A	ᠶ	Final Form
186B ᠪ MONGOLIAN LETTER SIBE FA		
186B+ZWJ	ᠪ	Initial Form
ZWJ+186B+ZWJ	ᠪᠡ	Medial Form
ZWJ+186B	ᠪᠤ	Final Form
186C ᠬᠠ MONGOLIAN LETTER SIBE GAA		
186C+ZWJ	ᠬᠠ	Initial Form
ZWJ+186C+ZWJ	ᠬᠠᠦ	Medial Form
ZWJ+186C	ᠬᠠᠮ	Final Form
186D ᠬᠡ MONGOLIAN LETTER SIBE HAA		
186D+ZWJ	ᠬᠡ	Initial Form
ZWJ+186D+ZWJ	ᠬᠡᠦ	Medial Form
ZWJ+186D	ᠬᠡᠮ	Final Form
186E ᠬᠢ MONGOLIAN LETTER SIBE TSA		
186E+ZWJ	ᠬᠢ	Initial Form
ZWJ+186E+ZWJ	ᠬᠢᠦ	Medial Form
ZWJ+186E	ᠬᠢᠮ	Final Form
186F ᠬᠣ MONGOLIAN LETTER SIBE ZA		
186F+ZWJ	ᠬᠣ	First Initial Form
186F+FVS1+ZWJ	ᠬᠣᠦ	Second Initial Form
ZWJ+186F+ZWJ	ᠬᠣᠮ	First Medial Form
ZWJ+186F+FVS1+ZWJ	ᠬᠣᠮᠦ	Second Medial Form
ZWJ+186F	ᠬᠣᠮᠤ	Final Form
1870 ᠬᠤ MONGOLIAN LETTER SIBE RAA		
1870+ZWJ	ᠬᠤ	Initial Form
ZWJ+1870+ZWJ	ᠬᠤᠦ	Medial Form
ZWJ+1870	ᠬᠤᠮ	Final Form
1871 ᠬᠥ MONGOLIAN LETTER SIBE CHA		
1871+ZWJ	ᠬᠥ	Initial Form
ZWJ+1871+ZWJ	ᠬᠥᠦ	Medial Form
ZWJ+1871	ᠬᠥᠮ	Final Form
1872 ᠬᠦ MONGOLIAN LETTER SIBE ZHA		
1872+ZWJ	ᠬᠦ	Initial Form
ZWJ+1872+ZWJ	ᠬᠦᠦ	Medial Form
ZWJ+1872	ᠬᠦᠮ	Final Form

Manchu letters

1873 ᠮ MONGOLIAN LETTER MANCHU I		
1873+FVS1	ᠮ	Isolate Form
1873+ZWJ	ᠮᠡ	Initial Form
1873+FVS1+ZWJ	ᠮᠢ	First Medial Form
ZWJ+1873+ZWJ	ᠮᠣ	Second Medial Form
ZWJ+1873+FVS1+ZWJ	ᠮᠤ	Third Medial Form
ZWJ+1873+FVS2+ZWJ	ᠮᠥ	Fourth Medial Form
ZWJ+1873	ᠮᠦ	First Final Form
ZWJ+1873+FVS1	ᠮᠦᠦ	Second Final Form
ZWJ+1873+FVS2	ᠮᠦᠮ	Third Final Form

1874	ᠠ	MONGOLIAN LETTER MANCHU KA		
	1874+FVS1	ᠠ	Isolate Form	
	1874+ZWJ	ᠠ	Initial Form	
	1874+FVS1+ZWJ	ᠠ	First Medial Form	
	ZWJ+1874+ZWJ	ᠠ	Second Medial Form	
	ZWJ+1874+FVS1+ZWJ	ᠠ	Third Medial Form	
	ZWJ+1874+FVS2+ZWJ	ᠠ	Fourth Medial Form	
	ZWJ+1874	ᠠ	First Final Form	
	ZWJ+1874+FVS1	ᠠ	Second Final Form	
	ZWJ+1874+FVS2	ᠠ	Third Final Form	

1875	ᠡ	MONGOLIAN LETTER MANCHU RA		
	1875+ZWJ	ᠡ	Initial Form	
	ZWJ+1875+ZWJ	ᠡ	Medial Form	
	ZWJ+1875	ᠡ	Final Form	

1876	ᠢ	MONGOLIAN LETTER MANCHU FA		
	1876+ZWJ	ᠢ	First Initial Form	
	1876+ZWJ+FVS1	ᠢ	Second Initial Form	
	ZWJ+1876+ZWJ	ᠢ	First Medial Form	
	ZWJ+1876+FVS1+ZWJ	ᠢ	Second Medial Form	
	ZWJ+1876	ᠢ	Final Form	

1877	ᠣ	MONGOLIAN LETTER MANCHU ZHA		
	1877+ZWJ	ᠣ	Initial Form	
	ZWJ+1877+ZWJ	ᠣ	Medial Form	
	ZWJ+1877	ᠣ	Final Form	

Extensions for Sanskrit and Tibetan

1880	ᠠᠨ	MONGOLIAN LETTER ALI GALI ANUSVARA		
	1880+FVS1	ᠠᠨ	Second Form	
1881	ᠠᠨᠠ	MONGOLIAN LETTER ALI GALI VISARGA ONE		
	1881+FVS1	ᠠᠨᠠ	Second Form	
1882	ᠠᠨᠢ	MONGOLIAN LETTER ALI GALI DAMARU		
1883	ᠠᠨᠣ	MONGOLIAN LETTER ALI GALI UBADAMA		
1884	ᠠᠨᠤ	MONGOLIAN LETTER ALI GALI INVERTED UBADAMA		
1885	ᠠᠨᠤᠯ	MONGOLIAN LETTER ALI GALI BALUDA		
1886	ᠠᠨᠤᠯᠠ	MONGOLIAN LETTER ALI GALI THREE BALUDA		
1887	ᠠᠨᠤᠯᠠᠰ	MONGOLIAN LETTER ALI GALI A*		
	1887+FVS1	ᠠᠨᠤᠯᠠᠰ	Second Isolate Form	
	1887+ZWJ	ᠠᠨᠤᠯᠠᠰ	Initial Form	
	ZWJ+1887+ZWJ	ᠠᠨᠤᠯᠠᠰ	Medial Form	
	ZWJ+1887	ᠠᠨᠤᠯᠠᠰ	First Final Form	
	ZWJ+1887+FVS1	ᠠᠨᠤᠯᠠᠰ	Second Final Form	
	ZWJ+1887+FVS2	ᠠᠨᠤᠯᠠᠰ	Third Final Form	
	ZWJ+1887+FVS3	ᠠᠨᠤᠯᠠᠰ	Fourth Final Form	
1888	ᠠᠨᠢᠯ	MONGOLIAN LETTER ALI GALI I		
	1888+ZWJ	ᠠᠨᠢᠯ	Initial Form	
	ZWJ+1888+ZWJ	ᠠᠨᠢᠯ	Medial Form	

	ZWJ+1888	ᠠᠨᠢᠯ	First Final Form	
	ZWJ+1888+FVS1	ᠠᠨᠢᠯ	Second Final Form	
1889	ᠠᠨᠢᠯᠠ	MONGOLIAN LETTER ALI GALI KA		
	1889+ZWJ	ᠠᠨᠢᠯᠠ	Initial Form	
	ZWJ+1889+ZWJ	ᠠᠨᠢᠯᠠ	Medial Form	
	ZWJ+1889	ᠠᠨᠢᠯᠠ	Final Form	
188A	ᠠᠨᠢᠯᠠᠨ	MONGOLIAN LETTER ALI GALI NGA		
	188A+ZWJ	ᠠᠨᠢᠯᠠᠨ	First Initial Form	
	188A+FVS1+ZWJ	ᠠᠨᠢᠯᠠᠨ	Second Initial Form	
	ZWJ+188A+FVS1+ZWJ	ᠠᠨᠢᠯᠠᠨ	First Medial Form	
	ZWJ+188A+FVS1+ZWJ	ᠠᠨᠢᠯᠠᠨ	Second Medial Form	
188B	ᠠᠨᠢᠯᠠᠰ	MONGOLIAN LETTER ALI GALI CA		
	188B+ZWJ	ᠠᠨᠢᠯᠠᠰ	Initial Form	
	ZWJ+188B+ZWJ	ᠠᠨᠢᠯᠠᠰ	Medial Form	
	ZWJ+188B	ᠠᠨᠢᠯᠠᠰ	Final Form	
188C	ᠠᠨᠢᠯᠠᠳ	MONGOLIAN LETTER ALI GALI TTA		
	188C+ZWJ	ᠠᠨᠢᠯᠠᠳ	Initial Form	
	ZWJ+188C+ZWJ	ᠠᠨᠢᠯᠠᠳ	Medial Form	
	ZWJ+188C	ᠠᠨᠢᠯᠠᠳ	Final Form	
188D	ᠠᠨᠢᠯᠠᠳᠠ	MONGOLIAN LETTER ALI GALI TTHA		
	188D+ZWJ	ᠠᠨᠢᠯᠠᠳᠠ	Initial Form	
	ZWJ+188D+ZWJ	ᠠᠨᠢᠯᠠᠳᠠ	Medial Form	
	ZWJ+188D	ᠠᠨᠢᠯᠠᠳᠠ	Final Form	
188E	ᠠᠨᠢᠯᠠᠳᠠᠳ	MONGOLIAN LETTER ALI GALI DDA		
	188E+ZWJ	ᠠᠨᠢᠯᠠᠳᠠᠳ	Initial Form	
	ZWJ+188E+ZWJ	ᠠᠨᠢᠯᠠᠳᠠᠳ	Medial Form	
	ZWJ+188E	ᠠᠨᠢᠯᠠᠳᠠᠳ	Final Form	
188F	ᠠᠨᠢᠯᠠᠳᠠᠳᠠ	MONGOLIAN LETTER ALI GALI NNA		
	188F+ZWJ	ᠠᠨᠢᠯᠠᠳᠠᠳᠠ	Initial Form	
	ZWJ+188F+ZWJ	ᠠᠨᠢᠯᠠᠳᠠᠳᠠ	Medial Form	
	ZWJ+188F	ᠠᠨᠢᠯᠠᠳᠠᠳᠠ	Final Form	
1890	ᠠᠨᠢᠯᠠᠳᠠᠳᠠᠳ	MONGOLIAN LETTER ALI GALI TA		
	1890+ZWJ	ᠠᠨᠢᠯᠠᠳᠠᠳᠠᠳ	Initial Form	
	ZWJ+1890+ZWJ	ᠠᠨᠢᠯᠠᠳᠠᠳᠠᠳ	Medial Form	
	ZWJ+1890	ᠠᠨᠢᠯᠠᠳᠠᠳᠠᠳ	Final Form	
1891	ᠠᠨᠢᠯᠠᠳᠠᠳᠠᠳᠠ	MONGOLIAN LETTER ALI GALI DA		
	1891+ZWJ	ᠠᠨᠢᠯᠠᠳᠠᠳᠠᠳᠠ	Initial Form	
	ZWJ+1891+ZWJ	ᠠᠨᠢᠯᠠᠳᠠᠳᠠᠳᠠ	Medial Form	
	ZWJ+1891	ᠠᠨᠢᠯᠠᠳᠠᠳᠠᠳᠠ	Final Form	
1892	ᠠᠨᠢᠯᠠᠳᠠᠳᠠᠳᠠᠳ	MONGOLIAN LETTER ALI GALI PA		
	1892+ZWJ	ᠠᠨᠢᠯᠠᠳᠠᠳᠠᠳᠠᠳ	Initial Form	
	ZWJ+1892+ZWJ	ᠠᠨᠢᠯᠠᠳᠠᠳᠠᠳᠠᠳ	Medial Form	
	ZWJ+1892	ᠠᠨᠢᠯᠠᠳᠠᠳᠠᠳᠠᠳ	Final Form	
1893	ᠠᠨᠢᠯᠠᠳᠠᠳᠠᠳᠠᠳᠠᠳ	MONGOLIAN LETTER ALI GALI PHA		
	1893+ZWJ	ᠠᠨᠢᠯᠠᠳᠠᠳᠠᠳᠠᠳᠠᠳ	Initial Form	
	ZWJ+1893+ZWJ	ᠠᠨᠢᠯᠠᠳᠠᠳᠠᠳᠠᠳᠠᠳ	Medial Form	
	ZWJ+1893	ᠠᠨᠢᠯᠠᠳᠠᠳᠠᠳᠠᠳᠠᠳ	Final Form	

