

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This publication is difficult for implementers to obtain and improvements over the past 14 years means this set is now out-of-date.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	᠐	MONGOLIAN DIGIT FOUR		
1815	᠕	MONGOLIAN DIGIT FIVE		
1816	᠖	MONGOLIAN DIGIT SIX		
1817	᠐	MONGOLIAN DIGIT SEVEN		
1818	᠘	MONGOLIAN DIGIT EIGHT		
1819	᠑	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	ZWJ+1844	᠋	Final Form
183A	᠊	MONGOLIAN LETTER KA	1845	᠋	MONGOLIAN LETTER TODO I
183A+ZWJ	᠊	Initial Form	1845+ZWJ	᠋	Initial Form
ZWJ+183A+ZWJ	᠊	Medial Form	ZWJ+1845+ZWJ	᠋	First Medial Form
ZWJ+183A	᠊	Final Form	ZWJ+1845+FVS1+ZWJ	᠋	Second Medial Form
183B	᠊	MONGOLIAN LETTER KHA	ZWJ+1845	᠋	Final Form
183B+ZWJ	᠊	Initial Form	1846	᠋	MONGOLIAN LETTER TODO O
ZWJ+183B+ZWJ	᠊	Medial Form	1846+ZWJ	᠋	Initial Form
ZWJ+183B	᠊	Final Form	ZWJ+1846+ZWJ	᠋	First Medial Form
183C	᠋	MONGOLIAN LETTER TSA	ZWJ+1846+FVS1+ZWJ	᠋	Second Medial Form
183C+ZWJ	᠋	Initial Form	ZWJ+1846	᠋	Final Form
ZWJ+183C+ZWJ	᠋	Medial Form	1847	᠋	MONGOLIAN LETTER TODO U*
ZWJ+183C	᠋	Final Form	1847+FVS1	᠋	Second Isolate Form
183D	᠋	MONGOLIAN LETTER ZA	1847+ZWJ	᠋	Initial Form
183D+ZWJ	᠋	Initial Form	ZWJ+1847+ZWJ	᠋	First Medial Form
ZWJ+183D+ZWJ	᠋	Medial Form	ZWJ+1847+FVS1+ZWJ	᠋	Second Medial Form
ZWJ+183D	᠋	Final Form	ZWJ+1847+FVS2+ZWJ	᠋	Third Medial Form
183E	᠋	MONGOLIAN LETTER HAA	ZWJ+1847	᠋	First Final Form
183E+ZWJ	᠋	Initial Form	ZWJ+1847+FVS1	᠋	Second Final Form
ZWJ+183E+ZWJ	᠋	Medial Form	1848	᠋	MONGOLIAN LETTER TODO OE
ZWJ+183E	᠋	Final Form	1848+ZWJ	᠋	Initial Form
183F	᠋	MONGOLIAN LETTER ZRA	ZWJ+1848+ZWJ	᠋	First Medial Form
183F+ZWJ	᠋	Initial Form	ZWJ+1848+FVS1+ZWJ	᠋	Second Medial Form
ZWJ+183F+ZWJ	᠋	Medial Form	ZWJ+1848	᠋	Final Form
ZWJ+183F	᠋	Final Form	1849	᠋	MONGOLIAN LETTER TODO UE*
1840	᠋	MONGOLIAN LETTER LHA	1849+FVS1	᠋	Second Isolate Form
1840+ZWJ	᠋	Initial Form	1849+ZWJ	᠋	Initial Form
ZWJ+1840+ZWJ	᠋	Medial Form	ZWJ+1849+ZWJ	᠋	First Medial Form
ZWJ+1840	᠋	Final Form	ZWJ+1849+FVS1+ZWJ	᠋	Second Medial Form
1841	᠋	MONGOLIAN LETTER ZHI	ZWJ+1849	᠋	Final Form
1841+ZWJ	᠋	Initial Form	184A	᠋	MONGOLIAN LETTER TODO ANG
ZWJ+1841+ZWJ	᠋	Medial Form	184A+ZWJ	᠋	Initial Form
ZWJ+1841	᠋	Final Form	ZWJ+184A+ZWJ	᠋	Medial Form
1842	᠋	MONGOLIAN LETTER CHI	ZWJ+184A	᠋	Final Form
1842+ZWJ	᠋	Initial Form	184B	᠋	MONGOLIAN LETTER TODO BA
ZWJ+1842+ZWJ	᠋	Medial Form	184B+ZWJ	᠋	Initial Form
ZWJ+1842	᠋	Final Form	ZWJ+184B+ZWJ	᠋	Medial Form
			ZWJ+184B	᠋	Final Form
Todo letters			184C	᠋	MONGOLIAN LETTER TODO PA
1843	᠋	MONGOLIAN LETTER TODO LONG VOWEL SIGN	184C+ZWJ	᠋	Initial Form
1843+ZWJ	᠋	Initial Form	ZWJ+184C+ZWJ	᠋	Medial Form
ZWJ+1843+ZWJ	᠋	Medial Form	ZWJ+184C	᠋	Final Form
ZWJ+1843	᠋	Final Form	184D	᠋	MONGOLIAN LETTER TODO QA
1844	᠋	MONGOLIAN LETTER TODO E	184D+ZWJ	᠋	First Initial Form
1844+ZWJ	᠋	Initial Form	184D+FVS1+ZWJ	᠋	Second Initial Form
ZWJ+1844+ZWJ	᠋	First Medial Form	ZWJ+184D+ZWJ	᠋	First Medial Form
ZWJ+1844+FVS1+ZWJ	᠋	Second 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	ᠯ	MONGOLIAN LETTER TODO CHA
1852+ZWJ	ᠯ	Initial Form
ZWJ+1852+ZWJ	ᠯ	Medial Form
ZWJ+1852	ᠯ	Final Form
1853	ᠪ	MONGOLIAN LETTER TODO JA
1853+ZWJ	ᠪ	Initial Form
ZWJ+1853+ZWJ	ᠪ	Medial Form
ZWJ+1853	ᠪ	Final Form
1854	ᠰ	MONGOLIAN LETTER TODO TSA
1854+ZWJ	ᠰ	Initial Form
ZWJ+1854+ZWJ	ᠰ	Medial Form
ZWJ+1854	ᠰ	Final Form
1855	ᠠ	MONGOLIAN LETTER TODO YA
1855+ZWJ	ᠠ	Initial Form
ZWJ+1855+ZWJ	ᠠ	Medial Form
ZWJ+1855	ᠠ	Final Form
1856	ᠨ	MONGOLIAN LETTER TODO WA
1856+ZWJ	ᠨ	Initial Form
ZWJ+1856+ZWJ	ᠨ	Medial Form
ZWJ+1856	ᠨ	Final Form
1857	ᠣ	MONGOLIAN LETTER TODO KA
1857+ZWJ	ᠣ	Initial Form
ZWJ+1857+ZWJ	ᠣ	Medial Form
ZWJ+1857	ᠣ	Final Form
1858	ᠤ	MONGOLIAN LETTER TODO GAA
1858+ZWJ	ᠤ	Initial Form
ZWJ+1858+ZWJ	ᠤ	Medial Form
ZWJ+1858	ᠤ	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	ᠣ	MONGOLIAN LETTER TODO NIA
185B+ZWJ	ᠣ	Initial Form
ZWJ+185B+ZWJ	ᠣ	Medial Form
ZWJ+185B	ᠣ	Final Form
185C	ᠤ	MONGOLIAN LETTER TODO DZA
185C+ZWJ	ᠤ	Initial Form
ZWJ+185C+ZWJ	ᠤ	Medial Form
ZWJ+185C	ᠤ	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	ᠱ	MONGOLIAN LETTER SIBE I
185E+FVS1	ᠱ	Isolate Form
185E+ZWJ	ᠱ	Initial Form
ZWJ+185E+ZWJ	ᠱ	First Medial Form
ZWJ+185E+FVS1+ZWJ	ᠱ	Second Medial Form
ZWJ+185E+FVS2+ZWJ	ᠱ	Third Medial Form
ZWJ+185E	ᠱ	First Final Form
ZWJ+185E+FVS1	ᠱ	Second Final Form
ZWJ+185E+FVS2	ᠱ	Third Final Form
185F	ᠰ	MONGOLIAN LETTER SIBE IY
185F+ZWJ	ᠰ	Initial Form
ZWJ+185F+ZWJ	ᠰ	Medial Form
ZWJ+185F	ᠰ	Final Form
1860	ᠰ	MONGOLIAN LETTER SIBE UE
1860+ZWJ	ᠰ	Initial Form
ZWJ+1860+ZWJ	ᠰ	First Medial Form
ZWJ+1860+FVS1+ZWJ	ᠰ	Second Medial Form
ZWJ+1860	ᠰ	First Final Form
ZWJ+1860+FVS1	ᠰ	Second Final Form
ZWJ+1860+FVS2	ᠰ	Third Final Form
1861	ᠰ	MONGOLIAN LETTER SIBE U
1861+FVS1	ᠰ	Isolate Form

1861+ZWJ	ᠠ	Initial Form
ZWJ+1861+ZWJ	ᠡ	Medial Form
ZWJ+1861	ᠢ	Final Form
1862 ᠮ MONGOLIAN LETTER SIBE ANG		
1862+ZWJ	ᠣ	Initial Form
ZWJ+1862+ZWJ	ᠤ	Medial Form
ZWJ+1862	ᠥ	Final Form
1863 ᠯ MONGOLIAN LETTER SIBE KA		
1863+FVS1	ᠪ	Isolate Form
1863+ZWJ	ᠣ	Initial Form
ZWJ+1863+ZWJ	ᠤ	First Medial Form
ZWJ+1863+FVS1+ZWJ	ᠥ	Second Medial Form
ZWJ+1863	ᠨ	Final Form
1864 ᠮ MONGOLIAN LETTER SIBE GA		
1864+FVS1	ᠪ	Isolate Form
1864+ZWJ	ᠣ	Initial Form
ZWJ+1864+ZWJ	ᠤ	Medial Form
ZWJ+1864	ᠥ	Final Form
1865 ᠮ MONGOLIAN LETTER SIBE HA		
1865+FVS1	ᠪ	Isolate Form
1865+ZWJ	ᠣ	Initial Form
ZWJ+1865+ZWJ	ᠤ	Medial Form
ZWJ+1865	ᠥ	Final Form
1866 ᠮ MONGOLIAN LETTER SIBE PA		
1866+ZWJ	ᠣ	Initial Form
ZWJ+1866+ZWJ	ᠤ	Medial Form
ZWJ+1866	ᠥ	Final Form
1867 ᠮ MONGOLIAN LETTER SIBE SHA		
1867+ZWJ	ᠣ	Initial Form
ZWJ+1867+ZWJ	ᠤ	Medial Form
ZWJ+1867	ᠥ	Final Form
1868 ᠮ MONGOLIAN LETTER SIBE TA		
1868+ZWJ	ᠣ	First Initial Form
1868+FVS1+ZWJ	ᠣ	Second Initial Form
ZWJ+1868+ZWJ	ᠤ	First Medial Form
ZWJ+1868+FVS1+ZWJ	ᠤ	Second Medial Form
ZWJ+1868+FVS2+ZWJ	ᠥ	Third Medial Form
ZWJ+1868	ᠨ	Final Form
1869 ᠮ MONGOLIAN LETTER SIBE DA		
1869+ZWJ	ᠣ	First Initial Form
1869+FVS1+ZWJ	ᠣ	Second Initial Form
ZWJ+1869+ZWJ	ᠤ	First Medial Form
ZWJ+1869+FVS1+ZWJ	ᠤ	Second Medial Form
ZWJ+1869	ᠥ	Final Form
186A ᠮ MONGOLIAN LETTER SIBE JA		
186A+ZWJ	ᠣ	Initial Form
ZWJ+186A+ZWJ	ᠤ	Medial Form

ZWJ+186A	ᠥ	Final Form
186B ᠮ MONGOLIAN LETTER SIBE FA		
186B+ZWJ	ᠣ	Initial Form
ZWJ+186B+ZWJ	ᠤ	Medial Form
ZWJ+186B	ᠥ	Final Form
186C ᠮ MONGOLIAN LETTER SIBE GAA		
186C+ZWJ	ᠣ	Initial Form
ZWJ+186C+ZWJ	ᠤ	Medial Form
ZWJ+186C	ᠥ	Final Form
186D ᠮ MONGOLIAN LETTER SIBE HAA		
186D+ZWJ	ᠣ	Initial Form
ZWJ+186D+ZWJ	ᠤ	Medial Form
ZWJ+186D	ᠥ	Final Form
186E ᠮ MONGOLIAN LETTER SIBE TSA		
186E+ZWJ	ᠣ	Initial Form
ZWJ+186E+ZWJ	ᠤ	Medial Form
ZWJ+186E	ᠥ	Final Form
186F ᠮ MONGOLIAN LETTER SIBE ZA		
186F+ZWJ	ᠣ	First Initial Form
186F+FVS1+ZWJ	ᠣ	Second Initial Form
ZWJ+186F+ZWJ	ᠤ	First Medial Form
ZWJ+186F+FVS1+ZWJ	ᠤ	Second Medial Form
ZWJ+186F	ᠥ	Final Form
1870 ᠮ MONGOLIAN LETTER SIBE RAA		
1870+ZWJ	ᠣ	Initial Form
ZWJ+1870+ZWJ	ᠤ	Medial Form
ZWJ+1870	ᠥ	Final Form
1871 ᠮ MONGOLIAN LETTER SIBE CHA		
1871+ZWJ	ᠣ	Initial Form
ZWJ+1871+ZWJ	ᠤ	Medial Form
ZWJ+1871	ᠥ	Final Form
1872 ᠮ MONGOLIAN LETTER SIBE ZHA		
1872+ZWJ	ᠣ	Initial Form
ZWJ+1872+ZWJ	ᠤ	Medial Form
ZWJ+1872	ᠥ	Final Form

Manchu letters

1873 ᠮ MONGOLIAN LETTER MANCHU I		
1873+FVS1	ᠪ	Isolate Form
1873+ZWJ	ᠣ	Initial Form
1873+FVS1+ZWJ	ᠣ	First Medial Form
ZWJ+1873+ZWJ	ᠤ	Second Medial Form
ZWJ+1873+FVS1+ZWJ	ᠤ	Third Medial Form
ZWJ+1873+FVS2+ZWJ	ᠥ	Fourth Medial Form
ZWJ+1873	ᠥ	First Final Form
ZWJ+1873+FVS1	ᠥ	Second Final Form
ZWJ+1873+FVS2	ᠥ	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 ᠪ MONGOLIAN LETTER MANCHU ZHA

	1877+ZWJ	ᠪ	Initial Form	
	ZWJ+1877+ZWJ	ᠪ	Medial Form	
	ZWJ+1877	ᠪ	Final Form	

Extensions for Sanskrit and Tibetan

1880 ᠣ MONGOLIAN LETTER ALI GALI ANUSVARA

	1880+FVS1	ᠣ	Second Form	
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1881 ᠨ MONGOLIAN LETTER ALI GALI VISARGA ONE

	1881+FVS1	ᠨ	Second Form	
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1882 ᠮ MONGOLIAN LETTER ALI GALI DAMARU

1883 ᠯ MONGOLIAN LETTER ALI GALI UBADAMA

1884 ᠮ MONGOLIAN LETTER ALI GALI INVERTED UBADAMA

1885 ᠯ MONGOLIAN LETTER ALI GALI BALUDA

1886 ᠯ MONGOLIAN LETTER ALI GALI THREE BALUDA

1887 ᠮ MONGOLIAN LETTER ALI GALI A*

	1887+FVS1	ᠮ	Second Isolate Form	
	1887+ZWJ	ᠮ	Initial Form	
	ZWJ+1887+ZWJ	ᠮ	Medial Form	
	ZWJ+1887	ᠮ	First Final Form	
	ZWJ+1887+FVS1	ᠮ	Second Final Form	
	ZWJ+1887+FVS2	ᠮ	Third Final Form	
	ZWJ+1887+FVS3	ᠮ	Fourth Final Form	

1888 ᠨ MONGOLIAN LETTER ALI GALI I

	1888+ZWJ	ᠨ	Initial Form	
	ZWJ+1888+ZWJ	ᠨ	Medial Form	

	ZWJ+1888	ᠨ	First Final Form	
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	ZWJ+1888+FVS1	ᠨ	Second Final Form	
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1889 ᠢ MONGOLIAN LETTER ALI GALI KA

	1889+ZWJ	ᠢ	Initial Form	
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	ZWJ+1889+ZWJ	ᠢ	Medial Form	
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	ZWJ+1889	ᠢ	Final Form	
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188A ᠢ MONGOLIAN LETTER ALI GALI NGA

	188A+ZWJ	ᠢ	First Initial Form	
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	188A+FVS1+ZWJ	ᠢ	Second Initial Form	
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	ZWJ+188A+FVS1+ZWJ	ᠢ	First Medial Form	
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	ZWJ+188A+FVS1+ZWJ	ᠢ	Second Medial Form	
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188B ᠢ MONGOLIAN LETTER ALI GALI CA

	188B+ZWJ	ᠢ	Initial Form	
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	ZWJ+188B+ZWJ	ᠢ	Medial Form	
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	ZWJ+188B	ᠢ	Final Form	
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188C ᠢ MONGOLIAN LETTER ALI GALI TTA

	188C+ZWJ	ᠢ	Initial Form	
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	ZWJ+188C+ZWJ	ᠢ	Medial Form	
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	ZWJ+188C	ᠢ	Final Form	
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188D ᠢ MONGOLIAN LETTER ALI GALI TTHA

	188D+ZWJ	ᠢ	Initial Form	
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	ZWJ+188D+ZWJ	ᠢ	Medial Form	
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	ZWJ+188D	ᠢ	Final Form	
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188E ᠢ MONGOLIAN LETTER ALI GALI DDA

	188E+ZWJ	ᠢ	Initial Form	
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	ZWJ+188E+ZWJ	ᠢ	Medial Form	
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	ZWJ+188E	ᠢ	Final Form	
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188F ᠢ MONGOLIAN LETTER ALI GALI NNA

	188F+ZWJ	ᠢ	Initial Form	
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	ZWJ+188F+ZWJ	ᠢ	Medial Form	
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	ZWJ+188F	ᠢ	Final Form	
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1890 ᠢ MONGOLIAN LETTER ALI GALI TA

	1890+ZWJ	ᠢ	Initial Form	
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	ZWJ+1890+ZWJ	ᠢ	Medial Form	
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	ZWJ+1890	ᠢ	Final Form	
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1891 ᠢ MONGOLIAN LETTER ALI GALI DA

	1891+ZWJ	ᠢ	Initial Form	
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	ZWJ+1891+ZWJ	ᠢ	Medial Form	
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	ZWJ+1891	ᠢ	Final Form	
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1892 ᠢ MONGOLIAN LETTER ALI GALI PA

	1892+ZWJ	ᠢ	Initial Form	
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	ZWJ+1892+ZWJ	ᠢ	Medial Form	
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	ZWJ+1892	ᠢ	Final Form	
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1893 ᠢ MONGOLIAN LETTER ALI GALI PHA

	1893+ZWJ	ᠢ	Initial Form	
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	ZWJ+1893+ZWJ	ᠢ	Medial Form	
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	ZWJ+1893	ᠢ	Final Form	
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1894 ᠰ MONGOLIAN LETTER ALI GALI SSA
 1894+ZWJ ᠰ Initial Form
 ZWJ+1894+ZWJ ᠰ Medial Form
 ZWJ+1894 ᠰ Final Form

1895 ᠵ MONGOLIAN LETTER ALI GALI ZHA
 1895+ZWJ ᠵ Initial Form
 ZWJ+1895+ZWJ ᠵ Medial Form
 ZWJ+1895 ᠵ Final Form

1896 ᠷ MONGOLIAN LETTER ALI GALI ZA
 1896+ZWJ ᠷ Initial Form
 ZWJ+1896+ZWJ ᠷ Medial Form
 ZWJ+1896 ᠷ Final Form

1897 ᠠ MONGOLIAN LETTER ALI GALI AH
 1897+ZWJ ᠠ Initial Form
 ZWJ+1897+ZWJ ᠠ Medial Form
 ZWJ+1897 ᠠ Final Form

1898 ᠲ MONGOLIAN LETTER TODO ALI GALI TA
 1898+ZWJ ᠲ Initial Form
 ZWJ+1898+ZWJ ᠲ Medial Form
 ZWJ+1898 ᠲ Final Form

1899 ᠮ MONGOLIAN LETTER TODO ALI GALI ZHA
 1899+ZWJ ᠮ Initial Form
 ZWJ+1899+ZWJ ᠮ Medial Form
 ZWJ+1899 ᠮ Final Form

189A ᠬ MONGOLIAN LETTER MANCHU ALI GALI GHA
 189A+ZWJ ᠬ Initial Form
 ZWJ+189A+ZWJ ᠬ Medial Form
 ZWJ+189A ᠬ Final Form

189B ᠮ MONGOLIAN LETTER MANCHU ALI GALI NGA
 189B+ZWJ ᠮ Initial Form
 ZWJ+189B+ZWJ ᠮ Medial Form
 ZWJ+189B ᠮ Final Form

189C ᠴ MONGOLIAN LETTER MANCHU ALI GALI CA
 189C+ZWJ ᠴ Initial Form
 ZWJ+189C+ZWJ ᠴ Medial Form
 ZWJ+189C ᠴ Final Form

189D ᠵ MONGOLIAN LETTER MANCHU ALI GALI JHA
 189D+ZWJ ᠵ Initial Form
 ZWJ+189D+ZWJ ᠵ Medial Form
 ZWJ+189D ᠵ Final Form

189E ᠲ MONGOLIAN LETTER MANCHU ALI GALI TTA
 189E+ZWJ ᠲ Initial Form
 ZWJ+189E+ZWJ ᠲ Medial Form
 ZWJ+189E ᠲ Final Form

189F ᠳ MONGOLIAN LETTER MANCHU ALI GALI DDHA
 189F+ZWJ ᠳ Initial Form
 ZWJ+189F+ZWJ ᠳ Medial Form

ZWJ+189F ᠳ Final Form

18A0 ᠠ MONGOLIAN LETTER MANCHU ALI GALI TA
 18A0+ZWJ ᠠ Initial Form
 ZWJ+18A0+ZWJ ᠠ Medial Form
 ZWJ+18A0 ᠠ Final Form

18A1 ᠡ MONGOLIAN LETTER MANCHU ALI GALI DHA
 18A1+ZWJ ᠡ Initial Form
 ZWJ+18A1+ZWJ ᠡ Medial Form
 ZWJ+18A1 ᠡ Final Form

18A2 ᠢ MONGOLIAN LETTER MANCHU ALI GALI SSA
 18A2+ZWJ ᠢ Initial Form
 ZWJ+18A2+ZWJ ᠢ Medial Form
 ZWJ+18A2 ᠢ Final Form

18A3 ᠣ MONGOLIAN LETTER MANCHU ALI GALI CYA
 18A3+ZWJ ᠣ Initial Form
 ZWJ+18A3+ZWJ ᠣ Medial Form
 ZWJ+18A3 ᠣ Final Form

18A4 ᠵ MONGOLIAN LETTER MANCHU ALI GALI ZHA
 18A4+ZWJ ᠵ Initial Form
 ZWJ+18A4+ZWJ ᠵ Medial Form
 ZWJ+18A4 ᠵ Final Form

18A5 ᠮ MONGOLIAN LETTER MANCHU ALI GALI ZA
 18A5+ZWJ ᠮ Initial Form
 ZWJ+18A5+ZWJ ᠮ Medial Form
 ZWJ+18A5 ᠮ Final Form

18A6 ᠶ MONGOLIAN LETTER ALI GALI HALF U
 18A6+ZWJ ᠶ Initial Form
 ZWJ+18A6+ZWJ ᠶ Medial Form
 ZWJ+18A6 ᠶ Final Form

18A7 ᠷ MONGOLIAN LETTER ALI GALI HALF YA
 18A7+ZWJ ᠷ Initial Form
 ZWJ+18A7+ZWJ ᠷ Medial Form
 ZWJ+18A7 ᠷ Final Form

18A8 ᠪ MONGOLIAN LETTER MANCHU ALI GALI BHA
 18A8+ZWJ ᠪ Initial Form
 ZWJ+18A8+ZWJ ᠪ Medial Form
 ZWJ+18A8 ᠪ Final Form

18A9 ᠳ MONGOLIAN LETTER ALI GALI DAGALGA

18AA ᠬ MONGOLIAN LETTER MANCHU ALI GALI LHA
 18AA+ZWJ ᠬ Initial Form
 ZWJ+18AA+ZWJ ᠬ Medial Form
 ZWJ+18AA ᠬ Final Form