TO: Unicode Technical Committee
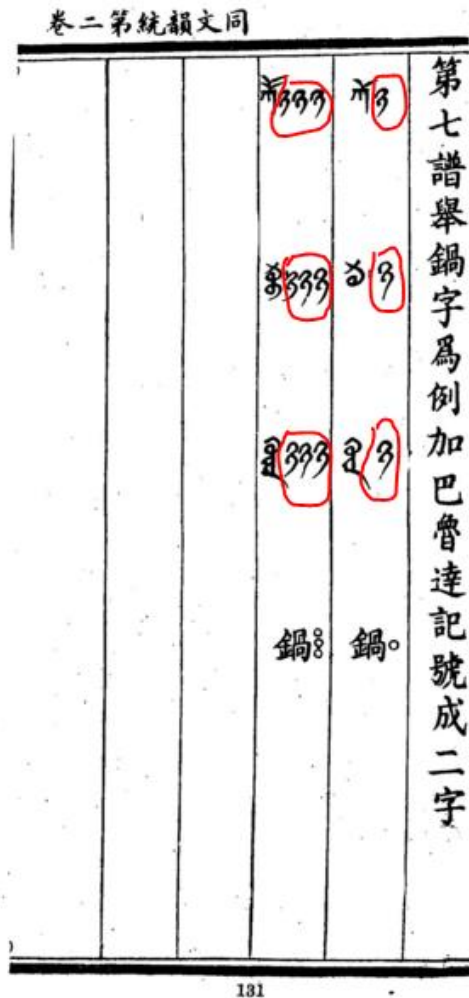
FROM: Greg Eck (with input from members of the W3C Mongolian discussion list)

DATE: 26 January 2016

SUBJECT: Mongolian discussion documents

Baluda Refinements

The Baluda pair (U+1885 / U+1886) has never been implemented correctly. This was brought to light in 2012 in meetings with Professor Quejingzhabu when he informed us that the baluda actually is written to the right of the top-most letter of a given word. Since that time, others have confirmed the same thought. Andrew West has put forth the following interesting finding[1]:

Current font shaping is like this ………………………………………………………..
Where the baluda is shaped in-line with the text instead of to the right side of the text.

Proposal: Change the general category from Lo (Letter, Other) to Mn (non-spacing mark) so that the character can be processed as a diacritical mark rather than a letter drawn on the stem. The Dagalga (U+18A8) is currently being processed as a mark successfully.

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[1] http://www.babelstone.co.uk/Mongolian/TWYT_130.jpg

FVS MIS-MATCH
(see DS00_FVSMisMatch.pdf)

There are two opinions on how to determine the position of a glyph before/after the NNBSP/MVS. The first method as written up in the earliest documentation (MGWBM/TR170) seems to hold to the idea that anything between the first letter and the last letter of a Mongolian word is in the medial position. If there is a NNBSP or a MVS control character in the middle of the word, the letters adjacent to the NNBSP/MVS are still considered to be in the medial position. The second method as implemented by font developers (at least those in our forum) is to consider the letters pre/post NNBSP/MVS as final/initial. In other words, the letter before an NNBSP/MVS (assuming that the string of letters preceding the NNBSP/MVS has more than one letter) is considered to be in the final position. A letter following an NNBSP/MVS is considered to be in the initial position (assuming that the string of letters following the NNBSP/MVS has more than one letter). The Microsoft Universal Shaping Engine (aka Uniscribe) and the Google Harfbuzz rendering engine both follow the second method. This has created a "disconnect" between those holding to the first method and those holding to the second method. There are several cases where we can see that a font has placed the FVS assignment in two locations, thus following both methods rather than holding to one opinion.

Proposal: Leave the fonts as they are (in running text implementation). Glyph shaping in running text displays fine. It is the FVS specification where we find variation and duplication. Change the FVS specification to match the actual positions as determined by the font rendering engines. Given such a specification, the individual font developers will know how to change their FVS implementations in their individual fonts.

| form	Q	USVL	NP	MB	FZ	NSM	MWc	BS	MS
isolate	ᠵ		ᠵ	ᠵ	ᠵ	ᠵ	ᠵ	ᠵ	ᠵ
is+fvs1	ᠵ	ᠵ	ᠵ	ᠵ	ᠵ	ᠵ	ᠵ	ᠵ	ᠵ
initial	ᠵ		ᠵ	ᠵ	ᠵ	ᠵ	ᠵ	ᠵ	ᠵ
in+fvs1		n/s		ᠵ	ᠵ	ᠵ	ᠵ	ᠵ	ᠵ
medial	ᠴ		ᠴ	ᠴ	ᠴ	ᠴ	ᠴ	ᠴ	ᠴ
m+fvs1	ᠴ	ᠴ	ᠴ	ᠴ	ᠴ	ᠴ	ᠴ	ᠴ	ᠴ
m+fvs2	ᠴ	ᠴ	ᠴ	ᠴ	ᠴ	ᠴ	[ᠴ]	ᠴ	[ᠴ]
final	᠌		᠌	᠌	᠌	᠌	᠌	᠌	᠌
f+fvs1	᠋	᠋	᠋	᠋	᠋	᠋	᠋	᠋	᠋

- U+1820-A (post-NNBSP) by the MGWBM, TR170, and current Chinese Standard: **Medial**

ZWJ+1820+FVS2+ZWJ ᠋ (xx_) *Third Medial Form*

- U+1820-A (post-NNBSP) by the Universal Shaping Engine (Uniscribe) / Harfbuzz: **Initial**

- Proposed

1820+FVS1+ZWJ ꭞ (xx__) *Second Initial Form*

form	Q	USVL	NP	MB	FZ	NSM	MWc	BS	MS
isolate	ꞏ→		ꞏ→	ꞏ→	ꞏ→	ꞏ→	ꞏ→	ꞏ→	ꞏ→
initial	ꞏ→		ꞏ→	ꞏ→	ꞏ→	ꞏ→	ꞏ→	ꞏ→	ꞏ→
i+fvs1	→	→	→	→	→	→	→	→	→
medial	ꓹ		ꓹ	ꓹ	ꓹ	ꞏꓹ	ꓹ	ꞏꓹ	ꓹ
m+fvs1	ꞏꓹ	ꞏꓹ	ꞏꓹ	ꞏꓹ	ꞏꓹ	ꓹ	ꞏꓹ	ꓹ	ꞏꓹ
m+fvs2	�<	ꞏ�<	ꞏ�<	ꞏ�<	ꞏ�<	ꞏ�<	ꓹ	ꞏ�<	ꞏ�<
m+fvs3	ꞏꓩ	ꞏꓩ	ꞏꓩ	ꞏꓩ	ꞏꓩ	ꞏꓩ	ꓹ	ꞏꓩ	ꞏꓩ
final	�<		�<	�<	�<	�<	�<	�<	�<
f+fvs1			n/s	ꞏ�<	ꞏ�<	ꞏ�<	ꞏ�<	ꞏ�<	ꞏ�<

- U+1828-N (pre-MVS) by the MGWBM, TR170, and current Chinese Standard: **Medial**

ZWJ+1828+FVS2+ZWJ ꭞ (x__) *Third Medial Form*

- U+1828-N (pre-MVS) by the Universal Shaping Engine (Uniscribe) / Harfbuzz: **Final**

- Proposed

ZWJ+1828+FVS1 ꭞ (x__) *Second Final Form*

m+fvs2	ꞏꓨ	ꞏꓨ	ꓨ	ꞏꓨ	» ꓨ	ꞏꓨ	ꞏꓩ	ꞏꓩ	ꞏꓩ	ꓨ
m+fvs3	ꓨ	ꓨ	ꞏꓨ	ꓨ	» ꞏꓨ	ꓨ	ꞏꓨ	ꞏꓩ	ꓩ	ꞏꓨ
final			n/s	ꓨ		ꓨ	ꓨ	ꓨ	ꓨ	ꓨ
f+fvs1			n/s	ꞏꓨ		ꞏꓨ	ꞏꓨ	ꞏꓨ	ꞏꓨ	ꞏꓨ

- U+182C-Q (pre-MVS) #1 by the MGWBM, TR170, and current Chinese Standard: **Medial**

ZWJ+182C+FVS2+ZWJ ꭞ (x__) *Third Medial Form*

- U+182C-Q (pre-MVS) #1 by the Universal Shaping Engine (Uniscribe) / Harfbuzz: **Final**

- Proposed

ZWJ+182C+FVS1 ꭞ (x__) *Second Final Form*

- U+182C-Q (pre-MVS) #2 by the MGWBM, TR170, and current Chinese Standard: **Medial**

ZWJ+182C+FVS3+ZWJ   (x__)   *Fourth Medial Form*

- U+182C-Q (pre-MVS) #2 by the Universal Shaping Engine (Uniscribe) / Harfbuzz: **Final**

- Proposed

ZWJ+182C   (x__)   *First Final Form*

m+fvs2	᠌᠌	᠌᠌	᠌᠌		᠌᠌	᠌᠌	᠌	᠌	᠌	᠌
m+fvs3	᠌	᠌	᠌		᠌	᠌	᠌᠌	᠌	᠌	᠌
final	᠌		᠌		᠌	᠌	᠌	᠌	᠌	᠌
f+fvs1		᠌	᠌		᠌	᠌	᠌	᠌᠌	᠌᠌	᠌᠌
f+fvs2	᠌		᠌		᠌	᠌	᠌	᠌	᠌	᠌
f+fvs3			n/s		᠌	᠌	᠌	᠌	᠌	᠌

- U+182D-G (pre-MVS) by the MGWBM, TR170, and current Chinese Standard: **Medial**

ZWJ+182D+FVS2+ZWJ   (x__)   *Third Medial Form*

- U+182D-G (pre-MVS) by the Universal Shaping Engine (Uniscribe) / Harfbuzz: **Final**

- Proposed

ZWJ+182D+FVS3   (x__)   *Fourth Final Form*

form	Q	USVL	NP	MB	FZ	NSM	MWc	BS	MS
isolate	᠌		᠌	᠌	᠌	᠌	᠌	᠌	᠌
initial	᠌		᠌	᠌	᠌	᠌	᠌	᠌	᠌
medial	᠌		᠌	᠌	᠌	᠌	᠌	᠌	᠌
m+fvs1	᠌	᠌	᠌	᠌	᠌	᠌	᠌	᠌	᠌
final	᠌		᠌	᠌	᠌	᠌	᠌	᠌	᠌
f+fvs1			n/s	᠌	᠌	᠌	᠌	᠌	᠌

- U+1835-J (pre-MVS) by the MGWBM, TR170, and current Chinese Standard: **Medial**

ZWJ+1835+FVS1+ZWJ ◌ (x__) *Second Medial Form*

- U+1835-J (pre-MVS) by the Universal Shaping Engine (Uniscribe) / Harfbuzz: **Final**

- Proposed
  ZWJ+1835+FVS1 ◌ (x__) *Second Final Form*

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form	Q	USVL	NP	MB	FZ	NSM	MWc	BS	MS
isolate	�face		�face	�face	�face	�face	�face	�face	�face
initial									
i+fvs1									
medial				»					
m+fvs1									
m+fvs2									
final			n/s						

- U+1836-Y (pre-MVS) by the MGWBM, TR170, and current Chinese Standard: **Medial**
  ZWJ+1836+FVS2+ZWJ ◌ (x__) *Third Medial Form*

- U+1836-Y (pre-MVS) by the Universal Shaping Engine (Uniscribe) / Harfbuzz: **Final**

- Proposed
  ZWJ+1836 ◌ (x__) *Final Form*

This paper has three sections:

Exhaustive Analysis of Original Standardized Variants Listing [1]

Column 1 – No issues

Column 2 – One issue (182D-GA) Masculine final form - [glyph] ; Feminine final form - [glyph] .

- There is confusion at the feminine final 182D-GA. This is easily the most complex variant in the Mongolian script context-wise and possibly specification-wise as well. The MGWBM places the variant at 182D+180C. The TR170 specification places the variant at the182D+180B. The reason that the MGWBM skips one FVS slot (FVS1) and places the feminine form at 182D+180C is that the specification has taken into account the need for the default context to be over-ridden in special cases. There are several cases where the default context determining the final feminine form is present, but the correct form is the masculine. This case would be handled by the 182D+FVS1-Final over-ride. The MGWBM notation uses the parenthesis, as below, to say that the masculine is both the final default as well as the FVS1 assigned glyph. This form of notation is confusing in its terse-ness, however concise in its descriptive power. This is what I teach my students:

  ZWJ+182D   [glyph] (x__)   *First Final Form*
  ZWJ+182D+FVS1   [glyph] (x__)   *Second Final Form*
  ZWJ+182D+FVS2   [glyph] (x__)   *Third Final Form*

  The font implementations under inspection are all in complete agreement as shown at the Ishida Font Comparator site[2]

final	[glyph]		[glyph]	[glyph]	[glyph]	[glyph]	[glyph]	[glyph]
f+fvs1		[glyph]	[glyph]	[glyph]	[glyph]	[glyph]	[glyph]	[glyph]	[glyph]
f+fvs2	[glyph]		[glyph]	[glyph]	[glyph]	[glyph]	[glyph]	[glyph]	[glyph]
f+fvs3			n/s	[glyph]	[glyph]	[glyph]	[glyph]	[glyph]	[glyph]

  MGWBM follows …

		ml. ga final form	ga			ZWJoin ⇒	((FVS1))
[glyph]		ml. ga feminine isolate form	ga				⇒

3	[glyph]	ml. ga feminine medial form	ga			ZWJoin ⇒ ZWJoin FVS1	030
4	[glyph]	ml. ga feminine final form	ga			ZWJoin ⇒ FVS2	031

  TR170 follows …

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[1] *http://www.unicode.org/Public/UNIDATA/StandardizedVariants.html* *as of January 20, 2016.*
[2] http://r12a.github.io/scripts/mongolian/variants.html

45	⟨glyph⟩	MONGOLIAN LETTER GA	-		⟨glyph⟩	FIRST INITIAL FORM		⟨glyph⟩	Z-W Join			GA
			44		⟨glyph⟩	SECOND INITIAL FORM		⟨glyph⟩	Z-W Join	FV S1		GA
				6	⟨glyph⟩	FIRST MEDIAL FORM	Z-W Join	⟨glyph⟩	Z-W Join			GA
				26	⟨glyph⟩	SECOND MEDIAL FORM	Z-W Join	⟨glyph⟩	Z-W Join	FV S1		GA
				27	⟨glyph⟩	THIRD MEDIAL FORM	Z-W Join	⟨glyph⟩	Z-W Join	FV S2		GA
				28	⟨glyph⟩	FINAL FORM	Z-W Join	⟨glyph⟩				GA
			137		⟨glyph⟩	FEMININE ISOATE FORM		⟨glyph⟩				GA
				30	⟨glyph⟩	FEMININE MEDIAL FORM	Z-W Join	⟨glyph⟩	Z-W Join	FV S3		GA
				31	⟨glyph⟩	FEMININE FINAL FORM	Z-W Join	⟨glyph⟩		FV S1		GA

PROPOSAL: Change the FVS assignment for the feminine final GA from 182D+FVS1 to 182D+FVS2.

Column 3 – One issue of incorrect positional assignment, as follows …

- The 1887 isolate ⟨glyph⟩ is actually a final. This was brought to light in discussions with Professor Quejingzhabu late last year (2015). The question now, is how to assign it as a final since all of the FVS slots are taken up. Suggested solution is the specification of a new FVS4.

Column 4 – Five issues where the glyph is either incorrect or needing refinement, as follows …

- Initial 185F+FVS1:   Current is ⟨glyph⟩ ;   Desired is ⟨glyph⟩
- Medial 1873+FVS3:   Current is ⟨glyph⟩ ;   Desired is ⟨glyph⟩
- 1881+FVS1:   Current is ⟨glyph⟩ ;   Desired is ⟨glyph⟩
- Final 1887+FVS1:   Current is ⟨glyph⟩ ;   Desired is ⟨glyph⟩
- Final 1887+FVS3:   Current is ⟨glyph⟩ ;   Desired is ⟨glyph⟩

Column 5 – Eleven issues where the description could be sharpened, as follows …

- Medial 1828+FVS4 – the term "separate" is used only once in the entire block; it is felt that in keeping to similar descriptions such as "first", "second", "third", "fourth", there is greater clarity. Proposed description is "fourth medial form" rather than "separate form".
- Final 182A+FVS1 – the term "alternate" again is used only in this one occasion; for the same reason as above the proposed description is "second final form" rather than "alternate form".
- Isolate 182C+FVS1 – the main feature used in the description is easily seen to be position (first, second, third, fourth, fifth); the additional feature of gender if used in the description should not be as prominent as the main feature of position; if used, it should be used consistently throughout the specification – a study should be done to determine whether this is indeed the case. Proposal is to leave the description as tight as possible and use only position and leave out gender – in this case "second isolate form".
- Final 182D+FVS2 – for the same reason as above the proposal is to leave the term "feminine" out and use the description "third final form" instead of "feminine form". There

will be cases where this "feminine" form is used in words that are actually masculine also, so again the addition of gender directly in the description is a bit cumbersome.

- Medial 182D+FVS3 – for the same reason above, the proposal is to use the description of "fourth medial form" rather than "feminine form".
- Initial 184D+FVS1 – for the same reason above, the proposal is to use the description of "second initial form" rather than "feminine form".
- Medial 184D+FVS1 – for the same reason above, the proposal is to use the description of "second medial form" rather than "feminine form".
- Final 1874+FVS1 – for the same reason above, the proposal is to use the description of "second final form" rather than "feminine first final form".
- Medial 1874+FVS2 – for the same reason above, the proposal is to use the description of "third medial form" rather than "feminine first medial form".
- Final 1874+FVS2 – for the same reason above, the proposal is to use the description of "third final form" rather than "feminine second final form".
- Medial 1874+FVS3 – for the same reason above, the proposal is to use the description of "fourth final form" rather than "feminine second final form".

Mongolian Velar Family of Glyphs

The Mongolian Script standards (MGWBM[3] and the TR170[4]) have gone through a lot of change from definition to the stage of actual implementations. You can see the initial design thoughts in the early standards. You can trace the history of what worked and what did not work. One thing that seems to have not worked was the use of the feminine isolates as an initial default. At least in the Chinese Standard, you can see the move away from this idea to the more workable masculine as the display default. I have never had a full round of discussion about this process, but it seems that this is what happened. Given this premise then, it is reasonable that we see gaps and inconsistencies around the area of the feminine isolates for the Mongolian QA/GA, Todo QA/GA, Sibe KA/GA/HA, and the Manchu KA.

This is a very special class of variants. There is no question that they all need assignment for purposes of teaching heuristic, for dictionary headings, and such. There is also the possibility of over-specification however as currently seen in the Todo pair. I think it is wise to look at these all together and determine an appropriately economic as well as effectual assignment. Given the need to display these forms in dictionaries, we have a clear justification for the stand-alone isolate. There is another area that covers probably more scope however. That is the area of ligaturing. The feminine forms of these glyphs all ligature readily. And we might say more precisely, they only ligature except when used in an isolate setting. This means that they never appear in initial or medial positions except in ligatured context. And of course, they would never appear in a final context. So, we might consider these feminine glyphs to have virtual forms in the initial and medial contexts. As we have already agreed that the isolate form is justified, we might consider, for purposes of economics, not assigning FVS initial/medial sequences (which should be almost identical), but allowing the isolate form to represent the virtual forms at the initial / medial contexts. A precedent for this approach is found currently in the Mongolian 182C/182D pair where there is no initial/medial FVS assignment found for these feminine glyphs. This representation could be annotated allowing for the overall reduction of at least two FVS assignments per letter.

[3] http://www.babelstone.co.uk/Mongolian/MGWBM.html
[4] ftp://ftp.iist.unu.edu/pub/techreports/report170a.tgz

There is another case where this method has not been followed resulting in inconsistent specification. This is the Todo pair at U+184D/U+184E. According to the MGWBM/TR170/USVL we find one initial specification and one medial specification at U+184D. However at U+184E, the sister letter, we find no initial/medial feminine form assignment. Instead we find one isolate feminine FVS assignment. This method of assignment is exactly the opposite of the sister letter, 184D.

Looking at the attached chart, we can start with the Mongolian pair QA/GA to set the nomenclature paradigm. Though current documentation is shy about specifying an isolate for a consonant, all font designers know that each position must have a display form. Therefore, specify the QA initial default (which is also the Unicode presentation glyph) as the masculine isolate glyph. This is followed by the feminine isolate closest to the default – the undotted form taking the first FVS1 slot. The remaining dotted feminine isolate takes the FVS2 slot. Following the same pattern for the Mongolian 182D-GA, we take the initial default which is masculine as the default isolate. The feminine glyph closest in feature to the default isolate is the dotted isolate – so this glyph takes the FVS1 slot. The remaining isolate, the undotted feminine form takes the FVS2 slot. This pattern, which almost matches the earliest documentation then gives us a template to follow in the FVS assignments of the Todo pair, the Sibe three and the Manchu single.

- MONGOLIAN 182C-QA/182D-GA (TR170)

44	ꢢ	MONGOLIAN LETTER QA	-		ꢢ	FIRST INITIAL FORM		Z-W Join			QA
			45		ꢢ	SECOND INITIAL FORM		Z-W Join	FV S1		QA
				6	ꢢ	FIRST MEDIAL FORM	Z-W Join	ꢢ	Z-W Join		QA
				26	ꢢ	SECOND MEDIAL FORM	Z-W Join	ꢢ	Z-W Join	FV S1	QA
				27	ꢢ	THIRD MEDIAL FORM	Z-W Join	ꢢ	Z-W Join	FV S2	QA
				28	ꢢ	FOURTH MEDIAL FORM	Z-W Join	ꢢ	Z-W Join	FV S3	QA
			137		ꢢ	FEMININE FIRST ISOLATE FORM		ꢢ			QA
				29	ꢢ	FEMININE SECOND ISOLATE FORM		ꢢ		FV S1	QA
45	ꢢ	MONGOLIAN LETTER GA	-		ꢢ	FIRST INITIAL FORM		ꢢ	Z-W Join		GA
			44		ꢢ	SECOND INITIAL FORM		ꢢ	Z-W Join	FV S1	GA
				6	ꢢ	FIRST MEDIAL FORM	Z-W Join	ꢢ	Z-W Join		GA
				26	ꢢ	SECOND MEDIAL FORM	Z-W Join	ꢢ	Z-W Join	FV S1	GA
				27	ꢢ	THIRD MEDIAL FORM	Z-W Join	ꢢ	Z-W Join	FV S2	GA
				28	ꢢ	FINAL FORM	Z-W Join	ꢢ			GA
			137		ꢢ	FEMININE ISOATE FORM		ꢢ			GA
				30	ꢢ	FEMININE MEDIAL FORM	Z-W Join	ꢢ	Z-W Join	FV S3	GA
				31	ꢢ	FEMININE FINAL FORM	Z-W Join	ꢢ		FV S1	GA

- MONGOLIAN 182C-QA/182D-GA (MGWBM)

- Todo 184D-QA / 184E-GA (TR170)

	BASIC CHARACTERS			VARIANT FORMS			
No	CHARACTER	NAME	No	GLYPH	NAME	RULE	
77	:ᡔ	MONGOLIAN LETTER TODO QA	-	:ᡔ	INITIAL FORM	:ᡔ	ZW Join
			26	:ᡓ	MEDIAL FORM	ZW Join	:ᡔ ZW Join
			59	ᠣ	FEMININE INITIAL FORM	:ᡔ ZW Join	FV S1
			59	ᠣ	FEMININE MEDIAL FORM	ZW Join :ᡔ ZW Join	FV S1
			54	ᠣ	FEMININE FINAL FORM	ZW Join :ᡔ	
78	ᠣᡔ	MONGOLIAN LETTER TODO GA	-	ᠣᡔ	INITIAL FORM	ᠣᡔ ZW Join	
			83	ᠣᡓ	FIRST MEDIAL FORM	ZW Join ᠣᡔ ZW Join	
			84	᠊ᡓ	SECOND MEDIAL FORM	ZW Join ᠣᡔ ZW Join	FV S1
			85	᠊ᡕ	FINAL FORM	ZW Join ᠣᡔ	
			137	ᠣ	FEMININE ISOLATE FORM	ᠣᡔ	

- TODO 184D-QA / 184E-GA (MGWBM)

- SIBE 1863-QA / 1864-GA / 1865-HA (TR170)

99			44		⇒	INITIAL FORM		:～	Z-W Jon				KA
			6	�1	FIRST MEDIAL FORM	Z-W Jon	:～	Z-W Jon			KA
			104	:◄	SECOND MEDIAL FORM	Z-W Jon	:～	Z-W Jon	FV S1		KA
	:～	MONGOLIAN LETTER SIBE KA			:～	FINAL FORM	Z-W Jon	:～			KA
			137	?	FEMININE ISOLATE FORM		:～				KA
100	⇒	MONGOLIAN LETTER SIBE GA	-		⇒	INITIAL FORM		⇒	Z-W Jon		GA	GA
			105	⇒,	MEDIAL FORM	Z-W Jon	⇒	Z-W Jon		GA	GA
			106	⇒	FEMININE ISOLATE FORM		⇒			GA	GA
101	⇒	MONGOLIAN LETTER SIBE HA	-		⇒	INITIAL FORM		⇒	Z-W Jon		HA	HA
			107	⇒°	MEDIAL FORM	Z-W Jon	⇒	Z-W Jon		HA	HA
			108	⇒	FEMININE ISOLATE FORM		⇒			HA	HA

- MONGOLIAN 1863-QA / 1864-GA / 1865-HA (MGWBM)

			044	⇒		mls. ka masculine initial form	ka		～ Z-W Jon
			032 – 3	�		mls. ka first medial form	ka		Z-W Jon ～ Z-W Jon
			1	:◄		mls. ka second medial form	ka		Z-W Jon ～ Z-W Jon S1	104
099	～	MLS. KA		～		mls. ka final form	ka		Z-W Jon ～
			137	?		mls. ka feminine isolate form	ka		～
100	⇒	MLS. GA		⇒		mls. ga initial form	ga	ga	⇒ Z-W Jon
			1	⇒,		mls. ga medial form	ga	ga	Z-W Jon ⇒ Z-W Jon	105
			2	⇒		mls. ga feminine isolate form	ga	ga	⇒	106
101	⇒	MLS. QA		⇒		mls. qa initial form	qa	qa	⇒ Z-W Jon
			1	⇒°		mls. qa medial form	qa	qa	Z-W Jon ⇒ Z-W Jon	107
			2	⇒		mls. qa feminine isolate form	qa	qa	⇒	108

- MANCHU 1874-KA (TR170)

116			44	⇒	INITIAL FORM		:⇒	Z-W Jon			KA
			6	�1	FIRST MEDIAL FORM	Z-W Jon	:⇒	Z-W Jon			KA
			26	:⇒1	SECOND MEDIAL FORM	Z-W Jon	:⇒	Z-W Jon	FV S1		KA
	:⇒	MONGOLIAN LETTER MANCHU KA		:⇒	FINAL FORM	Z-W Jon	:⇒			KA
			137	?	FEMININE ISOLATE FORM		:⇒				KA
			30	⌒	FEMININE FIRST MEDIAL FORM	Z-W Jon	:⇒	Z-W Jon	FV S2		KA
			120	:⌒	FEMININE SECOND MEDIAL FORM	Z-W Jon	:⇒	Z-W Jon	FV S3		KA
			121	⌣	FEMININE FIRST FINAL FORM	Z-W Jon	:⇒		FV S1		KA
			122	:⌣	FEMININE SECOND FINAL FORM	Z-W Jon	:⇒		FV S2		KA

- MANCHU 1874-KA (MGWBM)

- AliGali 1889-KA (added for sake of completion although there is nothing needed here in the FVS area)

Proposal for Unification of the Mongolian Velar Block

- 182C ₍ₓ₎ ꯞ MONGOLIAN LETTER QA

182C+FVS1	ꞓ ₍ₓ₎	*Second Isolate Form*
182C+FVS2	ꞓ ₍ₓ₎	*Third Isolate Form*
182C+ZWJ	ꯞ ₍ₓ₎	*First Initial Form*

- 182D ₍ₓ₎ ꯞ MONGOLIAN LETTER GA

182D+FVS1	ꞓ ₍ₓ₎	*Second Isolate Form*
182D+FVS2	ꞓ ₍ₓ₎	*Third Isolate Form*
182D+ZWJ	ꯞ ₍ₓ₎	*First Initial Form*

- 184D ₍ₓ₎ ꯞ MONGOLIAN LETTER TODO QA

184D+FVS1	ꞓ ₍ₓ₎	Second *Isolate Form*
184D+ZWJ	ꯞ ₍ₓ₎	*Initial Form*

- 184E ₍ₓ₎ ꯞ MONGOLIAN LETTER TODO GA

184E+FVS1	ꞓ ₍ₓ₎	Second *Isolate Form*
184E+ZWJ	ꯞ ₍ₓ₎	*Initial Form*

- 1863 ₍ₓ₎ ꯞ MONGOLIAN LETTER SIBE KA

1863	ꯞ ₍ₓ₎	*First Isolate Form*
1863+FVS1	ꞓ ₍ₓ₎	*Second Isolate Form*
1863+ZWJ	ꯞ ₍ₓ₎	*Initial Form*

- 1864 ₍ₓₓ₎ ꯞ MONGOLIAN LETTER SIBE GA

1864+FVS1	ꞓ ₍ₓₓ₎	*Second Isolate Form*
1864+ZWJ	ꯞ ₍ₓₓ₎	*Initial Form*

- 1865 ₍ₓₓ₎ ꯞ MONGOLIAN LETTER SIBE HA

1865+FVS1	ꞓ ₍ₓₓ₎	*Second Isolate Form*

1865+ZWJ	ᡠ (__xx)	*Initial Form*

- 1874 (__x) ᠺ MONGOLIAN LETTER MANCHU KA

1874	ᠺ (__x)	*First Isolate Form*
1874+FVS1	ᠻ (__x)	*Second Isolate Form*
1874+ZWJ	ᠺ (__x)	*Initial Form*

- 1889 (xx__) ᠻ MONGOLIAN LETTER ALI GALI KA

1889+ZWJ	ᠻ (xx__)	*Initial Form*

Action Items for Unification of the Mongolian Velar Block
- U+182C-Mongolian QA
  - Change 182C+FVS1 from the dotted feminine isolate to the undotted isolate as the second isolate form
  - Add 182C+FVS2 dotted feminine isolate as the third isolate form
- U+182D-Mongolian GA
  - Add 182D+FVS1 dotted feminine isolate as the second isolate form
  - Add 182D+FVS2 undotted feminine isolate as the third isolate form
- U+184D-Todo QA
  - Delete 184D+FVS1 feminine initial
  - Delete 184D+FVS1 feminine medial
  - Add 184D+FVS1 feminine isolate as the second isolate form
- U+184E-Todo GA
  - Add 184E+FVS1 feminine isolate as the second isolate form
- U+1863-Sibe KA
  - Add 1863+FVS1 first feminine isolate as the first isolate form
  - Add 1863+FVS2 second feminine isolate as the second isolate form
- U+1864-Sibe GA
  - Add 1864+FVS1 second feminine isolate as the second isolate form
- U+1865-Sibe HA
  - Add 1864+FVS1 second feminine isolate as the second isolate form
- U+1874-Manchu KA
  - Add 1874+FVS1 first feminine isolate as the first isolate form
  - Add 1874+FVS2 second feminine isolate as the second isolate form
- U+1889-AliGali KA
  - No action necessary

NOTE: You may be asking why there is a difference of treatment at 1863 and 1874? Why is there a first isolate in these two cases and not in the others? These are two special cases where the Unicode ascribed code-point glyph is not the initial but instead another positional variant – in this case the final variant. Whereas in other cases the first isolate is also the initial/Unicode glyph and there is no need to state that it is the first isolate – in this case the first isolate must be explicitly assigned or there will be no way to display the glyph except through simulation with the ZWJ. This begs the question, then, as to whether we should also assign FVS positions to the 15 code-points whose Unicode glyphs are also un-displayable except by simulating the position with ZWJ. This is the area as discussed below.

Unicode Isolate Forms without FVS assignments

This is an FYI at present. The issue is that there is no easy way for the user to type these code-point's Unicode form without having intrinsic understanding of the block. The user will have to use a ZWJ combination. The user will have to know the position of the particular code-point that is the Unicode form. It is felt that this should be a simple task to write any given Unicode form whereas in reality it is not.
- 1824 (Initial) – already included as a proposed new variant

- 1826 (Initial) – already included as a proposed new variant
- 184A (Final)
- 184B (Final)
- 184F (Final)
- 1859 (Final)
- 185D (Final)
- 185E (Second Medial)
- 1861 (Medial)
- 1862 (Final)
- 1863 (Final)
- 1873 (Final)
- 1874 (Medial)
- 1875 (Final)
- 1876 (Medial)

Additional New FVS Assignments

- New FVS2 assignment at <U+1822-Medial><U+180C> Three out of six font developers implement this double-tooth U+1822 form.

  ZWJ+1822+FVS2+ZWJ   (x__)   *Third Medial Form*

- New FVS3 assignment at <U+1822-Medial><U+180D> This variant is needed to over-ride default context of the medial I in words such as NAIMA "eight".

  ZWJ+1822+FVS3+ZWJ   (x__)   *Fourth Medial Form*

- New FVS1 assignment at <U+1822-Final><U+180B> This 1822 final variant has been attested by various independent sources.

  ZWJ+1822+FVS1   (x__)   *Second Final Form*

- New FVS1 assignment at <U+1824-Isolate><U+180B> This variant is needed to display the Unicode isolate form of U+1824. This is also an important glyph for dictionary headings.

  1824+FVS1   (x__)   *Second Isolate Form*

- New FVS1 assignment at <U+1824-Final><U+180B> This variant is needed for foreign spellings such as "Nassau".

  ZWJ+1824+FVS1   (x__)   *Second Final Form*

- New FVS2 assignment at <U+1824-Final><U+180C> This variant has been attested by several independent sources as a variant of the dotted genitive case U/UE after the sequence <U+1828-N><NNBSP>.

  ZWJ+1824+FVS2   (x__)   *Third Final Form*

- New FVS2 assignment at <U+1826-Isolate><U+180C> This variant is needed to display the Unicode isolate form of U+1826. This is also an important glyph for dictionary headings.

  1826+FVS2   (x__)   *Third Isolate Form*

- New FVS3 assignment at <U+1826-Medial><U+180D> This variant is needed to over-ride the context so that we can use the DUEGER with or without the NNBSP.

ZWJ+1826+FVS3+ZWJ   ▽ (x__)   *Fourth Medial Form*
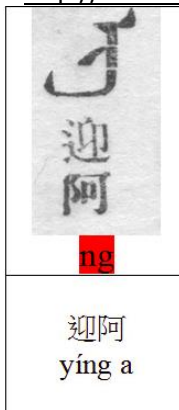
- New FVS2 assignment at <U+1826-Final><U+180C> This variant has been attested by several independent sources as a variant of the dotted genitive case U/UE after the sequence <U+1828-N><NNBSP>.

ZWJ+1826+FVS2   ♀ (x__)   *Third Final Form*

- New FVS4 assignment at <U+1828-Medial><U+180F> This default form is needed with FVS assignment to over-ride native context for such rare cases as ANAR.

ZWJ+1828+FVS4+ZWJ   ⌐ (x__)   *Fifth Medial Form*

- New FVS1 assignment at <U+1829-Isolate><U+180B> This isolate is evidenced in the dictionary "mongɣol nanggiyad üsüg-ün toli bičig" (蒙漢字典) published in 1928. This is shown in context at http://www.cneas.tohoku.ac.jp/staff/hkuri/articles/a62houkoku14.pdf

迎阿
yíng a

- New FVS2 assignment at <U+182C-Initial><U+180C> This variant is needed for the special case of QQIR.

182C+FVS2+ZWJ   ℂ (x__)   *Third Initial Form*

- New FVS3 assignment at <U+182D><U+180C> This variant is needed for foreign loan words such as GRAM.

182D+FVS2+ZWJ   ℂ (x__)   *Third Initial Form*

- New FVS4 assignment at <U+182D><U+180F> This default form is needed with FVS assignment to over-ride native context for such rare cases as COGAGULA.

ZWJ+182D+FVS4+ZWJ   ╥ (x__)   *Fifth Medial Form*

- New FVS1 assignment at <U+1843><U+180B> This variant has been attested to.

ZWJ+1843+FVS1   ˡ (_x_)   *Second Final Form*

- New FVS3 assignment at <U+1887><U+180F> This is currently listed as an isolate in the Chinese Standard. Professor Quejingzhabu says that this is a mistake and is actually a final.

ZWJ+1887+FVS4   ꡢ (x__)   *Fifth Final Form*

New FVS Control Character

- There are three instances now where the FVS4 may be needed, one of which is definitely confirmed. The current <U+1887-Isolate><FVS1> is actually a final as confirmed by Professor Quejingzhabu. There is discussion ongoing now as to whether this control character should actually be something of a "Default Variant Selector" as there are at least four cases where this feature could be helpful. One of our forum members would argue that there are 40+ cases where such a feature could be helpful. The problem is that we will still be needing a more generic new control character to handle instances like the U+1887. Additional information forthcoming regarding the New 2016 Chinese Standard will be helpful in directing this proposal also.

180F   (xxxx)   ⸬FV S3⸬   MONGOLIAN FREE VARIATION SELECTOR FOUR

Further Research Necessary
- 180A-Finals
- 1860-ThirdFinalForm
- 1868/1869-Medials – is the order correct?
- 1873-FourthFinalForm
- 1888-SecondMedialForm
- 18A0-SecondInitialForm
- 18A0-SecondMedialForm
- 18A1-SecondInitialForm
- 18A1-SecondMedialForm