Serto Antioch Bible

A Preliminary Guide to the OpenType Font

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The **Serto Antioch Bible** font was created to produce the Antioch Bible texts. It has been in development since 2012, modifying it each time an Antioch Bible volume was published. The development culminated in 2020 with the modifications for the publication of the *Syriac-English New Testament* (Gorgias Press, 2020). We are pleased to make the font available to the wider public.

The glyph designs are based on the print type of the diplomat and printer Savary de Bréves (1560–1627) who produced the Syriac print type sometimes around 1612 (Coakley W11.C). This print type is the source of most modern Serto fonts. The type was acquired by the Imprimerie Catholique in Beirut from the Imprimerie Nationale in Paris sometime in the 2nd half of the 19th cent. It was also acquired by St. Mark's Syriac Orthodox Press in Jerusalem from which the current font was designed. St. Mark's Press was the primary press of the Syriac Orthodox Church during the first half of the 20th century.

The first digital adaptation of the St. Mark's print types took place in 1986. A bitmap font was designed for Multi-Lingual Scholar™ (MLS) and became ubiquitous during the last decade and a half of the previous century. It was later redesigned as an OpenType outline font in 2001 and distributed by Beth Mardutho as part of the Meltho fonts package under the name Serto Jerusalem. Starting 2012, with the publication of the first Antioch Bible volume, the font underwent development to perfect spacing between characters and marks (vowels and dots), especially for fully vocalized and dotted texts. This is a major improvement on previous Serto fonts within the Meltho package where frequently base characters, vowels, and dots collide.

The font remains a work in progress. What follows is a description of the enhancements. References to features and rule names are intended to help those who would like to further develop the font.[1] The current release includes all source tables to enable users to further develop the font.

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[1] The OpenType tables can be edited using Microsoft's *Visual OpenType Layout Tool* (VOLT).

Character Sets

Serto Antioch Bible includes a wide range of characters. The Latin set is adapted from Charis SIL by the Summer Institute of Linguistics. The following Unicode blocks are covered:

1. Basic Latin (e.g. A a B b)
2. Latin 1 Supplement (e.g. ä î)
3. Latin Extended-A (e.g. ā š)
4. Latin Extended-B (e.g. ɔ ə ʔ)
5. Combining Diacritical Marks (e.g. diacritics as in ȧ ạ)
6. Arabic, limited to:
   a. Punctuation marks (e.g. ؟ ؛)
   b. Hamza and vowel marks used in Garshuni
   c. Indic numerals (e.g. ١٢٣)
   d. *Taṭwīl* (the elongation line between letters).
7. Syriac Unicode Block in its entirety (shown in the table below), including
   a. Persian and Sogdian letters: ܟ ܫ ܙ ܦ ܩ
8. Syriac Supplement which include Malayalam Garshuni letters: ࡘ ࡨ ࡠ ࡆ ࡏ ࡏ ࡍ ࡋ ࡃ ࡊ ࡉ ࡇ (starting at U+0860)
9. Two dots on the left of base letters which can be used as dots *between* letters. These are COMBINING DOT ABOVE LEFT (Unicode 1DF8) and a newly proposed COMBINING DOT BELOW LEFT (Unicode 1DFA, accepted by Unicode but not yet approved as of 2020). Note that some software programs may not support these within a Syriac text. [We must wait a bit to use them until they gets implemented in systems.]

Serto Antioch Bible also include characters not yet part of the Unicode standard:

1. Older form of Mim as in ܟܣܘܡܬܐ for ܟܣܘܡܬܐ (type a final ܐ, then ܝ, then ܟܣܘܡ).
2. Ancient Jacob of Edessa vowels found in grammatical manuscripts: ܔ ܓ ܨ ܩ ܖ ܣ ܗ ܢ.
3. Greek dotted Pe ܦ, Armenian Garshun dotted Pe ܦ, and a dotted Garshuni ܓ (in addition to the already existing dashed ܓ).
4. Greek diphthong combinations found in *mashlmonutho* ('masora') manuscripts:
5. Various dotted punctuations found in early manuscripts: ؛ ÷ ؟ ~ ※ :: ∴
6. Looped final Olaph ܠ, looped final Lomadh-Olaph ligature ܠ, crossed Lomadh-Olaph ܠ, and a tailed Simkath ܤ.
7. Old Syriac Numbers: ܝ (1), ܗ (5), ܬ (10), ܢ (20), and ܩ (100) found in inscriptions and parchments—including combinations ܢ (2), ܡ (3), etc. up to ܡܡܡ (9).
8. Superscript ܐ to ܝ, as in ܐ ܒ ܓ ܝ

9. Vowels of the Maronite Gabriel Ḥawwa ܐ ܠ used in 1773.

10. Chanting elongation mark found in Beth Gazo-like manuscripts: .

11. Ligatures: ܠܐ ܕܟ ܗܘ ܠܐ ܣ which the user has to type manually.

The font includes alternative glyphs used in substitutions (e.g. various forms for Sodhe depending on context: ܩ ܠܩ ܠܘ ܨܘ ܨܘ) as discussed below. These cannot be typed and are picked up automatically by the font depending on context.

The Syriac Abbreviation mark has been updated to current Unicode requirements; e.g. ܚܒ ܚܒ ܚܒ.

Characters not found in the standard Syriac keyboard are usually accessible through "Insert Symbol"-type operations in various programs.

Syriac Unicode Block

The following table gives the chart of the Syriac Unicode Block. Users are encouraged to note which keys are used for which dots. Keyboard references are to those in Microsoft Windows.

Code	Glyph	Description	Notes
		Punctuation	These are "punctuation" marks for various points that are placed next to base characters; i.e. these are not diacritics. In addition to these, the font contains the normal full stop (ܚ., on the "m" key) and colon (ܚ:, on the "|" key) from the Latin Unicode block.
U+0700	܀	Syriac End of Paragraph	
U+0701	܁	Syriac Supralinear Full Stop	ܚ·
U+0702	܂	Syriac Sublinear Full Stop	ܚ.
U+0703	܃	Syriac Supralinear Colon	ܚ:
U+0704	܄	Syriac Sublinear Colon	ܚ:
U+0705	܅	Syriac Horizontal Colon	ܚ··
U+0706	܆	Syriac Colon skewed left	ܚ:.
U+0707	܇	Syriac Colon skewed right	ܚ.:
U+0708	܈	Syriac Supralinear Colon skewed left	ܚ:
U+0709	܉	Syriac Sublinear Colon skewed right	ܚ.:
U+070A	܊	Syriac Contraction	
U+070B	܋	Syriac Harklean Obelus	
U+070C	܌	Syriac Harklean Metobelus	
U+070D	܍	Syriac Harklean Asteriscus	
U+070F	܏	[Syriac Abbreviation Mark](#)	
		Letters	These are the base letters including the letters adapted for garshunographic writing.

Code	Glyph	Description	Notes
U+0710	ܐ	Syriac Letter Alaph	
U+0711	ܑ	Syriac Letter Superscript Alaph	
U+0712	ܒ	Syriac Letter Beth	
U+0713	ܓ	Syriac Letter Gamal	
U+0714	ܔ	Syriac Letter Gamal Garshuni	
U+0715	ܕ	Syriac Letter Dalath	
U+0716	ܖ	Syriac Letter Dotless Dalath Rish	Do *not* use for ܪ for which type Rish, followed by Syome. Use only for a dottless Dolath/Rish as found in Old Syriac documents (and to represent the dottless graph sometimes found in manuscripts and documents).
U+0717	ܗ	Syriac Letter He	
U+0718	ܘ	Syriac Letter Waw	
U+0719	ܙ	Syriac Letter Zain	
U+071A	ܚ	Syriac Letter Heth	
U+071B	ܛ	Syriac Letter Teth	
U+071C	ܜ	Syriac Letter Teth Garshuni	
U+071D	ܝ	Syriac Letter Yudh	
U+071E	ܞ	Syriac Letter Yudh He	
U+071F	ܟ	Syriac Letter Kaph	
U+0720	ܠ	Syriac Letter Lamadh	
U+0721	ܡ	Syriac Letter Mim	
U+0722	ܢ	Syriac Letter Nun	
U+0723	ܣ	Syriac Letter Semkath	
U+0724	ܤ	Syriac Letter Final Semkath	
U+0725	ܥ	Syriac Letter E	
U+0726	ܦ	Syriac Letter Pe	
U+0727	ܧ	Syriac Letter Reversed Pe	
U+0728	ܨ	Syriac Letter Sadhe	
U+0729	ܩ	Syriac Letter Qaph	
U+072A	ܪ	Syriac Letter Rish	
U+072B	ܫ	Syriac Letter Shin	
U+072C	ܬ	Syriac Letter Taw	
U+072D	ܭ	Syriac Letter Persian Bheth	
U+072E	ܮ	Syriac Letter Persian Ghamal	
U+072F	ܯ	Syriac Letter Persian Dhalath	

Code	Glyph	Description	Notes
U+074D	؍	Syriac Letter Sogdian Zhain	
U+074E	؎	Syriac Letter Sogdian Khaph	
U+074F	؏	Syriac Letter Sogdian Fe	
Diacritics			These are vowels and dots that appear above/below base letters. In addition to these, the font includes diacritical marks from the Combining Diacritical Marks block (U+0300) that cover Syome (ܟ̈), dot above (ܟ̇, shift+p), dot below (ܔ, ":" on the keyboard), etc. It is important that the user types the correct dot in the correct context. The keyboard keys are indicated beldow.
U+0730	ܰ	Syriac Pthaha Above	
U+0731	ܱ	Syriac Pthaha Below	
U+0732	ܲ	Syriac Pthaha Dotted	Keyboard: Z (use for the vowel ܔ)
U+0733	ܳ	Syriac Zqapha Above	
U+0734	ܴ	Syriac Zqapha Below	
U+0735	ܵ	Syriac Zqapha Dotted	Keyboard: X (use for the vowel ܟ̈)
U+0736	ܶ	Syriac Rbasa Above	
U+0737	ܷ	Syriac Rbasa Below	
U+0738	ܸ	Syriac Dotted Zlama Horizontal	Keyboard: C (use for the vowel ܔ e)
U+0739	ܹ	Syriac Dotted Zlama Angular	Keyboard: N (use for the vowel ܔ $é$)
U+073A	ܺ	Syriac Hbasa Above	
U+073B	ܻ	Syriac Hbasa Below	
U+073C	ܼ	Syriac Hbasa-Esata Dotted	Keyboard: V (use for ܘ vowel only)
U+073D	ܽ	Syriac Esasa Above	
U+073E	ܾ	Syriac Esasa Below	
U+073F	ܿ	Syriac Rwaha	Keyboard: B (use for ܘ݁ only)
U+0740	݀	Syriac Feminine Dot	Keyboard: Y (use fore perfect, 3rd feminine verb ܩܛܠܬ which in East Syriac becomes ܩܛܠܗ)
U+0741	݁	Syriac Qushshaya	Keyboard: U (use for Qushoyo dot, ܟ݁)
U+0742	݂	Syriac Rukkakha	Keyboard: M (use for Rukokho dot, ܟ݂)
U+0743	݃	Syriac Two Vertical Dots Above	
U+0744	݄	Syriac Two Vertical Dots Below	

Code	Glyph	Description	Notes
U + 0745	$\overset{\cdot\cdot}{\cdot}$	Syriac Three Dots Above	
U + 0746	$\underset{\cdot\cdot}{\cdot}$	Syriac Three Dots Below	
U + 0747	$\acute{}$	Syriac Oblique Line Above	
U + 0748	$\grave{}$	Syriac Oblique Line Below	
U + 0749		Syriac Music	
U + 074A		Syriac Barrekh	

Size of Vowel Glyphs

Good scribes always used a different reed or the edge of a reed to write vowels resulting in a text where the vowels take a secondary role with respect to the weight of the text. This good practice is maintained in **Serto Antioch Bible**. The vowels are helpers and for this reason they are small. If they are too big, then the eye of the reader will get distracted by the vowels, especially in fully vocalized text as exemplified in the typesetting of Psalm 1 below. The same applies to dots. Users are discouraged from using the ring (circle) to denote Rukokho and Qushoyo dots. These rings were used particularly in grammars and lexica to denote a *red* dot. They are not suitable for text editions.

ܛܘܼܒ݂ܰܘܗ̄ܝ ܠܓܰܒ݂ܪܳܐ ١

ܕ݂ܒ݂ܡܶܠܟ݁ܳܐ ܕ݂ܥܰܘ̈ܠܶܐ ܠܳܐ ܗܰܠܶܟ݂܆

ܘܒ݂ܐܘܼܪܚܳܐ ܕ݂ܚܰܛ̈ܳܝܶܐ ܠܳܐ ܩܳܡ܂

ܘܥܰܠ ܡܰܘܬ݁ܒ݂ܳܐ ܕ݂ܡܡܰܝܩ̈ܳܢܶܐ ܠܳܐ ܝܺܬ݂ܶܒ݂܆

ܐܶܠܳܐ ܒ݂ܢܳܡܘܿܣܶܗ ܕ݂ܡܳܪܝܳܐ ܪ̈ܶܚܡܰܘܗ̄ܝ܆ ܕ

ܘܒ݂ܢܳܡܘܿܣܶܗ ܢܶܗܓ݁ܶܐ ܐܺܝܡܳܡܳܐ ܘܠܺܠܝܳܐ܂

ܘܢܶܗܘܶܐ ܐܰܝܟ݂ ܐܺܝܠܳܢܳܐ ܕ݂ܢܰܨܺܝܒ݂ ܥܰܠ ܝܰܒ݂ܠܳܐ ܕ݂ܡܰܝ̈ܳܐ܆ ܓ

ܘܦܺܐܪ̈ܰܘܗ̄ܝ ܒ݂ܙܰܒ݂ܢܶܗ ܝܳܗ̄ܒ݁܂

ܘܛܰܪ̈ܦܰܘܗ̄ܝ ܠܳܐ ܢܳܬ݂ܪܺܝܢ܆

ܘܟ݂ܽܠ ܕ݂ܢܶܥܒ݁ܶܕ݂ ܢܰܨܠܰܚ܂

ܠܳܐ ܗܘܳܐ ܗܳܟ݂ܰܢܳܐ ܥܰܘ̈ܠܶܐ܆ ٤

ܐܶܠܳܐ ܐܰܝܟ݂ ܥܽܘܪܳܐ

ܕ݂ܕ݂ܳܪܶܐ ܠܶܗ ܪܽܘܚܳܐ܂

- ܣܚ̈ܝܐ ܗ̇ܢܐ ܠܐ ܒܩܘܦܘܢ ܘܬ̇ܟܡܚܐ ܓܝ̈ܝܐ:
ܘܐܒ ܠܐ ܡܠܝ̈ܬܐ ܟܓܢܘܗܡܐ ܘܐܘܬܢܬܐ.
- ܣܚ̈ܝܐ ܘܒ̈ܝܐ ܘ̇ܗ ܡܢܐ ܐܘܢܐ ܘܐܘܬܢܬܐ:
ܘܐܘܢܐ ܘܬ̇ܟܡܚܐ ܝ̇ܐܟܝ.

Substitutions

Substitution rules replace one glyph with another glyph, optionally using context. For example, all Meltho fonts have a rule that converts the sequence ܝ followed by Seyome ܳ to the glyph ܷ.

> **Common mistake:** Many users type the dottless Old Syriac ܝ followed by Seyome ܳ to get ܷ. While one visually gets the same result, this is problematic. If the user searches for words containing ܷ, the word will *not* be found as the dottless ܝ has its own Unicode values.

The following subsections describe the types of substitutions that were implemented in **Serto Antioch Bible**. Font developers will find substitution rules under the *calt* feature.

Ḥeth-Yudh Sequences

Both ܚ and ܝ have versions in the font with a longer connecting line. These are triggered automatically when the two letters are next to each other as shown below:

ܠܡܚܝܡܡ

Otherwise, one gets:

ܠܡܚܝܡܡ
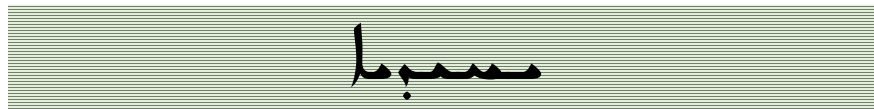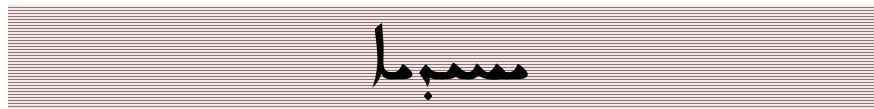
> **Note to font developers:** In order to keep the esthetics of the connections, when one of these letters takes a longer connection, the other letter also takes a connection as well. This is triggered by a second rule in the fonts. For this reason, these two rules are numbered to indicate their sequence.

[Rules name prefix: HethYudh; feature Name: calt]

Ṭeth

Ṭeth has alternative glyphs with long connectors. They are triggered in the following contexts:
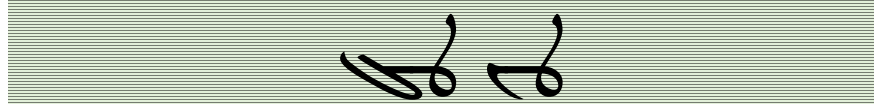
Otherwise, one gets:

[Rules name prefix: TethLong; feature Name: calt]

Sodhe

A few versions of the glyph are included in the font with different descenders (vertical distance under the base line). This allowed font developers to write substitution rules depending on context as shown in the following example:
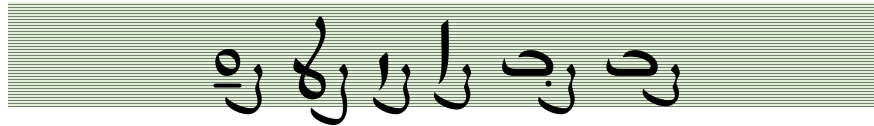
In the above, ܒ on its own does not trigger any rule and the normal ܪ appears. But if one adds a Rukokho point on ܒ, then a rule is triggered to use a taller ܪ. Similarly, a final ܐ triggers a taller ܪ though not as tall as the one with ܒ. A ܘ trigger even a taller version, and a ܠ trigger the tallest of all versions. The context can be a bit more complex. In the last example, the taller ܪ is triggered by the Mbaṭlono ܖ. Without these rules, one gets,

[Rules name prefix: SodheTall; feature name calt.]

Lomadh

There are various forms of the initial and medial Lomadh ܠ, each with a connect line of different length; e.g. Lomadh ܠ and the longer ܠ. The variant forms are triggered automatically depending on context, most of the time in the presence of vowels.
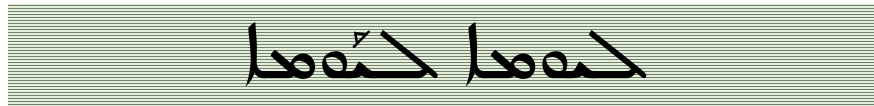
In the above, the vowel on Yudh triggered a rule that substitutes the regular Lomadh with a longer one to ensure that the vowel is at a good distance from Lomadh. Otherwise, one gets:
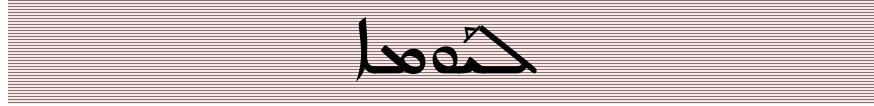
[Rules name prefix: LomadhLong; feature Name: calt]

Olaph Lomadh Ligature

A similar rule elongates the ligature ـﻼ when followed by a Sodhe with a vowel; e.g.
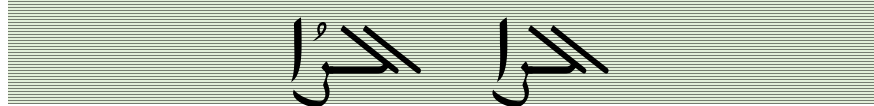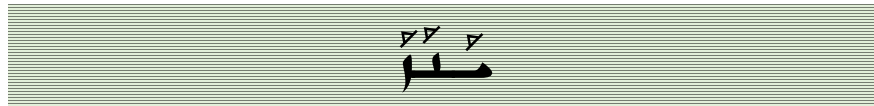
Otherwise, one gets:

[Rules name prefix: OlaphLomadhLigaLong; feature Name: calt]

Narrow Letters with Vowels

Many narrow (or thin) letters such as ܕ ܘ ܪ etc. have versions with a longer line. The longer versions are triggered in fully vocalized text to ensure that vowels do not touch each other. For example, these rules result in:

Otherwise, one gets:

> **Note to font developers:** Rules in fonts apply in the order given. The output of one rule becomes the input of the next rule. As there are many rules, it is important to keep them in the correct order of execution; i.e., which rule must be triggered first. Otherwise, one gets an undesirable result. These rules are numbered to give this order.

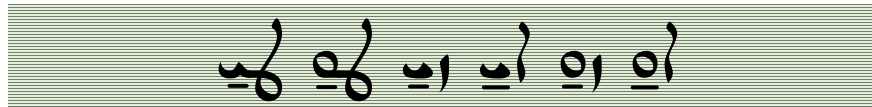[Rules name prefix: ThinLetters; feature Name: calt]

Syome on Lomadh ܠ

With the tradition of the ancient scribes, Syome is slanted when it appears on ܠ as in ܡܰܠܟ̈ܐ. If the user wants to have a straight Syome ̈ instead, it can be placed on another letter as in ܡܰܠܟ̈ܐ. Alternatively, the user can place

it on a line (shift + j on the keyboard) *before* ܠ as in ܡܬܚܕܠܐ. In the above example, the typing sequence is ܡܟ, then

ܿ (shift + j then Syome), then ܠ.

Mbaṭlono

The normal length of Mbaṭlono appears in ܐܘ and ܒܝ. But in the context of ܪ or ܿ, a shorter version is triggered as in:

Otherwise, one gets:

[Rules name prefix: MbatlonoShort; feature Name: calt]

Kerning Rules

These rules move glyphs (both consonants and vowels) to the left to avoid vowel marks touching adjacent consonants as in
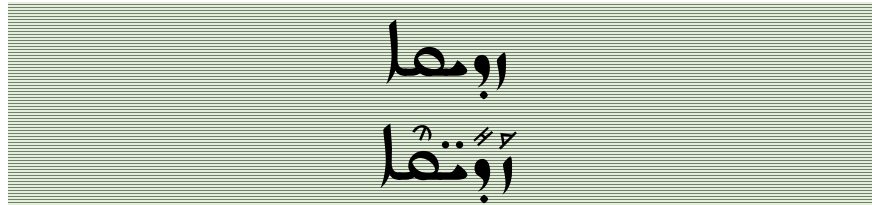
In the above, an additional space was added between ܪ and ܘ and between ܪ and ܬ when the vowels were added. Otherwise, one gets:

All these rules are under the Kerning feature. They are too many to document. The font contains more than 130 such rules, each rule triggered by different contexts.

Kerning rules have names such as *kern k ∕ dV __ Q*. This rule will kern ܩ to the left when it is preceded by a vocalized ܪ (including ܝ and ܞ) which is vocalized and followed by a Qushoyo point (i.e. on the ܩ). Basically, the purpose is to avoid the vowel of ܪ being at a close proximity of the Qushoyo dot on ܩ as in:

It is the presence of the vowel on ܘ *and* the Qushoyo dot that triggers the rule. A second context is also added to cover the case when ܘ itself has a Qushoyo dot. Without this rule, one gets

where the vowel on ܘ is too close to the Qushoyo dot of ܟ.

How to Type Texts—PLEASE READ

As one can see from the ܘܟܼ example above, the order in which characters are typed affects how the rules are triggered. Unfortunately, Microsoft Volt—the program used to specify font rules—does not support regular expressions. This is why the above rule has *two* contexts to cover ܘ with or without a Qushoyo dot although this dot has nothing to do with our rule.

To simply contexts, the rules were expressed in the font with the following typing order in mind. Users *must* adhere to this order when typing.

1. Type the base letter (e.g. ܘ)
2. Then type the Qushoyo/Rukokho dots, if any (e.g. ܘ)
3. Then type Syome, if any (e.g. ܘ̈)
4. Then type the vowel, if any (e.g. ܘ̆)

Failing to follow this order will cause the rules *not* to trigger. For example, if the user types first the ܿ on ܟ, then the Qushoyo dot, ܟ̇ (instead of the Qushoyo dot first then the vowel, ܟ̇ —yes, both look exactly the same), then the rule will *not* trigger because the rule expects a Qushoyo dot directly after ܟ. While visually marks (vowels and dots) appear above/below base letters, in the computer's memory, the characters appear one *after* the next in the order in which they were typed.

Reporting Bugs

Please report bugs to contact@bethmardutho.org. Please make sure to include an example in a Word file and a screen image that shows what you see on the screen. We cannot promise to respond to all requests. For this reason, the font is released with its source data (OpenType tables) so that font developers (and users if they dare) can modify the font independently. ܘܗܘ ܗܠܝ ܠܟܬܒܡܐܝ