

A few tips for (beginning) font developers

Khmer Unicode fonts consist of the actual outlines of the letters as well as instructions for the rendering system how to assemble a string of characters into the visual image.

The Mondulkiri fonts contain the following elements:

1. The basic font with all the basic outlines.
2. Instructions for the OpenType rendering system.
3. Instructions for the AAT rendering system.

The basic font with all the basic outlines

To create a basic font file with all the outlines a font editor like FontLab (commercial) or FontForge (open source) is needed.

The instructions for the OpenType rendering system

The OpenType (OT) instructions for this font were created with the VOLT tool from Microsoft¹. Once the basic font is opened in VOLT, the instructions can be loaded with 'Import - Project' and compiled. Make sure glyph shapes and names match, using the Edit Glyphs window. If they don't match the glyphs in the font are not ordered in the same way as they were in the font with which the project was created (or glyphs were added or deleted). In that case the postscript names in the font need to be 'imported for all glyphs, then edited in regard to their type and number of components in the Glyph Editor. Then the Glyph Data can be exported and merged with the original project file in a text editor. Then the project can be imported (Using 'Import anchor by glyph name') for the new font. Before giving the font to other users the VOLT-readable tables should be removed with 'File - Ship Font'.

The Mondulkiri fonts require a version of VOLT 1.1.225 or earlier. Some newer versions refuse compilation because on the non-standard use of anchors in the font.

It may be necessary to add the OT tables before the AAT tables for the font to work properly.

The instructions for the AAT rendering system

Apple provides some tools for working with fonts. The Mondulkiri fonts have been produced using version 3.1.0 of the Apple Font Tools (<https://developer.apple.com/fonts/>) on OS X 10.6.8. The newer version of Font Tools needed with OS X 10.8 introduced some problems with some general tables in the font (as of August 2012).

To add the AAT instructions to the font open Terminal, change to the directory with the font and the instruction files (enter 'cd ', drag a file from the desired directory into the window, delete the name of the file and press enter). The following two commands add the composite glyphs needed for the AAT tables and then add the AAT tables. The case of the letters of the options is significant:

```
ftxenhancer -A khmer4add.xml fontname
```

```
ftxenhancer -m Khmermif.txt fontname
```

¹ <http://www.microsoft.com/typography/volt.msp>

Finishing off

To finish the font off the following steps in Windows are recommended:

1. Recreate some of the tables in the font using the Microsoft commandline tools `cachett.exe` and `fastfont.exe` (<http://www.microsoft.com/typography/tools/tools.aspx>). The case of the letters of the options and table names is significant, the programs need to be in the same folder as the font or the full path needs to be used (or they need to be in the path).
`cachett -TLTSH fontname x.ttf`
`cachett -Thdmx x.ttf fontname`
`fastfont fontname`
2. As last step the font should be checked for errors with Microsoft's free Font Validator (<http://www.microsoft.com/typography/fontvalidator.mspx>). The `ftxenhancer` may not update the values for `xMin` `xMax` `yMin` and `yMax` for the extreme points in all the glyphs when using the `-A` option. This error can be worked around by adding tiny outlines with these extreme points to an unused glyph in the font, so that those values are generated by the font editor.
3. In order for Stylistic Sets in fonts to work in Microsoft Word, these fonts need to be digitally signed. However, as of Word 2010 in June 2012 Microsoft Word does not appear to support Stylistic Sets for the Khmer script.

Note: Font Validator will consider the values of the `VDMX` table to be incorrect. However, the `VDMX` table should not be regenerated with `cachett`. The cause for this error is that some glyphs of Khmer letters that are rarely used, exceed the `Ascender` and `Descender` set in the font editor. If the `VDMX` table is regenerated, programs will later display the font much smaller than desired.