

The Odia-TeX Manual

Typesetting in Odia using T_EX, L^AT_EX

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Summary

This article gives an overview of the Odia- \TeX -package which can be used with \TeX , \LaTeX for typesetting text in Odia (ଓଡ଼ିଆ). It also lays down an intuitive scheme for transliterating words from Odia into English and describes usage of the Python script `od2tex` to convert the transliterated text to Odia- \TeX syntax. Additionally, one may use Odia- \TeX in combination with other packages, to typeset mixed language documents. Odia- \TeX is a fork of the Oriya- \TeX project by Jeroen Hellingman and this manual borrows extensively from the original article written by him.

License

The Odia- \TeX fonts are Copyright © 1999-2016 Jeroen Hellingman, Soumyashant Nayak. The pre-processor `od2tex` is Copyright © 2016 Soumyashant Nayak. However, they may be freely distributed in the spirit of the GNU General Public License. The only restriction is that you cannot place further restrictions on this or derived works and you should give others you give this software or derived works to, everything, including the sources. Of course, works you print using this font are not derived works, but if you add or touch up a few characters, or create a post script font, based on this design, it is.

This is still a work in progress and is part of a bigger vision to make user-friendly professional typesetting options available in Odia. If you would like to contribute to this project, feel free to write to the e-mail address given below.

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Github page : <<https://github.com/nsoum/odia-tex>>

1 Introduction

The Odia alphabet follows the alphabetic order of Sanskrit. This order is based on phonetic principles. The vowels come first, in pairs of a short and long sound, those articulated in the back of the mouth first. After the ‘pure’ vowels come the ‘diphtongs’ (in Sanskrit, *e* and *o* are supposed to have been diphtongs originally).

| | | | | | |
|-----------|-----------|----------|-----------|----------|----------|
| ଅ | ଆ | ଇ | ଈ | ଉ | ଊ |
| <i>a</i> | <i>ā</i> | <i>i</i> | <i>ī</i> | <i>u</i> | <i>ū</i> |
| ୠ | ୡ | ୢ | ୣ | | |
| <i>r̥</i> | <i>r̄</i> | <i>ḷ</i> | <i>ḹ</i> | | |
| ଏ | ଐ | ଓ | ଔ | | |
| <i>e</i> | <i>ai</i> | <i>o</i> | <i>au</i> | | |

Three vowel modifiers traditionally follow the vowels. These are ଅଁ *am̐*, ଅଂ *aṁ*, and ଅଃ *aḥ*, which originally stood for a nasalisation, a following nasal, and a following aspiration respectively. In Odia, ଃ *h̐* is now used to indicate that the following consonant is doubled. Here written on the letter ଅ *a*, they can appear on any letter. The modifiers are followed by the consonants arranged in rows (called *varg*) of related sounds. The rows are ordered again by point of articulation, with semivowels and sibilants coming at the end, and in each row the voiceless sound first, followed by the aspirated, voiced, voiced and aspirated sound and the corresponding nasal.

| | | | | |
|-----------|------------|-----------|------------|------------|
| କ | ଖ | ଗ | ଘ | ଙ |
| <i>ka</i> | <i>kha</i> | <i>ga</i> | <i>gha</i> | <i>ṅa</i> |
| ଚ | ଛ | ଜ | ଝ | ଞ |
| <i>ca</i> | <i>cha</i> | <i>ja</i> | <i>jha</i> | <i>ṇa</i> |
| ଟ | ଠ | ଡ | ଢ | ଣ |
| <i>ṭa</i> | <i>ṭha</i> | <i>ḍa</i> | <i>ḍha</i> | <i>ṇa</i> |
| ତ | ଥ | ଦ | ଧ | ନ |
| <i>ta</i> | <i>tha</i> | <i>da</i> | <i>dha</i> | <i>na</i> |
| ପ | ଫ | ବ | ଭ | ମ |
| <i>pa</i> | <i>pha</i> | <i>ba</i> | <i>bha</i> | <i>ma</i> |
| ୟ | ଞ | ର | ଲ | ୱ |
| <i>ya</i> | <i>ya</i> | <i>ra</i> | <i>la</i> | <i>va</i> |
| ଶ | ଷ | ସ | | |
| <i>śa</i> | <i>ṣa</i> | <i>sa</i> | | |
| ହ | ଼ | | ଢ଼ | ଢ଼ |
| <i>ha</i> | <i>ḷa</i> | | <i>ṛa</i> | <i>ṛha</i> |

as shown in this table, all consonants are thought to be followed by the short letter ଅ *a*.¹

When a vowel follows a consonant, this is indicated by writing a special vowel sign, attached to the consonant. These vowel signs sometimes even stand before the consonant they apply to. Here the vowel signs are shown attached to the letter ଗ *ga*:

¹The vowels ଞ, ଢ, and ଢ are not used in Odia at all. They are borrowed from Sanskrit (and even in Sanskrit the last one is only introduced for symmetry), and are included in the alphabet for completeness. The letter ଱ is a recent invention to distinguish the sound *va* from *ba* in loanwords. It is a combination of the vowel ଓ with a secondary ଞ.

| | | | | | |
|-----------------|-----------------|------------------|-----------------|------------------|-----------------|
| ଗ <i>ga</i> | ଗା <i>gā</i> | ଗି <i>gi</i> | ଗି <i>gī</i> | ଗୁ <i>gu</i> | ଗୁ <i>gū</i> |
| ଗ୍ <i>gr</i> | ଗେ <i>ge</i> | ଗୈ <i>gai</i> | ଗୋ <i>go</i> | ଗୌ <i>gau</i> | |

Vowel signs often combine with the consonant they apply to: The vowel sign for \bar{a} , ା, is often joined to the letter, as in କା *kā*. The vowel sign for *i*, ି, ‘sinks’ into the outer circle, for example in କି *ki*, and the vowel sign for *u*, ୁ, can be written in one continuous stroke, as in କୁ *ku*. Sometimes the vowel sign for *u*, ୁ, becomes ୃ, for example in ଲୁ *lu*. On the letters ଥ *tha* and ଢ *dha*, the vowel sign for *i*, ି, becomes a little hook ୃ, written below the letter: ଥି *thi*, ଢି *dhi*. However, recent simplifications of the script have done away with all these irregular vowel signs.

When no vowel follows a consonant at all, not even the short ଥ *a*, this can be indicated with a sign called virama, ୃ, for example, କ୍ *k*. However, this symbol is not used that often. It is normally omitted at the end of words.

When two or more consonants follow each other, they are combined into a consonant cluster or conjunct. Often these conjuncts consist of a smaller version of the second letter subscribed to the first letter, for example, ଣ୍ନ *śca* is used for ଣ. Sometimes, the outer circle of the subscribed consonant is omitted, as in ଳ୍ଳ *lka* for ଳ. In many cases, however, the original consonants can hardly be recognised in the conjunct, for example in କ୍ଷ *kṣa* for କ୍ଷ. A fairly complete list of conjuncts is given in Section 8.

The letters ଯ *ya* and ର *ra* are treated in a special way. When ର *ra* is the first consonant of a cluster, it appears as the symbol reph ି at the end of the cluster, for example, ଣ୍ନ *ṛṇṇa*. When it is the last in a cluster, it appears as a subscribed hook, ୃ, for example in ପ୍ର *pra*. When the letter ଯ *y* is the last in a cluster, it appears as the symbol ୃ, for example, କ୍ୟ *kya*. This same symbol ୃ appears after the vowels ଇ *e* and ଓ *o* to modify their sounds.

The rules for combining consonants into conjuncts used to make typing and typesetting Odia a very complicated business. Traditional Odia typefaces in lead require several hundreds of different types. A computer, however, can easily apply all the rules, and make it possible to type only the base letters of Odia in their phonetic order.

The spelling and the use of conjuncts is hardly standardized, and it is no exception to come across spelling variations even inside a single book.

Punctuation in Odia script is similar to that in English, except that the period is replaced by a standing bar ।, called *danda*, which is separated from the last word by a space to avoid confusion with the vowel sign for ଥି *ā*.

Finally, Odia uses its own set of figures for numerals, ୧ ୨ ୩ ୪ ୫ ୬ ୭ ୮ ୯ ୦, although international figures are sometimes used as well, and % for the percent sign. The symbol for Indian rupee, given by ₹, is also included in Odia-TeX.

2 Odia- \TeX fonts

In this section, we display the two variants of fonts in the Odia- \TeX -package. The alphabets, numerals and some extra signs (decimal dot, percent sign and the Indian rupee symbol) are included.

2.1 Konark font

Konark regular 72 pt

Font: Regular 12 pt

ଅ କୋଣାର୍କ

Konark regular 24pt

ଅ ଆ ଇ ଈ ଉ ଊ ଋ ଌ ଐ ଓ ଔ ଅଁ ଅଂ ଅଃ
କ ଖ ଗ ଘ ଙ ଚ ଛ ଜ ଝ ଞ ଟ ଠ ଡ ଢ ଣ
ତ ଥ ଦ ଧ ନ ପ ଫ ବ ଭ ମ ଯ ର ଲ ଳ ଶ ଷ ସ ହ ଣ୍ଡ ଣ୍ଡଃ
କ କା କି କୀ କୁ କୁ କୃ କୈ କୌ କୌ କଂ କଃ

୧୭୩୪୫୬୭୮୯୦

• % ₹

2.2 Cuttack font

Cuttack regular 72pt

ଅକଟକ

Cuttack regular 24pt

ଅ ଆ ଇ ଈ ଉ ଊ ଋ ଌ ଏ ଐ ଓ ଔ ଅଁ ଅଂ ଅଃ
କ ଖ ଗ ଘ ଙ ଚ ଛ ଜ ଝ ଞ ଟ ଠ ଡ ଢ ଣ ତ ଥ ଦ ଧ ନ
ପ ଫ ବ ଭ ମ ଯ ଋ ର ଲ ଳ ଳ ଷ ସ ହ ଷ ଢ ଢ
କ କା କି କୀ କୁ କୁ କୁ କେ କୈ କେ। କୌ କଂ କଃ

୧୭୩୪୫୬୭୮୯୦

. % ₹

3 Setting up Odia- \TeX

In order to setup Odia- \TeX on a GNU/Linux system, please follow the instructions below.

- (i) Download and extract the Odia- \TeX -package from the github page at <https://github.com/nsoum/odia-tex>.
- (ii) Place the folders `odia-fonts-core` and `odia-build-metafont-core` in `texmf/fonts/source`. If you are not using a local `texmf` directory, you must also set the appropriate permissions.
- (iii) Place the folder `odia-tex-core` in `texmf/tex`, and the folder `odia-latex-core` in `texmf/tex/latex`.
- (iv) In order to generate the fonts, run `tex odmacs.tex` at the commandline. This may take a few minutes depending on the specifications of your computer.
- (v) From the `src` folder in the `odia-tex` directory of Step (i), extract the tarball `od2tex-0.5.tar.gz` containing the `od2tex` source code. Go to the extracted folder and run `sudo python setup.py install` at the commandline to install `od2tex` on your system.

Now the Konark and Cuttack fonts are ready to be used with plain \TeX and \LaTeX . Also the pre-processor `od2tex` is installed and the usage tips may be found by running `od2tex --help` at the commandline.

4 How to Use Odia- \TeX

A set of Odia fonts alone doesn't make up an easy-to-use Odia typesetting system. One also needs an easy way of typing Odia text. The complex rules of Odia script makes it cumbersome and error prone to type all required shapes directly. A computer can handle the composition and allow the user to type only the base characters in phonetic order. As the rules of Odia composition are not built into \TeX , the pre-processor `od2tex` will be used to accomplish this by converting Odia text typed in an ASCII-based transliteration scheme to Odia- \TeX syntax. The transliteration scheme is prescribed in 4.1. The details of usage of the preprocessor `od2tex` is described in 4.2.

Before you can start, you will have to load some macros. Users of plain \TeX have to input the file `odmacs.tex` somewhere at the start of their document. Users of \LaTeX can simply use the package `odia` to load the required macros and fonts. In 4.3, an example is discussed to illustrate various aspects of the Odia- \TeX -package.

4.1 Transliteration scheme

The following table indicates how to type Odia. The first column indicates the transliteration typed, the second the Odia letter output, and the third the scientific transcription. It should be noted that the scientific transcription is based on the model of Sanskrit, and does not give an exact indication of the actual pronunciation in Odia.

| | | | | | | | | |
|---|---------------|----------|------|---|------------|--------|---|----------------|
| a | ଅ or implicit | <i>a</i> | କା | କ | <i>ka</i> | ପା | ପ | <i>pa</i> |
| A | ଅି or ଂ | <i>ā</i> | କ୍ଷା | ଖ | <i>kha</i> | ଫା, ଫା | ଫ | <i>pha, fa</i> |
| i | ଇ or ି | <i>i</i> | ଗା | ଗ | <i>ga</i> | ବା | ବ | <i>ba</i> |
| I | ଇ or ଂ | <i>ī</i> | ଘା | ଘ | <i>gha</i> | ଭା | ଭ | <i>bha</i> |
| u | ଉ or ୁ | <i>u</i> | ଙା | ଙ | <i>ṅa</i> | ମା | ମ | <i>ma</i> |
| U | ଉ or ୂ | <i>ū</i> | ଚା | ଚ | <i>ca</i> | ଯା | ଯ | <i>ya</i> |

| | | | | | | | | |
|-----|--------|-----------|------|---|------------|------|----|------------|
| Ru | ର or ୠ | <i>r</i> | chha | ଛ | <i>cha</i> | Ja | ଝ | <i>ḡa</i> |
| RU | ର or ୠ | <i>r̄</i> | ja | ଜ | <i>ja</i> | ra | ଞ | <i>ra</i> |
| L.u | ୠ or ୡ | <i>l</i> | jha | ଝ | <i>jha</i> | la | ଲ | <i>la</i> |
| L.U | ୡ or ୢ | <i>l̄</i> | nya. | ଞ | <i>ñā</i> | va | ୱ | <i>va</i> |
| e | ଏ or ୤ | <i>e</i> | Ta | ଟ | <i>ṭa</i> | sha | ଶ | <i>śa</i> |
| ai. | ଐ or ୥ | <i>ai</i> | Tha | ଠ | <i>ṭha</i> | Sa | ଷ | <i>ṣa</i> |
| o | ଓ or ୦ | <i>o</i> | Da | ଡ | <i>ḍa</i> | sa | ସ | <i>sa</i> |
| au. | ଔ or ୧ | <i>au</i> | Dha | ଢ | <i>ḍha</i> | ha | ହ | <i>ha</i> |
| n. | ଂ | <i>m̄</i> | Na | ଣ | <i>ṇa</i> | La | ଳ | <i>ḷa</i> |
| m. | ଂ | <i>m̄</i> | ta | ତ | <i>ta</i> | D.a | ଡ଼ | <i>ṛa</i> |
| H | ଃ | <i>h̄</i> | tha | ଥ | <i>ṭha</i> | Dh.a | ଡ଼ | <i>ṛha</i> |
| | | | da | ଦ | <i>da</i> | k | କ୍ | |
| | | | dha | ଧ | <i>dha</i> | | | |
| | | | na | ନ | <i>na</i> | | | |

For dead consonants, the ASCII transcription is the one for the corresponding consonant without the trailing a (for example, ଝ \rightarrow kh). The transliteration for consonant-vowel combinations or conjunctive consonants is achieved by treating the leading consonants in the combination as dead consonants (*consonant* + ୠ). Below we consider one example each for a consonant-vowel combination and a conjunctive consonant.

୧. ଘି = ଘ + ଇ. Thus, ଘି is transliterated as *ghi*,

୨. ଷ୍ଟ = ଷ୍ଟ + ଇ + ଇ. Thus, ଷ୍ଟ is transliterated as *kSma*.

❗ Note that the transliteration scheme is case-sensitive.

କ \rightarrow ka, କା \rightarrow kA, କି \rightarrow ki, କି \rightarrow kI, କୁ \rightarrow ku, କୁ \rightarrow kU.

କୃ \rightarrow kRu, କେ \rightarrow ke, କୈ \rightarrow kai., କୋ \rightarrow ko, କୌ \rightarrow kau..

ଜମୁନା \rightarrow Jamuna, ଜହ୍ନା \rightarrow jahna.

4.2 od2tex

The pre-processor `od2tex` accepts text files with `.od` extension, containing text in which Odia is typed in the transliteration scheme described in 4.1. The ideal method for large blocks of Odia text is to include them in a separate `[TEXTNAME].od` file and convert it to `[TEXTNAME].tex` using `od2tex`. The output file `[TEXTNAME].tex` contains Odia-TeX syntax which tells TeX how to typeset your Odia text. This should be included via `\input{[TEXTNAME].tex}` in the main TeX file at the appropriate place. For small chunks of text, the conversion may be directly done at the commandline by using the `--conv` option, and the results copied to the main TeX file.

We quote the help documentation for `od2tex` verbatim below.

Usage: `od2tex [OPTION]`

or: `od2tex [ODNAME[.od]]`

or: `od2tex [ODNAME[.od]] [TEXTNAME[.tex]]`

Run `od2tex` on `ODNAME.od` which contains transliterated text (in English), creating a TeX file `ODNAME.tex` with Odia-TeX syntax in the same directory, if output file is not specified.

Else run `od2tex` on `ODNAME.od` and output to `TEXTNAME.tex`

-h, --help : View this help file to learn usage
-c, --conv : Convert transliterated text string to Odia-TeX syntax

EXAMPLE(s) :

```
$ od2tex --conv "oD.ishA"
```

This is od2tex, Version 0.5 (Odia-TeX, 2016)

Converting the string 'oD.ishA' to Odia-TeX syntax :
ow\odnukta [zA

```
$ od2tex init.od
```

This is od2tex, Version 0.5 (Odia-TeX, 2016)

Converting init.od to init.tex.

```
$ od2tex init.od final.tex
```

This is od2tex, Version 0.5 (Odia-TeX, 2016)

Converting init.od to final.tex.

Written by :

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github page: <https://github.com/nsoum/odia-tex/src>

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✍ Although od2tex will process any text file, it is good practice to name the files containing the transliterated text, with the .od extension for easier organization. od2tex will display a warning if the file does not have the extension .od though and append .tex to the filename after processing.

4.3 Example

Create a file `example.od` which contains transliterated text:

```
kaTaka jillAra hariharapura praganA madhyare goTie grAma,  
nAma pATapura | grAma muNDAmuNDire goTie ghara | Agili  
pichhili chAri bakharA, khanjA pAchiri chALiAre DhinkishALa,  
agaNA madhyare kUa, Agaku dANDaduAra, pachhaku bAD.iduAra |
```

Run `od2tex example.od` to obtain the output file `example.tex` which contains the text in Odia-TeX syntax :

```
kqk j[\odlla Ar hr[hrp]r p\odsecra gnA m\oddhya <r <gAq[e g\odsecra Am,  
nAm pAqp]r . g\odsecra Am m]\odNDa Am]\odNDa [<r <gAq[e Gr . aAg[l[  
p[C[l[ cAr[ bKrA, K\odnyja A pAc[r[ cAL[aA<r W[\odngka [zAL,  
agNA m\oddhya <r kZa, aAgk] dA\odNDa d]aAr, pCk] bAw\odnukta [d]aAr .
```

Then `example.tex` is invoked from the main TeX file using the `\input` command. A sample L^AT_EX file and its final output are given below.

4.3.1 Sample L^AT_EX file

```
\documentclass[12pt]{article}
\usepackage{odia}

\begin{document}
Text in Konark font :\\
{\knrk
\input{example.tex}
}\\ \ \
Text in Cuttack font :\\
{\cttck
\input{example.tex}
}
\end{document}
```

4.3.2 Final output

Text in Konark font :

କଟକ ଜିଲ୍ଲାର ହରିହରପୁର ପ୍ରଗନା ମଧ୍ୟରେ ଗୋଟିଏ ଗ୍ରାମ, ନାମ ପାଟପୁର । ଗ୍ରାମ ମୁଣ୍ଡାମୁଣ୍ଡିରେ ଗୋଟିଏ ଘର । ଆଗିଲି ପିଛିଲି
ରୁରି ବଖରା, ଖଜୁ ପାଟିରି ରୁଲିଆରେ ତିଙ୍କିଶାଳ, ଅଗଣା ମଧ୍ୟରେ କୁଅ, ଆଗକୁ ଦାଣ୍ଡୁଆର, ପଛକୁ ବାଡ଼ିଦୁଆର ।

Text in Cuttack font :

କଟକ ଜିଲ୍ଲାର ହରିହରପୁର ପ୍ରଗନା ମଧ୍ୟରେ ଗୋଟିଏ ଗ୍ରାମ, ନାମ ପାଟପୁର । ଗ୍ରାମ ମୁଣ୍ଡାମୁଣ୍ଡିରେ ଗୋଟିଏ ଘର । ଆଗିଲି ପିଛିଲି
ଚାରି ବଖରା, ଖଜୁ ପାଟିରି ଚାଳିଆରେ ତିଙ୍କିଶାଳ, ଅଗଣା ମଧ୍ୟରେ କୁଅ, ଆଗକୁ ଦାଣ୍ଡୁଆର, ପଛକୁ ବାଡ଼ିଦୁଆର ।

5 Table of Odia letters

All basic characters of the Odia script are given, together with their Roman transliteration, ISCII² and Unicode³ code-position, ASCII representation, and name. In a few cases, two ISCII characters are needed to represent a single Odia character. The vowel signs are given on a dotted circle, which represents the consonant or conjunct to which the vowel sign is to be applied.

Conjuncts and ligatures of consonants and vowel signs are given in the next sections.

| Odia | Roman | ISCII | Unicode | ASCII | name |
|---------------|-------|-------|---------|-------|-----------|
| <i>vowels</i> | | | | | |
| ଅ | a | A4 | 0B05 | a | vowel a |
| ଆ | ā | A5 | 0B06 | A | vowel aa |
| ଇ | i | A6 | 0B07 | i | vowel i |
| ଈ | ī | A7 | 0B08 | I | vowel ii |
| ଉ | u | A8 | 0B09 | u | vowel u |
| ଊ | ū | A9 | 0B0A | U | vowel uu |
| ଋ | r̄ | AA | 0B0B | Ru | vowel ri |
| ୠ | r̄̄ | AA E9 | 0B60 | RU | vowel rii |
| ୡ | l̄ | A6 E9 | 0B0C | L.u | vowel li |
| ୢ | l̄̄ | A7 E9 | 0B61 | L.U | vowel lii |
| ଏ | e | AC | 0B0F | e | vowel e |

²Indian Script Code for Information Interchange, IS 13194:1991

³The Unicode Standard, Version 1.0, Vol 1., and checked against the tables of version 2.014

| | | | | | |
|------------------------|-----|-------|----------------|--------|-----------------------|
| ଏ | ai | AD | OB10 | ai . | vowel ai |
| ଓ | o | B0 | OB13 | o | vowel o |
| ଔ | au | B1 | OB14 | au . | vowel au |
| <i>vowel modifiers</i> | | | | | |
| ଈ | am̐ | A1 | OB01 | n . | candrabindu |
| ୈ | aṁ | A2 | OB02 | m . | anusvar |
| ୱ | aḥ | A3 | OB03 | H | visarg |
| <i>consonants</i> | | | | | |
| କ | ka | B3 | OB15 | ka | consonant ka |
| ଖ | kha | B4 | OB16 | kha | consonant kha |
| ଗ | ga | B5 | OB17 | ga | consonant ga |
| ଘ | gha | B6 | OB18 | gha | consonant gha |
| ଙ | ṅa | B7 | OB19 | nga . | consonant nga |
| ଚ | ca | B8 | OB1A | cha | consonant ca |
| ଛ | cha | B9 | OB1B | chha | consonant cha |
| ଜ | ja | BA | OB1C | ja | consonant ja |
| ଝ | jha | BB | OB1D | jha | consonant jha |
| ଞ | ña | BC | OB1E | nya . | consonant nya |
| ଟ | ṭa | BD | OB1F | Ta | consonant tta |
| ଠ | ṭha | BE | OB20 | Tha | consonant ttha |
| ଡ | ḍa | BF | OB21 | Da | consonant dda |
| ଢ | ḍha | C0 | OB22 | Dha | consonant ddha |
| ଣ | ṇa | C1 | OB23 | Na | consonant nna |
| ତ | ta | C2 | OB24 | ta | consonant ta |
| ଥ | tha | C3 | OB25 | tha | consonant tha |
| ଦ | da | C4 | OB26 | da | consonant da |
| ଧ | dha | C5 | OB27 | dha | consonant dha |
| ନ | na | C6 | OB28 | na | consonant na |
| ପ | pa | C8 | OB2A | pa | consonant pa |
| ଫ | pha | C9 | OB2B | pha | consonant pha |
| ବ | ba | CA | OB2C | ba | consonant ba |
| ଭ | bha | CB | OB2D | bha | consonant bha |
| ମ | ma | CC | OB2E | ma | consonant ma |
| ଯ | ya | CD | OB5F | Ja | consonant ya |
| ୟ | ṃya | CE | OB2F | ya | consonant yya |
| ର | ra | CF | OB30 | ra | consonant ra |
| ଲ | la | D1 | OB32 | la | consonant la |
| ୱ | va | D4 | OB13 OB4D OB2C | va | consonant va |
| ଭ | ba | -- | -- | b . | consonant ba with dot |
| ଶ | śa | D5 | OB36 | sha | consonant sha |
| ଷ | ṣa | D6 | OB37 | Sa | consonant ssa |
| ସ | sa | D7 | OB38 | sa | consonant sa |
| ହ | ha | D8 | OB39 | ha | consonant ha |
| ଈ | ḷa | D2 | OB33 | La | consonant lla |
| ୱ | ṛa | BF E9 | OB5C | D . a | consonant rra |
| ଝ | ṛha | C0 E9 | OB5D | Dh . a | consonant rrha |

vowel signs

| | | | | | |
|-----|----|-------|------|-----|----------------|
| ◌ā | ā | DA | 0B3E | A | vowel sign aa |
| ◌i | i | DB | 0B3F | i | vowel sign i |
| ◌ī | ī | DC | 0B40 | I | vowel sign ii |
| ◌u | u | DD | 0B41 | u | vowel sign u |
| ◌ū | ū | DE | 0B42 | U | vowel sign uu |
| ◌ṛ | ṛ | DF | 0B43 | Ru | vowel sign ri |
| ◌ṝ | ṝ | DF E9 | -- | RU | vowel sign rii |
| ◌ḷ | ḷ | DB E9 | -- | L.u | vowel sign li |
| ◌ḹ | ḹ | DC E9 | -- | L.U | vowel sign lii |
| ◌e | e | E1 | 0B47 | e | vowel sign e |
| ◌ai | ai | E2 | 0B48 | ai. | vowel sign ai |
| ◌o | o | E4 | 0B4B | o | vowel sign o |
| ◌au | au | E5 | 0B4C | au. | vowel sign au |

additional vowels

| | | | | |
|----|---|----|----------------|-----|
| ◌ê | ê | -- | 0B0F 0B4D 0B5F | ai. |
| ◌ô | ô | -- | 0B13 0B4D 0B5F | au. |

other signs and symbols

| | | | | | |
|----|--|-------|------|-------------|---------------------|
| ◌̣ | | E8 | 0B4D | \odhalant | halant |
| ◌̤ | | EA E9 | 0B3D | \odavagraha | avagraha |
| ◌̥ | | -- | 0B70 | \odganesh | issnar |
| ◌̦ | | A1 E9 | -- | \odomsign | om sign |
| % | | | 0025 | \odpercent | percent sign |
| ₹ | | | 20B9 | \odrupee | Indian rupee symbol |

digits

| | | | | | |
|---|---|----|------|---|-------------|
| ० | 0 | F1 | 0B66 | 0 | digit zero |
| १ | 1 | F2 | 0b67 | 1 | digit one |
| २ | 2 | F3 | 0B68 | 2 | digit two |
| ३ | 3 | F4 | 0B69 | 3 | digit three |
| ४ | 4 | F5 | 0B6A | 4 | digit four |
| ५ | 5 | F6 | 0B6B | 5 | digit five |
| ६ | 6 | F7 | 0B6C | 6 | digit six |
| ७ | 7 | F8 | 0B6D | 7 | digit seven |
| ८ | 8 | F9 | 0B6E | 8 | digit eight |
| ९ | 9 | FA | 0B6F | 9 | digit nine |

conjunct control

| | | | | | |
|-------|-----|----------------|---------------------|-----------|--------------------|
| କ୍ରା | kra | B3 E8 CF | 0B15 0B4D 0B30 | kra | ordinary conjunct |
| କ୍ୱରା | kra | B3 E8 E8 CF | 0B15 0B4D 200C 0B30 | k{}ra | explicit halant |
| କ୍ୱରା | kra | B3 E8 E8 E8 CF | 0B15 0B4D 200D 0B30 | k\odsecra | alternate conjunct |

6 Table of Consonant-Vowel Sign Combinations

Vowel-signs often combine with the consonant or conjunct they modify.

| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|----------|----------|
| <i>a</i> | <i>ā</i> | <i>i</i> | <i>ī</i> | <i>u</i> | <i>ū</i> | <i>ṛ</i> | <i>e</i> | <i>ai</i> | <i>o</i> | <i>au</i> | <i>ṁ</i> | <i>ṇ</i> | <i>ḥ</i> |
| ଅ | ଆ | ଇ | ଈ | ଉ | ଊ | ୠ | ଏ | ଐ | ଓ | ଔ | ଂ | ଣ | ଃ |

| | | | | | | | | | | | | | | |
|-----------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|
| <i>k</i> | କ | କା | କି | କୀ | କୁ | କୁ | କୁ | କେ | କୈ | କୋ | କୌ | କ୍ | କଂ | କଃ |
| <i>kh</i> | ଖ | ଖା | ଖି | ଖୀ | ଖୁ | ଖୁ | ଖୁ | ଖେ | ଖୈ | ଖୋ | ଖୌ | ଖ୍ | ଖଂ | ଖଃ |
| <i>g</i> | ଗ | ଗା | ଗି | ଗୀ | ଗୁ | ଗୁ | ଗୁ | ଗେ | ଗୈ | ଗୋ | ଗୌ | ଗ୍ | ଗଂ | ଗଃ |
| <i>gh</i> | ଘ | ଘା | ଘି | ଘୀ | ଘୁ | ଘୁ | ଘୁ | ଘେ | ଘୈ | ଘୋ | ଘୌ | ଘ୍ | ଘଂ | ଘଃ |
| <i>ṇ</i> | ଙ | ଙା | ଙି | ଙୀ | ଙୁ | ଙୁ | ଙୁ | ଙେ | ଙୈ | ଙୋ | ଙୌ | ଙ୍ | ଙଂ | ଙଃ |
| <i>c</i> | ଚ | ଚା | ଚି | ଚୀ | ଚୁ | ଚୁ | ଚୁ | ଚେ | ଚୈ | ଚୋ | ଚୌ | ଚ୍ | ଚଂ | ଚଃ |
| <i>ch</i> | ଛ | ଛା | ଛି | ଛୀ | ଛୁ | ଛୁ | ଛୁ | ଛେ | ଛୈ | ଛୋ | ଛୌ | ଛ୍ | ଛଂ | ଛଃ |
| <i>j</i> | ଜ | ଜା | ଜି | ଜୀ | ଜୁ | ଜୁ | ଜୁ | ଜେ | ଜୈ | ଜୋ | ଜୌ | ଜ୍ | ଜଂ | ଜଃ |
| <i>jh</i> | ଝ | ଝା | ଝି | ଝୀ | ଝୁ | ଝୁ | ଝୁ | ଝେ | ଝୈ | ଝୋ | ଝୌ | ଝ୍ | ଝଂ | ଝଃ |
| <i>ṅ</i> | ଞ | ଞା | ଞି | ଞୀ | ଞୁ | ଞୁ | ଞୁ | ଞେ | ଞୈ | ଞୋ | ଞୌ | ଞ୍ | ଞଂ | ଞଃ |
| <i>t</i> | ଟ | ଟା | ଟି | ଟୀ | ଟୁ | ଟୁ | ଟୁ | ଟେ | ଟୈ | ଟୋ | ଟୌ | ଟ୍ | ଟଂ | ଟଃ |
| <i>th</i> | ଠ | ଠା | ଠି | ଠୀ | ଠୁ | ଠୁ | ଠୁ | ଠେ | ଠୈ | ଠୋ | ଠୌ | ଠ୍ | ଠଂ | ଠଃ |
| <i>d</i> | ଡ | ଡା | ଡି | ଡୀ | ଡୁ | ଡୁ | ଡୁ | ଡେ | ଡୈ | ଡୋ | ଡୌ | ଡ୍ | ଡଂ | ଡଃ |
| <i>dh</i> | ଢ | ଢା | ଢି | ଢୀ | ଢୁ | ଢୁ | ଢୁ | ଢେ | ଢୈ | ଢୋ | ଢୌ | ଢ୍ | ଢଂ | ଢଃ |
| <i>n</i> | ଣ | ଣା | ଣି | ଣୀ | ଣୁ | ଣୁ | ଣୁ | ଣେ | ଣୈ | ଣୋ | ଣୌ | ଣ୍ | ଣଂ | ଣଃ |
| <i>t</i> | ତ | ତା | ତି | ତୀ | ତୁ | ତୁ | ତୁ | ତେ | ତୈ | ତୋ | ତୌ | ତ୍ | ତଂ | ତଃ |
| <i>th</i> | ଥ | ଥା | ଥି | ଥୀ | ଥୁ | ଥୁ | ଥୁ | ଥେ | ଥୈ | ଥୋ | ଥୌ | ଥ୍ | ଥଂ | ଥଃ |
| <i>d</i> | ଦ | ଦା | ଦି | ଦୀ | ଦୁ | ଦୁ | ଦୁ | ଦେ | ଦୈ | ଦୋ | ଦୌ | ଦ୍ | ଦଂ | ଦଃ |
| <i>dh</i> | ଧ | ଧା | ଧି | ଧୀ | ଧୁ | ଧୁ | ଧୁ | ଧେ | ଧୈ | ଧୋ | ଧୌ | ଧ୍ | ଧଂ | ଧଃ |
| <i>n</i> | ନ | ନା | ନି | ନୀ | ନୁ | ନୁ | ନୁ | ନେ | ନୈ | ନୋ | ନୌ | ନ୍ | ନଂ | ନଃ |
| <i>p</i> | ପ | ପା | ପି | ପୀ | ପୁ | ପୁ | ପୁ | ପେ | ପୈ | ପୋ | ପୌ | ପ୍ | ପଂ | ପଃ |
| <i>ph</i> | ଫ | ଫା | ଫି | ଫୀ | ଫୁ | ଫୁ | ଫୁ | ଫେ | ଫୈ | ଫୋ | ଫୌ | ଫ୍ | ଫଂ | ଫଃ |
| <i>b</i> | ବ | ବା | ବି | ବୀ | ବୁ | ବୁ | ବୁ | ବେ | ବୈ | ବୋ | ବୌ | ବ୍ | ବଂ | ବଃ |
| <i>bh</i> | ଭ | ଭା | ଭି | ଭୀ | ଭୁ | ଭୁ | ଭୁ | ଭେ | ଭୈ | ଭୋ | ଭୌ | ଭ୍ | ଭଂ | ଭଃ |
| <i>m</i> | ମ | ମା | ମି | ମୀ | ମୁ | ମୁ | ମୁ | ମେ | ମୈ | ମୋ | ମୌ | ମ୍ | ମଂ | ମଃ |
| <i>y</i> | ୟ | ୟା | ୟି | ୟୀ | ୟୁ | ୟୁ | ୟୁ | ୟେ | ୟୈ | ୟୋ | ୟୌ | ୟ୍ | ୟଂ | ୟଃ |
| <i>ỵ</i> | ଯ | ଯା | ଯି | ଯୀ | ଯୁ | ଯୁ | ଯୁ | ଯେ | ଯୈ | ଯୋ | ଯୌ | ଯ୍ | ଯଂ | ଯଃ |
| <i>r</i> | ର | ରା | ରି | ରୀ | ରୁ | ରୁ | ରୁ | ରେ | ରୈ | ରୋ | ରୌ | ର୍ | ରଂ | ରଃ |
| <i>l</i> | ଲ | ଲା | ଲି | ଲୀ | ଲୁ | ଲୁ | ଲୁ | ଲେ | ଲୈ | ଲୋ | ଲୌ | ଲ୍ | ଲଂ | ଲଃ |
| <i>ś</i> | ଶ | ଶା | ଶି | ଶୀ | ଶୁ | ଶୁ | ଶୁ | ଶେ | ଶୈ | ଶୋ | ଶୌ | ଶ୍ | ଶଂ | ଶଃ |
| <i>ṣ</i> | ଷ | ଷା | ଷି | ଷୀ | ଷୁ | ଷୁ | ଷୁ | ଷେ | ଷୈ | ଷୋ | ଷୌ | ଷ୍ | ଷଂ | ଷଃ |
| <i>s</i> | ସ | ସା | ସି | ସୀ | ସୁ | ସୁ | ସୁ | ସେ | ସୈ | ସୋ | ସୌ | ସ୍ | ସଂ | ସଃ |
| <i>h</i> | ହ | ହା | ହି | ହୀ | ହୁ | ହୁ | ହୁ | ହେ | ହୈ | ହୋ | ହୌ | ହ୍ | ହଂ | ହଃ |
| <i>l̥</i> | ଳ | ଳା | ଳି | ଳୀ | ଳୁ | ଳୁ | ଳୁ | ଳେ | ଳୈ | ଳୋ | ଳୌ | ଳ୍ | ଳଂ | ଳଃ |
| | ଠ | ଠା | ଠି | ଠୀ | ଠୁ | ଠୁ | ଠୁ | ଠେ | ଠୈ | ଠୋ | ଠୌ | ଠ୍ | ଠଂ | ଠଃ |

6.1 combinations of vowel signs, reph and candrabindu

When vowel signs, reph and candrabindu appear together, the following ligatures are used.

ୈଁ ୈଁ େଁ େଁଁ େଁଁଁ େଁଁଁଁ େଁଁଁଁଁ

7 Table of Conjunct Consonants

The table below gives all the conjuncts included in the font.

| | | | | | | |
|------------|---|----------|--------|---|--------|------|
| କ୍ + କ୍ | = | କ୍ | କ୍ + ଚ | = | କ୍ | dba |
| କ୍ + ଚ | = | କ୍ | କ୍ + ଉ | = | କ୍ | dbha |
| କ୍ + ଚ | = | କ୍ | କ୍ + ଗ | = | କ୍ | dma |
| କ୍ + ଚ | = | କ୍ or କ୍ | କ୍ + ଘ | = | କ୍ | dhya |
| କ୍ + କ୍ | = | କ୍ | କ୍ + ଙ | = | କ୍ | dhva |
| କ୍ + ଚ | = | କ୍ | କ୍ + ଟ | = | କ୍ | nta |
| କ୍ + ଛ | = | କ୍ | କ୍ + ଡ | = | କ୍ + ଡ | ntya |
| କ୍ + ଛ + ଶ | = | କ୍ | କ୍ + ଢ | = | କ୍ | ntra |
| କ୍ + ଢ | = | କ୍ | କ୍ + ଣ | = | କ୍ | ntha |
| କ୍ + ଣ | = | କ୍ | କ୍ + ଂ | = | କ୍ | nda |
| କ୍ + ଂ | = | କ୍ | କ୍ + ଃ | = | କ୍ | ndha |
| କ୍ + ଃ | = | କ୍ | କ୍ + ଌ | = | କ୍ | nna |
| କ୍ + ଌ | = | କ୍ | କ୍ + ୌ | = | କ୍ | pya |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | bja |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | bda |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | bdha |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | bba |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | pta |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | psa |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | mpa |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | mpha |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | mba |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | mbha |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | mma |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | rṇṇa |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | rba |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | lka |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | lpa |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | lpha |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | lla |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | śca |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | ścha |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | śta |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | śna |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | śka |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | śta |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | śtha |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | ṣṇa |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | ṣpa |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | ṣpha |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | ska |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | skha |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | sta |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | stra |
| କ୍ + ୍ | = | କ୍ or କ୍ | କ୍ + ୌ | = | କ୍ | stha |
| କ୍ + ୌ | = | କ୍ or କ୍ | କ୍ + ୍ | = | କ୍ | spa |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | spha |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | hna |
| କ୍ + ୍ | = | କ୍ | କ୍ + ୌ | = | କ୍ | hma |
| କ୍ + ୌ | = | କ୍ | କ୍ + ୍ | = | କ୍ | hva |