

# **TIPA Manual**

**Version 1.3**

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PHONETICS is the **science** of speech-sounds.  
From a practical point of view it is the **art** of producing  
speech-sounds and recognizing them by ear.

(Henry Sweet, *A Primer of Phonetics*, 1906; Boldface by Sweet)

The non-roman letters of the International Phonetic Alphabet  
have been designed as far as possible to harmonise well with  
the roman letters. The Association does not recognise  
makeshift letters; It recognises only letters which have been  
carefully cut so as to be in harmony with the other letters.

(*The Principles of the International Phonetic Association*, 1949)

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# Chapter 1

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## Introduction

TIPA<sup>1</sup> is a system for processing IPA (International Phonetic Alphabet) symbols in L<sup>A</sup>T<sub>E</sub>X. It is based on TSIPA<sup>2</sup> but both METAFONT source codes and L<sup>A</sup>T<sub>E</sub>X macros have been thoroughly rewritten so it can be considered as a new system.

Among many features of TIPA, the following are the new features as compared with TSIPA or any other existing systems for processing IPA symbols.

- A new 256 character encoding for phonetic symbols ('T3'), which includes all the symbols and diacritics found in the recent versions of IPA and some non-IPA symbols.
- Complete support of L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>.
- A variety of font styles including roman, slanted, bold, bold extended, sans serif and typewriter.
- Easy input method in the IPA environment.
- Extended macros for accents and diacritics.<sup>3</sup>
- A flexible system of macros for 'tone letters'.
- An optional package (`vowel.sty`) for drawing vowel diagrams. This package can be used independently from the TIPA package.<sup>4</sup>
- A slightly modified set of fonts that go well when used with Times Roman and Helvetica fonts.

---

<sup>1</sup>TIPA stands for *T<sub>E</sub>X IPA* or *Tokyo IPA*. The primary ftp site in which the latest version of TIPA is placed is `ftp://tooyoo.L.u-tokyo.ac.jp/pub/TeX/tipa`, and also it is mirrored onto the directory `fonts/tipa` of the CTAN archives.

<sup>2</sup>TSIPA was made in 1992 by Kobayashi Hajime, Fukui Rei and Shirakawa Shun. It is available from a CTAN archive.

One problem with TSIPA was that symbols already included in OT1, T1 or Math fonts are excluded, because of the limitation of its 128 character encoding. As a result, a string of phonetic representation had to be often composed of symbols from different fonts, disabling the possibility of automatic inter-word kerning, and also too many symbols had to be realized as macros.

<sup>3</sup>These macros are now defined in a separate file called '`exaccent.sty`' in order for the authors of other packages to be able to make use of them. The idea of separating these macros from other ones was suggested by Frank Mittelbach.

<sup>4</sup>Documentation is also made separately in '`vowel.tex`' so that no further mention will be made here.

## 1.1 Installation

### 1.1.1 Basics

In a CTAN site or any other sites that have a copy of the TIPA package, the directory structure of TIPA looks as follows.

```
sty — containing *.sty, *.fd, *.def files.
mf  — containing METAFONT source files.
tfm — containing font metric files.
doc — containing document files.
dvips — containing tipa.map file.
type1 — containing PostScript type1 fonts.
```

If you are using a recent set of L<sup>A</sup>T<sub>E</sub>X2e distribution, all you need to do is basically only two things.

- Copy all the files in the **sty** directory into an appropriate place.
- Copy all the files in the **mf** directory into an appropriate place.

In the case of a popular Unix-like OS, the actual installation procedure will look like the following.

(`$texmf` stands for your T<sub>E</sub>X system directory; `/usr/local/share/texmf`, for example).

```
mkdir $texmf/tex/latex/tipa — create a directory for style files.
cp sty/* $texmf/tex/latex/tipa — copy all the files in sty.
mkdir $texmf/fonts/source/fkr — create a directory for
mkdir $texmf/fonts/source/fkr/tipa mf files.
cp mf/* $texmf/fonts/source/fkr/tipa — copy all the mf files.
mktexlsr — update the kpathsea database.
```

If you are using Windows or Mac, follow the equivalent steps: i.e., create a directory/folder for style files and copy the contents of the TIPA **sty** directory/folder; then, create a directory/folder for METAFONT source files and copy the contents of the TIPA **mf** directory/folder.

If you are going to run TIPA on the basis of **pk** files, all other things such as **tfm** files and **pk** files will be generated automatically. That's all for the installation.

You may optionally copy all the **tfm** files into an appropriate directory which T<sub>E</sub>X and device driver programs can find. This will save time for the automatic font generation.

```
mkdir $texmf/fonts/tfm/fkr
mkdir $texmf/fonts/tfm/fkr/tipa
cp tfm/* $texmf/fonts/tfm/fkr/tipa
```

If your T<sub>E</sub>X system is not equipped with the automatic font generation mechanism, you may have to create and install **pk** files by yourself. For example:

```
(generate pk font files; please ask someone how to do this.)
mkdir $texmf/fonts/pk/ljfour/fkr
mkdir $texmf/fonts/pk/ljfour/fkr/tipa
cp *pk $texmf/fonts/pk/ljfour/fkr/tipa
```



## 1.2. TIPA font families

### 1.1.2 Installing Type1 fonts

If you want to create a PDF document, you need to install Type1 fonts. First, copy the contents of the directories `dvips` and `type1` onto appropriate directories. For example:

```
cp dvips/tipa.map $texmf/dvips/config
mkdir $texmf/fonts/type1/fkr
mkdir $texmf/fonts/type1/fkr/tipa
cp type1/* $texmf/fonts/type1/fkr/tipa
mktexlsr — update the kpathsea database.
```

Then, edit config files for your device driver. In the case of `dvips`, edit `config.ps` and/or `config.pdf`, for example, and insert a line containing:

```
p +tipa.map
```

There are several ways to make PDF documents. The author of this document usually uses `dvips`. For example:

```
dvips -Ppdf tipaman
```

will produce `tipaman.ps`. In this case, `config.pdf` has to be modified as explained above. Then, by using Acrobat Distiller (this is not free software), you can convert it to a PDF file. Alternatively, you can use free software such as `dvipdfm`, `dvipdf`, `pdflatex`, and so on.

In the case of `pdflatex`, for example, you have to copy the file `tipa.map` onto the following directory.

```
$texmf/pdftex/config
```

Then, edit `pdftex.cfg` and insert a line containing:

```
map +tipa.map
```

## 1.2 TIPA font families

This version of TIPA includes two families of IPA fonts, `tipa` and `xipa`. The former family of fonts is for normal use with L<sup>A</sup>T<sub>E</sub>X, and the latter family is intended to be used with ‘`times.sty`’(PSNFSS). They all have the same T3 encoding as explained in the previous section.

- `tipa`

**Roman:** `tipa8`, `tipa9`, `tipa10`, `tipa12`, `tipa17`

**Slanted:** `tipas18`, `tipas19`, `tipas110`, `tipas112`

**Bold extended:** `tipabx8`, `tipabx9`, `tipabx10`, `tipabx12`

**Bold extended Slanted:** `tipabs10`

**Sans serif:** `tipass8`, `tipass9`, `tipass10`, `tipass12`, `tipass17`

**Sans serif Bold extended:** `tipasb10`

**Sans serif Slanted:** tipasi10

**Bold:** tipab10

**Typewriter Text:** tipatt8, tipatt9, tipatt10, tipatt12

**Typewriter Text Slanted:** tipats10

- xipa

**Roman:** xipa10

**Slanted:** xipas110

**Bold:** xipab10

**Bold Slanted:** xipabs10

**Sans serif Bold:** xipasb10

**Sans serif Slanted:** xipasi10

All these fonts are made by METAFONT, based on the Computer Modern font series. In the case of the xipa series, parameters are adjusted so as to look fine when used with Times Roman (in the cases of xipa10, xipas110, xipab10) and Helvetica (in the case of xipass10).

# Chapter 2

---

## TIPA Encoding

### 2.1 Selection of symbols

#### 2.1.1 IPA symbols

When the first version of TIPA (version 1.0) was released, the selection of IPA phonetic symbols was made based on the following works.

- *Phonetic Symbol Guide* (Pullum and Ladusaw, 1986).
- The official IPA charts of '49, '79, '89 and '93 versions.
- Articles published in the *JIPA*<sup>1</sup>, such as IPA (1989), IPA (1990), Esling and Gaylord (1993), IPA (1993), and so on.
- An unpublished paper by J. C. Wells: “Computer-coding the IPA: a proposed extension of SAMPA” (Wells, 1995).
- Popular textbooks on phonetics.

More specifically, this first version tried to incorporate all the symbols and diacritics defined in the '79, '89 and '93 versions of IPA and some non-IPA symbols. And in the case of the '49 version of IPA, as was described in the *Principles* (IPA, 1949), there were too many obsolete symbols and only those symbols that had had some popularity at least for some time or for some group of people were included.

Then, soon after the first release, several important works were published.

- The second edition of *Phonetic Symbol Guide* (Pullum and Ladusaw, 1996). (henceforth abbreviated as *PSG*.)
- The official IPA chart of '96 version.
- “Preview of the IPA Handbook” (IPA, 1995).
- *Handbook of the International Phonetic Association* (IPA, 1999). (henceforth abbreviated as *Handbook*.)

---

<sup>1</sup> *Journal of the International Phonetic Association*.

The differences between '93 and '96 versions of IPA are very few. However, the second edition of *PSG* contains much more symbols than before.

The current version of *tipa* (version 1.1) is a result of an effort to increase the number of symbols as much as possible and to cover almost all the symbols included in *PSG*. However, the 256 character encoding (see next section for detail) used in TIPA has been already filled with symbols assigned in the first release. Therefore, it was necessary to create a set of new auxiliary fonts to include new symbols, and the new set of fonts is now called **TIPX**.

It should be also noted that TIPA includes all the necessary elements of ‘tone letters’, enabling all the theoretically possible combinations of the tone letter system. This system was devised by Yuen-Ren Chao (Chao, 1933) and it is now admitted as an official way of representing tones in the recent publication of the International Phonetic Association.

But the treatment of tone letters is quite insufficient in that only a limited number of combinations is allowed. This is apparently due to the fact that there has been no ‘portable’ way of combining symbols that can be used across various computer environments. Therefore **T<sub>E</sub>X**’s productive system of macro is an ideal tool for handling a system like tone letters.

In the process of writing **METAFONT** source codes for TIPA phonetic symbols there have been many problems besides the one with the selection of symbols. One such problem was that sometimes the exact shape of a symbol was unclear. For example, the shapes of the symbols such as ɿ (Stretched C), and ʝ (Curly-tail J) differ according to sources. This is partly due to the fact that the IPA has been continuously revised for the past few decades, and partly due to the fact that different ways of computerizing phonetic symbols on different systems have resulted in a diversity of the shapes of phonetic symbols.

Although there is no definite answer to such a problem yet, it seems to me that it is a privilege of those working with **METAFONT** to have a systematic way of controlling the shapes of phonetic symbols.

### 2.1.2 Non-IPA symbols

Besides IPA symbols, TIPA also contains symbols that are useful for the following areas of phonetics and linguistics.

- Symbols used in the American phonetics. (e.g., æ, ɛ, ɒ, λ, etc.)
- Symbols used in the historical study of Indo-European languages. (e.g., ʙ, ɹ, ʌ, ɹ, ɹ, and accents such as ǎ, ě, etc.)
- Symbols used in the phonetic description of languages in East Asia. (e.g., ɿ, ʝ, ɿ, ʝ, etc.)
- Diacritics used in ‘ExtIPA Symbols for Disordered Speech’ (ICPLA, 1994) and ‘VoQS (Voice Quality Symbols)’ (Ball et al., 1994). (e.g., ǁ, ǂ, ǃ, etc.)

## 2.2. Encoding

|      | '0                                     | '1   | '2 | '3 | '4 | '5 | '6 | '7 |
|------|--|--|----|----|----|----|----|----|
| '00x | Accents and diacritics                 |  |    |    |    |    |    |    |
| '04x |  |  |    |    |    |    |    |    |
| '05x | Punctuation marks                      |  |    |    |    |    |    |    |
| '06x | Basic IPA symbols I (vowels)           |  |    |    |    |    |    |    |
| '07x |  |  |    |    |    |    |    |    |
| '10x | Basic IPA symbols II                   |  |    |    |    |    |    |    |
| '13x |  |  |    |    |    |    |    |    |
| '14x | Punct.                                 | Basic IPA symbols III<br>(lowercase letters) |    |    |    |    |    |    |
| '17x | Diacritics                             |  |    |    |    |    |    |    |
| '20x | Tone letters and other suprasegmentals |  |    |    |    |    |    |    |
| '23x |  |  |    |    |    |    |    |    |
| '24x | Old IPA, non-IPA symbols               |  |    |    |    |    |    |    |
| '27x |  |  |    |    |    |    |    |    |
| '30x | Extended IPA symbols                   |  |    |    |    |    |    |    |
| '33x |  |  |    |    |    |    |    |    |
| '34x | Basic IPA symbols IV                   |  |    |    |    |    |    |    |
| '37x |  |  |    |    |    |    |    |    |

Table 2.1: Layout of the T3 encoding

## 2.2 Encoding

The 256 character encoding of TIPA is now officially called the ‘T3’ encoding.<sup>2</sup> In deciding this new encoding, care is taken to harmonize with other existing encodings, especially with the T1 encoding. Also the easiness of inputting phonetic symbols is taken into consideration in such a way that frequently used symbols can be inputted with small number of keystrokes.

Table 2.1 shows the layout of the T3 encoding.

The basic structure of the encoding found in the first half of the table (character codes '000–'177) is based on normal text encodings (ASCII, OT1 and T1) in that sectioning of this area into several groups, such as the section for accents and diacritics, the section for punctuation marks, the section for numerals, and the sections for uppercase and lowercase letters, is basically the same with these encodings.

Note also that the T3 encoding contains not only phonetic symbols but also usual punctuation marks that are used with phonetic symbols, and in such

---

<sup>2</sup>In a discussion with the L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> team it was suggested that the 128 character encoding used in WSUIPA would be referred to as the OT3 encoding.

|              |   |   |   |   |   |   |   |   |   |
|--------------|---|---|---|---|---|---|---|---|---|
| <i>ASCII</i> | : | ; | " |   |   |   |   |   |   |
| <i>TIPA</i>  | : | ˙ | ˆ |   |   |   |   |   |   |
| <i>ASCII</i> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| <i>TIPA</i>  | ʉ | ɪ | ʌ | ɜ | ɥ | ɐ | ɒ | ɤ | ə |
| <i>ASCII</i> | @ | A | B | C | D | E | F | G | H |
| <i>TIPA</i>  | ə | ɑ | β | ɛ | ð | ɛ | φ | ɣ | ɦ |
| <i>ASCII</i> | J | K | L | M | N | O | P | Q | R |
| <i>TIPA</i>  | j | ɸ | ʌ | ɨ | ɨ | ɔ | ʔ | ʕ | ɾ |
| <i>ASCII</i> | T | U | V | W | X | Y | Z |   |   |
| <i>TIPA</i>  | θ | ʊ | ʊ | ʊ | χ | ɣ | ʒ |   |   |

Table 2.2: TIPA shortcut characters

cases the same codes are assigned as the normal text encodings. However, it is a matter of trade-off to decide which punctuation marks are to be included. For example ‘:’ and ‘;’ might have been preserved in T3 but in this case ‘:’ has been traditionally used as a substitute for the length mark ‘˙’ so that I decided to exclude ‘:’ in favor of the easiness of inputting the length mark by a single keystroke.

The encoding of the section for accents and diacritics is closely related to T1 in that the accents commonly included in T1 and T3 have the same encoding.

The sections for numerals and uppercase letters are filled with phonetic symbols that are used frequently in many languages, because numerals and uppercase letters are usually not used as phonetic symbols. Also, the assignments made here are used as the ‘shortcut characters’, which will be explained in section 3.2.1.

As for the section for uppercase letters in the usual text encoding, a series of discussion among the members of the `ling-tex` mailing list revealed that there seem to be a certain amount of consensus on what symbols are to be assigned to each code. For example, they were almost unanimous for the assignments such as ɑ for A, β for B, ð for D, ʃ for S, θ for T, etc. For more details, see table 2.2.

The encoding of the section for numerals was more difficult than the above case. One of the possibilities was to assign symbols based on the resemblance of shapes. One can easily think of assignments such as 3 for 3, 6 for 6, etc. But the resemblance of shape alone does not serve as a criteria for all the assignments. So I decided to assign basic vowel symbols to this section.<sup>3</sup> Fortunately the resemblance of shape is to some extent maintained as is shown in table 2.2.

The encoding of the section for lowercase letters poses no problem since they are all used as phonetic symbols. Only one symbol, namely ‘g’, needs some attention because its shape should be ‘g’, rather than ‘g’, as a phonetic symbol.<sup>4</sup>

The second half of the table (character codes ’200–’377) is divided into four sections. The first section is devoted to the elements of tone letters and other suprasegmental symbols.

Among the remaining three sections the last section ’340–’377 contains

<sup>3</sup>This idea was influenced by the above mentioned article by J. C. Wells (Wells, 1995).

<sup>4</sup>However, it was declared that these two symbols are equivalent in the most recent version of the IPA. Anyway, alternative shape ‘g’ is preserved in another section and can be used as `\textg`.

## 2.2. *Encoding*

more basic symbols than the other two sections. This is a result of assigning the same character codes as latin-1 (ISO8859-1) and T1 encodings to the symbols that are commonly included in TIPA, latin-1 and T1 encoded fonts.<sup>5</sup> These are the cases of æ, ø, œ, ç and þ. And within each section, symbols are arranged largely in alphabetical order.

For a table of the T3 encoding, see Appendix F.

---

<sup>5</sup>This is based on a suggestion by Jörg Knappen.





# Chapter 3

---

## Usage

### 3.1 Declaration of **TIPA** package

In order to use TIPA, first declare `tipa.sty` package at the preamble of a document.

```
\documentclass{article}
\usepackage{tipa}
```

If you want to use an additional set of phonetic symbols, declare `tipx.sty` after the declaration of `tipa.sty`.

```
\documentclass{article}
\usepackage{tipa}
\usepackage{tipx}
```

#### 3.1.1 Encoding options

The above declaration uses OT1 as the default text encoding. If you want to use TIPA symbols with T1, specify the option ‘T1’.

```
\documentclass{article}
\usepackage[T1]{tipa}
```

If you want to use a more complex form of encoding, declare the use of `fontenc` package by yourself and specify the option ‘`noenc`’. In this case the option ‘T3’, which represents the TIPA encoding, must be included as an option to the `fontenc` package. For example, if you want to use TIPA and the University Washington Cyrillic (OT2) with the T1 text encoding, the following command will do this.

```
\documentclass{article}
\usepackage[T3,OT2,T1]{fontenc}
\usepackage[noenc]{tipa}
```

By default, TIPA includes the `fontenc` package internally but the option `noenc` suppresses this.

### 3.1.2 Using TIPA with PSNFSS

In order to use TIPA with `times.sty`, declare the use of `times.sty` before declaring `tipa` packages.

```
\documentclass{article}
\usepackage{times}
\usepackage{tipa}
```

Font description files `t3ptm.fd` and `t3phv.fd` are automatically loaded by the above declaration.

This manual can be typeset with Times Roman and XIPA fonts by uncommenting a few lines that appear near the top of the file `tipaman.tex`.

### 3.1.3 Other options

TIPA can be extended by the options `tone`, `extra`.

If you want to use the optional package for ‘tone letters’, add ‘`tone`’ option to the `\usepackage` command that declares `tipa` package.

```
\usepackage[tone]{tipa}
```

And if you want to use diacritics for extIPA and VoQS, specify ‘`extra`’ option.

```
\usepackage[extra]{tipa}
```

Finally, there is one more option called ‘`safe`’, which is used to suppress definitions of some possibly ‘dangerous’ commands of TIPA.

```
\usepackage[safe]{tipa}
```

More specifically, the following commands are suppressed by declaring the `safe` option. Explanation on the function of each command will be given later.

- `\s` Equivalent to `\textsyllabic`; maybe harmless but too short for a control sequence name.
- `\*` Already defined in plain `TEX`; however, many consider its redefinition harmless.
- `\|`, `\:`, `\;`, `\!` Already defined in `LATEX`; these redefinitions are obviously the most dangerous ones. However, remedies are prepared even in ‘unsafe’ mode. There is a command called `\Vert` which has the same meaning as `\|` and can be used in ‘unsafe’ mode. For the remaining three commands, TIPA provides commands called `\tipamedspace`, `\tipathickspace` and `\tipanegthinspace` which retain the meanings of `\:`, `\;` and `\!`, respectively, even in the ‘unsafe mode’.

Despite the above ‘remedies’, you may sometimes want to use the above commands with their original names in the ‘unsafe’ mode. In such cases, a command called `\tipasafemode` can be used. For example:

### 3.2. Input commands for phonetic symbols

*Input:* `\textipa{[\\!b] [\\:r] [\\;B]}\quad\textipa{\\tipasafemode  
$ a\\:a\\quad b\\;b\\quad c\\!c\\quad\\! $}\\quad  
\\textipa{[\\!b] [\\:r] [\\;B] (back again!)}`

*Output:* [6] [ɹ] [B] a a b b æ || [6] [ɹ] [B] (back again!)

As is shown in this example, `\tipasafemode` must be used within a group. Otherwise, the meanings of TIPA's special macros are lost.

Finally, more than one options can be specified at the same time, by separating a comma. For example:

`\usepackage[tone,extra,safe]{tipa}`

## 3.2 Input commands for phonetic symbols

### 3.2.1 Ordinary phonetic symbols

TIPA phonetic symbols can be inputted by the following two ways.

- (1) Input macro names in the normal text environment.
- (2) Input macro names or *shortcut characters* within the following groups or environment.

- `\textipa{...}`<sup>1</sup>
- `{\tipaencoding ...}`
- `\begin{IPA} ... \end{IPA}`

(These groups and environment will be henceforth referred to as the *IPA environment*.)

A shortcut character refers to a single character that is assigned to a specific phonetic symbol and that can be directly inputted by an ordinary keyboard. In TIPA fonts, the character codes for numerals and uppercase letters in the normal ASCII encoding are assigned to such shortcut characters, because numerals and uppercase letters are usually not used as phonetic symbols. Additional shortcut characters for symbols such as æ, œ, ø may also be used if you are using a T1 encoded font and an appropriate input system for it.

The following pair of examples show the same phonetic transcription of an English word that are inputted by the above mentioned two input methods.

*Input 1:* `[\\textsecstress\\textepsilon kspl\\textschwa  
\\textprimstress ne\\textsci\\textesh\\textschwa n]`

*Output 1:* [ɛksplə'neɪʃən]

*Input 2:* `\textipa{["Eksp1@"neIS@n]}`

*Output 2:* [ɛksplə'neɪʃən]

---

<sup>1</sup>I personally prefer a slightly shorter name like `\ipa` rather than `\textipa` so that I usually put a command `\let\ipa\textipa` somewhere in my style file. However, this command was named after the general convention of L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>. The same can be said for all the symbol names beginning with `\text`.

| <i>Symbol name</i>  | <i>Macro name</i>           | <i>Symbol</i> |
|---------------------|-----------------------------|---------------|
| Turned A            | <code>\textturna</code>     | ɐ             |
| Glottal stop        | <code>\textglotstop</code>  | ʔ             |
| Right-tail D        | <code>\textrtaild</code>    | ɖ             |
| Small capital G     | <code>\textscg</code>       | ɡ             |
| Hooktop B           | <code>\texthtb</code>       | ɸ             |
| Curly-tail C        | <code>\textctc</code>       | ɕ             |
| Crossed H           | <code>\textcrh</code>       | ħ             |
| Old L-Yogh ligature | <code>\textOlyoghlig</code> | ȝ             |
| Beta                | <code>\textbeta</code>      | β             |

Table 3.1: Naming of TIPA symbols

It is apparent that inputting shortcut characters in the IPA environment is far easier than inputting lengthy symbol names in the normal text environment.

Moreover, although the outputs of the above examples look almost the same, they are *not* identical, exactly speaking. This is because in the IPA environment automatic kerning between neighboring symbols is enabled, as is illustrated by the following pair of examples.

*Input 1:* `v\textturnv w\textscg y\textturny [\textesh]`

*Output 1:* vɐv ɡaw yɐy [ʃ]

*Input 2:* `\textipa{v2v w\textscg yLy [S]}`

*Output 2:* vɐv ɡaw yɐy [ʃ]

In the next example, *Input 2* is far better than *Input 1*, for the same reason.

*Input 1:* `[\textipa{S}]`

*Output 1:* [ʃ]

*Input 2:* `\textipa{[S]}`

*Output 2:* [ʃ]

Therefore, it is recommended to use `\textipa` or other IPA environments as much as possible.

Table 2.2 shows most of the shortcut characters that can be used in the IPA environment, together with the corresponding characters in the ASCII encoding.

### 3.2.2 Naming of phonetic symbols

Every TIPA phonetic symbol has a unique symbol name, such as *Turned A*, *Hooktop B*, *Schwa*. Also each symbol has a corresponding macro name, such as `\textturna`, `\texthtb`, `\textschwa`. The naming was made based on the literature listed in section 2.1. Among them, *PSG* is particularly important because it gives several explicit principles on naming. As an example, the three terms ‘turned’, ‘inverted’ and ‘reversed’ are distinguished in the following way (p. xxvii):

**Turned** rotated by 180 degrees (e.g., t vs. ɿ)

### 3.2. Input commands for phonetic symbols

**Inverted** vertical mirror image (e.g.,  $\mathfrak{R}$  vs.  $\mathfrak{R}^\text{v}$ )  
**Reversed** horizontal mirror image (e.g.,  $\mathfrak{?}$  vs.  $\mathfrak{?}^\text{h}$ )

The name used as a control sequence is usually an abbreviated form of the corresponding symbol name with a prefix `\text`. The conventions used in the abbreviation can be summarized as follows.

- Suffixes and endings such as ‘-ive’, ‘-al’, ‘-ed’ are omitted.
- ‘right’, ‘left’ are abbreviated to `r`, `l` respectively.
- For ‘small capital’ symbols, prefix `sc` is added.
- A symbol with a hooktop is abbreviated as `ht...`
- A symbol with a curly-tail is abbreviated as `ct...`
- A ‘crossed’ symbol is abbreviated as `cr...`
- A ligature is abbreviated as `...lig`.
- For an old version of a symbol, prefix `0` is added.

Note that the prefix `0` (old) should be given in uppercase letter.

Table 3.1 shows some examples of correspondence between symbol names and control sequence names.

#### 3.2.3 Ligatures

Just like the symbols such as “, ”, –, —, fi, ff are realized as ligatures by inputting ‘, ’, --, ---, fi, ff in  $\text{\TeX}$ , two of the TIPA symbols, namely *Secondary Stress* and *Double Pipe*, and double quotation marks<sup>2</sup> can be inputted as ligatures in the IPA environment.

*Input:* `\textipa{" " | || ‘ ‘ ’ ’}`  
*Output:* ‘, | || “ ”

#### 3.2.4 Special macros `\*`, `\;`, `\:` and `\!`

TIPA defines `\*`, `\:`, `\;` and `\!` as special macros in order to easily input phonetic symbols that do not have a shortcut character explained above. Before explaining how to use these macros, it is necessary to note that these macros are primarily intended to be used by linguists who usually do not care about things in math mode. And they can be ‘dangerous’ in that they override existing  $\text{\LaTeX}$  commands used in the math mode. So if you want to preserve the original meaning of these commands, declare the option ‘safe’ at the preamble. (However, TIPA provides commands called `\tipamedspace`, `\tipathickspace` and `\tipanegthinspace`, having the same meanings as `\:`, `\;` and `\!`, respectively. These can be used even in ‘unsafe’ mode.)

The macro `\*` is used in three different ways. First, when this macro is followed by one of the letters f, k, r, t or w, it results in a turned symbol.<sup>3</sup>

<sup>2</sup>Although TIPA fonts do not include the symbols “ and ”, a negative value of kerning is automatically inserted between ‘ and ‘, ’ and ’, so that the same results can be obtained as in the case of the normal text font.

<sup>3</sup>This idea was pointed out by Jörg Knappen.

*Input:* `\textipa{\*f \*k \*r \*t \*w}`

*Output:* ʃ ɣ ɹ ɹ ʌ

Secondly, when this macro is followed by one of the letters j, n, h, l or z, it results in a frequently used symbol that otherwise has no easy way to input.

*Input:* `\textipa{\*j \*n \*h \*l \*z}`

*Output:* ʃ ɲ ɰ ɫ ʒ

Thirdly, when this macro is followed by letters other than the above cases, they are turned into the symbols of the default text font. This is useful in the IPA environment to select symbols temporarily from the normal text font.

*Input:* `\textipa{\*A d0g, \*B k\ae{ }t, ma\super{\*{214}}}`

*Output:* A dɔg, B kæt, ma<sup>214</sup>

The remaining macros `\;`, `\:` and `\!` are used to make small capital symbols, retroflex symbols, and implosives or clicks, respectively.

*Input:* `\textipa{\;B \;E \;A \;H \;L \;R}`

*Output:* B E A H L R

*Input:* `\textipa{\:d \:l \:n \:r \:s \:z}`

*Output:* ɖ ɭ ɳ ʂ ʐ

*Input:* `\textipa{\!b \!d \!g \!j \!G \!o}`

*Output:* ɓ ɗ ɡ ʄ ɠ ʘ

### 3.2.5 Punctuation marks

The following punctuation marks and text symbols that are normally included in the text encoding are also included in the T3 encoding so that they can be directly inputted in the IPA environment.

*Input:* `\textipa{! ' ( ) * + , - . / = ? [ ] ' }`

*Output:* ! ' ( ) \* + , - . / = ? [ ] ' }

All the other punctuation marks and text symbols that are not included in T3 need to be inputted with a prefix `\*` explained in the last section when they appear in the IPA environment.

*Input:* `\textipa{\*; \*: \*@ \*# \*$ \*& \*% \*{ \*}}`

*Output:* ; : @ # \$ & % { }

### 3.2. Input commands for phonetic symbols

| <i>Input in the normal<br/>text environment</i> | <i>Input in the IPA<br/>environment</i> | <i>Output</i> |
|---|---|---------------|
| <code>\'a</code>                                | <code>\'a</code>                        | á             |
| <code>\"a</code>                                | <code>\"a</code>                        | ä             |
| <code>\ a</code>                                | <code>\~a</code>                        | ã             |
| <code>\r{a}</code>                              | <code>\r{a}</code>                      | â             |
| <code>\textsyllabic{m}</code>                   | <code>\s{m}</code>                      | ṁ             |
| <code>\textsubumlaut{a}</code>                  | <code>\"*a</code>                       | ạ             |
| <code>\textsubtilde{a}</code>                   | <code>\~*a</code>                       | ẃ             |
| <code>\textsubring{a}</code>                    | <code>\r*a</code>                       | ȁ             |
| <code>\textdotacute{e}</code>                   | <code>\.'e</code>                       | ě             |
| <code>\textgravedot{e}</code>                   | <code>\'e</code>                        | ë             |
| <code>\textacutemacron{a}</code>                | <code>\'=a</code>                       | ǎ             |
| <code>\textcircumdot{a}</code>                  | <code>\^a</code>                        | â             |
| <code>\texttildedot{a}</code>                   | <code>\~a</code>                        | ã             |
| <code>\textbreve{a}</code>                      | <code>\u=a</code>                       | ă             |

Table 3.2: Examples of inputting accents and diacritics

#### 3.2.6 Accents and diacritics

Table 3.2 shows how to input accents and diacritics in TIPA with some examples. Here again, there are two kinds of input methods; one for the normal text environment, and the other for the IPA environment.

In the IPA environment, most of the accents and diacritics can be inputted more easily than in the normal text environment, especially in the cases of subscript symbols that are normally placed over a symbol and in the cases of combined accents, as shown in the table.

As can be seen by the above examples, most of the accents that are normally placed over a symbol can be placed under a symbol by adding an `*` to the corresponding accent command in the IPA environment.

The advantage of IPA environment is further exemplified by the all-purpose accent `\|`, which is used as a macro prefix to provide shortcut inputs for the diacritics that otherwise have to be inputted by lengthy macro names. Table 3.3 shows examples of such accents. Note that the macro `\|` is also ‘dangerous’ in that it has been already defined as a math symbol of L<sup>A</sup>T<sub>E</sub>X. So if you want to preserve the original meaning of this macro, declare ‘safe’ option at the preamble. (However, there is an alternative command called `\Vert` (originally defined in plain T<sub>E</sub>X) which has the same meaning as `\|` and can be used even if the `safe` option is not specified.)

Finally, examples of words with complex accents that are inputted in the IPA environment are shown below.

*Input:* `\textipa{*|\|c{k}\r*mt\'om *bhr\'=at\er}`  
*Output:* \*k̄mtóm \*bhrátēr

For a full list of accents and diacritics, see Appendix A.

| <i>Input in the normal<br/>text environment</i> | <i>Input in the IPA<br/>environment</i> | <i>Output</i>    |
|---|---|------------------|
| <code>\textsubbridge{t}</code>                  | <code>\l[t</code>                       | t <sub>˘</sub>   |
| <code>\textinvsubbridge{t}</code>               | <code>\l]t</code>                       | t <sub>˘˘</sub>  |
| <code>\textsublhalfring{a}</code>               | <code>\l(a</code>                       | a <sub>˘</sub>   |
| <code>\textsubrhalfring{a}</code>               | <code>\l)a</code>                       | a <sub>˘˘</sub>  |
| <code>\textroundcap{k}</code>                   | <code>\l c{k}</code>                    | k <sub>˘</sub>   |
| <code>\textsubplus{o}</code>                    | <code>\l+o</code>                       | o <sub>˘</sub>   |
| <code>\textraising{e}</code>                    | <code>\l'e</code>                       | e <sub>˘</sub>   |
| <code>\textlowering{e}</code>                   | <code>\l'e</code>                       | e <sub>˘˘</sub>  |
| <code>\textadvancing{o}</code>                  | <code>\l&lt;o</code>                    | o <sub>˘˘</sub>  |
| <code>\textretracting{a}</code>                 | <code>\l&gt;a</code>                    | a <sub>˘˘</sub>  |
| <code>\textovercross{e}</code>                  | <code>\l x{e}</code>                    | e <sub>˘˘˘</sub> |
| <code>\textsubw{k}</code>                       | <code>\l w{k}</code>                    | k <sub>˘˘</sub>  |
| <code>\textseagull{t}</code>                    | <code>\l m{t}</code>                    | t <sub>˘˘˘</sub> |

Table 3.3: Examples of the accent prefix `\l`

### 3.2.7 Superscript symbols

In the normal text environment, superscript symbols can be inputted by a L<sup>A</sup>T<sub>E</sub>X macro called `\textsuperscript`. This macro takes one argument which can be either a symbol or a string of symbols, and can be nested.

Since the name of this macro is too long, TIPA provides an abbreviated form of this macro called `\super`.

*Input 1:* `t\textsuperscript h k\textsuperscript w`  
`a\textsuperscript{bc}`  
`a\textsuperscript{b\textsuperscript{c}}`

*Output 1:* t<sup>h</sup> k<sup>w</sup> a<sup>bc</sup> a<sup>b<sup>c</sup></sup>

*Input 2:* `\textipa{t\super{h} k\super{w}`  
`a\super{bc} a\super{b\super{c}}}`

*Output 2:* t<sup>h</sup> k<sup>w</sup> a<sup>bc</sup> a<sup>b<sup>c</sup></sup>

(A quiz question: A careful reader may have noticed that the above *Output1* and *Output2* slightly differ. Explain the reason.)

These macros automatically select the correct size of superscript font no matter what size of text font is used.

### 3.2.8 Tone letters

TIPA provides a flexible system of macros for ‘tone letters’. A tone letter is represented by a macro called ‘`\tone`’, which takes one argument consisting of a string of numbers ranging from 1 to 5. These numbers denote pitch levels, 1 being the lowest and 5, the highest. Within this range, any combination is allowed and there is no limit in the length of combination.

As an example of the usage of the tone letter macro, the four tones of Chinese are shown below.



### 3.3. How easy is it to input phonetic symbols?

*Input:* \tone{55}ma ‘mother’, \tone{35}ma ‘hemp’,  
\tone{214}ma ‘horse’, \tone{51}ma ‘scold’

*Output:*   ma<sup>⌈</sup> “mother”, ma<sup>⌊</sup> “hemp”, ma<sup>⌋</sup> “horse”, ma<sup>⌈</sup> “scold”

The next example looks ridiculous but shows capabilities of the tone letter macro.

*Input:* \tone{15253545}

*Output:* 

\stone

In some languages, length distinctions accompany the tone letter description. In such cases a command called `\stone` can be used to represent a tone letter that is shorter than a usual one. The next example from Cantonese illustrates this (look at the examples for *entering tones*).

| <i>Tone name</i> | <i>Input</i>           | <i>Output</i> |
|------------------|------------------------|---------------|
| high level       | \tone{53} or \tone{55} | ˥ or ˥˥       |
| low level        | \tone{21} or \tone{22} | ˩ or ˩˩       |
| high rising      | \tone{35}              | ˥˩            |
| low rising       | \tone{24}              | ˩˥            |
| high departing   | \tone{44}              | ˥˨            |
| low departing    | \tone{33}              | ˩˨            |
| high entering    | \stone{55}             | ˥˥            |
| mid entering     | \stone{44}             | ˥˩            |
| low entering     | \stone{33}             | ˩˩            |

## \rtone

In some languages, the level/contour bars are placed at the right hand side of the vertical bar. In such cases a command called `\rtone` is used instead of `\tone`. The next example is from the Kyoto Japanese.

*Input:* `\textipa{[\rtone{11}a\rtone{53}me]}` ‘rain’

*Output:* [Laṽme] ‘rain’

### 3.3 How easy is it to input phonetic symbols?

Let us briefly estimate here how easy (or difficult) it is to input phonetic symbols with TIPA in terms of the number of keystrokes.

The following table shows statistics for all the phonetic symbols that appear in the '93 version of IPA chart (diacritics and symbols for suprasegmentals excluded). It is assumed here that each symbol is inputted within the IPA environment and the **safe** option is not specified.

| <i>keystrokes</i> | <i>number</i> | <i>examples</i>     |
|-------------------|---------------|---------------------|
| 1                 | 65            | a, b, ə, α, β, etc. |
| 2                 | 2             | ø,                  |
| 3                 | 30            | æ, t, v, 6, etc.    |
| 5                 | 1             | ç                   |
| more than 5       | 7             | ε, ʔ, ‡, w, etc.    |

| <i>Font style</i>      | <i>Input in the IPA environment</i>        | <i>Output</i> |
|------------------------|--|---------------|
| <i>Roman</i>           | <code>\textipa{f@"nEtIks}</code>           | fə'netɪks     |
| <i>Slanted</i>         | <code>\textipa{\slshape f@"nEtIks}</code>  | fə'netɪks     |
| or                     | <code>\textipa{\textsl{f@"nEtIks}}</code>  | fə'netɪks     |
| or                     | <code>\textsl{\textipa{f@"nEtIks}}</code>  | fə'netɪks     |
| <i>Bold extended</i>   | <code>\textipa{\bfseries f@"nEtIks}</code> | fə'netɪks     |
| or                     | <code>\textipa{\textbf{f@"nEtIks}}</code>  | fə'netɪks     |
| or                     | <code>\textbf{\textipa{f@"nEtIks}}</code>  | fə'netɪks     |
| <i>Sans serif</i>      | <code>\textipa{\sffamily f@"nEtIks}</code> | fə'netɪks     |
| or                     | <code>\textipa{\textsf{f@"nEtIks}}</code>  | fə'netɪks     |
| or                     | <code>\textsf{\textipa{f@"nEtIks}}</code>  | fə'netɪks     |
| <i>Typewriter Text</i> | <code>\textipa{\ttfamily f@"nEtIks}</code> | fə'netɪks     |
| or                     | <code>\textipa{\texttt{f@"nEtIks}}</code>  | fə'netɪks     |
| or                     | <code>\texttt{\textipa{f@"nEtIks}}</code>  | fə'netɪks     |

Table 3.4: Examples of font switching

As is shown in the table, about 92% of the symbols can be inputted within three keystrokes.

### 3.4 Changing font styles

This version of TIPA includes five styles of fonts, i.e., roman, slanted, bold, bold extended, sans serif and typewriter. These styles can be switched in much the same way as in the normal text fonts (see table 3.4).

The bold fonts are usually not used within the standard L<sup>A</sup>T<sub>E</sub>X class packages so that if you want to use them, it is necessary to use low-level font selection commands of L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>.

*Input:* `{\fontseries{b}\selectfont abcdefg \textipa{ABCDEFGF}}`  
*Output:* abcdefg αβϰδϵϕγ

Note also that slanting of TIPA symbols should correctly work even in the cases of nested accents and in the cases of symbols made up by macros.

*Input:* `\textsl{\textipa{\'\{"{\u*{e}}}}}`  
*Output:* é  
*Input:* `\textsl{\textdoublebaresh}`  
*Output:* ₣ (This symbol is composed by a macro.)

# Chapter 4

---

## Customizing TIPA

### 4.1 Internal commands

Some of the internal commands of TIPA are defined without the letter @ in order to allow a user to extend the capability of TIPA.

#### 4.1.1 \ipabar

Some TIPA symbols such as `\textbarb`  $\bar{\mathfrak{b}}$ , `\textcrtwo`  $\bar{\mathfrak{z}}$  are defined by using an internal macro command `\ipabar`. This command is useful when you want to make barred or crossed symbols not defined in TIPA.

This command requires the following five parameters to control the position and length of the bar.

- #1 the symbol to be barred
- #2 the height of the bar (in dimen)
- #3 bar width
- #4 left kern added to the bar
- #5 right kern added to the bar

Parameters #3, #4, #5 are to be given in a scaling factor to the width of the symbol, which is equal to 1 if the bar has the same width as the symbol in question. For example, the following command states a barred b ( $\bar{\mathfrak{b}}$ ) of which the bar position in the y-coordinate is `.5ex` and the width of the bar is slightly larger than that of the letter b.

```
% Barred B
\newcommand\textbarb{%
  \ipabar{\tipaencoding b}{.5ex}{1.1}{}{}}
```

Note that the parameters #4 and #5 can be left blank if the value is equal to 0.

And the next example declares a barred c ( $\bar{\mathfrak{c}}$ ) of which the bar width is a little more than half as large as the letter c and it has the same amount of kerning at the right.

```
% Barred C
\newcommand\textbarc{%
  \ipabar{\tipaencoding c}{.5ex}{.55}{}{.55}}
```

More complex examples with the `\tipabar` command are found in `T3enc.def`.

#### 4.1.2 `\tipaloweraccent`, `\tipaupperaccent`

These two commands are used in the definitions of TIPA accents and diacritics. They are special forms of the commands `\loweraccent` and `\upperaccent` that are defined in `exaccent.sty`. The difference between the commands with the prefix `tipa` and the ones without it is that the former commands select accents from a T3 encoded font while the latter ones do so from the current text font.

These commands take two parameters, the code of the accent (in decimal, octal or hexadecimal number) and the symbol to be accented, as shown below.

*Input:* `\tipaupperaccent{0}{a}`  
*Output:* à

Optionally, these commands can take an extra parameter to adjust the vertical position of the accent. Such an adjustment is sometimes necessary in the definition of a nested accent. The next example shows TIPA's definition of the 'Circumflex Dot Accent' (e.g., â).

```
% Circumflex Dot Accent
\newcommand\textcircumdot[1]{\tipaupperaccent[-.2ex]{2}%
  {\tipaupperaccent[-.1ex]{10}{#1}}}
```

This definition states that a dot accent is placed over a symbol thereby reducing the vertical distance between the symbol and the dot by `.1ex`, and a circumflex accent is placed over the dot and the distance between the two accents is reduced by `.2ex`.

If you want to make a combined accent not included in TIPA, you can do so fairly easily by using these two commands together with the optional parameter. For more examples of these commands, see `tipa.sty` and `extraipa.sty`.

#### 4.1.3 `\tipaLoweraccent`, `\tipaUpperaccent`

These two commands differ from the two commands explained above in that the first parameter should be a symbol (or any other thing, typically an `\hbox`), rather than the code of the accent. They are special cases of the commands `\Loweraccent` and `\Upperaccent` and the difference between the two pairs of commands is the same as before.

The next example makes a schwa an accent.

*Input:* `\tipaUpperaccent[.2ex]{%
 {\lower.8ex\hbox{\texttip{\super@}}}{a}}`  
*Output:* â

The next example is an interesting application of this command for the Middle High German (This macro and the example below are provided by Christian Folini and now included in `tipa.sty`).

```
\newcommand{\sup}[2]{\texttip{\tipaUpperaccent[.2ex]{%
  {\lower.8ex\hbox{\super{#2}}}{#1}}}
```

## 4.2. Manual Kerning

Und swer dc mit flis t<sup>o</sup>t, so stat das gelt und v̈och dū g<sup>u</sup>ter in destē  
bessere behabnüsse und behūgde. (1330 AD. Translation: And if  
this is done with diligence, the money and the affairs will be in  
better shape.)

In this example, t<sup>o</sup>t is inputted as `t\sup{s}{u}{o}t` and so on.

### 4.1.4 `\ipaclap`

This command is useful if you need to compose a new symbol by overlapping two symbols. This command is different from T<sub>E</sub>X's commands `\llap` and `\rlap` in that the alignment is made at the center of each symbol.

The next example shows how to make a Slashed B.

*Input:* `\ipaclap{\textipa{b}}{\textipa{/}}`

*Output:*  $\text{ɸ}$

## 4.2 Manual Kerning

The shapes of phonetic symbols are sometimes *nasty* in the sense that they can have a leftward or rightward protrusion that cannot be found in the case of normal text fonts. In such cases it is sometimes necessary to input kerning commands manually.

One way to do this is to prepare a set of kerning commands like the following:

```
\newcommand\K{\kern.05em} % small amount of kerning
\newcommand\KK{\kern.1em} % middle amount of kerning
\newcommand\KKK{\kern.2em} % big amount of kerning
```

And then to put these commands whenever necessary. For example:

*Input:* `\textipa{[\texttrhooke r]}`

*Output:*  $[\text{e}_\text{r}]$  — This is OK but

*Input:* `\textipa{[\texttrhooke]}`

*Output:*  $[\text{e}_]$  — this doesn't look good so that

*Input:* `\textipa{[\texttrhooke\KK]}`

*Output:*  $[\text{e}_]$  — manually fixed like this.



# Acknowledgments

First of all, many thanks are due to the co-authors of **TSIPA**, Kobayashi Hajime and Shirakawa Shun. Kobayashi Hajime was the main font designer of **TSIPA**. Shirakawa Shun worked very hard in deciding encoding, checking the shapes of symbols and writing the Japanese version of the document. **TIPA** was impossible without **TSIPA**.

I would like to thank also Jörg Knappen whose insightful comments greatly helped the development of **TIPA** in many ways. I was also helped and encouraged by Christina Thiele, Martin Haase, Kirk Sullivan and many other members of the **ling-tex** mailing list.

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After the first release, I also received useful comments from: Dominique Unruh, Peter Zimmermann, Rafael Laboissière, Yoshinari Fujino, Walter Schmidt, Dirk Janssen, Joachim Becker, Christian Folini, Conrado Badenas, Alexis Dimitriadis, John Frampton and probably from many others. I am very sorry that I haven't recorded all the names. Please let me know if your name is missing. I am also sorry that I sometimes have been unable to follow all the advice simply because of lack of time. Finally, Donna Erickson kindly read over the draft of the present version and corrected my English. All remaining errors are, of course, my own.





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# Appendix A

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## Annotated List of TIPA Symbols

For each symbol, a large scale image of the symbol is displayed with a frame. Within the frame, horizontal lines that indicate `x_height` and baseline are also shown. At the top left corner of a frame, a number indicating the octal code of the symbol is shown. In the case of a symbol from `tipx` fonts, the code number is underlined.

Next, the following information is shown at the right of each symbol in this order: (1) the name of the symbol, (2) explanation on its usage with some examples (for non-IPA usages, an asterisk is put at the beginning), (3) input method in typewriter style, and finally (4) sources or references.

Sometimes the input method is displayed in the form of *Input1: xxx, Input2: yyy*. In such cases *Input1* indicates the one used in the normal text environment and *Input2*, the one used in the IPA environment.

The following abbreviations are used in the examples of usage and explanations in the footnote.

*ExtIPA* = *ExtIPA Symbols for Disordered Speech*

*VoQS* = *Voice Quality Symbols*

*PSG* = *Phonetic Symbol Guide* (Pullum and Ladusaw, 1996)

*Handbook* = *Handbook of the International Phonetic Association* (IPA, 1999)

*Principles* = *Principles of the International Phonetic Association* (IPA, 1949)














*JIPA* = *Journal of the International Phonetic Association*

*IE* Indo-European

*OHG* Old High German

*OCS* Old Church Slavic
















## A.1 Vowels and Consonants

|      |   |  |
|------|---|--|
| '141 |    | Lower-case A <i>Usage:</i> open front unrounded vowel<br><i>Input:</i> a<br><i>Sources:</i> IPA '49–'96  |
| '040 |    | Right-hook A<br><i>Input:</i> \texttrhooka<br><i>Sources:</i> PSG  |
| '065 |    | Turned A <i>Usage:</i> near-open central vowel<br><i>Input1:</i> \textturna <i>Input2:</i> 5<br><i>Sources:</i> IPA '49–'96                    |
| '101 |    | Script A <i>Usage:</i> open back unrounded vowel<br><i>Input1:</i> \textscripta <i>Input2:</i> A<br><i>Sources:</i> IPA '49–'96                |
| '066 |    | Turned script A <i>Usage:</i> open back rounded vowel<br><i>Input1:</i> \textturnscripta <i>Input2:</i> 6<br><i>Sources:</i> IPA '49–'96       |
| '041 |   | Inverted script A<br><i>Input:</i> \textinvscripta<br><i>Sources:</i> PSG  |
| '346 |  | Ash <i>Usage:</i> near-open front unrounded vowel<br><i>Input:</i> \ae<br><i>Sources:</i> IPA '49–'96  |
| '042 |  | A-O ligature<br><i>Input:</i> \textao lig<br><i>Sources:</i> PSG   |
| '300 |  | Small capital A <sup>1</sup> <i>Usage:</i> *open central unrounded vowel<br><i>Input1:</i> \textsca <i>Input2:</i> \;A<br><i>Sources:</i> PSG  |
| '043 |  | Left-hook four<br><i>Input:</i> \textlhookfour<br><i>Sources:</i> PSG  |
| '160 |  | Inverted small capital A<br><i>Input:</i> \textinv sca<br><i>Sources:</i> PSG  |
| '161 |  | Small capital A-O ligature<br><i>Input:</i> \textscaolig<br><i>Sources:</i> PSG  |
| '062 |  | Turned V <sup>2</sup> <i>Usage:</i> open-mid back unrounded vowel<br><i>Input1:</i> \textturnv <i>Input2:</i> 2<br><i>Sources:</i> IPA '49–'96 |














<sup>1</sup>This symbol is fairly common among Chinese phoneticians.

<sup>2</sup>In a previous version of PSG this symbol was called 'Inverted V' but it was apparently a mistake.

## A.1. Vowels and Consonants

|       |   |   |
|-------|---|---|
| '162  |    | Small capital delta<br><i>Input:</i> <code>\textscdelta</code><br><i>Sources:</i> PSG   |
| '142  |    | Lower-case B <i>Usage:</i> voiced bilabial plosive<br><i>Input:</i> <code>b</code><br><i>Sources:</i> IPA '49–'96   |
| '240  |    | Crossed B<br><i>Input:</i> <code>\textcrb</code><br><i>Sources:</i> PSG   |
| Macro |    | Barred B<br><i>Input:</i> <code>\textbarb</code><br><i>Sources:</i> PSG   |
| '272  |    | Soft sign <i>Usage:</i> *as in OCS о҃нь 'fire'.<br><i>Input:</i> <code>\textsoftsign</code><br><i>Sources:</i> PSG  |
| '273  |    | Hard sign <i>Usage:</i> *as in OCS градѣ 'town'.<br><i>Input:</i> <code>\texthardsign</code><br><i>Sources:</i> PSG   |
| '341  |   | Hooktop B <i>Usage:</i> voiced bilabial implosive<br><i>Input1:</i> <code>\texthtb</code> <i>Input2:</i> <code>\!b</code><br><i>Sources:</i> IPA '49–'96            |
| '340  |  | Small capital B <i>Usage:</i> voiced bilabial trill<br><i>Input1:</i> <code>\textscb</code> <i>Input2:</i> <code>\;B</code><br><i>Sources:</i> IPA '89–'96          |
| '102  |  | Beta <i>Usage:</i> voiced bilabial fricative<br><i>Input1:</i> <code>\textbeta</code> <i>Input2:</i> <code>B</code><br><i>Sources:</i> IPA '49–'96                  |
| '143  |  | Lower-case C <i>Usage:</i> voiceless palatal plosive<br><i>Input:</i> <code>c</code><br><i>Sources:</i> IPA '49–'96   |
| Macro |  | Barred C<br><i>Input:</i> <code>\textbarc</code><br><i>Sources:</i> PSG   |
| Macro |  | Wedge C <i>Usage:</i> *equivalent to IPA tʃ<br><i>Input:</i> <code>\v{c}</code><br><i>Sources:</i> PSG  |
| '347  |  | C Cedilla <i>Usage:</i> voiceless palatal fricative<br><i>Input:</i> <code>\c{c}</code><br><i>Sources:</i> IPA '49–'96  |
| '301  |  | Hooktop C <i>Usage:</i> voiceless palatal implosive<br><i>Input:</i> <code>\texthtc</code><br><i>Sources:</i> IPA '89   |
| '103  |  | Curly-tail C <i>Usage:</i> voiceless alveolo-palatal fricative<br><i>Input1:</i> <code>\textctc</code> <i>Input2:</i> <code>C</code><br><i>Sources:</i> IPA '49–'96 |
















Appendix A. Annotated List of TIPA Symbols

|       |   |  |
|-------|---|--|
| '302  |    | Stretched C <sup>3</sup> <i>Usage:</i> postalveolar click<br><i>Input:</i> <code>\textstretchc</code><br><i>Sources:</i> IPA '49, '79                              |
| '044  |    | Stretched C (original form)<br><i>Input:</i> <code>\textstretchcvar</code><br><i>Sources:</i> Beach (1938)   |
| '045  |    | Curly-tail stretched C<br><i>Input:</i> <code>\textctstretchc</code><br><i>Sources:</i> PSG  |
| '046  |    | Curly-tail stretched C (original form)<br><i>Input:</i> <code>\textctstretchcvar</code><br><i>Sources:</i> Beach (1938)  |
| '144  |    | Lower-case D <i>Usage:</i> voiced dental or alveolar plosive<br><i>Input:</i> <code>d</code><br><i>Sources:</i> IPA '49–'96  |
| '241  |    | Crossed D<br><i>Input:</i> <code>\textcrd</code><br><i>Sources:</i> PSG  |
| Macro |   | Barred D<br><i>Input:</i> <code>\textbard</code><br><i>Sources:</i> PSG  |
| '047  |  | Front-hook D<br><i>Input:</i> <code>\textfrhookd</code><br><i>Sources:</i> PSG   |
| '050  |  | Front-hook D (Original) <sup>4</sup><br><i>Input:</i> <code>\textfrhookdvar</code><br><i>Sources:</i>  |
| '342  |  | Hooktop D <i>Usage:</i> voiced dental or alveolar implosive<br><i>Input1:</i> <code>\texthtd</code> <i>Input2:</i> <code>\!d</code><br><i>Sources:</i> IPA '49–'96 |
| '343  |  | Right-tail D <i>Usage:</i> voiced retroflex plosive<br><i>Input1:</i> <code>\texttrtaild</code> <i>Input2:</i> <code>\:d</code><br><i>Sources:</i> IPA '49–'96     |
| '243  |  | Hooktop right-tail D <i>Usage:</i> voiced retroflex implosive<br><i>Input:</i> <code>\texthtrtaild</code><br><i>Sources:</i> PSG, Handbook                         |
| '242  |  | Curly-tail D <i>Usage:</i> *voiced alveolo-palatal plosive<br><i>Input:</i> <code>\textctd</code><br><i>Sources:</i>   |















<sup>3</sup>The shape of this symbol differs according to the sources. In *PSG* and recent articles in *JIPA*, it is 'stretched' toward both the ascender and descender regions and the whole shape looks like a thick staple. In the old days, however, it was stretched only toward the descender and the whole shape looked more like a stretched c, as is shown in the next item (original form).

<sup>4</sup>This shape is used by Jones (1973).

## A.1. Vowels and Consonants

|       |   |  |
|-------|---|--|
| '051  |    | D-B ligature<br><i>Input:</i> <code>\textdblig</code><br><i>Sources:</i> PSG   |
| Macro |    | D-Z ligature<br><i>Input:</i> <code>\textdzlig</code><br><i>Sources:</i> PSG   |
| Macro |    | D-Curly-tail Z ligature<br><i>Input:</i> <code>\textdctzlig</code><br><i>Sources:</i>  |
| '303  |    | D-Yogh ligature <i>Usage:</i> voiced postalveolar affricate<br><i>Input:</i> <code>\textdyoghlig</code><br><i>Sources:</i> IPA '49-'96                         |
| Macro |    | Curly-tail D-Curly-tail Z ligature<br><i>Input:</i> <code>\textctdctzlig</code><br><i>Sources:</i>   |
| '104  |    | Eth <i>Usage:</i> voiced dental fricative<br><i>Input1:</i> <code>\dh</code> <i>Input2:</i> D<br><i>Sources:</i> IPA '49-'96                                   |
| '145  |   | Lower-case E <i>Usage:</i> close-mid front unrounded vowel<br><i>Input:</i> e<br><i>Sources:</i> IPA '49-'96   |
| '052  |  | Right-hook E<br><i>Input:</i> <code>\textrhooke</code><br><i>Sources:</i> PSG  |
| '100  |  | Schwa <i>Usage:</i> mid central vowel<br><i>Input1:</i> <code>\textschwa</code> <i>Input2:</i> @<br><i>Sources:</i> IPA '49-'96                                |
| '304  |  | Right-hook schwa <i>Usage:</i> r-colored ə<br><i>Input:</i> <code>\textrhookschwa</code><br><i>Sources:</i> IPA '49, '79                                       |
| '071  |  | Reversed E <i>Usage:</i> close-mid central unrounded vowel<br><i>Input1:</i> <code>\textreve</code> <i>Input2:</i> 9<br><i>Sources:</i> IPA '49-'96            |
| '244  |  | Small capital E<br><i>Input1:</i> <code>\textsce</code> <i>Input2:</i> \;E<br><i>Sources:</i> PSG  |
| '105  |  | Epsilon <i>Usage:</i> open-mid front unrounded vowel<br><i>Input1:</i> <code>\textepsilon</code> <i>Input2:</i> E<br><i>Sources:</i> IPA '49-'96               |
| '053  |  | Right-hook epsilon<br><i>Input:</i> <code>\textrhookepsilon</code><br><i>Sources:</i> PSG  |
| '305  |  | Closed epsilon <sup>5</sup> <i>Usage:</i> (obsolete) open-mid central rounded vowel<br><i>Input:</i> <code>\textcloseepsilon</code><br><i>Sources:</i> IPA '93 |

## Appendix A. Annotated List of TIPA Symbols















|       |   |  |
|-------|---|--|
| '063  |    | Reversed epsilon <i>Usage:</i> open-mid central unrounded vowel<br><i>Input1:</i> <code>\textrevepsilon</code> <i>Input2:</i> 3<br><i>Sources:</i> IPA '49–'96   |
| '307  |    | Right-hook reversed epsilon <i>Usage:</i> r colored ɜ<br><i>Input:</i> <code>\textrhoekrevepsilon</code><br><i>Sources:</i> PSG                                  |
| '306  |    | Closed reversed epsilon <sup>6</sup> <i>Usage:</i> open-mid central rounded vowel<br><i>Input:</i> <code>\textcloserevepsilon</code><br><i>Sources:</i> Handbook |
| '146  |    | Lower-case F <i>Usage:</i> voiceless labiodental fricative<br><i>Input:</i> f<br><i>Sources:</i> IPA '49–'96   |
| '163  |    | Small capital F<br><i>Input:</i> <code>\textscf</code><br><i>Sources:</i> PSG  |
| '147  |    | Lower-case G <i>Usage:</i> voiced velar plosive<br><i>Input1:</i> <code>\textscriptg</code> <i>Input2:</i> g<br><i>Sources:</i> IPA '49–'96                      |
| Macro |   | Barred G<br><i>Input:</i> <code>\textbarg</code><br><i>Sources:</i> PSG  |
| Macro |  | Crossed G<br><i>Input:</i> <code>\textcrg</code><br><i>Sources:</i> PSG  |
| '344  |  | Hooktop G <i>Usage:</i> voiced velar implosive<br><i>Input1:</i> <code>\texthtg</code> <i>Input2:</i> \!g<br><i>Sources:</i> IPA '49–'96                         |
| '245  |  | Looptail G <i>Usage:</i> equivalent to g<br><i>Input1:</i> g <i>Input2:</i> <code>\textg</code><br><i>Sources:</i>   |
| '345  |  | Small capital G <i>Usage:</i> voiced uvular plosive<br><i>Input1:</i> <code>\textscg</code> <i>Input2:</i> \;G<br><i>Sources:</i> IPA '49–'96                    |
| '311  |  | Hooktop small capital G <i>Usage:</i> voiced uvular implosive<br><i>Input1:</i> <code>\texthtscg</code> <i>Input2:</i> \!G<br><i>Sources:</i> IPA '89–'96        |
| '107  |  | Gamma <i>Usage:</i> voiced velar fricative<br><i>Input1:</i> <code>\textgamma</code> <i>Input2:</i> G<br><i>Sources:</i> IPA '49–'96                             |
| '054  |  | Greek gamma <sup>7</sup><br><i>Input:</i> <code>\textgrgamma</code><br><i>Sources:</i> PSG   |

<sup>5</sup>In the 1993 version of IPA, this symbol was used as the symbol for the open-mid central rounded vowel. However, in the 1996 version, this symbol was replaced by Closed reversed epsilon, i.e., ɜ. In fact, it was a typographical error, as was announced in IPA (1995, p. 48).

<sup>6</sup>See the footnote above.














## A.1. Vowels and Consonants

|      |   |   |
|------|---|---|
| '055 |    | Front-tail gamma<br><i>Input:</i> <code>\textfrtailgamma</code><br><i>Sources:</i> <i>PSG</i>   |
| '056 |    | Back-tail gamma<br><i>Input:</i> <code>\textbktailgamma</code><br><i>Sources:</i> <i>PSG</i>  |
| '310 |    | Baby gamma <i>Usage:</i> (obsolete) close-mid back unrounded vowel<br><i>Input:</i> <code>\textbabygamma</code><br><i>Sources:</i> IPA '49, '79                     |
| '067 |    | Ram's horns <i>Usage:</i> close-mid back unrounded vowel<br><i>Input1:</i> <code>\textramshorns</code> <i>Input2:</i> 7<br><i>Sources:</i> IPA '89–'96              |
| '150 |    | Lower-case H <i>Usage:</i> voiceless glottal fricative<br><i>Input:</i> <code>h</code><br><i>Sources:</i> IPA '49–'96   |
| '377 |    | H-V ligature <i>Usage:</i> *as in <i>Gothic</i> has 'what'.<br><i>Input:</i> <code>\texthvlig</code><br><i>Sources:</i> <i>PSG</i>                                  |
| '350 |   | Crossed H <sup>8</sup> <i>Usage:</i> voiceless pharyngeal fricative<br><i>Input:</i> <code>\textcrh</code><br><i>Sources:</i> IPA '49–'96                           |
| '110 |  | Hooktop H <i>Usage:</i> voiced glottal fricative<br><i>Input1:</i> <code>\texthth</code> <i>Input2:</i> <code>H</code><br><i>Sources:</i> IPA '49–'96               |
| '057 |  | Right-tail hooktop H<br><i>Input:</i> <code>\textrtailhth</code><br><i>Sources:</i> <i>PSG</i>  |
| '060 |  | Heng<br><i>Input:</i> <code>\textheng</code><br><i>Sources:</i> <i>PSG</i>  |
| '312 |  | Hooktop heng <i>Usage:</i> simultaneous <i>f</i> and <i>x</i><br><i>Input:</i> <code>\texththeng</code><br><i>Sources:</i> IPA '49–'96                              |
| '064 |  | Turned H <i>Usage:</i> voiced labial-palatal approximant<br><i>Input1:</i> <code>\textturnh</code> <i>Input2:</i> 4<br><i>Sources:</i> IPA '49–'96                  |
| '313 |  | Small capital H <i>Usage:</i> voiceless epiglottal fricative<br><i>Input1:</i> <code>\textsch</code> <i>Input2:</i> <code>\;H</code><br><i>Sources:</i> IPA '89–'96 |
| '151 |  | Lower-case I <i>Usage:</i> close front unrounded vowel<br><i>Input:</i> <code>i</code><br><i>Sources:</i> IPA '49–'96   |

<sup>7</sup>It is not my intention to include all the Greek letters appearing in *PSG*. The reason for including this symbol is to assure typographical consistency with the next two symbols derived from Greek gamma.

<sup>8</sup>In *Handbook*, this symbol is called 'Barred H'.

## Appendix A. Annotated List of TIPA Symbols

|       |   |  |
|-------|---|--|
| '031  |    | Undotted I <i>Usage:</i> *used in Turkish orthography<br><i>Input:</i> \i<br><i>Sources:</i> PSG   |
| '061  |    | Barred I <i>Usage:</i> close central unrounded vowel<br><i>Input1:</i> \textbari <i>Input2:</i> 1<br><i>Sources:</i> IPA '49–'96               |
| '111  |    | Small capital I <i>Usage:</i> near-close near-front unrounded vowel<br><i>Input1:</i> \textsci <i>Input2:</i> I<br><i>Sources:</i> IPA '89–'96 |
| '314  |    | Iota <i>Usage:</i> (obsolete) near-close near-front unrounded vowel<br><i>Input:</i> \textiota<br><i>Sources:</i> IPA '49, '79                 |
| '061  |    | Left-hooktop I <sup>9</sup><br><i>Input:</i> \textlhti<br><i>Sources:</i>  |
| '246  |    | Left-hooktop Long I <sup>10</sup><br><i>Input:</i> \textlhtlongi<br><i>Sources:</i> PSG  |
| '247  |   | Viby I <sup>11</sup><br><i>Input:</i> \textvibyi<br><i>Sources:</i> PSG  |
| Macro |  | Raised Viby I<br><i>Input:</i> \textraisevibyi<br><i>Sources:</i>  |
| '152  |  | Lower-case J <i>Usage:</i> voiced palatal approximant<br><i>Input:</i> j<br><i>Sources:</i> IPA '49–'96  |
| '032  |  | Undotted J<br><i>Input:</i> \j<br><i>Sources:</i>  |
| '112  |  | Curly-tail J <sup>12</sup> <i>Usage:</i> voiced palatal fricative<br><i>Input1:</i> \textctj <i>Input2:</i> J<br><i>Sources:</i> IPA '89–'96   |















<sup>9</sup>This symbol is sometimes found instead of ɿ (next item) in textbooks of Chinese in Japan.

<sup>10</sup>The two symbols ɿ and ʝ are mainly used among Chinese linguists. These symbols are based on “det svenska landsmålsalfabetet” and introduced to China by Bernhard Karlgren. The original shapes of these symbols were in italic as was always the case with “det svenska landsmålsalfabetet”. It seems that the Chinese linguists who wanted to continue to use these symbols in IPA changed their shapes upright. PSG’s descriptions to the origin of these symbols are inaccurate.

<sup>11</sup>I call this symbol ‘Viby I’, based on the following description by Bernhard Karlgren: “Une voyelle très analogue à ɿ se rencontre dans certains dial. suédois; on l’appelle ‘i de Viby’.” (Karlgren, 1915–1926, p. 295)















<sup>12</sup>In the official IPA charts of '89 through '96, this symbol has a dish serif on top of the stem, rather than the normal sloped serif found in the letter j. I found no reason why it should have a dish serif here, so I changed it to a normal sloped serif. The official (?) IPA shape can be used by the \textctjvar command. (j)

## A.1. Vowels and Consonants

|       |   |   |
|-------|---|---|
| '062  |    | Curly-tail J (a variety found in 1996 IPA) <i>Usage:</i> same as the above<br><i>Input:</i> <code>\textctjvar</code><br><i>Sources:</i> IPA '89–'96   |
| Macro |    | Wedge J <i>Usage:</i> *equivalent to IPA dʒ<br><i>Input:</i> <code>\v{\j}</code><br><i>Sources:</i> PSG   |
| '351  |    | Barred dotless J <i>Usage:</i> voiced palatal plosive<br><i>Input:</i> <code>\textbardotlessj</code><br><i>Sources:</i> IPA '89–'96   |
| '315  |    | Old barred dotless J <i>Usage:</i> voiced palatal plosive<br><i>Input:</i> <code>\textObardotlessj</code><br><i>Sources:</i> IPA '49, '79   |
| '352  |    | Hooktop barred dotless J <sup>13</sup> <i>Usage:</i> voiced palatal implosive<br><i>Input1:</i> <code>\texthtbardotlessj</code> <i>Input2:</i> <code>\!j</code><br><i>Sources:</i> Handbook |
| '063  |    | Hooktop barred dotless J (a variety) <i>Usage:</i> same as the above<br><i>Input:</i> <code>\texthtbardotlessjvar</code><br><i>Sources:</i> IPA '89–'93, PSG                                |
| '250  |   | Small capital J<br><i>Input1:</i> <code>\textscj</code> <i>Input2:</i> <code>\;J</code><br><i>Sources:</i> PSG  |
| '153  |  | Lower-case K <i>Usage:</i> voiceless velar plosive<br><i>Input:</i> <code>k</code><br><i>Sources:</i> IPA '49–'96   |
| '316  |  | Hooktop K <i>Usage:</i> voiceless velar implosive<br><i>Input:</i> <code>\texthtk</code><br><i>Sources:</i> IPA '89   |
| '251  |  | Turned K<br><i>Input1:</i> <code>\textturnk</code> <i>Input2:</i> <code>\*k</code><br><i>Sources:</i> PSG   |
| '164  |  | Small capital K<br><i>Input:</i> <code>\textsck</code><br><i>Sources:</i> PSG   |
| '165  |  | Turned small capital K<br><i>Input:</i> <code>\textturnsck</code><br><i>Sources:</i> PSG  |
| '154  |  | Lower-case L <i>Usage:</i> alveolar lateral approximant<br><i>Input:</i> <code>l</code><br><i>Sources:</i> IPA '49–'96  |
| '353  |  | L with tilde<br><i>Input1:</i> <code>\textltilde</code> <i>Input2:</i> <code>\ ~l</code><br><i>Sources:</i> IPA '49–'96   |















<sup>13</sup>In PSG the shape of this symbol slightly differs. Here I followed the shape found in IPA '89–'96.

Appendix A. Annotated List of TIPA Symbols

|      |   |  |
|------|---|--|
| '252 |    | Barred L<br><i>Input:</i> <code>\textbarl</code><br><i>Sources:</i> PSG  |
| '354 |    | Belted L <i>Usage:</i> voiceless dental or alveolar lateral fricative<br><i>Input:</i> <code>\textbeltl</code><br><i>Sources:</i> IPA '49–'96                                |
| '355 |    | Right-tail L <i>Usage:</i> retroflex lateral approximant<br><i>Input1:</i> <code>\texttrtail</code> <i>Input2:</i> <code>\:l</code><br><i>Sources:</i> IPA '49–'96           |
| '320 |    | L-Yogh ligature <i>Usage:</i> voiced alveolar lateral fricative<br><i>Input:</i> <code>\textlyoghlig</code><br><i>Sources:</i> IPA '89–'96                                   |
| '255 |    | Old L-Yogh ligature <i>Usage:</i> voiced alveolar lateral fricative<br><i>Input:</i> <code>\textOlyoghlig</code><br><i>Sources:</i> IPA '49, '79                             |
| '111 |    | L-Fish-hook R ligature <i>Usage:</i> alveolar lateral flap<br><i>Input:</i> <code>\textlfishhookrlig</code><br><i>Sources:</i>   |
| '317 |   | Small capital L <i>Usage:</i> velar lateral approximant<br><i>Input1:</i> <code>\textscL</code> <i>Input2:</i> <code>\;L</code><br><i>Sources:</i> IPA '89–'96               |
| '166 |  | Reversed small capital L<br><i>Input:</i> <code>\textrevscL</code><br><i>Sources:</i> PSG  |
| '253 |  | Lambda<br><i>Input:</i> <code>\textlambda</code><br><i>Sources:</i> PSG  |
| '254 |  | Crossed lambda<br><i>Input:</i> <code>\textcrlambda</code><br><i>Sources:</i> PSG  |
| '155 |  | Lower-case M <i>Usage:</i> bilabial nasal<br><i>Input:</i> <code>m</code><br><i>Sources:</i> IPA '49–'96   |
| '115 |  | Left-tail M (at right) <sup>14</sup> <i>Usage:</i> labiodental nasal<br><i>Input1:</i> <code>\textltailm</code> <i>Input2:</i> <code>M</code><br><i>Sources:</i> IPA '49–'96 |
| '064 |  | H-M ligature<br><i>Input:</i> <code>\texthmlig</code><br><i>Sources:</i> PSG   |
| '127 |  | Turned M <i>Usage:</i> close back unrounded vowel<br><i>Input1:</i> <code>\textturnm</code> <i>Input2:</i> <code>W</code><br><i>Sources:</i> IPA '49–'96                     |

<sup>14</sup>PSG calls this symbol 'Meng'.















## A.1. Vowels and Consonants

|       |   |  |
|-------|---|--|
| '356  |    | Turned M, right leg <i>Usage:</i> voiced velar approximant<br><i>Input:</i> <code>\textturnmrleg</code><br><i>Sources:</i> IPA '79–'93               |
| '167  |    | Small capital M<br><i>Input:</i> <code>\textscm</code><br><i>Sources:</i> PSG  |
| '156  |    | Lower-case N <i>Usage:</i> dental or alveolar nasal<br><i>Input:</i> <code>n</code><br><i>Sources:</i> IPA '49–'96                                   |
| '065  |    | Front-bar N <sup>15</sup><br><i>Input:</i> <code>\textfrbarn</code><br><i>Sources:</i> PSG   |
| '066  |    | N, right leg <sup>16</sup><br><i>Input:</i> <code>\textnrleg</code><br><i>Sources:</i> IPA '49   |
| Macro |    | N with tilde<br><i>Input:</i> <code>\~n</code><br><i>Sources:</i> PSG  |
| '361  |   | Left-tail N (at left) <i>Usage:</i> palatal nasal<br><i>Input:</i> <code>\textltailn</code><br><i>Sources:</i> IPA '49–'96                           |
| '116  |  | Eng <i>Usage:</i> velar nasal<br><i>Input1:</i> <code>\ng</code> <i>Input2:</i> N<br><i>Sources:</i> IPA '49–'96                                     |
| '357  |  | Right-tail N <i>Usage:</i> retroflex nasal<br><i>Input1:</i> <code>\textrtailn</code> <i>Input2:</i> <code>\:n</code><br><i>Sources:</i> IPA '49–'96 |
| '256  |  | Curly-tail N <i>Usage:</i> *alveolo-palatal nasal<br><i>Input:</i> <code>\textctn</code><br><i>Sources:</i>  |
| '360  |  | Small capital N <i>Usage:</i> uvular nasal<br><i>Input1:</i> <code>\textscn</code> <i>Input2:</i> <code>\;N</code><br><i>Sources:</i> IPA '49–'96    |
| '157  |  | Lower-case O <i>Usage:</i> close-mid back rounded vowel<br><i>Input:</i> <code>o</code><br><i>Sources:</i> IPA '49–'96                               |
| '067  |  | Female sign<br><i>Input:</i> <code>\textfemale</code><br><i>Sources:</i> PSG   |
| '070  |  | Uncrossed female sign<br><i>Input:</i> <code>\textuncrfemale</code><br><i>Sources:</i> PSG   |

<sup>15</sup>This shape is based on *PSG* (p. 119). However, its original shape looks a little different. Here I simply followed the shape found in *PSG* because in its source (Trager, 1964) the shape of this symbol is unclear (typewritten, modified by handwriting).















<sup>16</sup>In *PSG*, this symbol is called 'Long-Leg N'.

Appendix A. Annotated List of TIPA Symbols

|      |   |  |
|------|---|--|
| '362 |    | Bull's eye <sup>17</sup> <i>Usage:</i> bilabial click<br><i>Input1:</i> <code>\textbullseye</code> <i>Input2:</i> <code>\!o</code><br><i>Sources:</i> IPA '93, '96           |
| '071 |    | Bull's eye (an old version) <i>Usage:</i> bilabial click<br><i>Input:</i> <code>\text0bullseye</code><br><i>Sources:</i> IPA '79, '89  |
| '070 |    | Barred O <i>Usage:</i> close-mid central rounded vowel<br><i>Input1:</i> <code>\textbaro</code> <i>Input2:</i> 8<br><i>Sources:</i> IPA '49–'96                              |
| '370 |    | Slashed O <i>Usage:</i> close-mid front rounded vowel<br><i>Input:</i> <code>\o</code><br><i>Sources:</i> IPA '49–'96  |
| '367 |    | O-E ligature <i>Usage:</i> open-mid front rounded vowel<br><i>Input:</i> <code>\oe</code><br><i>Sources:</i> IPA '49–'96   |
| '327 |    | Small capital O-E ligature <i>Usage:</i> open front rounded vowel<br><i>Input1:</i> <code>\textSCOelig</code> <i>Input2:</i> <code>\OE</code><br><i>Sources:</i> IPA '79–'96 |
| '117 |   | Open O <i>Usage:</i> open-mid back rounded vowel<br><i>Input1:</i> <code>\textopeno</code> <i>Input2:</i> 0<br><i>Sources:</i> IPA '49–'96                                   |
| '072 |  | Right-hook open O<br><i>Input:</i> <code>\textrhookopeno</code><br><i>Sources:</i> PSG   |
| '257 |  | Turned C (Open O)-E ligature<br><i>Input:</i> <code>\textturncelig</code><br><i>Sources:</i> PSG   |
| '260 |  | Omega<br><i>Input:</i> <code>\textomega</code><br><i>Sources:</i> PSG  |
| '073 |  | Inverted omega<br><i>Input:</i> <code>\textinvomega</code><br><i>Sources:</i> PSG  |
| '321 |  | Closed omega <i>Usage:</i> (obsolete) near-close near-back rounded vowel<br><i>Input:</i> <code>\textcloseomega</code><br><i>Sources:</i> IPA '49, '79                       |
| '261 |  | Small capital omega<br><i>Input:</i> <code>\textSCOmega</code><br><i>Sources:</i> PSG  |
| '160 |  | Lower-case P <i>Usage:</i> voiceless bilabial plosive<br><i>Input:</i> p<br><i>Sources:</i> IPA '49–'96  |
















<sup>17</sup>In PSG this name is spelled 'Bullseye'.

## A.1. Vowels and Consonants

|      |   |  |
|------|---|--|
| '322 |    | Hooktop P <i>Usage:</i> voiceless bilabial implosive<br><i>Input:</i> <code>\texthtp</code><br><i>Sources:</i> IPA '89   |
| '074 |    | Left-hook P<br><i>Input:</i> <code>\textlhookp</code><br><i>Sources:</i> PSG   |
| '170 |    | Small capital P<br><i>Input:</i> <code>\textscp</code><br><i>Sources:</i> PSG  |
| '337 |    | Wynn <i>Usage:</i> *labiovelar approximant<br><i>Input:</i> <code>\textwynn</code><br><i>Sources:</i> Old English  |
| '376 |    | Thorn <i>Usage:</i> *interdental fricative<br><i>Input1:</i> <code>\textthorn</code> <i>Input2:</i> <code>\th</code><br><i>Sources:</i> Old English                  |
| '120 |    | A variety of thorn (1)<br><i>Input:</i> <code>\textthornvari</code><br><i>Sources:</i> PSG   |
| '121 |   | A variety of thorn (2)<br><i>Input:</i> <code>\textthornvarii</code><br><i>Sources:</i> PSG  |
| '122 |  | A variety of thorn (3)<br><i>Input:</i> <code>\textthornvariii</code><br><i>Sources:</i> PSG   |
| '123 |  | A variety of thorn (4)<br><i>Input:</i> <code>\textthornvariv</code><br><i>Sources:</i> PSG  |
| '106 |  | Phi <i>Usage:</i> voiceless bilabial fricative<br><i>Input1:</i> <code>\textphi</code> <i>Input2:</i> <code>F</code><br><i>Sources:</i> IPA '49–'96                  |
| '161 |  | Lower-case Q <i>Usage:</i> voiceless uvular plosive<br><i>Input:</i> <code>q</code><br><i>Sources:</i> IPA '49–'96   |
| '323 |  | Hooktop Q <i>Usage:</i> voiceless uvular implosive<br><i>Input:</i> <code>\texthtq</code><br><i>Sources:</i> IPA '89   |
| '075 |  | Q-P ligature<br><i>Input:</i> <code>\textqplig</code><br><i>Sources:</i> PSG   |
| '171 |  | Small capital Q <sup>18</sup> <i>Usage:</i> *voiceless pharyngeal plosive<br><i>Input1:</i> <code>\textscq</code> <i>Input2:</i> <code>\;Q</code><br><i>Sources:</i> |
















<sup>18</sup>Suggested by Prof S. Tsuchida for Austronesian languages in Taiwan. In PSG 'Female Sign' and 'Uncrossed Female Sign'(pp. 110–111) are noted for pharyngeal stops, as proposed by Trager (1964). Also, I'm not sure about the difference between an epiglottal plosive and a pharyngeal stop.

Appendix A. Annotated List of TIPA Symbols















|       |   |  |
|-------|---|--|
| '162  |    | Lower-case R <i>Usage:</i> alveolar trill<br><i>Input:</i> <code>r</code><br><i>Sources:</i> IPA '49–'96   |
| '122  |    | Fish-hook R <i>Usage:</i> alveolar tap or flap<br><i>Input1:</i> <code>\textfishhookr</code> <i>Input2:</i> <code>R</code><br><i>Sources:</i> IPA '49–'96                    |
| '324  |    | Long-leg R <i>Usage:</i> alveolar fricative trill<br><i>Input:</i> <code>\textlonglegr</code><br><i>Sources:</i> IPA '49, '79  |
| '363  |    | Right-tail R <i>Usage:</i> retroflex tap or flap<br><i>Input1:</i> <code>\textrtailr</code> <i>Input2:</i> <code>\:r</code><br><i>Sources:</i> IPA '49–'96                   |
| '364  |    | Turned R <i>Usage:</i> alveolar approximant<br><i>Input1:</i> <code>\textturnr</code> <i>Input2:</i> <code>\*r</code><br><i>Sources:</i> IPA '49–'96                         |
| '365  |    | Turned R, right tail <i>Usage:</i> retroflex approximant<br><i>Input1:</i> <code>\textturnrrtail</code> <i>Input2:</i> <code>\:R</code><br><i>Sources:</i> IPA '49–'96       |
| '325  |   | Turned long-leg R <i>Usage:</i> alveolar lateral flap<br><i>Input:</i> <code>\textturnlonglegr</code><br><i>Sources:</i> IPA '49–'96   |
| '366  |  | Small capital R <i>Usage:</i> uvular trill<br><i>Input1:</i> <code>\textscr</code> <i>Input2:</i> <code>\;R</code><br><i>Sources:</i> IPA '49–'96                            |
| '172  |  | Reversed small capital R<br><i>Input:</i> <code>\textrevscr</code><br><i>Sources:</i> PSG  |
| '113  |  | Inverted small capital R <i>Usage:</i> voiced uvular fricative<br><i>Input1:</i> <code>\textinvscr</code> <i>Input2:</i> <code>K</code><br><i>Sources:</i> IPA '49–'96       |
| '163  |  | Lower-case S <i>Usage:</i> voiceless alveolar fricative<br><i>Input:</i> <code>s</code><br><i>Sources:</i> IPA '49–'96   |
| Macro |  | Wedge S <i>Usage:</i> *equivalent to IPA <code>ʃ</code><br><i>Input:</i> <code>\v{s}</code><br><i>Sources:</i> PSG   |
| '371  |  | Right-tail S (at left) <i>Usage:</i> voiceless retroflex fricative<br><i>Input1:</i> <code>\textrtails</code> <i>Input2:</i> <code>\:s</code><br><i>Sources:</i> IPA '49–'96 |
| '123  |  | Esh <i>Usage:</i> voiceless postalveolar fricative<br><i>Input1:</i> <code>\textesh</code> <i>Input2:</i> <code>S</code><br><i>Sources:</i> IPA '49–'96                      |
| Macro |  | Double-barred esh<br><i>Input:</i> <code>\textdoublebaresh</code><br><i>Sources:</i> Beach (1938), PSG   |



## A.1. Vowels and Consonants

|       |   |  |
|-------|---|--|
| '076  |    | Reversed esh with top loop<br><i>Input:</i> <code>\textlooptoprevesh</code><br><i>Sources:</i> IPA '49   |
| '262  |    | Curly-tail esh <i>Usage:</i> palatalized ʃ<br><i>Input:</i> <code>\textctesh</code><br><i>Sources:</i> IPA '49, '79  |
| '164  |    | Lower-case T <i>Usage:</i> voiceless dental or alveolar plosive<br><i>Input:</i> <code>t</code><br><i>Sources:</i> IPA '49–'96                                   |
| '077  |    | Front-hook T<br><i>Input:</i> <code>\textfrhookt</code><br><i>Sources:</i> PSG   |
| '263  |    | Left-hook T <i>Usage:</i> palatalized t<br><i>Input:</i> <code>\textlhookt</code><br><i>Sources:</i> PSG   |
| '372  |    | Right-tail T <i>Usage:</i> voiceless retroflex plosive<br><i>Input1:</i> <code>\textrtailt</code> <i>Input2:</i> <code>\:t</code><br><i>Sources:</i> IPA '49–'96 |
| '326  |   | Hooktop T <i>Usage:</i> voiceless dental or alveolar implosive<br><i>Input:</i> <code>\texthtt</code><br><i>Sources:</i> IPA '89                                 |
| '330  |  | Turned T <i>Usage:</i> dental click<br><i>Input1:</i> <code>\textturnt</code> <i>Input2:</i> <code>\*t</code><br><i>Sources:</i> IPA '49, '79                    |
| '100  |  | Curly-tail turned T<br><i>Input:</i> <code>\textctturnt</code><br><i>Sources:</i> Beach (1938), PSG  |
| '264  |  | Curly-tail T <i>Usage:</i> *voiceless alveolo-palatal plosive<br><i>Input:</i> <code>\textcctt</code><br><i>Sources:</i>   |
| Macro |  | T-Curly-tail C ligature<br><i>Input:</i> <code>\texttctclig</code><br><i>Sources:</i>  |
| Macro |  | Curly-tail T-Curly-tail C ligature<br><i>Input:</i> <code>\textcttctclig</code><br><i>Sources:</i>   |
| '265  |  | T-S ligature<br><i>Input:</i> <code>\texttslig</code><br><i>Sources:</i> IPA '49, '79  |
| '331  |  | T-Esh ligature <i>Usage:</i> voiceless postalveolar affricate<br><i>Input:</i> <code>\texttshlig</code><br><i>Sources:</i> IPA '49–'96                           |
| '124  |  | Theta <i>Usage:</i> voiceless dental fricative<br><i>Input1:</i> <code>\texttheta</code> <i>Input2:</i> <code>T</code><br><i>Sources:</i> IPA '49–'96            |















## Appendix A. Annotated List of TIPA Symbols

|      |   |  |
|------|---|--|
| '165 |    | Lower-case U <i>Usage:</i> close back rounded vowel<br><i>Input:</i> u<br><i>Sources:</i> IPA '49–'96  |
| '060 |    | Barred U <i>Usage:</i> close central rounded vowel<br><i>Input1:</i> \textbaru <i>Input2:</i> 0<br><i>Sources:</i> IPA '49–'96                     |
| '125 |    | Upsilon <i>Usage:</i> near-close near-back rounded vowel<br><i>Input1:</i> \textupsilon <i>Input2:</i> U<br><i>Sources:</i> IPA '89–'96            |
| '366 |    | Small capital U <i>Usage:</i> *equivalent to IPA ʊ<br><i>Input1:</i> \textscu <i>Input2:</i> \;U<br><i>Sources:</i> IPA '49–'96                    |
| '173 |    | Turned small capital U<br><i>Input:</i> \textturnscu<br><i>Sources:</i> PSG  |
| '166 |    | Lower-case V <i>Usage:</i> voiced labiodental fricative<br><i>Input:</i> v<br><i>Sources:</i> IPA '49–'96  |
| '126 |   | Script V <sup>19</sup> <i>Usage:</i> voiced labiodental approximant<br><i>Input1:</i> \textscriptv <i>Input2:</i> V<br><i>Sources:</i> IPA '49–'96 |
| '167 |  | Lower-case W <i>Usage:</i> voiced labio-velar approximant<br><i>Input:</i> w<br><i>Sources:</i> IPA '49–'96  |
| '373 |  | Turned W <i>Usage:</i> voiceless labio-velar fricative<br><i>Input1:</i> \textturnw <i>Input2:</i> \*w<br><i>Sources:</i> IPA '49–'96              |
| '170 |  | Lower-case X <i>Usage:</i> voiceless velar fricative<br><i>Input:</i> x<br><i>Sources:</i> IPA '49–'96   |
| '130 |  | Chi <i>Usage:</i> voiceless uvular fricative<br><i>Input1:</i> \textchi <i>Input2:</i> X<br><i>Sources:</i> IPA '49–'96                            |
| '171 |  | Lower-case Y <i>Usage:</i> close front rounded vowel<br><i>Input:</i> y<br><i>Sources:</i> IPA '49–'96   |
| '114 |  | Turned Y <i>Usage:</i> palatal lateral approximant<br><i>Input1:</i> \textturny <i>Input2:</i> L<br><i>Sources:</i> IPA '49–'96                    |
| '131 |  | Small capital Y <i>Usage:</i> near-close near-front rounded vowel<br><i>Input1:</i> \textscy <i>Input2:</i> Y<br><i>Sources:</i> IPA '49–'96       |

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<sup>19</sup>In *Handbook*, this symbols is called 'Cursive V'.

## A.1. Vowels and Consonants

|       |   |   |
|-------|---|---|
| '266  |    | Left-hooktop long Y <sup>20</sup><br><i>Input:</i> <code>\textlhtlongy</code><br><i>Sources:</i> PSG  |
| '267  |    | Viby Y <sup>21</sup><br><i>Input:</i> <code>\textvibyy</code><br><i>Sources:</i> PSG  |
| '172  |    | Lower-case Z <i>Usage:</i> voiced alveolar fricative<br><i>Input:</i> <code>z</code><br><i>Sources:</i> IPA '49–'96   |
| '336  |    | Comma-tail Z <i>Usage:</i> *as in <i>OHG</i> <i>ëzzan</i> 'to eat'.<br><i>Input:</i> <code>\textcommatailz</code><br><i>Sources:</i> OHG, PSG                   |
| Macro |    | Wedge Z <i>Usage:</i> *equivalent to IPA ʒ<br><i>Input:</i> <code>\v{z}</code><br><i>Sources:</i> PSG   |
| '375  |    | Curly-tail Z <i>Usage:</i> voiced alveolo-palatal fricative<br><i>Input:</i> <code>\textctz</code><br><i>Sources:</i> IPA '49–'96                               |
| '374  |   | Right-tail Z <i>Usage:</i> voiced retroflex fricative<br><i>Input1:</i> <code>\textrtailz</code> <i>Input2:</i> <code>\:z</code><br><i>Sources:</i> IPA '49–'96 |
| Macro |  | Crossed two<br><i>Input:</i> <code>\textcrtwo</code><br><i>Sources:</i> IPA '49   |
| '101  |  | Turned two<br><i>Input:</i> <code>\textturntwo</code><br><i>Sources:</i> IPA '49  |
| '132  |  | Yogh <sup>22</sup> <i>Usage:</i> voiced postalveolar fricative<br><i>Input1:</i> <code>\textyogh</code> <i>Input2:</i> Z<br><i>Sources:</i> IPA '49–'96         |
| '102  |  | Bent-tail yogh<br><i>Input:</i> <code>\textbenttailyogh</code><br><i>Sources:</i> IPA '49   |
| '270  |  | Curly-tail yogh <i>Usage:</i> palatalized ʒ<br><i>Input:</i> <code>\textctyogh</code><br><i>Sources:</i> IPA '49, '79   |
| '271  |  | Reversed yogh<br><i>Input:</i> <code>\textrevyogh</code><br><i>Sources:</i> PSG   |
| '103  |  | Turned three<br><i>Input:</i> <code>\textturnthree</code><br><i>Sources:</i> IPA '49  |

<sup>20</sup>See explanations in footnote 11.






<sup>21</sup>See explanations in footnote 11.

<sup>22</sup>In *Handbook*, this symbols is called 'Ezh'.









Appendix A. Annotated List of TIPA Symbols

|       |  |  |
|-------|--|--|
| '120  |  | Glottal stop <i>Usage:</i> glottal plosive<br><i>Input1:</i> \textglotstop <i>Input2:</i> P<br><i>Sources:</i> IPA '49–'96                         |
| '124  |  | A variety of glottal stop (1)<br><i>Input:</i> \textglotstopvari<br><i>Sources:</i> PSG  |
| '125  |  | A variety of glottal stop (2)<br><i>Input:</i> \textglotstopvarii<br><i>Sources:</i> PSG   |
| '126  |  | A variety of glottal stop (3)<br><i>Input:</i> \textglotstopvariii<br><i>Sources:</i> PSG  |
| '274  |  | Superscript glottal stop<br><i>Input:</i> \textraiseglotstop<br><i>Sources:</i>  |
| '334  |  | Barred glottal stop <i>Usage:</i> epiglottal plosive<br><i>Input:</i> \textbarglotstop<br><i>Sources:</i> IPA '89–'96                              |
| '333  |  | Inverted glottal stop <i>Usage:</i> alveolar lateral click<br><i>Input:</i> \textinvglotstop<br><i>Sources:</i> IPA '49, '79                       |
| Macro |  | Crossed inverted glottal stop<br><i>Input:</i> \textcrinvglotstop<br><i>Sources:</i> IPA '49   |
| '104  |  | Curly-tail inverted glottal stop<br><i>Input:</i> \textctinvglotstop<br><i>Sources:</i> Beach (1938), PSG  |
| '105  |  | Turned glottal stop (PSG 1996:211)<br><i>Input:</i> \textturnglotstop<br><i>Sources:</i> PSG   |
| '121  |  | Reversed glottal stop <i>Usage:</i> voiced pharyngeal fricative<br><i>Input1:</i> \textrevglotstop <i>Input2:</i> Q<br><i>Sources:</i> IPA '49–'96 |
| '335  |  | Barred reversed glottal stop <i>Usage:</i> voiced epiglottal fricative<br><i>Input:</i> \textbarrevglotstop<br><i>Sources:</i> IPA '89–'96         |
| '174  |  | Pipe <i>Usage:</i> dental click<br><i>Input1:</i> \textpipe <i>Input2:</i>  <br><i>Sources:</i> IPA '89–'96  |
| '106  |  | Pipe (a variety with no descender) <i>Usage:</i> dental click<br><i>Input:</i> \textpipevar<br><i>Sources:</i> PSG                                 |
| '175  |  | Double-barred pipe <i>Usage:</i> palatoalveolar click<br><i>Input:</i> \textdoublebarpipe<br><i>Sources:</i> IPA '89–'96                           |









## A.2. Suprasegmentals

|       |   |   |
|-------|---|---|
| '110  |  | Double-barred pipe (a variety with no descender) <i>Usage:</i> same as the above<br><i>Input:</i> <code>\textdoublebarpipevar</code><br><i>Sources:</i> PSG |
| Macro |  | Double-barred slash <i>Usage:</i> *a variant of ‡<br><i>Input:</i> <code>\textdoublebarslash</code><br><i>Sources:</i> PSG                                  |
| '177  |  | Double pipe <i>Usage:</i> alveolar lateral click<br><i>Input1:</i> <code>\textdoublepipe</code> <i>Input2:</i>   <br><i>Sources:</i> IPA '89-'96            |
| '107  |  | Double pipe (a variety with no descender) <i>Usage:</i> same as the above<br><i>Input:</i> <code>\textdoublepipevar</code><br><i>Sources:</i> PSG           |
| '041  |  | Exclamation point <i>Usage:</i> (post)alveolar click<br><i>Input:</i> !<br><i>Sources:</i> IPA '89-'96  |

## A.2 Suprasegmentals





|      |   |   |
|------|---|---|
| '042 |  | Vertical stroke (Superior) <i>Usage:</i> primary stress<br><i>Input1:</i> <code>\textprimstress</code> <i>Input2:</i> "<br><i>Sources:</i> IPA '49-'96                      |
| '177 |  | Vertical stroke (Inferior) <i>Usage:</i> secondary stress<br><i>Input1:</i> <code>\textsecstress</code> <i>Input2:</i> ""<br><i>Sources:</i> IPA '49-'96                    |
| '072 |  | Length mark <i>Usage:</i> long<br><i>Input1:</i> <code>\textlengthmark</code> <i>Input2:</i> :<br><i>Sources:</i> IPA '49-'96   |
| '073 |  | Half-length mark <i>Usage:</i> half-long<br><i>Input1:</i> <code>\texthalflength</code> <i>Input2:</i> ;<br><i>Sources:</i> IPA '49-'96                                     |
| '222 |  | Vertical line <i>Usage:</i> minor (foot) group<br><i>Input:</i> <code>\textvertline</code><br><i>Sources:</i> IPA '89-'96   |
| '223 |  | Double vertical line <i>Usage:</i> major (intonation) group<br><i>Input:</i> <code>\textdoublevertline</code><br><i>Sources:</i> IPA '89-'96                                |
| '074 |  | Bottom tie bar <i>Usage:</i> linking (absence of a break)<br><i>Input1:</i> <code>\textbottomtiebar</code> <i>Input2:</i> <code>\t*{}</code><br><i>Sources:</i> IPA '89-'96 |
| '224 |  | Down arrow <sup>23</sup> <i>Usage:</i> downstep<br><i>Input:</i> <code>\textdownstep</code><br><i>Sources:</i> IPA '89-'96  |

## Appendix A. Annotated List of TIPA Symbols

|      |   |  |
|------|---|--|
| '225 |    | Up arrow <i>Usage:</i> upstep<br><i>Input:</i> <code>\textupstep</code><br><i>Sources:</i> IPA '89–'96                                       |
| '226 |    | Downward diagonal arrow <i>Usage:</i> global fall<br><i>Input:</i> <code>\textglobfall</code><br><i>Sources:</i> IPA '89–'96                 |
| '227 |    | Upward diagonal arrow <i>Usage:</i> global rise<br><i>Input:</i> <code>\textglobrise</code><br><i>Sources:</i> IPA '89–'96                   |
| '005 |    | Superscript left arrow<br><i>Input:</i> <code>\textspleftarrow</code><br><i>Sources:</i> PSG, p. 243   |
| '007 |    | Down full arrow <i>Usage:</i> ingressive airflow<br><i>Input:</i> <code>\textdownfullarrow</code><br><i>Sources:</i> ExtIPA, <i>Handbook</i> |
| '010 |    | Up full arrow <i>Usage:</i> egressive airflow<br><i>Input:</i> <code>\textupfullarrow</code><br><i>Sources:</i> ExtIPA, <i>Handbook</i>      |
| '011 |   | Subscript right arrow <i>Usage:</i> sliding articulation<br><i>Input:</i> <code>\textsubrightarrow</code><br><i>Sources:</i> ExtIPA          |
| '012 |  | Subscript double arrow <i>Usage:</i> labial spreading<br><i>Input:</i> <code>\textsubdoublearrow</code><br><i>Sources:</i> ExtIPA            |

### A.2.1 Tone letters







The tones illustrated here are only a representative sample of what is possible. For more details see section 3.2.8.

|       |   |  |
|-------|---|--|
| Macro |  | Extra high tone<br><i>Input:</i> <code>\tone{55}</code><br><i>Sources:</i> IPA '89–'96 |
| Macro |  | High tone<br><i>Input:</i> <code>\tone{44}</code><br><i>Sources:</i> IPA '89–'96       |
| Macro |  | Mid tone<br><i>Input:</i> <code>\tone{33}</code><br><i>Sources:</i> IPA '89–'96        |
| Macro |  | Low tone<br><i>Input:</i> <code>\tone{22}</code><br><i>Sources:</i> IPA '89–'96        |

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



<sup>23</sup>The shapes of `\textdownstep` and `\textupstep` differ according to sources. Here I followed the shapes found in the recent IPA charts.

### A.3. Accents and Diacritics



|       |   |  |
|-------|---|--|
| Macro |  | Extra low tone<br><i>Input:</i> <code>\tone{11}</code><br><i>Sources:</i> IPA '89-'96            |
| Macro |  | Falling tone<br><i>Input:</i> <code>\tone{51}</code><br><i>Sources:</i> IPA '89-'96              |
| Macro |  | Rising tone<br><i>Input:</i> <code>\tone{15}</code><br><i>Sources:</i> IPA '89-'96               |
| Macro |  | High rising tone<br><i>Input:</i> <code>\tone{45}</code><br><i>Sources:</i> IPA '89-'96          |
| Macro |  | Low rising tone<br><i>Input:</i> <code>\tone{12}</code><br><i>Sources:</i> IPA '89-'96           |
| Macro |  | High rising falling tone<br><i>Input:</i> <code>\tone{454}</code><br><i>Sources:</i> IPA '89-'96 |

#### A.2.2 Diacritical Tone Marks
















Some symbols included in the next section are also used as diacritical tone marks.

|      |   |  |
|------|---|--|
| '230 |  | Macron plus acute accent <i>Usage:</i> high rising tone<br><i>Input:</i> <code>\texthighrise{a}</code><br><i>Sources:</i> IPA '89-'96              |
| '231 |  | Grave accent plus macron <i>Usage:</i> low rising tone<br><i>Input:</i> <code>\textlowrise{a}</code><br><i>Sources:</i> IPA '89-'96                |
| '232 |  | Grave plus acute plus grave accent <i>Usage:</i> rising-falling tone<br><i>Input:</i> <code>\textrisefall{a}</code><br><i>Sources:</i> IPA '89-'96 |
| '233 |  | Acute plus grave plus acute accent <i>Usage:</i> falling-rising tone<br><i>Input:</i> <code>\textfallrise{a}</code><br><i>Sources:</i>             |

### A.3 Accents and Diacritics
















|      |   |   |
|------|---|---|
| '000 |  | Grave accent <i>Usage:</i> low tone<br><i>Input:</i> <code>\'e</code><br><i>Sources:</i> IPA '49-'96  |
| '001 |  | Acute accent <i>Usage:</i> high tone<br><i>Input:</i> <code>\'e</code><br><i>Sources:</i> IPA '49-'96 |

Appendix A. Annotated List of TIPA Symbols














|      |   |  |
|------|---|--|
| '002 |    | Circumflex accent <i>Usage:</i> falling tone<br><i>Input:</i> <code>\^e</code><br><i>Sources:</i> IPA '49–'96  |
| '003 |    | Tilde <i>Usage:</i> nasalized<br><i>Input:</i> <code>\~e</code><br><i>Sources:</i> IPA '49–'96   |
| '004 |    | Umlaut <i>Usage:</i> centralized<br><i>Input:</i> <code>\"e</code><br><i>Sources:</i> IPA '49–'96  |
| '005 |    | Double acute accent <i>Usage:</i> extra high tone<br><i>Input:</i> <code>\H{e}</code><br><i>Sources:</i> IPA '89–'96   |
| '006 |    | Ring<br><i>Input:</i> <code>\r{e}</code><br><i>Sources:</i>  |
| '007 |    | Wedge <i>Usage:</i> rising tone<br><i>Input:</i> <code>\v{e}</code><br><i>Sources:</i> IPA '49–'96   |
| '010 |   | Breve <i>Usage:</i> extra short<br><i>Input:</i> <code>\u{e}</code><br><i>Sources:</i> IPA '49–'96   |
| '011 |  | Macron <i>Usage:</i> mid tone<br><i>Input:</i> <code>\=e</code><br><i>Sources:</i>   |
| '012 |  | Dot<br><i>Input:</i> <code>\.e</code><br><i>Sources:</i>   |
| '013 |  | Cedilla<br><i>Input:</i> <code>\c{e}</code><br><i>Sources:</i>   |
| '014 |  | Polish hook (Ogonek accent)<br><i>Input1:</i> <code>\textpolhook{e}</code> <i>Input2:</i> <code>\k{e}</code><br><i>Sources:</i>  |
| '000 |  | Reversed Polish hook<br><i>Input:</i> <code>\textrevpolhook{o}</code><br><i>Sources:</i> PSG, p. 129   |
| '015 |  | Double grave accent <i>Usage:</i> extra low tone<br><i>Input1:</i> <code>\textdoublegrave{e}</code> <i>Input2:</i> <code>\H*e</code><br><i>Sources:</i> IPA '89–'96    |
| '016 |  | Subscript grave accent <i>Usage:</i> low falling tone<br><i>Input1:</i> <code>\textsubgrave{e}</code> <i>Input2:</i> <code>\'*e</code><br><i>Sources:</i> IPA '49, '79 |
| '017 |  | Subscript acute accent <i>Usage:</i> low rising tone<br><i>Input1:</i> <code>\textsubacute{e}</code> <i>Input2:</i> <code>\'*e</code><br><i>Sources:</i> IPA '49, '79  |



### A.3. Accents and Diacritics

|       |   |  |
|-------|---|--|
| Macro |    | Subscript circumflex accent<br><i>Input1:</i> <code>\textsubcircum{e}</code> <i>Input2:</i> <code>\^*e</code><br><i>Sources:</i>                       |
| '020  |    | Round cap<br><i>Input1:</i> <code>\textroundcap{g}</code> <i>Input2:</i> <code>\ c{g}</code><br><i>Sources:</i>  |
| Macro |    | Acute accent with macron<br><i>Input1:</i> <code>\textacutemacron{a}</code> <i>Input2:</i> <code>\'=a</code><br><i>Sources:</i>                        |
| Macro |    | Grave accent with macron<br><i>Input:</i> <code>\textgravemacron{a}</code><br><i>Sources:</i>  |
| '234  |    | Vertical bar accent<br><i>Input:</i> <code>\textvbaraccent{a}</code><br><i>Sources:</i>  |
| '235  |    | Double vertical bar accent<br><i>Input:</i> <code>\textdoublevbaraccent{a}</code><br><i>Sources:</i>   |
| '236  |   | Grave dot accent<br><i>Input1:</i> <code>\textgravedot{e}</code> <i>Input2:</i> <code>\'.e</code><br><i>Sources:</i>                                   |
| '237  |  | Dot acute accent<br><i>Input1:</i> <code>\textdotacute{e}</code> <i>Input2:</i> <code>\'.e</code><br><i>Sources:</i>                                   |
| Macro |  | Circumflex dot accent<br><i>Input1:</i> <code>\textcircumdot{a}</code> <i>Input2:</i> <code>\^ .a</code><br><i>Sources:</i>                            |
| Macro |  | Tilde dot accent<br><i>Input1:</i> <code>\texttildedot{a}</code> <i>Input2:</i> <code>\~.a</code><br><i>Sources:</i>                                   |
| Macro |  | Breve macron accent<br><i>Input1:</i> <code>\textbrevemacron{a}</code> <i>Input2:</i> <code>\u=a</code><br><i>Sources:</i>                             |
| Macro |  | Ring macron accent<br><i>Input1:</i> <code>\textringmacron{a}</code> <i>Input2:</i> <code>\r=a</code><br><i>Sources:</i>                               |
| Macro |  | Acute wedge accent<br><i>Input1:</i> <code>\textacutewedge{s}</code> <i>Input2:</i> <code>\v's</code><br><i>Sources:</i>                               |
| Macro |  | Dot breve accent<br><i>Input:</i> <code>\textdotbreve{a}</code><br><i>Sources:</i>   |
| '021  |  | Subscript bridge <i>Usage:</i> dental<br><i>Input1:</i> <code>\textsubbridge{t}</code> <i>Input2:</i> <code>\ [t</code><br><i>Sources:</i> IPA '49–'96 |
















Appendix A. Annotated List of TIPA Symbols

|      |   |  |
|------|---|--|
| '022 |    | Inverted subscript bridge <i>Usage:</i> apical<br><i>Input1:</i> <code>\textinvsbridge{d}</code> <i>Input2:</i> <code>\ ]t</code><br><i>Sources:</i> IPA '89–'96                       |
| '023 |    | Subscript square <i>Usage:</i> laminal<br><i>Input:</i> <code>\textsubsquare{n}</code><br><i>Sources:</i> IPA '89–'96  |
| '024 |    | Subscript right half-ring <sup>24</sup> <i>Usage:</i> more rounded<br><i>Input1:</i> <code>\textsubrhalfring{o}</code> <i>Input2:</i> <code>\ )o</code><br><i>Sources:</i> IPA '49–'96 |
| '025 |    | Subscript left half-ring <i>Usage:</i> less rounded<br><i>Input1:</i> <code>\textsublhalfring{o}</code> <i>Input2:</i> <code>\ (o</code><br><i>Sources:</i> IPA '49–'96                |
| '026 |    | Subscript W <i>Usage:</i> labialized<br><i>Input1:</i> <code>\textsubw{k}</code> <i>Input2:</i> <code>\ w{k}</code><br><i>Sources:</i> IPA '79   |
| '026 |    | Over W <i>Usage:</i> *labialized<br><i>Input:</i> <code>\textoverw{g}</code><br><i>Sources:</i>  |
| '027 |   | Subscript seagull <i>Usage:</i> linguolabial<br><i>Input1:</i> <code>\textseagull{t}</code> <i>Input2:</i> <code>\ m{t}</code><br><i>Sources:</i> IPA '89–'96                          |
| '030 |  | Over-cross <i>Usage:</i> mid-centralized<br><i>Input1:</i> <code>\textovercross{e}</code> <i>Input2:</i> <code>\ x{e}</code><br><i>Sources:</i> IPA '49–'96                            |
| '033 |  | Subscript plus <sup>25</sup> <i>Usage:</i> advanced<br><i>Input1:</i> <code>\textsubplus{\textopeno}</code> <i>Input2:</i> <code>\ +0</code><br><i>Sources:</i> IPA '49–'96            |
| '034 |  | Raising sign <i>Usage:</i> raised<br><i>Input1:</i> <code>\textraising{\textepsilon}</code> <i>Input2:</i> <code>\ 'E</code><br><i>Sources:</i> IPA '49–'96                            |
| '035 |  | Lowering sign <i>Usage:</i> lowered<br><i>Input1:</i> <code>\textlowering{e}</code> <i>Input2:</i> <code>\ 'e</code><br><i>Sources:</i> IPA '49–'96                                    |
| '036 |  | Advancing sign <i>Usage:</i> advanced tongue root<br><i>Input1:</i> <code>\textadvancing{u}</code> <i>Input2:</i> <code>\ &lt;u</code><br><i>Sources:</i> IPA '49–'96                  |
| '037 |  | Retracting sign <i>Usage:</i> retracted tongue root<br><i>Input1:</i> <code>\textretracting{\textschwa}</code> <i>Input2:</i> <code>\ &gt;@</code><br><i>Sources:</i> IPA '49–'96      |

<sup>24</sup>Diacritics `\textsubrhalfring` and `\textsublhalfring` can be placed after a symbol by inputting, for example, `[e\textsubrhalfring{ }]` [e].

<sup>25</sup>The diacritics such as `\textsubplus`, `\textraising`, `\textlowering`, `\textadvancing` and `\textretracting` can be placed after a symbol by inputting `[e\textsubplus{ }]` [e+], for example.

### A.3. Accents and Diacritics







|      |   |   |
|------|---|---|
| '003 |    | Subscript tilde <i>Usage:</i> creaky voiced<br><i>Input1:</i> \textsubtilde{e} <i>Input2:</i> \~*e<br><i>Sources:</i> IPA '89–'96                             |
| '004 |    | Subscript umlaut <i>Usage:</i> breathy voiced<br><i>Input1:</i> \textsubumlaut{e} <i>Input2:</i> \"*e<br><i>Sources:</i> IPA '79, '89, '93                    |
| '006 |    | Subscript ring <i>Usage:</i> voiceless<br><i>Input1:</i> \textsubring{u} <i>Input2:</i> \r*u<br><i>Sources:</i> IPA '49–'96                                   |
| '007 |    | Subscript wedge <i>Usage:</i> voiced<br><i>Input1:</i> \textsubwedge{e} <i>Input2:</i> \v*e<br><i>Sources:</i> IPA '49–'96                                    |
| '011 |    | Subscript bar <i>Usage:</i> retracted<br><i>Input1:</i> \textsubbar{e} <i>Input2:</i> \=*e<br><i>Sources:</i> IPA '49–'96                                     |
| '012 |    | Subscript dot <i>Usage:</i> *retroflex<br><i>Input1:</i> \textsubdot{e} <i>Input2:</i> \.*e<br><i>Sources:</i>  |
| '020 |   | Subscript arch <i>Usage:</i> non-syllabic<br><i>Input:</i> \textsubarch{e}<br><i>Sources:</i>   |
| '042 |  | Syllabicity mark <i>Usage:</i> syllabic<br><i>Input1:</i> \textsyllabic{m} <i>Input2:</i> \s{m}<br><i>Sources:</i> IPA '49–'96                                |
| '046 |  | Superimposed tilde <i>Usage:</i> velarized or pharyngealized<br><i>Input1:</i> \textsuperimposetilde{t} <i>Input2:</i> \ \~{t}<br><i>Sources:</i> IPA '49–'96 |
| '136 |  | Corner <i>Usage:</i> no audible release<br><i>Input:</i> t\textcorner<br><i>Sources:</i> IPA '89–'96  |
| '137 |  | Open corner <i>Usage:</i> *release/burst<br><i>Input:</i> t\textopencorner<br><i>Sources:</i>   |
| '176 |  | Rhoticity <i>Usage:</i> rhoticity<br><i>Input:</i> \textschwa\textrhoticity<br><i>Sources:</i> IPA '89–'96  |
| '040 |  | Celtic palatalization mark <i>Usage:</i> *as in <i>Irish</i> b'an 'woman'.<br><i>Input:</i> b\textceltpal<br><i>Sources:</i>                                  |
| '275 |  | Left pointer<br><i>Input:</i> k\textlptr<br><i>Sources:</i>   |
| '276 |  | Right pointer<br><i>Input:</i> k\textrptr<br><i>Sources:</i>  |

## Appendix A. Annotated List of TIPA Symbols

|                                   |  |  |
|-----------------------------------|--|--|
| '004                              |  | Rectangle <sup>26</sup> <i>Usage:</i> *equivalent to IPA ˘ (Corner)<br><i>Input:</i> <code>p\textrectangle</code><br><i>Sources:</i>                                 |
| '006                              |  | Retracting sign (a variety)<br><i>Input:</i> <code>\textretractingvar</code><br><i>Sources:</i> IPA '49  |
| '076                              |  | Top tie bar <i>Usage:</i> affricates and double articulations<br><i>Input1:</i> <code>\texttptiebar{gb}</code> <i>Input2:</i> <code>\t{gb}</code><br><i>Sources:</i> |
| See page 47 for 'Bottom tie bar'. |  |  |
| '047                              |  | Apostrophe <i>Usage:</i> ejective<br><i>Input:</i> <code>'</code><br><i>Sources:</i> IPA '49–'96   |
| '134                              |  | Reversed apostrophe <i>Usage:</i> (obsolete) weak aspiration<br><i>Input:</i> <code>\textrevapostrophe</code><br><i>Sources:</i> IPA '49, '79                        |
| '056                              |  | Period <i>Usage:</i> syllable break as in [ɹi.ækt]<br><i>Input:</i> <code>.</code><br><i>Sources:</i> IPA '89–'96  |
| '043                              |  | Hooktop<br><i>Input:</i> <code>\texthooktop</code><br><i>Sources:</i>  |
| '044                              |  | Right hook<br><i>Input:</i> <code>\textrthook</code><br><i>Sources:</i>  |
| '001                              |  | Right hook (long)<br><i>Input:</i> <code>\textrthooklong</code><br><i>Sources:</i>   |
| '045                              |  | Palatalization hook<br><i>Input:</i> <code>\textpalhook</code><br><i>Sources:</i>  |
| '002                              |  | Palatalization hook (long)<br><i>Input:</i> <code>\textpalhooklong</code><br><i>Sources:</i>   |
| '003                              |  | Palatalization hook (a variety)<br><i>Input:</i> <code>\textpalhookvar</code><br><i>Sources:</i>   |
| Macro                             |  | Superscript H <i>Usage:</i> aspirated<br><i>Input1:</i> <code>p\textsuperscript{h}</code> <i>Input2:</i> <code>p\super h</code><br><i>Sources:</i> IPA '49–'96       |







<sup>26</sup>This symbol is used among Japanese linguists as a diacritical symbol indicating no audible release (IPA ˘), because the symbol ˘ is used to indicate pitch accent in Japanese.

#### A.4. Diacritics for ExtIPA, VoQS














|       |   |  |
|-------|---|--|
| Macro |  | Superscript W <i>Usage:</i> labialized<br><i>Input1:</i> <code>k\textsuperscript{w}</code> <i>Input2:</i> <code>k\super w</code><br><i>Sources:</i> IPA '49–'96  |
| Macro |  | Superscript J <i>Usage:</i> palatalized<br><i>Input1:</i> <code>t\textsuperscript{j}</code> <i>Input2:</i> <code>t\super j</code><br><i>Sources:</i> IPA '49–'96                                       |
| Macro |  | Superscript gamma <i>Usage:</i> velarized<br><i>Input1:</i> <code>t\textsuperscript{\textgamma}</code> <i>Input2:</i> <code>t\super G</code><br><i>Sources:</i> IPA '89–'96                            |
| Macro |  | Superscript reversed glottal stop <i>Usage:</i> pharyngealized<br><i>Input1:</i> <code>d\textsuperscript{\textrevglotstop}</code> <i>Input2:</i> <code>d\super Q</code><br><i>Sources:</i> IPA '89–'96 |
| Macro |  | Superscript N <i>Usage:</i> nasal release<br><i>Input1:</i> <code>d\textsuperscript{n}</code> <i>Input2:</i> <code>d\super n</code><br><i>Sources:</i> IPA '89–'96                                     |
| Macro |  | Superscript L <i>Usage:</i> lateral release<br><i>Input1:</i> <code>d\textsuperscript{l}</code> <i>Input2:</i> <code>d\super l</code><br><i>Sources:</i> IPA '89–'96                                   |

#### A.4 Diacritics for ExtIPA, VoQS

In order to use diacritics listed in this section, it is necessary to specify the option ‘extra’ at the preamble (See the section entitled “Other options” on section 3.1.3). Note also that some of the diacritics are defined by using symbols from fonts other than TIPA so that they may not look quite satisfactory and/or may not be slanted (e.g. `\whistle{s}`  $\text{ᶑ}$ ).

|       |   |   |
|-------|---|---|
| '011  |  | Subscript double arrow <i>Usage:</i> *labial spreading<br><i>Input:</i> <code>\spreadlips{s}</code><br><i>Sources:</i> ExtIPA '94               |
| Macro |  | Overbridge <i>Usage:</i> *dentolabial<br><i>Input:</i> <code>\overbridge{v}</code><br><i>Sources:</i> ExtIPA '94                                |
| Macro |  | Bibridge <i>Usage:</i> *interdental/bidental<br><i>Input:</i> <code>\bibridge{n}</code><br><i>Sources:</i> ExtIPA '94                           |
| Macro |  | Subscript double bar <i>Usage:</i> *alveolar<br><i>Input:</i> <code>\subdoublebar{t}</code><br><i>Sources:</i> ExtIPA '94                       |
| Macro |  | Subscript double vertical line <i>Usage:</i> *strong articulation<br><i>Input:</i> <code>\subdoublevert{f}</code><br><i>Sources:</i> ExtIPA '94 |
| Macro |  | Subscript corner <i>Usage:</i> *weak articulation<br><i>Input:</i> <code>\subcorner{v}</code><br><i>Sources:</i> ExtIPA '94                     |

Appendix A. Annotated List of TIPA Symbols

|       |   |  |
|-------|---|--|
| Macro |    | Up arrow <i>Usage:</i> *whistled articulation<br><i>Input:</i> \whistle{s}<br><i>Sources:</i> ExtIPA '94                           |
| '012  |    | Subscript right arrow <i>Usage:</i> *sliding articulation<br><i>Input:</i> \sliding{\textipa{Ts}}<br><i>Sources:</i> ExtIPA '94    |
| Macro |    | Crossed tilde <i>Usage:</i> *denasal<br><i>Input:</i> \crtilde{m}<br><i>Sources:</i> ExtIPA '94                                    |
| Macro |    | Dotted tilde <i>Usage:</i> *nasal escape<br><i>Input:</i> \dottedtilde{a}<br><i>Sources:</i> ExtIPA '94                            |
| Macro |    | Double tilde <i>Usage:</i> *velopharyngeal friction<br><i>Input:</i> \doubletilde{s}<br><i>Sources:</i> ExtIPA '94                 |
| Macro |    | Parenthesis plus ring <i>Usage:</i> *partial voiceless<br><i>Input:</i> \partvoiceless{n}<br><i>Sources:</i> ExtIPA '94            |
| Macro |   | Parenthesis plus ring <i>Usage:</i> *initial partial voiceless<br><i>Input:</i> \inipartvoiceless{n}<br><i>Sources:</i> ExtIPA '94 |
| Macro |  | Parenthesis plus ring <i>Usage:</i> *final partial voiceless<br><i>Input:</i> \finpartvoiceless{n}<br><i>Sources:</i> ExtIPA '94   |
| Macro |  | Parenthesis plus subwedge <i>Usage:</i> *partial voicing<br><i>Input:</i> \partvoice{s}<br><i>Sources:</i> ExtIPA '94              |
| Macro |  | Parenthesis plus subwedge <i>Usage:</i> *initial partial voicing<br><i>Input:</i> \inipartvoice{s}<br><i>Sources:</i> ExtIPA '94   |
| Macro |  | Parenthesis plus subwedge <i>Usage:</i> *final partial voicing<br><i>Input:</i> \finpartvoice{s}<br><i>Sources:</i> ExtIPA '94     |
| '275  |  | Subscript left pointer <i>Usage:</i> *right offset jaw voice<br><i>Input:</i> \sublptr{J}<br><i>Sources:</i> VoQS '94              |
| '276  |  | Subscript right pointer <i>Usage:</i> *left offset jaw voice<br><i>Input:</i> \subrptr{J}<br><i>Sources:</i> VoQS '94              |

# Appendix B

---

## Recent Changes

### B.1 Changes from Version 1.2 to 1.3

Some symbols included in the xipa and related font families have been modified.

### B.2 Changes from Version 1.1 to 1.2

The following

- The following symbols are added to the `tipx` fonts:  
Varieties of glottal stop symbols and a new symbol:  
`? (\textglotstopvari)`  
`? (\textglotstopvarii)`  
`? (\textglotstopvariii)`  
`ɾ (\textlfishhookrlig)`
- Symbol shapes of the `xipa` and `xipx` font families slightly modified.

### B.3 Changes from Version 1.0 to 1.1

The following changes have been made since the first release of TIPA<sup>1</sup>.

- The following typefaces are newly added in Version 1.1. Font description files (`*.fd`) modified accordingly.  
Bold Extended Slanted Roman:  $[,ɛksplə'neɪfən]$   
Sans Serif Bold Extended:  $[,ɛksplə'neɪfən]$   
Sans Serif Slanted:  $[,ɛksplə'neɪfən]$   
Typewriter Text:  $[,ɛksplə'neɪfən]$   
Typewriter Text Slanted:  $[,ɛksplə'neɪfən]$
- Many bugs fixed in the METAFONT source codes; modifications made for almost every symbol. The `xipa` family of fonts now more closely simulates

---

<sup>1</sup>The first release of TIPA has been known as ‘beta0624’. I originally intended to change it to something like ‘tipa-1.0’ soon after the release but unfortunately I didn’t have the opportunity to do so.

Times Roman style.<sup>2</sup>

- `t3enc.def` and `tipa.sty` modified.
- New series of fonts, **tipx** and **xipx** have been created. These fonts are collections of symbols missing in the previous version of TIPA and cover almost all the symbols that appear in the second edition of *PSG* (1996). (Remember that TIPA was released in 1996 and at the time the second edition of *PSG* was not available.) Some of the symbols included in the previous version of TIPA are now moved into **tipx** and **xipx**. Thus the T3 encoding is slightly modified.

In order to use newly created fonts, add the following after the declaration of TIPA.

```
\usepackage{tipx}
```

For a list of newly created symbols, see next section.

The encoding of **tipx** and **xipx** still has no definite name. The style file (`tipx.sty`) uses the U encoding and new family names (`tipx` and `xipx` which are arbitrary). In the future, it may be possible to use a new encoding name TS3 (I experimentally put `ts3enc.def` and `ts3*.fd` in the `sty` directory of the package. Use these files at your own risk, if the system doesn't complain.)

- Some new tone letter commands, `\stone` and `\rtone`.
- Manual updated.
- Manual for the `vowel.sty` completed.
- Some diacritic commands added.

### B.3.1 Newly created symbols

The following two symbols are newly adopted in the **tipa** encoding (i.e., T3).

Hooktop right-tail D —  $\mathfrak{d}$   
 Left-hooktop long Y —  $\mathfrak{y}$

The following command was realized by a macro in the previous version but now is assigned a code of its own in the **tipa** encoding (i.e., T3).

Crossed lambda —  $\lambda$

The following symbols are (mostly) newly created symbols in the **tipx** fonts. (Note that some are moved from the **tipa** because of the encoding change.)

---

<sup>2</sup>I'm not fully satisfied with the result of this simulation and further changes will be made in the next release. However, I have no intention of simulating too closely in order to avoid any possible copyright problems.



### B.3. Changes from Version 1.0 to 1.1

Right-hook A — a<sub>᳚</sub>  
Left-hook four — 4  
Inverted script A — α  
A-O ligature — æ  
Inverted small capital A — ʋ  
Small capital A-O ligature — ʌ  
Stretched C (original form) — c  
Curly-tail stretched C — ĸ  
Curly-tail stretched C (original form) — ċ  
Front-hook D — ɖ  
Front-hook D (Original) — ɗ  
D-B ligature — db  
Small capital delta — Δ  
Right-hook E — e<sub>᳚</sub>  
Right-hook epsilon — ε<sub>᳚</sub>  
Small capital F — Ƒ  
Greek gamma — γ  
Front-tail gamma — γ  
Back-tail gamma — γ  
Right-tail hooktop H — ħ  
Heng — ħ  
Curly-tail J (a variety found in 1996 IPA) — j  
Hooktop barred dotless J (a variety) — ƒ  
Small capital K — Ƒ  
Turned small capital K — Ƒ  
Reversed small capital L — ɹ  
H-M ligature — hm  
Small capital M — Ɔ  
Front-bar N — ɳ  
Right leg N — ɳ  
Bull's eye (an old version) — ⊙  
Female sign — ♀  
Uncrossed female sign — ♀  
Right-hook open O — ɔ̣  
Inverted omega — ɰ  
Left-hook P — p  
Small capital P — Ɔ  
A variety of thorn (1) — þ  
A variety of thorn (2) — þ  
A variety of thorn (3) — þ  
A variety of thorn (4) — þ  
Q-P ligature — qp  
Reversed small capital R — ɹ  
Reversed esh with top loop — ɹ  
Front-hook T — ɖ  
Curly-tail turned T — ɹ  
Turned small capital U — ɹ  
Turned two — ɹ  
Bent-tail yogh — ɹ  
Turned three — ɹ

Curly-tail inverted glottal stop — ɰ  
 Turned glottal stop (PSG 1996:211) — Ɂ  
 Pipe (a variety with no descender) — |  
 Double pipe (a variety with no descender) — ||  
 Double-barred pipe (a variety with no descender) — ‡  
 Superscript left arrow — ←  
 Down full arrow — ↓  
 Up full arrow — ↑  
 Subscript right arrow — →  
 Subscript double arrow — ↔  
 Reversed Polish hook — an accent command e.g., ˛  
 Retracting sign (a variety) — ɸ  
 Right hook (long) — ɹ  
 Palatalization hook (long) — ɹ̃  
 Palatalization hook (a variety) — ɹ̥

### B.3.2 Symbol shape changes

Shapes of the following symbols have been modified from the first version to the present.

| Name                     | Macro name                      | New | Old | Old symbol name                    |
|--------------------------|---------------------------------|-----|-----|------------------------------------|
| Pipe                     | <code>\textpipe</code>          |     |     | <code>\textpipevar</code>          |
| Double pipe              | <code>\textdoublepipe</code>    |     |     | <code>\textdoublepipevar</code>    |
| Double-barred pipe       | <code>\textdoublebarpipe</code> | ‡   | ‡   | <code>\textdoublebarpipevar</code> |
| Down arrow               | <code>\textdownstep</code>      | ↓   | ↓   | <code>\textdownfullarrow</code>    |
| Up arrow                 | <code>\textupstep</code>        | ↑   | ↑   | <code>\textupfullarrow</code>      |
| Bull's eye               | <code>\textbullseye</code>      | ⊙   | ⊙   | <code>\text0bullseye</code>        |
| Hooktop barred dotless J | <code>\texthtbardotlessj</code> | ƒ   | ƒ   | <code>\texthtbardotlessjvar</code> |

For each symbol, the old shape is preserved in the `tipx` fonts and can be accessed by a new name (in most cases `var` or `0` is attached) indicated at the rightmost column of the above table.

# Appendix C

---

## Symbols not included in TIPA

Although the present version of TIPA includes almost all the symbols found in *PSG* and *Handbook*, there are still some symbols not included or defined in TIPA.

Some such symbols can be realized by writing appropriate macros, while some others cannot be realized without resorting to the Metafont.

This section discusses these problems by classifying such symbols into three categories, as shown below.

- (1) Symbols that can be realized by T<sub>E</sub>X's macro level and/or by using symbols from other fonts.
- (2) Symbols that can be imitated by T<sub>E</sub>X's macro level and/or by using symbols from other fonts (but may not look quite satisfactory).
- (3) Symbols that cannot be realized at all, without creating a new font.

With the addition of the TIPA fonts, symbols that belong to the third category are virtually non-existent now.

As for the symbols that belong to the first and second categories, TIPA provides a variety of macros and parts of symbols that can be used to compose a desired symbol if you can write an appropriate macro for it.

The following table shows symbols that belong to the first category. For each symbol, an example of input method and its output is also given. Note that barred or crossed symbols can be easily made by TIPA's `\ipabar` macro.

|                            |   |     |
|----------------------------|---|-----|
| Barred small capital I     | <code>\ipabar{\textsci}{.5ex}{1.1}{-}{-}</code>     | ı   |
| Barred J                   | <code>\ipabar{j}{.5ex}{1.1}{-}{-}</code>            | ĵ   |
| Crossed K                  | <code>\ipabar{k}{1.2ex}{.6}{-}{.4}</code>           | ķ   |
| Barred open O              | <code>\ipabar{\textopeno}{.5ex}{.6}{.4}{-}</code>   | ǫ   |
| Barred small capital omega | <code>\ipabar{\textscomega}{.5ex}{1.1}{-}{-}</code> | Ϝ   |
| Barred P                   | <code>\ipabar{p}{.5ex}{1.1}{-}{-}</code>            | Ɔ   |
| Half-barred U              | <code>\ipabar{u}{.5ex}{.5}{-}{.5}</code>            | ụ  |
| Barred small capital U     | <code>\ipabar{\textscu}{.5ex}{1.1}{-}{-}</code>     | Ϝ   |
| Double slash               | <code>/\kern-.25em/</code>                          | //  |
| Triple slash               | <code>/\kern-.25em/\kern-.25em/</code>              | /// |

The next definitions attach a tiny 'left hook' (which shows palatalization) to a symbol. For example:

### Appendix C. Symbols not included in TIPA

```
% Left-hook B
\newcommand\textlhookb{\tipaencoding
  b\hspace{-.15em}\raisebox{.0ex}{\textpalhookvar}}
% Left-hook M
\newcommand\textlhookm{\tipaencoding
  m\hspace{-.15em}\raisebox{.0ex}{\textpalhook}}
```

The former example uses a left-hook called `\textpalhookvar`, (,) and the latter uses a hook called `\textpalhook`, (,).

Left-hook B —  $\mathfrak{b}$   
 Left-hook M —  $\mathfrak{m}$

Symbols that belong to the second category are shown below. Note that slashed symbols can be in fact easily made by a macro. For example, a slashed b i.e.,  $\mathfrak{b}$  can be made by `\ipaclap{\textipa{b}}{\textipa{/}}`. The reason why slashed symbols are not included in TIPA is as follows: first, a simple overlapping of a symbol and a slash does not always result in a good shape, and secondly, it doesn't seem significant to devise fine-tuned macros for symbols which were created essentially for typewriters.

|           |                |
|-----------|----------------|
| Slashed B | $\mathfrak{b}$ |
| Slashed C | $\mathfrak{c}$ |
| Slashed D | $\mathfrak{d}$ |
| Slashed U | $\mathfrak{u}$ |
| Slashed W | $\mathfrak{w}$ |

# Appendix D

---

## FAQ

**Q1:** I have installed all the TIPA fonts. But the system can't find them. What's wrong?

**A1:** Please don't forget to run the command `mktextlsr` after the installation. Also, try to run the command:

```
kpsewhich tipa10.mf
```

If the system shows nothing in return, you must have installed them in a wrong place.

**Q2:** I'm using shortcut letters but there are still many symbols which have no shortcut letters. What can I do? Do I have to use all these long names?

**A2:** You are free to define shorter names. L<sup>A</sup>T<sub>E</sub>X's `\newcommand` is a safe way to do this. For example:

```
\newcommand{\vef}{\textbarrevglotstop}
```

*Input:* `[\vef]` is a voiced epiglottal fricative.

*Output:* [ɸ] is a voiced epiglottal fricative.

**Q3:** I want to use the L<sup>A</sup>T<sub>E</sub>X command `\l` in the IPA environment. But I don't want to specify the `safe` option. Is it possible?

**A3:** Use a command called `\Vert` instead of `\l`. It has the same meaning. Other possibly dangerous commands such as `\:`, `\:` and `\!` have a similar substitute command. For more details, see page 12.

**Q4:** I can't input Eng (`\ng`) properly. Why?

**A4:** Use `\textipa{N}`. Technically speaking, this is a matter of priority among the OT1, T1 and T3 encodings. But may be called a bug. I'll work out this problem in the next release.

**Q5:** How can I input *capital letters*, I mean real capital letters, not small capitals, within the IPA environment?

**A5:** Use the command `\*`. For example:

*Input:* `\textipa{["pI*Di]}`  
*Output:* `['piDi]`

This command is explained in section 3.2.4.

**Q6:** How can I output an accent or diacritic symbol alone? For example, I want to print the umlaut symbol alone, in order to explain the usage of this symbol.

**A6:** Try to add an empty argument to the umlaut command.

*Input:* `\texipa{["{}]}`  
*Output:* `["]`

**Q7:** Are there only a limited number of tone letters?

**A7:** Absolutely not! Please read section 3.2.8 carefully.

**Q8:** How to create a PDF file?

**A8:** You can find a few examples in section 1.1.2.

**Q9:** I have succeeded in creating a PDF document. But TIPA fonts don't look good (jaggy). What's wrong?

**A9:** Type1 fonts are not embedded in your document and pk fonts are used instead. Install Type1 font files and/or map file correctly.

**Q10:** I have succeeded in creating a PDF document with Type1 fonts embedded. But some symbols are missing. Why?

**A10:** In some versions of `dvips`, the character shifting switch is turned on by default. In order to prevent this, try to invoke `dvips` in the following way.

`dvips -Ppdf -G0 filename`

**Q11:** I find no description on hyphenation of phonetic texts in this manual.

**A11:** I haven't seen any description on hyphenation in *Handbook* nor in *Principles*.

**Q12:** Why is italic font not included in TIPA? Slanted fonts can be used as substitutes. But I want real italic fonts.

**A12:** It isn't difficult to create italic shapes for a limited number of symbols such as Schwa, Turned script A, and so on. However, creating a whole set of IPA symbols in italic is quite a different story. It is difficult to distinguish, for example, Lower-case A and Script A in italic. In the IPA's *Principles*, it is recommended that the IPA symbols should be roman, excluding italic

shapes in some of the examples. Another point that should be made is that there exist several systems of phonetic symbols in which all the symbols appear in italic. These are the ones mainly used in Scandinavian countries, and the problem is, there is no one-to-one correspondences between such systems and the IPA. Aside from the strictly phonetic use of symbols, however, there is a practical need for italic versions of symbols such as italic Schwa. Therefore, it may be helpful to create a new auxiliary font containing limited number of italic symbols.

**Q13:** Which is the first name of the author of TIPA? I'm confused.

**A13:** Rei is his first name.

**Q14:** I can't send e-mail to the author.

**A14:** I recently changed my e-mail address.

fkr@l.u-tokyo.ac.jp

For instance,  
the Greek letters included in the International Alphabet  
are cut in roman adaptations. Thus, since the ordinary shape of  
the Greek letter  $\beta$  does not harmonise with roman type,  
in the International Phonetic Alphabet it is given the form  $\beta$ .  
(*Principles*, 1949, p. 1)

... And of the two form of Greek theta,  $\theta$  and  $\vartheta$ ,  
it has been necessary to choose the first (in vertical form),  
since the second cannot be made to harmonise with  
roman letters. (*Principles*, 1949, p. 2)





### E.1 tipa10 and tipx10

ðə 'nɔ:θ 'wɪnd ənd ðə 'sʌn wə dɪs'pju:tɪŋ wɪtʃ wəz ðə 'strɒŋgə, wən ə 'trævlə  
keɪm ə'ləŋ 'ræpt ɪ ə 'wɔ:m 'klouk. ðeɪ ə'grɪd ðæt ðə 'wʌn huː fɜːst sək'sɪdɪd ɪn  
'meɪkɪŋ ðə 'trævlə teɪk hɪz 'klouk ɒf fʊd bɪ kən'sɪdəd 'strɒŋgə ðæn ðɪ 'ʌðə.

[illegible]

la bi:z e l sɔlə:j sə dispytɛ, ʃakœ asyrã k il ete l ply fɔ:r, kât iz ô vy  
œ vwajazœ:r ki s avâse, âvlɔpe dâ sô mâtô. i sô tōbe dakɔ:r, kə  
səlyi ki arivɛ l prəmje a fɛr ote sô mâtô o vwajazœ:r, sərə rgarde  
kəm l ply fɔ:r.

### E.3 tipa17 and tipx17

\ / ^ ~ .. " ° v u - . " \ / ^ ° x 1 J +  
 ± τ + ± ' ! ' ° ~ ' ( ) \* + , - . / u i λ z u v x e  
 θ : ' ~ = ~ ? θ α β ε δ ε φ γ h i j v λ m η η o ? f r  
 ∫ θ υ υ w χ γ z [ ' ] ° ° ' a b c d e f g h i j k l m n  
 o p q r s t u v w x y z || | ‡ ~ ° - \ \ \ \ / / / - \ \ \  
 / / / / | || ↓ ↑ ↗ ↘ ~ ~ ~ ~ ' " ° ° ° b d d d e g l l j  
 x l λ λ h n æ ω Ω ∫ t t ts u u z z ь ь ? < > | A c C  
 G g o o o x y G h h i j k l h o p q r I f æ t t u s ?  
 f z p v b d d g G æ c h j f t t l w n n n O t t t R  
 æ ø s t m z z p h v

[illegible]

'ʔainst ʃtrɪtən zɪç 'nəʔtvɪnt ʔʊnt 'zənə, 'veɪr fən  
ʔiːnən 'baɪdən voɪl dəʁ ʃtɛʁkɛrə vɛɪrə, ʔals ʔain  
'vandɛrɛʁ, deɪʁ ʔɪn ʔainən vaxmən 'mantəl  
gə'hɪlt vaɪʁ, dəs veɪgəs daː'heɪʁ kaɪm. zɪː vʊɐdən  
'ʔainɪç, das 'deɪjeːnɪgə fyɪʁ dən ʃtɛʁkɛrən  
gɛltən zɔltə, deɪʁ dən 'vandɛrɛʁ 'tsvɪŋən vyɐdə,  
zainən 'mantəl 'ʔaptsuːneɪmən.

#### E.4 tipa8 and tipx8

[illegible]

, . : ; ' " % & \* ( ) [ \ ] ^ \_ { | } ~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß à á â ã

[illegible]

) \* + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [ \ ] ^ \_ ` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß à á â ã

0 1 2 3 4 5 6 7 8 9 : ; . , - ' " ~ ^ \_ ` { | } ~ ' ( ) \* + , - . / ¨ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ à á â ã ä å æ ç è é ê ë ì í î ï ð ñ ò ó ô õ ö ø ù ú û ü ý þ ÿ [ \ ] ^ \_ ` { | } ~ ' ( ) \* + , - . / ¨ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ à á â ã ä å æ ç è é ê ë ì í î ï ð ñ ò ó ô õ ö ø ù ú û ü ý þ ÿ

/ \ \_ \ \ \ / / / | || ↓ ↑ ↗ ↘ ~ ~ ~ ' " ~ ~ b d d d e g l l j x  
 † λ χ h n æ ω ŋ t t s u y z z ʔ < > | A C C d x o o x y  
 G h h u j k l h w b d r l f æ i t u s z z p b b d d g G æ s  
 h j f t t l w n n O r i r œ ø s t m z z p h v

ˆ ˇ ¨ ¯ ° ± ↓ ↑ a α æ f c ĸ d d b e ε γ γ γ h h i j j f m n η  
ϕ ϕ ⊙ ρ ϖ ϗ Ϙ l t ſ z z ε s l | || ‡ † ‡ ‡ ‡ ? ? ? v ∅ Δ F  
K X J M P Q Я Ѧ

la bi:z e l sɔlə:j sə dispytɛ, jakœ asyrã k il etɛ l ply fɔ:r,  
kāt iz ô vy œ vwajazœ:r ki s avãsɛ, ãvlɔpɛ dã sô mâtɔ. i  
sô tôbɛ dakɔ:r, kə sɔlyi ki arivɛ l prəmje a fɛr ote sô mâtɔ  
o vwajazœ:r, sərə rgarde kɔm l ply fɔ:r.

## E.8 tipabx8 and tipxbx8

[illegible][illegible]

'ʔaɪnst stɪrɪtən zɪç nɔ̃ʁtvɪnt ʔunt 'zɔnə, 've:r fɔn ʔi'nən 'baɪdən vɔ:l dəʃ  
'fʔæʁkəʁə vɛ:rə, ʔals ʔaɪn 'vʌndəʁəʃ, de:ʃ ʔɪn ʔaɪnən vʌʁmən 'mʌntəl gə'hʏlt  
vʌ:ʃ, das vɛgəs da:'he:rʃ kaɪm. zɪ vʏʁdən ʔaɪnɪç, das 'de:ʁje:nɪç fʏ:ʃ dən  
'fʔæʁkəʁən gɛltən zɔltə, de:ʃ dən 'vʌndəʁəʃ 'tsvɪŋən vʏʁdə, zainən 'mʌntəl  
'ʔaʁpsu'neɪmən.

### E.9 tipabx9 and tipxbx9

[illegible]

ˆ ˇ ˘ ˙ ˚ ˛ ˜ ˝ ˞ ˟ ˠ ˡ ˢ ˣ ˤ ˥ ˦ ˧ ˨ ˩ ˪ ˫ ˬ ˭ ˮ ˯ ˰ ˱ ˲ ˳ ˴ ˵ ˶ ˷ ˸ ˹ ˺ ˻ ˼ ˽ ˾ ˿ ˿  
 ͇͈͉͍͎̀́͂̓̈́͆͊͋͌ͅ͏͓͔͕͖͙͚͐͑͒͗͛ͣͤͥͦͧͨͩͪͫͬͭͮͯ͘͜͟͢͝͞͠͡ͰͱͲͳʹ͵Ͷͷ͸͹ͺͻͼͽͿͿ

marra f famsi wi r ri:h ka:nu bi jitxan?um ?inhu l ?a?wa fi:hum. u  
ba?de:n fa:fu ra:gil sa:ji:h gaj mim ba?i:d mitlaffa? bi ?aba:ja t?i:la. fa  
ttafa?um ?ala ?in illi jixalli:h ji?la? il ?aba:ja fi l ?awwal jiku:n huwwa  
?a?wa mit tami.

### E.10 tipasl10 and tipxsl10

### E.11 tipasl12 and tipxsl12

### E.12 tipas18 and tipxs18

### E.13 tipasl9 and tipxs19

[illegible][illegible]

\*ʔamst ʃtɪtən zɪç 'nɔʔvɪnt ʔɔnt 'zɔnə, 'vɛɪʃ fən ʔi'nən 'baidən voɪl dɐʃ 'ʃtɛkɐrə  
vɛɪrə, ʔals ʔam 'vandɐrɐʃ, dɐʃ ʔɪn ʔamən vɔʃmən 'mantəl gə'hɪlt vɔɪʃ, dəs vɛɪgəs  
dɔ:'hɛɪʃ kɔ:m. zɪ' vɔʊdən 'ʔaniç, dəs 'dɛɪʃjɛ:nɪç fɪɪʃ dən 'ʃtɛkɐrən gɛltən zɔltə,  
dɛɪʃ dən 'vandɐrɐʃ 'tsɪʋən vɪçdə, zɔmən 'mantəl 'ʔɔptsu'ne:mən.

### E.14 tipass10 and tipxss10

[illegible][illegible]

marra f famsi wi r ri:h ka:nu bi jitxan?um ?inhu l ?a?wa fi:hum. u ba:fde:n  
fa:fu ra:gil sa:ji:h gaj mim ba:fi:d mitlaffa:f bi ?aba:ja t?i:la. fa ttafa?um ?ala  
?in illi jixalli:h ji?la:f il ?aba:ja fi l ?awwal jiku:n huwwa ?a?wa mit ta:ni.

### E.15 tipass12 and tipxss12

( ) \* + , - . / # ! @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [ \ ] ^ \_ ` { | } ~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ à á â ã ä å æ ç

◌̊ ◌̋ ◌̌ ◌̍ ◌̎ ◌̏ ◌̐ ◌̑ ◌̒ ◌̓ ◌̔ ◌̕ ◌̖ ◌̗ ◌̘ ◌̙ ◌̚ ◌̛ ◌̜ ◌̝ ◌̞ ◌̟ ◌̠ ◌̡ ◌̢ ◌̣ ◌̤ ◌̥ ◌̦ ◌̧ ◌̨ ◌̩ ◌̪ ◌̫ ◌̬ ◌̭ ◌̮ ◌̯ ◌̰ ◌̱ ◌̲ ◌̳ ◌̴ ◌̵ ◌̶ ◌̷ ◌̸ ◌̹ ◌̺ ◌̻ ◌̼ ◌̽ ◌̾ ◌̿ ◌̀ ◌́ ◌͂ ◌̓ ◌̈́ ◌ͅ ◌͆ ◌͇ ◌͈ ◌͉ ◌͊ ◌͋ ◌͌ ◌͍ ◌͎ ◌͏ ◌͐ ◌͑ ◌͒ ◌͓ ◌͔ ◌͕ ◌͖ ◌͗ ◌͘ ◌͙ ◌͚ ◌͛ ◌͜ ◌͝ ◌͞ ◌͟ ◌͠ ◌͡ ◌͢ ◌ͣ ◌ͤ ◌ͥ ◌ͦ ◌ͧ ◌ͨ ◌ͩ ◌ͪ ◌ͫ ◌ͬ ◌ͭ ◌ͮ ◌ͯ ◌Ͱ ◌ͱ ◌Ͳ ◌ͳ ◌ʹ ◌͵ ◌Ͷ ◌ͷ ◌͸ ◌͹ ◌ͺ ◌ͻ ◌ͼ ◌ͽ ◌Ϳ ◌̀ ◌́ ◌͂ ◌̓ ◌̈́ ◌ͅ ◌͆ ◌͇ ◌͈ ◌͉ ◌͊ ◌͋ ◌͌ ◌͍ ◌͎ ◌͏ ◌͐ ◌͑ ◌͒ ◌͓ ◌͔ ◌͕ ◌͖ ◌͗ ◌͘ ◌͙ ◌͚ ◌͛ ◌͜ ◌͝ ◌͞ ◌͟ ◌͠ ◌͡ ◌͢ ◌ͣ ◌ͤ ◌ͥ ◌ͦ ◌ͧ ◌ͨ ◌ͩ ◌ͪ ◌ͫ ◌ͬ ◌ͭ ◌ͮ ◌ͯ ◌Ͱ ◌ͱ ◌Ͳ ◌ͳ ◌ʹ ◌͵ ◌Ͷ ◌ͷ ◌͸ ◌͹ ◌ͺ ◌ͻ ◌ͼ ◌ͽ ◌Ϳ

upepo ulikuwa ukibifana na jua kuwa nani mwenye nguvu kupita mwenziwe, mara akapita masafiri alijekuwa amevaa juba. walipatana kuwa atakajemvua juba kwanza msafiri ndiye mwenye nguvu.

## E.16 tipass17 and tipxss17

---

\ / ^ ~ " " ° v v - . " \ / ^ ° \* + , - . / # † λ z y e o x θ ε :  
 + - + - ' ! ' ' ~ ' ( ) \* + , - . / # † λ z y e o x θ ε :  
 ' ~ = ~ ? α β ρ δ ε φ γ h i j k l m n o p q r  
 s t u v w x y z [ ' ] " ' a b c d e f g h i j k l m n o p q r  
 s t u v w x y z || | † ~ , - \ \ \ \ / / / - \ \ \ \ / / / | ||  
 ↓ ↑ ↗ ↘ ' ~ ~ ~ ' " " " b d d d e g j j j k l λ λ h h  
 æ ω Ω [ t t t s y y z z z b b ? < > | A C C d x x o o z z x x  
 h h i i j k l k ω β d r j f æ t t f u b z z z p b b d d g  
 g æ ç h j f t t l y n n n O r j r æ ø s t m z z b h

---

° \* - ↓ ↑ a a æ f c c c d d e e γ γ γ h h i  
 j j f h n n η ♀ ♀ ⊙ z o p o l t z z z z z l l || † t b b  
 b b ? ? ? v w Δ F K X J M P Q R N

---

ʔə 'nɔːθ 'wind ənd ʔə 'slɪn wə dɪs'pjʊːtɪŋ wɪtʃ wəz  
 ʔə 'strɒŋge, wɛn ə 'trævle keɪm ə'ləŋ 'ræpt ɪn ə  
 'wɔːm 'klouk. ʔeɪ ə'grɪːd ʔæt ʔə 'wɪn huː fɜːst  
 sæk'sɪːdɪd ɪn 'meɪkɪŋ ʔə 'trævle teɪk hɪz 'klouk ɒf juːd  
 bɪ kən'sɪdəd 'strɒŋgə ʔən ʔɪ 'lðə.

## E.17 tipass8 and tipxss8

---

\ / ^ ~ " " ° v v - . " \ / ^ ° \* + , - . / # † λ z y e o  
 x θ ε : + - + - ' ! ' ' ~ ' ( ) \* + , - . / # † λ z y e o  
 ' ~ = ~ ? α β ρ δ ε φ γ h i j k l m n o p q r  
 s t u v w x y z [ ' ] " ' a b c d e f g h i j k  
 l m n o p q r s t u v w x y z || | † ~ , - \ \ \ \ / / / - \ \ \ \ / / / | ||  
 ↓ ↑ ↗ ↘ ' ~ ~ ~ ' " " " b d d d e g j j j k l λ λ h h  
 æ ω Ω [ t t t s y y z z z b b ? < > | A C C d x x o o z z x x  
 h h i i j k l k ω β d r j f æ t t f u b z z z p b b d d g  
 g æ ç h j f t t l y n n n O r j r æ ø s t m z z b h

---

° \* - ↓ ↑ a a æ f c c c d d e e γ γ γ h h i  
 j j f h n n η ♀ ♀ ⊙ z o p o l t z z z z z l l || † t b b  
 b b ? ? ? v w Δ F K X J M P Q R N

---

la biz e l sɔːlɪj sə dɪspɪte, ʃakœ asyrä k il ete l ply fɔːr, kät iz ɔː vy œ vwajazœːr ki s aväse,  
 ävlɔpe dā sō mātō. i sō tōbe dakɔːr, kə sɔlyi ki arɪvɪ l prəmje a fɛr ote sō mātō o vwajazœːr, sære  
 rgarde kɔm l ply fɔːr.

## E.18 tipass9 and tipxss9

[illegible][illegible]

ʔaɪnst fʃɪtɪtən zɪç 'nɔɐ̯tʃvɪnt ʔunt 'zɔnə, 'vɛ:ɐ̯ fɔn ʔiːnən 'baɪdən vo:l dɐʁ ʃtɛʁkɐɐ̯ vɛ:ɐ̯ə, ʔals ʔaɪn 'vandɐrɐk, dɛ:ʁ ʔɪn ʔaɪnən vaxmən 'mantəl gə'hʏlt va:ʁ, dəs vɛ:ɐ̯əs da:'hɛ:ʁ ka:m. zɪː vʊɐ̯dən 'ʔaɪnɪç, dəs 'dɛ:sjɛ:nɪgə fy:ʁ dən ʃtɛʁkɐɐ̯ən gɛltən zɔltə, dɛ:ʁ dən 'vandɐrɐk 'tsvɪɐ̯n vʏɐ̯də, zaɪnən 'mantəl ʔaɪtsuːnɛ:mən.

### E.19 tipab10 and tipxb10

[illegible][illegible]

marra f famsi wi r ri:h ka:nu bi jitxan?um ?inhu l ?a?wa fi:hum. u ba:fde:n  
 fa:fu ra:gil sa:jih gaj mim ba:fi:d mitlaffa? bi fa:ba:ja t?i:la. fa ttafa?um ?ala  
 ?in illi jixalli:h ji?la? il fa:ba:ja fi l ?awwal jiku:n huwwa ?a?wa mit tarni.

### E.20 tipabs10 and tipxbs10

) \* + , - . / 0 1 2 3 4 5 6 7 8 9 : ; ' " = < ? @ A B C D E F G H I J K L M N O P Q R S T  
 U V W X Y Z [ \ ] ^ \_ ` a b c d e f g h i j k l m n o p q r s t  
 u v w x y z { | } ~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾  
 ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß à á â ã  
 ä å æ ç è é ê ë ì í î ï ð ñ ò ó ô õ ö ÷ ø ù ú û ü ý þ ÿ

Ɑ Ɱ Ɐ Ɒ ⱱ Ⱳ ⱳ ⱴ Ⱶ ⱶ ⱷ ⱸ ⱹ ⱺ ⱻ ⱼ ⱽ Ȿ Ɀ ⱽ Ɀ ⱽ Ɀ ⱽ Ɀ ⱽ Ɀ ⱽ Ɀ ⱽ Ɀ ⱽ Ɀ ⱽ Ɀ ⱽ Ɀ ⱽ  
 p q r s t u v w x y z [ \ ] ^ \_ ` { | } ~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ à á â ã

*upepo ulikuwa ukibifana na jua kuwa nani mwenye nguvu kupita mwenziwe, mara akapita masafiri alijekuwa amevaa juba. walipatana kuwa atakajemvua juba kwanza msafiri ndije mwenye nguvu.*





ʔaɪnst ʃtɪtən zɪç 'nɔʊtvɪnt ʔʊnt 'zɔnə, 've:ɐ fɔn ʔiːnən  
'baɪdən vo:l deʁ 'ʃtɛʃkɛrə ve:rə, ʔals ʔaɪn 'vandɛrɛʃ, de:ʃ ʔɪn  
ʔaɪnən vaʁmən 'mantəl ge'hɪlt va:ʃ, dəs ve:ɡəs da:'he:ʃ ka:ɪm. zɪː  
vuɔdən 'ʔaɪnɪç, das 'de:ʃje:nɪɡə fy:ʃ dən 'ʃtɛʃkɛrən ɡɛltən  
zɔltə, de:ʃ dən 'vandɛrɛʃ 'tsvɪŋən vuɔdə, zaɪnən 'mantəl  
'ʔaʔtsuːne:mən.

## E.24 tipatt12 and tipxtt12

[illegible]

marra ʃ ʃamsi wi r ri:h ka:nu bi jitxanʔum ʔinhu l ʔaʔwa  
fi:hum. u baʃde:n ʃa:fu ra:gil sa:ji:h gaj mim baʃi:d  
mitlaffaʃ bi ʃaba:ja tʔi:la. fa ttafaʔum ʃala ʔin illi  
jixalli:h jiʔlaʃ il ʃaba:ja fi l ʔawwal jiku:n huwwa  
ʔaʔwa mit ta:ni.

### E.25 tipatt8 and tipxtt8

[illegible]

upepo ulikuwa uki6ifana na jua kuwa nani mwege nguvu kupita mwenziwe, mara akapita masafiri alijekuwa amevaa jua6a. walipatana kuwa atakajemvua jua6a kwanza msafiri ndije mwege nguvu.



**E.29** xipab10 and xipxb10

Λ ζ υ ρ σ τ θ ε ι : ' ~ = ^ ? α β γ δ ε φ χ η ι j k l m n o p q r s t u v w x y z || | ♪ , \_ - \ / \_ - \ / \_ - \ /  
| || ↓ ↑ ↘ ↗ ~ ~ ~ " ~ ~ b d f g e g l j x i λ λ β η ξ ω ο f t t s y q z ε ν ? < >  
| A C [ Θ Σ Φ Ξ Γ Η Π Ι Κ Λ Ξ Ω ϐ ϑ ϒ I f œ j ſ U S Z F Z P B G d d g f æ ç ħ j  
f i i l y η n n O r i r œ ø s t m z z þ lv

[illegible]

marra f famsi wi r ri:h ka:nu bi jitxan?um ?inhu l ?a?wa fi:hum. u ba:fde:n  
 fa:fu ra:gil sa:jih gaj mim ba:fi:d mitlaffa:f bi ?aba:ja t?i:la. fa ttafa?um ?ala  
 ?in illi jixalli:h ji?la:f il ?aba:ja fi l ?awwal jiku:n huwwa ?a?wa mit ta:ni.

### E.30 xipas110 and xipxs110

x09:~=-?aβδϕψhijvλmηγ?Γfθυυωχγ3[']Γ'abcde fgh  
 ijklmnopqrstuvwxyz||≠, \_\|/ \_\|/ \| \|<sup>†</sup>↘ ~~~~~b  
 d d f e g l j x i λ λ h n x ω n f t t s y q z ε b<sup>2<λ</sup> | a c c d t s o z z v g f h i j k l z  
 β q r l f a i f u z z f z p b b d d g g a c h f f i l l y η n n o r t i i r a e o s t m z z p h

[illegible]

*upepo ulikuwa ukibifana na jua kuwa nani mwenje nguvu kupita mwenziwe, mara akapita masafiri alijekuwa amevaa juba. walipatana kuwa atakajemvua juba kwanza msafiri ndije mwenje nguvu.*

### E.31 xipass10 and xipxss10

[illegible]

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 104

ðə 'nəʊθ 'wind ənd ðə 'sʌn wə dis'pjʊrtɪŋ wɪf wəz ðə 'strɒŋge, wɛn ə 'trævəl keɪm ə'laŋ 'ræpt ɪn ə 'wɔ:m 'kloʊk. ðeɪ ə'grɪ:d ðət ðə 'wʌn hu' fɜːst sək'sɪ'dɪd ɪn 'meɪkɪŋ ðə 'trævəl teɪk hɪz 'kloʊk ɒf ʃʊd bɪ kən'sɪdəd 'strɒŋgə ðən ðɪ 'lʌðə.

### E.33 xipasi10 and xipxsi10

### E.34 xipasb10 and xipxsb10



# Appendix F

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## Layout of TIPA fonts

Some phoneticians refer to Upsilon by the name *Bucket*,  
but it looks more like an urn to us.

(*PSG*, 1996, p. 185)

.....  
.....

O Attic shape! Fair attitude! with brede  
Of marble men and maidens overwrought,  
With forest branches and the trodden weed;  
Thou, silent form, dost tease us out of thought  
As doth eternity: Cold Pastoral!  
When old age shall this generation waste,  
Thou shalt remain, in midst of other woe  
Than ours, a friend to man, to whom thou say'st,  
“Beauty is truth, truth beauty, —that is all  
Ye know on earth, and all ye need to know.”

(John Keats, *Ode on a Grecian Urn*)

## F.1 tipa10

|      | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 |     |
|------|----|----|----|----|----|----|----|----|-----|
| '00x | `  | ´  | ^  | ~  | ¨  | ”  | °  | ˘  | "0x |
| '01x | ˘  | –  | ·  | ˆ  | ˙  | “  | ˆ  | ˙  |     |
| '02x | ˆ  | ˆ  | ˆ  | ˆ  | ˆ  | ˆ  | ˆ  | ˆ  | "1x |
| '03x | ×  | 1  | J  | +  | +  | +  | +  | +  |     |
| '04x | ˙  | !  | ˙  | ˙  | ˙  | ˙  | ˙  | ˙  | "2x |
| '05x | (  | )  | *  | +  | ,  | -  | .  | /  |     |
| '06x | u  | i  | Λ  | 3  | u  | e  | D  | Y  | "3x |
| '07x | θ  | 9  | :  | ˙  | ˘  | =  | ˆ  | ?  |     |
| '10x | ə  | α  | β  | ε  | ð  | ε  | Φ  | Y  | "4x |
| '11x | fi | r  | j  | u  | Λ  | u  | u  | o  |     |
| '12x | ʔ  | ʔ  | r  | f  | θ  | u  | u  | u  | "5x |
| '13x | χ  | Y  | 3  | [  | ˙  | ]  | ˙  | ˙  |     |
| '14x | ˙  | a  | b  | c  | d  | e  | f  | g  | "6x |
| '15x | h  | i  | j  | k  | l  | m  | n  | o  |     |
| '16x | p  | q  | r  | s  | t  | u  | v  | w  | "7x |
| '17x | x  | y  | z  |    |    | ≠  | ˘  | ˙  |     |
| '20x | –  | ˘  | ˘  | ˘  | ˘  | ˘  | ˘  | ˘  | "8x |
| '21x | /  | –  | ˘  | ˘  | ˘  | ˘  | ˘  | ˘  |     |
| '22x | /  | /  |    |    | ↓  | ↑  | ↗  | ↘  | "9x |
| '23x | ˘  | ˘  | ˘  | ˘  | ˙  | ˙  | ˙  | ˙  |     |
| '24x | b  | d  | d  | d  | E  | g  | l  | l  | "Ax |
| '25x | J  | u  | l  | λ  | λ  | h  | u  | æ  |     |
| '26x | ω  | Ω  | f  | t  | ts | ts | u  | u  | "Bx |
| '27x | 3  | ε  | u  | u  | ?  | <  | >  |    |     |
| '30x | Λ  | c  | C  | ϕ  | ø  | ø  | ø  | 3  | "Cx |
| '31x | Y  | G  | fj | H  | u  | J  | k  | L  |     |
| '32x | h  | o  | p  | q  | r  | I  | f  | æ  | "Dx |
| '33x | q  | u  | u  | u  | z  | f  | z  | p  |     |
| '34x | B  | b  | d  | d  | g  | G  | æ  | ç  | "Ex |
| '35x | h  | J  | f  | l  | l  | l  | u  | u  |     |
| '36x | N  | J  | O  | u  | I  | l  | R  | œ  | "Fx |
| '37x | ø  | s  | t  | M  | z  | z  | p  | h  |     |
|      | "8 | "9 | "A | "B | "C | "D | "E | "F |     |



F.2. tipx10

**F.2** tipx10

|      | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 |     |
|------|----|----|----|----|----|----|----|----|-----|
| '00x | ˘  | ˚  | ˛  | ˜  | ˚  | ˚  | ˚  | ˚  | "0x |
| '01x | ↑  | →  | ↔  |    |    |    |    |    |     |
| '04x | ä  | σ  | æ  | ɹ  | ç  | ç  | ç  | ɹ  | "2x |
| '05x | ɹ  | ɹ  | ä  | ä  | γ  | γ  | γ  | ɹ  |     |
| '06x | ɹ  | ı  | j  | f  | h  | n  | η  | ♀  | "3x |
| '07x | ♀  | ⊙  | ♀  | ϖ  | p  | ϖ  | l  | †  |     |
| '10x | ȧ  | z  | z  | ε  | ı  | ı  |    |    | "4x |
| '11x | †  | †  |    |    |    |    |    |    |     |
| '12x | þ  | þ  | þ  | þ  | ?  | ?  | ?  |    | "5x |
| '13x |    |    |    |    |    |    |    |    |     |
| '16x | ∇  | ∇  | Δ  | F  | K  | ∇  | ∇  | M  | "7x |
| '17x | P  | Q  | ∇  | ∇  |    |    |    |    |     |
|      | "8 | "9 | "A | "B | "C | "D | "E | "F |     |