


The tipauni package

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Version 0.6.1 — 2022-10-21

 <https://ctan.org/pkg/tipauni>

 <https://puszcza.gnu.org.ua/bugs/?group=tipauni>

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The L^AT_EX package tipauni

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Abstract

This package is the second step for L^AT_EX-internally bridging the gap between the Unicode and the TIPA package. The first step was the package [unitipa](#). Users can now use their beloved TIPA shortcuts with the benefits of Unicode i.e. searchability, copy-pasting, changing the font and many more. As this package needs the package `fontspec` for loading an IPA font, it needs to be compiled with Lua/X_YL^AT_EX. This package can also be viewed as an ASCII-based input method for producing IPA characters in Unicode.

1 Acknowledgements

This package is completed because of the rigorous help by Jairo A. del Rio, Jonathan P. Spratte, Phelype Oleinik & Ulrike Fischer. Their suggestions and contributions are extremely valuable for the development of this package.

Jonathan P. Spratte has helped the package by building a parser based on `expl3`. Phelype Oleinik has helped the package by building a test-suit for regression-tests. The tests can be seen in the git-repository of the project.

Lemures Lemniscati pointed a few bugs in the documentation & the code. Their details are as follows. are as follows:

2022-01-03 A typo '`\textsh`' in `tipauni.dtx`. ([link](#))

2022-01-09 Avoid unconditional loading of CharisSIL. ([link](#))

2022-01-09 Fix typos in Input B of Raised and Lowered. ([link](#))

2022-01-09 `\textcorner` should be defined by `\DeclareTextSymbol`. ([link](#))

2022-01-09 Fix a typo in Input B of Near-close near-front rounded. ([link](#))

Anja Hasse pointed a bug in the package with an SE question¹. It got fixed in v0.6.1 of the package.

All of these contributions are highly valuable for the development of this package.

¹URL: <https://tex.stackexchange.com/q/662466>

2 Package options

documentfont `documentfont=<font-name>`

The default font for the entire document set by this package is the [Charis SIL](#). Users can easily change it with the package-option `documentfont`. This option takes one value which is the font-name. e.g. For using the [Doulos SIL](#) font as the main font, use the package like it is used in the following.

```
\usepackage[documentfont=DoulosSIL]{tipauni}
```

Please note that you must provide a value to this key. If you pass it an empty value; i.e., “`documentfont={}`”/“`documentfont=`” or no value, i.e., “`documentfont`”, you will be prompted with errors from package `tipauni`. If an empty/no-value `documentfont` is used & no other non-empty `documentfont` has been used so far; then the document is typeset with the default font-family of Lua/X_YLaTeX, i.e., the Latin Modern family. If another `documentfont` has a non-empty value, the value of that option will be used as the font of the document.

fontspecoptions `fontspecoptions=<font-options>`

This option can be used to set options to the font set with `documentfont` package option. If the `recommendedfont` option is used & has the highest priority; the options set with `fontspecoptions` will be used with the Charis SIL font. If the `preservefont` option has the highest priority, this parameter will be ineffective & throw a warning. In the argument of this option write as if you are writing in the optional parameter of the `\setmainfont` command. e.g.

```
\usepackage[fontspecoptions={Scale=1.5}]{tipauni}
```

If this options is used with no value it will be ignored with a warning.
e.g. Try `\usepackage[fontspecoptions]{tipauni}`.

If it is used with an empty value it will reset the fontspec-options so far you have set.
e.g. Try:

```
\usepackage[%  
fontspecoptions={Scale=1.5},%  
fontspecfontspecoptions={}%  
]{tipauni}
```

Please note that the keys so far documented are the only keys which take values. Other than these the following keys *don't* take any value. You will be prompted with an error from package `expkv` if you use values for the following keys.

preservefont This option will omit executing the `\setmainfont` command with Charis SIL. The typeset document will use the default font of Lua/X_YLaTeX, i.e., the Latin Modern.

recommendedfont This option is used to override other font definitions made with option `documentfont`. Charis SIL will be used as the main font of the document when this option is used.

Please note that every option so far mentioned can potentially override each other. e.g. If a `documentfont` is added after a `preservefont`, the former will override the latter (& vice versa). It is true for all these three package options.

resetfontspecoptions This option is used to reset all the `fontspec` options set with package option `fontspecoptions`. As noted for the font-options, these two options which deal with the options of the loaded fonts also can override each other. The last one loaded will be considered of the highest priority.

incompatible By default `tipauni` will throw a warning if symbols not contained in the `tipa` package were used. Using this option you can switch this check off if you don't have to stay compatible with `tipa` to silence this warning.

3 List of available commands

TIPA has two alternative methods for inputting IPA characters. In the following tables, **Input A** column lists all the long TIPA commands (e.g. `\textrtailt`) & **Input B** column lists the short ones (e.g. `\textipa{\:t}`)². This documentation lists down all the commands necessary for typing symbols in the IPA chart.

3.1 Pulmonic consonants

Description	- Input A	- Input B	- Symbol
Retroflex voiceless stop	- <code>\textrtailt</code>	- <code>\:t</code>	- [ʈ]
Retroflex voiced stop	- <code>\textrtaild</code>	- <code>\:d</code>	- [ɖ]
Palatal voiced stop	- <code>\textbardotlessj</code>	- <code>*j</code>	- [j]
Uvular voiced stop	- <code>\textscg</code>	- <code>\;G</code>	- [g]
Glottal voiceless stop	- <code>\textglotstop</code>	- <code>P</code>	- [ʔ]
Labiodental nasal	- <code>\textltailm</code>	- <code>M</code>	- [ɱ]
Retroflex nasal	- <code>\textrtailn</code>	- <code>\:n</code>	- [ɳ]
Palatal nasal	- <code>\textltailn</code>	- <code>*n</code>	- [ɲ]
Velar nasal	- <code>\ng[§]</code>	- <code>N</code>	- [ŋ]
Uvular nasal	- <code>\textscn</code>	- <code>\;N</code>	- [ɴ]
Bilabial trill	- <code>\textscb</code>	- <code>\;B</code>	- [β]
Uvular trill	- <code>\textscr</code>	- <code>\;R</code>	- [ʀ]
Labiodental flap ¹	- <code>\labdentflap</code>	- <code>*v</code>	- [ɸ]
Alveolar tap	- <code>\textfishhookr</code>	- <code>R</code>	- [ɾ]
Retroflex flap	- <code>\textrtailr</code>	- <code>\:r</code>	- [ɽ]
Bilabial voiceless fricative	- <code>\textphi</code>	- <code>F</code>	- [ɸ]
Bilabial voiced fricative	- <code>\textbeta</code>	- <code>B</code>	- [β]
Dental voiceless fricative	- <code>\texttheta</code>	- <code>T</code>	- [θ]
Dental voiced fricative	- <code>\dh[§]</code>	- <code>D</code>	- [ð]

²All of these commands must be enclosed in the `\textipa` command. (e.g. `\textipa{\:tP}` for [ʈ])

Palatal voiceless fricative	- \textesh	- S	- [ʃ]
Palatal voiced fricative	- \textyogh	- Z	- [ʒ]
Retroflex voiceless fricative	- \textrtails	- \:s	- [ʂ]
Retroflex voiced fricative	- \textrtailz	- \:z	- [ʐ]
Palatal voiced fricative	- \textctj	- J	- [ç]
Velar voiced fricative	- \textgamma	- G	- [ɣ]
Uvular voiceless fricative	- \textchi	- X	- [χ]
Uvular voiced fricative	- \textinvscr	- K	- [ʁ]
Pharyngeal voiceless fricative	- \textcrh	- *h	- [ħ]
Pharyngeal voiced fricative	- \textrevglotstop	- Q	- [ʕ]
Glottal voiced fricative	- \texthth	- H	- [ɦ]
Alveolar voiceless lateral fricative	- \textbeltl	- *l	- [ɬ]
Alveolar voiced lateral fricative	- \textlyoghlig	- *z	- [ɮ]
Labiodental approximant	- \labdentapp	- V	- [ʋ]
Alveolar approximant	- \textturnr	- *r	- [ɹ]
Retroflex approximant	- \textturnrrtail	- \:R	- [ɻ]
Velar approximant	- \textturnmrleg	- *m	- [ɰ]
Retroflex lateral approximant	- \textrtaill	- \:l	- [ɭ]
Palatal lateral approximant	- \textturny	- L	- [ç̺]
Velar lateral approximant	- \textsc1	- \;L	- [ɮ̺]

[§] These commands are also available without package `tipa`.

¹ A symbol for this sound was introduced in 2005. The last update of the package `tipa` was in 2004, so this character is missing in it. A command for it is provided by this package. Such `tipa`-exclusive commands are written with red color in this documentation.

3.2 Non-Pulmonic consonants

Description	- Input A	- Input B	- Symbol
Bilabial click	- \textbullseye	- \!o	- [⦿]
Postalveolar click	- \pstalvclick	- !	- [!]
Palatoalveolar click	- \textdoublebarpipe	- \!c	- [‡]
Alveolar lateral click	- \textdoublepipe	-	- []
Bilabial implosive	- \texthtb	- \!b	- [ɓ]
Dental implosive	- \texthtd	- \!d	- [ɗ]
Palatal implosive	- \texthtbardotlessj	- \!j	- [ɟ]
Velar implosive	- \texthtg	- \!g	- [ɠ]
Uvular implosive	- \texthtscg	- \!G	- [ʛ]

3.3 Other symbols

Description	Input A	Input B	Symbol
Labial-velar voiceless fricative	<code>\textturnw</code>	<code>*w</code>	<code>[ʍ]</code>
Labial-palatal voiced approximant	<code>\textturnh</code>	<code>4</code>	<code>[ɥ]</code>
Epiglottal voiceless fricative	<code>\textsch</code>	<code>\;H</code>	<code>[ħ]</code>
Epiglottal voiced fricative/approximant	<code>\textbarrevglotstop</code>	<code>*1</code>	<code>[ʕ]</code>
Alveolar voiced lateral flap	<code>\textturnlonglegr</code>	<code>\!r</code>	<code>[ɺ]</code>
Epiglottal plosive	<code>\textbarglotstop</code>	<code>*2</code>	<code>[ʔ]</code>
Alveolo-palatal voiceless fricative	<code>\textctc</code>	<code>C</code>	<code>[ç]</code>
Alveolo-palatal voiced fricative	<code>\textctz</code>	<code>*Z</code>	<code>[ʒ]</code>
Postalveolar-velar voiceless fricative	<code>\texttheng</code>	<code>*3</code>	<code>[ɣ]</code>

3.4 Vowels

Description	Input A	Input B	Symbol
Near-close near-front unrounded	<code>\textsci</code>	<code>I</code>	<code>[ɪ]</code>
Near-close near-front rounded	<code>\textscy</code>	<code>Y</code>	<code>[ɥ]</code>
Open-mid front unrounded	<code>\textepsilon</code>	<code>E</code>	<code>[e]</code>
Close central unrounded	<code>\textbari</code>	<code>1</code>	<code>[ɨ]</code>
Close central rounded	<code>\textbaru</code>	<code>0</code>	<code>[ɯ]</code>
Near-close near-back rounded	<code>\textupsilon</code>	<code>U</code>	<code>[ʊ]</code>
Close-mid central unrounded	<code>\textreve</code>	<code>9</code>	<code>[ə]</code>
Close-mid central rounded	<code>\textbaro</code>	<code>8</code>	<code>[ɘ]</code>
Mid central vowel	<code>\textschwa</code>	<code>@</code>	<code>[ə]</code>
Open-mid central unrounded	<code>\textrepsilon</code>	<code>3</code>	<code>[ɜ]</code>
Open-mid central rounded	<code>\textcloserepsilon</code>	<code>&</code>	<code>[ɝ]</code>
Near-open central	<code>\textturna</code>	<code>5</code>	<code>[ɛ]</code>
Close back unrounded	<code>\textturnm</code>	<code>W</code>	<code>[ɯ]</code>
Close-mid back unrounded	<code>\textramshorns</code>	<code>7</code>	<code>[ɤ]</code>
Open-mid back unrounded	<code>\textturnv</code>	<code>2</code>	<code>[ʌ]</code>
Open-mid back rounded	<code>\textopeno</code>	<code>0</code>	<code>[ɔ]</code>
Open back unrounded	<code>\textscripta</code>	<code>A</code>	<code>[ɑ]</code>
Open back rounded	<code>\textturnscripta</code>	<code>6</code>	<code>[ɔ̃]</code>

3.5 Independent diacritics

Description	Input A	Input B	Symbol
Rhoticity	<code>ə\texttrhoticity</code>	<code>ə\tr</code>	<code>[ɤ̃]</code>
No audible release	<code>n\textcorner</code>	<code>n\tc</code>	<code>[n̚]</code>
Tie bar (standalone)	<code>\stdlnetiebar{ei}</code>	<code>\ts{ei}</code>	<code>[ə̯i]</code>

3.6 Dependent diacritics

Description	- Input A	- Input B	- Symbol
Voiceless	<code>\textsubring{m}</code>	<code>\r*m</code>	[m̥]
Voiced	<code>\textsubwedge{s}</code>	<code>\v*s</code>	[s̥]
More rounded	<code>\textsubrhalfring{w}</code>	<code>\ w</code>	[w̥]
Less rounded	<code>\textsublhalfring{w}</code>	<code>\ (w</code>	[w̥]
Advanced	<code>\textsubplus{ə}</code>	<code>\ +e</code>	[ə̥]
Retracted	<code>\textsubbar{l}</code>	<code>\=*l</code>	[l̥]
Mid-centralized	<code>\textovercross{e}</code>	<code>\ x{e}</code>	[ĕ]
Syllabic	<code>\textsyllabic{n}</code>	<code>\s{n}</code>	[n̥]
Non-syllabic	<code>\textsubarch{a}</code>	<code>\ns{a}</code>	[ḁ]
Breathy voiced	<code>\textsubumlaut{b}</code>	<code>\"*b</code>	[b̥]
Creaky voiced	<code>\textsubtilde{ə}</code>	<code>\~*ə</code>	[ə̥]
Linguolabial	<code>\textseagull{l}</code>	<code>\ ml</code>	[l̥]
Velarized	<code>\textsuperimposetilde{i}</code>	<code>\vl{i}</code> ¹	[i̥]
Raised	<code>\textraising{ə}</code>	<code>\ 'ə</code>	[ə̥]
Lowered	<code>\textlowering{ə}</code>	<code>\ `ə</code>	[ə̥]
Advanced tongue root	<code>\textadvancing{ə}</code>	<code>\ <ə</code>	[ə̥]
Retracted tongue root	<code>\textretracting{ə}</code>	<code>\ >ə</code>	[ə̥]
Dental	<code>\textsubbridge{t}</code>	<code>\ [t</code>	[t̥]
Apical	<code>\textinvsubbridge{t}</code>	<code>\]t</code>	[t̥]
Laminal	<code>\textsubsquare{s}</code>	<code>\lmn{s}</code>	[s̥]
Tie bar (top)	<code>\texttoptiebar{ei}</code>	<code>\t{ei}</code>	[e̥i̥]
Tie bar (bottom)	<code>\textbottomtiebar{ei}</code>	<code>\t*{ei}</code>	[e̥i̥]

¹ The documentation of package `tipa` on p. 53 describes a shorthand command i.e. `\|~{arg}` which is not functional. I haven't investigated the reasons, but instead provided a new shorthand command for this character.

4 Implementation

```

1 <@=tipauni>
2 <*package>

```

Provide the package with some description & version specifications.

```

3 \ProvidesPackage{tipauni}[2022/10/21 v0.6.1
4 Unicode characters with TIPA commands]

```

Load necessary packages.

```

5 \RequirePackage{xparse}
6 \RequirePackage{fontspec}
7 \RequirePackage{expkv-def,expkv-opt}

```

Package options are provided using the package `expkv`.

```

8 \newif\iftipauni@document@font
9 \def\tipauni@recommended@font{CharisSIL}
10 \tipauni@document@fonttrue

```

```

11 \let\tipauni@font@options\@empty
12 \ekvdefinekeys{tipauni}{%
13   bool incompatible           = \iftipauni@nontipa@ignore,%
14   noval preservefont         = {%
15     \let\tipauni@font\tipauni@undefined
16     \tipauni@document@fontfalse
17   },%
18   estore fontspecoptions     = \tipauni@font@options,%
19   new noval fontspecoptions  = {%
20     \PackageWarningNoLine{tipauni}{%
21       As you haven't given any value to package option\MessageBreak
22       `fontspecoptions'; it will be ignored. Please\MessageBreak
23       provide a valid (list of) fontspec option(s)%
24     }%
25   },%
26   noval resetfontspecoptions = {%
27     \let\tipauni@font@options\@empty
28   },%
29   noval documentfont        = {%
30     \PackageError{tipauni}{No value for the `documentfont' option}{%
31       The `documentfont' option has no value. Please provide a valid font-name,%
32       \MessageBreak
33       otherwise it will be ignored or (if given) the value of another non-empty%
34       \MessageBreak
35       `documentfont' will be used.%
36     }%
37     \ifdefined\tipauni@font
38       \tipauni@document@fonttrue
39     \else
40       \tipauni@document@fontfalse
41     \fi
42   },%
43   new code documentfont     = {%
44     \edef\tipauni@temp{#1}%
45     \ifx\tipauni@temp\@empty
46       \PackageError{tipauni}{Empty `documentfont' option}{%
47         The `documentfont' option has an empty value. Please provide a valid%
48         \MessageBreak
49         font-name, otherwise it will be ignored or (if given) the value of%
50         \MessageBreak
51         another non-empty `documentfont' will be used.%
52       }%
53     \ifdefined\tipauni@font
54       \tipauni@document@fonttrue
55     \else
56       \tipauni@document@fontfalse
57     \fi
58   \else
59     \tipauni@document@fonttrue
60     \let\tipauni@font\tipauni@temp
61   \fi
62   },%
63   noval recommendedfont    = {%
64     \tipauni@document@fonttrue

```



```

65     \let\tipauni@font\tipauni@recommended@font
66   }%
67 }
68 \ekvoProcessLocalOptions{tipauni}

```

The following code executes the `\setmainfont` command & issues a warning in a special case.

```

69 \iftipauni@document@font
70   \ifdefined\tipauni@font
71   \else
72     \let\tipauni@font\tipauni@recommended@font
73   \fi
74   \expandafter\setmainfont\expandafter
75   [\expandafter{\tipauni@font@options}]{\tipauni@font}
76 \else
77   \ifx\tipauni@font@options\@empty
78   \else
79     \PackageWarningNoLine{tipauni}{%
80       An active font loaded with package fontspec is\MessageBreak
81       necessary for `fontspecoptions' to take effect.\MessageBreak
82       Please use the `documentfont'/'recommendedfont'\MessageBreak
83       option or load a font outside package `tipauni'\MessageBreak
84       to make your options active. Currently ignoring:\MessageBreak
85       [\tipauni@font@options]%
86     }%
87   \fi
88 \fi

```

The following commands were kindly suggested by Phelype Oleinik for developing a conditional which is always global.

```

89 \newif\ifnontipa
90 \protected\def\nontipatrue{\global\let\ifnontipa\iftrue}
91 \protected\def\nontipafalse{\global\let\ifnontipa\iffalse}
92 \iftipauni@nontipa@ignore
93   \protected\def\nontipatrue{}
94 \fi

```

The following commands provide the command `\tipaunicmd` for printing characters that are missing in the `tipa` package.

```

95 \NewDocumentCommand\tipaunicmd{ m m }{%
96   \NewDocumentCommand#1{ }{\nontipatrue #2}%
97 }%

```

As can be seen above, everytime when a command that is absent in the `tipa` package is provided, it sets the conditional `nontipa` to true value. At the end of the document this package checks if there is any instance of a non-TIPA command. If yes, it generates a warning in the `.log` file saying that this code is now incompatible with the TIPA package and some characters might be displayed with a different font. All of this is achieved with the help of following commands. The discussion on [this](#) question helped a lot for fine tuning the warning message.

```

98 \AtEndDocument{%
99   \ifnontipa
100     \PackageWarningNoLine{tipauni}{%
101       You have used a command(s) that is (are) not\MessageBreak
102       supported by package TIPA. Thus your current code is\MessageBreak
103       incompatible with that package. These commands are\MessageBreak

```

```

104     printed with a different Unicode font. Refer to the\MessageBreak
105     documentation of package tipauni for a list of\MessageBreak
106     commands that are not supported in TIPA%
107 }%
108 \else
109 \fi
110 }%

```

From here the code for obtaining Unicode characters with TIPA commands starts.

```

111 \DeclareTextCommand{\tipaunistar}{TU}[1]{\#1}
112 \DeclareTextAccentDefault{\tipaunistar}{TU}
113 \DeclareTextCommand{\tipaunisemicolon}{TU}[1]{\#1}
114 \DeclareTextAccentDefault{\tipaunisemicolon}{TU}
115 \DeclareTextCommand{\tipaunicolon}{TU}[1]{\#1}
116 \DeclareTextAccentDefault{\tipaunicolon}{TU}
117 \DeclareTextCommand{\tipaunibang}{TU}[1]{\#1}
118 \DeclareTextAccentDefault{\tipaunibang}{TU}
119 \DeclareTextCommand{\tipaunipipe}{TU}[2]{\@pipeshorthands{\#1}{\#2}}
120 \DeclareTextAccentDefault{\tipaunipipe}{TU}
121 %% Pulmonic consonants
122 %%-- Stops
123 %%--** Retroflex
124 \DeclareTextSymbol{\texttrtailt}{TU}{"0288}%%
125 \DeclareTextComposite{\tipaunicolon}{TU}{t}{"288}
126 \DeclareTextSymbol{\texttrtaild}{TU}{"0256}%%
127 \DeclareTextComposite{\tipaunicolon}{TU}{d}{"256}
128 %%--** Palatal
129 \DeclareTextSymbol{\textbardotlessj}{TU}{"25F}%%
130 \DeclareTextComposite{\tipaunistar}{TU}{j}{"25F}
131 %%--** Uvular
132 \DeclareTextSymbol{\textscg}{TU}{"262}%%
133 \DeclareTextComposite{\tipaunisemicolon}{TU}{G}{"262}
134 %%--** Glottal
135 \DeclareTextSymbol{\textglotstop}{TU}{"294}%%
136 %%-- Nasals
137 %%--** Labiodental
138 \DeclareTextSymbol{\textltailm}{TU}{"271}%%
139 %%--** Retroflex
140 \DeclareTextSymbol{\textrtailn}{TU}{"273}%%
141 \DeclareTextComposite{\tipaunicolon}{TU}{n}{"273}
142 %%--** Palatal
143 \DeclareTextSymbol{\textltailn}{TU}{"272}%%
144 \DeclareTextComposite{\tipaunistar}{TU}{n}{"272}
145 %%--** Uvular
146 \DeclareTextSymbol{\textscn}{TU}{"274}%%
147 \DeclareTextComposite{\tipaunisemicolon}{TU}{N}{"274}
148 %%-- Trills
149 %%--** Bilabial
150 \DeclareTextSymbol{\textscb}{TU}{"299}%%
151 \DeclareTextComposite{\tipaunisemicolon}{TU}{B}{"299}
152 %%--** Uvular
153 \DeclareTextSymbol{\textscr}{TU}{"280}%%
154 \DeclareTextComposite{\tipaunisemicolon}{TU}{R}{"280}
155 %%-- Taps or flaps
156 %%-- Labiodental flap

```

```

157 \tipaunicmd{\labdentflap}{ }%% tipauni-exclusive
158 \DeclareTextComposite{\tipaunistar}{TU}{v}{2C71}%% tipauni-exclusive
159 %%---** Alveolar
160 \DeclareTextSymbol{\textfishhookr}{TU}{27E}%%
161 %%---** Retroflex
162 \DeclareTextSymbol{\textrtailr}{TU}{27D}%%
163 \DeclareTextComposite{\tipaunicolon}{TU}{r}{27D}
164 %%-- Fricatives
165 %%---** Bilabial
166 \DeclareTextSymbol{\textphi}{TU}{278}%%
167 \DeclareTextSymbol{\textbeta}{TU}{3B2}%%
168 %%---** Dental
169 \DeclareTextSymbol{\texttheta}{TU}{3B8}%%
170 %%---** Postalveolar
171 \DeclareTextSymbol{\textesh}{TU}{283}%%
172 \DeclareTextSymbol{\textyogh}{TU}{292}%%
173 %%---** Retroflex
174 \DeclareTextSymbol{\textrtails}{TU}{282}%%
175 \DeclareTextComposite{\tipaunicolon}{TU}{s}{282}
176 \DeclareTextSymbol{\textrtailz}{TU}{290}%%
177 \DeclareTextComposite{\tipaunicolon}{TU}{z}{290}
178 %%---** Palatal
179 \DeclareTextSymbol{\textctj}{TU}{29D}%%
180 %%---** Velar
181 \DeclareTextSymbol{\textgamma}{TU}{263}%%
182 %%---** Uvular
183 \DeclareTextSymbol{\textchi}{TU}{3C7}%%
184 \DeclareTextSymbol{\textinvscr}{TU}{281}%%
185 %%---** Pharyngeal
186 \DeclareTextSymbol{\textcrh}{TU}{127}%% h
187 \DeclareTextComposite{\tipaunistar}{TU}{h}{127}
188 \DeclareTextSymbol{\textrevglotstop}{TU}{295}%%
189 %%---** Glottal
190 \DeclareTextSymbol{\textthth}{TU}{266}%%
191 %%-- Lateral fricatives
192 %%---** Alveolar
193 \DeclareTextSymbol{\textbeltl}{TU}{26C}%%
194 \DeclareTextComposite{\tipaunistar}{TU}{l}{26C}
195 \DeclareTextSymbol{\textlyoghlig}{TU}{26E}%%
196 \DeclareTextComposite{\tipaunistar}{TU}{z}{26E}
197 %%-- Approximants
198 %%-- Labiodental approximant
199 \tipaunicmd{\labdentapp}{ }%% tipauni-exclusive
200 %%---** Alveolar
201 \DeclareTextSymbol{\textturnr}{TU}{279}%%
202 \DeclareTextComposite{\tipaunistar}{TU}{r}{279}
203 %%---** Retroflex
204 \DeclareTextSymbol{\textturnrrtail}{TU}{27B}%%
205 \DeclareTextComposite{\tipaunicolon}{TU}{R}{27B}
206 %%---** Velar
207 \DeclareTextSymbol{\textturnmrleg}{TU}{270}%%
208 \DeclareTextComposite{\tipaunistar}{TU}{m}{270}
209 %%-- Lateral approximants
210 %%---** Retroflex

```

```

211 \DeclareTextSymbol{\texttrtail1}{TU}{"26D}%%
212 \DeclareTextComposite{\tipaunicolon}{TU}{1}{"26D}
213 \DeclareTextSymbol{\textturny}{TU}{"28E}%%
214 \DeclareTextSymbol{\textsc1}{TU}{"29F}%%
215 \DeclareTextComposite{\tipaunisemicolon}{TU}{L}{"29F}
216 %% Non-pulmonic consonants
217 %%-- Clicks
218 %%--** Bilabial
219 \DeclareTextSymbol{\textbullseye}{TU}{"298}%%
220 \DeclareTextComposite{\tipaunibang}{TU}{o}{"298}
221 %%-- Postalveolar click
222 \tipaunicmd{\pstalvclick}{ }%% tipauni-exclusive
223 %%--** Palato-alveolar
224 \DeclareTextSymbol{\textdoublebarpipe}{TU}{"1C2}%%
225 \DeclareTextComposite{\tipaunibang}{TU}{c}{"1C2}%% tipauni-exclusive
226 %%--** Alveolar lateral
227 \DeclareTextSymbol{\textdoublepipe}{TU}{"1C1}%%
228 %%-- Implosives
229 %%--** Bilabial
230 \DeclareTextSymbol{\texthtb}{TU}{"253}%%
231 \DeclareTextComposite{\tipaunibang}{TU}{b}{"253}
232 %%--** Dental
233 \DeclareTextSymbol{\texthtd}{TU}{"257}%%
234 \DeclareTextComposite{\tipaunibang}{TU}{d}{"257}
235 %%--** Palatal
236 \DeclareTextSymbol{\texthtbardotlessj}{TU}{"284}%%
237 \DeclareTextComposite{\tipaunibang}{TU}{j}{"284}
238 %%--** Velar
239 \DeclareTextSymbol{\texthtg}{TU}{"260}%%
240 \DeclareTextComposite{\tipaunibang}{TU}{g}{"260}
241 %%--** Uvular
242 \DeclareTextSymbol{\texthtscg}{TU}{"29B}%%
243 \DeclareTextComposite{\tipaunibang}{TU}{G}{"29B}
244 %% Other consonants
245 \DeclareTextSymbol{\textturnw}{TU}{"28D}%%
246 \DeclareTextSymbol{\textturnh}{TU}{"265}%%
247 \DeclareTextSymbol{\textsch}{TU}{"29C}%%
248 \DeclareTextSymbol{\textbarrevglotstop}{TU}{"2A2}%%
249 \DeclareTextComposite{\tipaunistar}{TU}{1}{"2A2}%% tipauni-exclusive
250 \DeclareTextSymbol{\textbarglotstop}{TU}{"2A1}%%
251 \DeclareTextComposite{\tipaunistar}{TU}{2}{"2A1}%% tipauni-exclusive
252 \DeclareTextSymbol{\textctc}{TU}{"255}%%
253 \DeclareTextSymbol{\textctz}{TU}{"291}%%
254 \DeclareTextComposite{\tipaunistar}{TU}{Z}{"291}%% tipauni-exclusive
255 \DeclareTextSymbol{\textturnlonglegr}{TU}{"27A}%%
256 \DeclareTextComposite{\tipaunibang}{TU}{r}{"27A}%% tipauni-exclusive
257 \DeclareTextSymbol{\textthheng}{TU}{"267}%%
258 \DeclareTextComposite{\tipaunistar}{TU}{3}{"267}%% tipauni-exclusive
259 \DeclareTextComposite{\tipaunistar}{TU}{k}{"029E}%%
260 \DeclareTextComposite{\tipaunistar}{TU}{t}{"287}%%
261 \DeclareTextComposite{\tipaunistar}{TU}{w}{"28D}%%
262 \DeclareTextComposite{\tipaunisemicolon}{TU}{E}{"1D07}%%
263 \DeclareTextComposite{\tipaunisemicolon}{TU}{J}{"1D0A}%%
264 \DeclareTextComposite{\tipaunisemicolon}{TU}{A}{"1D00}%%

```

```

265 \DeclareTextComposite{\tipaunisemicolon}{TU}{H}{"29C}%
266 \DeclareTextComposite{\tipaunisemicolon}{TU}{U}{"1D1C}%
267 %% Vowels
268 \DeclareTextSymbol{\textsci}{TU}{"26A}%%
269 \DeclareTextSymbol{\textscy}{TU}{"28F}%%
270 \DeclareTextSymbol{\textepsilon}{TU}{"25B}%%
271 \DeclareTextSymbol{\textbari}{TU}{"268}%%
272 \DeclareTextSymbol{\textbaru}{TU}{"289}%%
273 \DeclareTextSymbol{\textupsilon}{TU}{"28A}%%
274 \DeclareTextSymbol{\textreve}{TU}{"258}%% e
275 \DeclareTextSymbol{\textbaro}{TU}{"275}%%
276 \DeclareTextSymbol{\textschwa}{TU}{"259}%% e
277 \DeclareTextSymbol{\textrepepsilon}{TU}{"25C}%%
278 \DeclareTextSymbol{\textclosererepsilon}{TU}{"25E}%%
279 \DeclareTextSymbol{\textturna}{TU}{"250}%%
280 \DeclareTextSymbol{\textturnm}{TU}{"26F}%%
281 \DeclareTextSymbol{\textramshorns}{TU}{"264}%%
282 \DeclareTextSymbol{\textturnv}{TU}{"28C}%%
283 \DeclareTextSymbol{\textopeno}{TU}{"254}%%
284 \DeclareTextSymbol{\textscripta}{TU}{"251}%%
285 \DeclareTextSymbol{\textturnscripta}{TU}{"252}%%
286 %% Independent diacritic marks
287 %%-- Rhoticity
288 \DeclareTextSymbol{\textrhoticity}{TU}{"2DE}%%
289 \tipaunicmd{\tr}{ }
290 %%-- Tie bar (below)
291 \DeclareTextCommand{\tipaunitextbottomtiebar}{TU}[2]{#1\symbol{"035C}#2}
292 \NewDocumentCommand\textbottomtiebar{ m }{\tipaunitextbottomtiebar#1}
293 %%-- Tie bar (below) - standalone character
294 \DeclareTextCommand{\tipaunits}{TU}[2]{#1\symbol{"203F}#2}
295 \NewDocumentCommand\stdlnetiebar{ m }{\tipaunits#1}
296 \NewDocumentCommand\ts{ m }{\tipaunits#1}

```

The following commands redefine the TIPA shorthand input for dependent diacritics.

```

297 %% No audible release
298 \DeclareTextSymbol{\textcorner}{TU}{"31A}%%
299 \tipaunicmd{\tc}{ }
300 %% Syllabic
301 \DeclareUnicodeAccent{\textsyllabic}{TU}{"0329}%%
302 \NewDocumentCommand\s{ m }{\textsyllabic{\textipa{#1}}\nontipatrue}
303 %% Non-syllabic
304 \DeclareUnicodeAccent{\textsubarch}{TU}{"032F}%% _
305 \NewDocumentCommand\ns{ m }{\textsubarch{\textipa{#1}}}
306 %% Laminal
307 \DeclareUnicodeAccent{\textsubsquare}{TU}{"033B}%%
308 \NewDocumentCommand\lms{ m }{\textsubsquare{\textipa{#1}}\nontipatrue}
309 %% Other complex shorthand commands
310 \DeclareTextCommand{\@pipeshortands}{TU}[2]{%
311   \if #1[\tipaunisubbridge{\textipa{#2}}\else
312   \if #1]\tipauniinvsubbridge{\textipa{#2}}\else
313   \if #1(\tipaunisublhalfring{\textipa{#2}}\else
314   \if #1)\tipaunisubrhalfring{\textipa{#2}}\else
315   \if #1+\tipaunisubplus{\textipa{#2}}\else
316   \if #1'\tipauniraising{\textipa{#2}}\else
317   \if #1`\tipaunilowering{\textipa{#2}}\else

```

```

318 \if #1<\tipauniadvancing{\textipa{#2}}\else
319 \if #1>\tipauniretracting{\textipa{#2}}\else
320 \if #1x\tipauniovercross{\textipa{#2}}\else
321 \if #1m\tipauniseagull{\textipa{#2}}\else #1#2%
322 \fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi
323 }%
324 \DeclareTextAccentDefault{\@pipeshortands}{TU}
325 \ExplSyntaxOn
326 \NewDocumentCommand \super { m }
327 {%
328   \str_case:nn {#1}
329   {
330     {h} {}
331     {w} {}
332     {j} {}
333     {} {}
334     {} {}
335     {n} {}
336     {l} {}
337   }
338 }

```

We need a few variables.

```

339 \seq_new:N \l__tipauni_remove_from_accents_seq
340 \tl_new:N \l__tipauni_textipa_tl

```

Since we have a non-standard syntax for some of the accent macros (having a starred variant) we have to exclude them from the list of accents which get special handling from `\text_expand:n` or else the stars will be surrounded by braces and not found by `\@ifstar`. This sequence stores the problematic accents which need to be excluded.

```

341 \seq_set_split:Nnn \l__tipauni_remove_from_accents_seq { , }
342 { \~, \=, \", \r, \v, \t }

```

We only search for the macros not contained in `tipa` if this is requested by the user.

```

343 \iftipauni@nontipa@ignore
344   \cs_new_eq:NN \__tipauni_nontipa_search: \prg_do_nothing:
345   \cs_new_eq:NN \__tipauni_nontipa_search:n \use_none:n
346 \else
347   \cs_new_protected:Npn \__tipauni_nontipa_search:
348   {
349     \unless\ifnontipa
350       \exp_args:No \__tipauni_nontipa_search:n \l__tipauni_textipa_tl
351     \fi
352   }

```

The warning thrown at the end of the run doesn't list which symbols were incompatible, so we stop searching when we found one incompatible symbol. We use `\str_if_in:nnT` so that groups don't affect the search. The alternative would be the much slower `\regex_match:nnT`.

```

353   \cs_new_protected:Npn \__tipauni_nontipa_search:n #1
354   {
355     \str_if_in:nnT {#1} {} { \nontipatrue \use_none_delimit_by_s_stop:w }
356     \str_if_in:nnT {#1} {} { \nontipatrue \use_none_delimit_by_s_stop:w }
357     \str_if_in:nnT {#1} {} { \nontipatrue \use_none_delimit_by_s_stop:w }
358     \str_if_in:nnT {#1} {} { \nontipatrue \use_none_delimit_by_s_stop:w }
359     \str_if_in:nnT {#1} {} { \nontipatrue \use_none_delimit_by_s_stop:w }

```

```

360 \str_if_in:nnT {#1} {} { \nontipatru \use_none_delimit_by_s_stop:w }
361 \str_if_in:nnT {#1} {} { \nontipatru \use_none_delimit_by_s_stop:w }
362 \str_if_in:nnT {#1} {} { \nontipatru \use_none_delimit_by_s_stop:w }
363 \str_if_in:nnT {#1} {} { \nontipatru \use_none_delimit_by_s_stop:w }
364 \use_none:nnn \s_stop
365 \use:n { \cs_gset_eq:NN \__tipauni_nontipa_search: \prg_do_nothing: }
366 }
367 \fi

```

The user facing macro needs to make some local settings.

```

368 \NewDocumentCommand\textipa{ +m }%
369 {
370   \begingroup
371   \let*\tipaunistar
372   \let\:\tipaunicolon
373   \let\;\tipaunisemicolon
374   \let\!\tipaunibang
375   \let\|\tipaunipipe
376   \let\t\tipaunit

```

Here we locally remove the accents which have a starred variant from the exclusion list of `\text_expand:n`.

```

377 \seq_map_inline:Nn \l__tipauni_remove_from_accents_seq
378 { \tl_remove_all:Nn \l_text_accents_tl {##1} }

```

Here is the real replacement. First we carefully expand the input using `\text_expand:n`, then we'll loop over the token list with a construct similar to the `expl3` internal `__tl_act:NNNn` (hence the name `__tipauni_act:n`). Since the replacement code depends on the correct string representation of things we explicitly set the `\escapechar` to a backslash and reset it afterwards.

```

379 \tl_set:Nx \l__tipauni_textipa_tl { \text_expand:n {#1} }
380 \use:x
381 {
382   \exp_not:n
383   {
384     \escapechar = `\\
385     \tl_set:Nx \l__tipauni_textipa_tl
386     { \exp_args:No \__tipauni_act:n \l__tipauni_textipa_tl }
387     \escapechar =
388   }
389   \int_use:N \escapechar
390 }
391 \exp_stop_f:
392 \l__tipauni_textipa_tl

```

Finally test for tipa-incompatible symbols.

```

393 \__tipauni_nontipa_search:
394 \endgroup
395 }

```

We'll need a scan mark for the `act` code, so we initialise it.

```

396 \scan_new:N \s__tipauni_act_stop
397 \cs_new:Npn \__tipauni_use_none_delimit_by_act_stop:w #1 \s__tipauni_act_stop {}

```

The `act` macro uses a bit of low level coding to get good performance. It implements a loop which does the replacement of single letters, bigraphs or combinations of one macro and one letter (which might be separated from the macro by multiple spaces, or

contained in braces as an argument, or both). `__tipauni_act:n` should be used inside an `x`-expansion context. The only token which is not allowed to be ever part of the argument for `__tipauni_act:n` is `\s__tipauni_act_stop`.

```
398 \cs_new:Npn \__tipauni_act:n #1 { \__tipauni_act_loop:w #1 {\s__tipauni_act_stop} . \s__tipau
```

Just to have an easier to spot output we use a private copy of `\exp_not:n`, meaning we leave the output in the input stream (but since the whole loop should be used in an `x`-expansion context this is fine, anything expecting arguments will get those later).

```
399 \cs_new_eq:NN \__tipauni_act_output:n \exp_not:n
```

The current loop status is indicated by one macro – `\use_none:nn` for the initial state; `__tipauni_act_macro:nn` if a macro being the start of a bigraph was encountered; or `__tipauni_act_char:nn` if a character being the start of a bigraph or a monograph was encountered – followed by one `n`-type argument containing information depending on the state. So for `__tipauni_act_loop:Nnw` the arguments are: `#1` is the status macro, `#2` more status information, `#3` the remainder of the argument list. It'll branch off depending on the first token in `#3` being either a space, a group (anything started by a character of category 1, typically an opening brace) and anything else (a valid `N`-type argument).

```
400 \cs_new:Npn \__tipauni_act_loop:w { \__tipauni_act_loop:Nnw \use_none:nn {} }
401 \cs_new:Npn \__tipauni_act_loop:Nnw #1#2#3 \s__tipauni_act_stop
402 {
403   \__tipauni_act_if_head_is_space:nTF {#3}
404     { \__tipauni_act_space:Nnw }
405     {
406       \tl_if_head_is_group:nTF {#3}
407         \__tipauni_act_group:Nnn
408         \__tipauni_act_normal:NnN
409       }
410       #1 {#2} #3 \s__tipauni_act_stop
411   }
```

We'll need a few explicit space tokens in the following definitions, so we use a temporary macro to set this up.

```
412 \group_begin:
413   \cs_set:Npn \__tipauni_tmp:n #1
414     {
```

Quick test for a leading space using the stop-marker.

```
415     \cs_new:Npn \__tipauni_act_if_head_is_space:nTF ##1
416       {
417         \__tipauni_act_if_head_is_space:w
418           \s__tipauni_act_stop ##1 \s__tipauni_act_stop
419           \__tipauni_act_if_head_is_space_true:w
420           \s__tipauni_act_stop #1 \s__tipauni_act_stop
421           \use_ii:nn
422       }
423     \cs_new:Npn \__tipauni_act_if_head_is_space:w
424       ##1 \s__tipauni_act_stop #1 ##2 \s__tipauni_act_stop
425     {}
426     \cs_new:Npn \__tipauni_act_if_head_is_space_true:w
427       \s__tipauni_act_stop #1 \s__tipauni_act_stop \use_ii:nn ##1 ##2
428     {##1}
```

The case with a space needs a bit of special treatment if the current state is `macro`. In that case we defer the decision and save the space inside the additional status `n`-type argument.

That consists of two nested n-type arguments, the first being the control sequence under test and the second tokens which need to be reinserted should the replacement fail.

```

429 \cs_new:Npn \__tipauni_act_space:Nnw ##1 ##2 #1
430 {
431   \token_if_eq_meaning:NNTF ##1 \__tipauni_act_macro:nn
432   { \__tipauni_act_space_macro:nn ##2 }
433   {
434     \cs_if_exist_use:cTF { \__tipauni_act_char_mono_ \tl_to_str:n { ##2 } : }
435     { \__tipauni_act_output:n {~} }
436     { \__tipauni_act_output:n { ##2 ~ } }
437     \__tipauni_act_loop:w
438   }
439 }
440 }
441 \__tipauni_tmp:n {~}
442 \group_end:

```

This macro just works as a helper to get the two separate arguments in the status and append a space token to the deferred list.

```

443 \cs_new:Npn \__tipauni_act_space_macro:nn #1#2
444 { \__tipauni_act_loop:Nnw \__tipauni_act_macro:nn { {#1} { #2 ~ } } }

```

The end marker is a single `\s__tipauni_act_stop` in a group, hence we need to test for that. If this isn't the end we need to handle two different cases, if the current state is a macro the group might actually be the correct argument to that macro, else a bigraph shouldn't contain a group, so we output what ever the current status deferred information was (either as a mono replacement or just as is) and act on the group.

```

445 \cs_new:Npn \__tipauni_act_group:Nnn #1#2#3
446 {
447   \__tipauni_use_none_delimit_by_act_stop:w
448   #3 \__tipauni_act_final:Nnw #1 {#2} \s__tipauni_act_stop
449   \token_if_eq_meaning:NNTF #1 \__tipauni_act_macro:nn
450   { \__tipauni_act_group_macro:nn {#2} {#3} }
451   {
452     \cs_if_exist_use:cF { \__tipauni_act_char_mono_ \tl_to_str:n { #2 } : }
453     { \__tipauni_act_output:n {#2} }
454     { \__tipauni_act_loop:w #3 {\s__tipauni_act_stop} . \s__tipauni_act_stop }
455   }
456   \__tipauni_act_loop:w
457 }

```

The final code needs to remove the remainder of the loop and reinsert whatever was deferred, unless that happens to be one of the single tokens to be replaced in which case we do the replacement.

```

458 \cs_new:Npn \__tipauni_act_final:Nnw
459 #1#2 \s__tipauni_act_stop #3 \__tipauni_act_loop:w #4 \s__tipauni_act_stop
460 {
461   \cs_if_exist_use:cF { \__tipauni_act_char_mono_ \tl_to_str:n { #2 } : }
462   {
463     \token_if_eq_meaning:NNTF #1 \__tipauni_act_macro:nn
464     { \exp_args:No \__tipauni_act_output:n { \use:nn #2 } }
465     { \__tipauni_act_output:n {#2} }
466   }
467 }

```

The normal case is pretty straight forward, if the current state is the initial state, check whether the token under test is the start of one of the replacement sequences (this would be stored inside a macro), if it isn't directly output it. If it is the code in that macro will do the right thing. If the current state is something else the state macro will handle things, so we just call it with the arguments it should get.

```

468 \cs_new:Npn \__tipauni_act_normal:NnN #1#2#3
469   {
470     \token_if_eq_meaning:NNTF #1 \use_none:nn
471     {
472       \cs_if_exist_use:cF { __tipauni_act_normal_ \tl_to_str:n {#3} :nw }
473       { \__tipauni_act_output:n }
474       {#3}
475     }
476     { #1 {#2} {#3} }
477     \__tipauni_act_loop:w
478   }

```

The code that should handle a macro will test whether a replacement occurs (stored inside a macro), if it does calls that macro, else outputs the deferred information. Since the macro state will have two groups in the deferred state we need to handle that using `\use_i:nn` to get the macro name, and `\use:nn` to just unbrace the macro and the other deferred tokens (which might be any number of spaces).

```

479 \cs_new:Npn \__tipauni_act_macro:nn #1#2
480   {
481     \cs_if_exist_use:cF
482     { __tipauni_act_macro_ \exp_args:No \tl_to_str:n { \use_i:nn #1 / #2 } : }
483     { \exp_args:No \__tipauni_act_output:n { \use:nn #1 #2 } }
484   }

```

If the macro state was active when a group was encountered we need to check whether that group was the correct argument for the replacement, if it was do the replacement, else reinstert the macro and deferred tokens and loop through the group.

```

485 \cs_new:Npn \__tipauni_act_group_macro:nn #1#2
486   {
487     \cs_if_exist_use:cF
488     { __tipauni_act_macro_ \exp_args:No \tl_to_str:n { \use_i:nn #1 / #2 } : }
489     {
490       \exp_args:No \__tipauni_act_output:n { \use:nn #1 }
491       { \__tipauni_act_loop:w #2 {\s__tipauni_act_stop} . \s__tipauni_act_stop }
492     }
493   }

```

If the char state is active we need to check whether a bigraph was found, if so do that replacement, else test whether the single char is to be replaced without being part of a bigraph, if not output it unchanged. If there was no bigraph the newly found character might be the start of a mono- or bigraph so we pass it back to the N-type act to evaluate that, in which case we need to remove a trailing `__tipauni_act_loop:w` which would start the next loop which we do using `\use_i:nn`.

```

494 \cs_new:Npn \__tipauni_act_char:nn #1#2
495   {
496     \cs_if_exist_use:cF { __tipauni_act_char_bigraph_ \tl_to_str:n { #1/#2 } : }
497     {
498       \cs_if_exist_use:cF { __tipauni_act_char_mono_ \tl_to_str:n { #1 } : }
499       { \__tipauni_act_output:n {#1} }
500       \use_i:nn { \__tipauni_act_normal:NnN \use_none:nn {} {#2} }

```

```

501     }
502 }

```

To register new bigraphs we use the following functions. The information is always stored inside two macros, the first is called `@@_act_normal_⟨first token⟩:nw` and will set the correct state, the second is named dependent on the state it should be found in, either `@@_act_macro_⟨first token⟩/⟨second token⟩:`, `@@_act_char_bigraph_⟨first token⟩/⟨second token⟩:`, or `@@_act_char_mono_⟨token⟩:`. Those second macros contain the actual replacement.

The first macro is a wrapper which just inputs `__tipauni_new_macro_bigraph:NNn` for the two macros in #1 and #2.

```

503 \cs_new_protected:Npn __tipauni_new_macro_pair_bigraph:NNNn #1#2#3#4
504 {
505   \__tipauni_new_macro_bigraph:NNn #1 #3 {#4}
506   \__tipauni_new_macro_bigraph:NNn #2 #3 {#4}
507 }

```

A macro bigraph should consist of a control sequence followed by another token. It'll switch the state to macro.

```

508 \cs_new_protected:Npn __tipauni_new_macro_bigraph:NNn #1#2#3
509 {
510   \cs_gset:cpn { __tipauni_act_normal_ \tl_to_str:n {#1} :nw } ##1##2 __tipauni_act_loop:w
511   { \__tipauni_act_loop:Nnw __tipauni_act_macro:nn { {##1} {} } }
512   \cs_gset:cpn { __tipauni_act_macro_ \tl_to_str:n { #1/#2 } : }
513   { \__tipauni_act_output:n {#3} }
514 }

```

A character bigraph should consist of two characters. It'll switch the state to char.

```

515 \cs_new_protected:Npn __tipauni_new_char_bigraph:NNn #1#2#3
516 {
517   \cs_gset:cpn { __tipauni_act_normal_ \tl_to_str:n {#1} :nw } ##1##2 __tipauni_act_loop:w
518   { \__tipauni_act_loop:Nnw __tipauni_act_char:nn {##1} }
519   \cs_gset:cpn { __tipauni_act_char_bigraph_ \tl_to_str:n { #1/#2 } : }
520   { \__tipauni_act_output:n {#3} }
521 }

```

And lastly the single replacements which should just be a single character. These will also switch the state to char (as they might be also a start of a bigraph).

```

522 \cs_new_protected:Npn __tipauni_new_char_mono:Nn #1#2
523 {
524   \cs_gset:cpn { __tipauni_act_normal_ \tl_to_str:n {#1} :nw } ##1##2 __tipauni_act_loop:w
525   { \__tipauni_act_loop:Nnw __tipauni_act_char:nn {##1} }
526   \cs_gset:cpn { __tipauni_act_char_mono_ \tl_to_str:n {#1} : }
527   { \__tipauni_act_output:n {#2} }
528 }

```

Everything that's now missing is defining the macros storing the replacements as described above.

```

529 \__tipauni_new_macro_pair_bigraph:NNNn \! \tipaunibang G { }
530 \__tipauni_new_macro_pair_bigraph:NNNn \! \tipaunibang g { }
531 \__tipauni_new_macro_pair_bigraph:NNNn \* \tipaunistar 1 { }
532 \__tipauni_new_macro_pair_bigraph:NNNn \* \tipaunistar 2 { }
533 \__tipauni_new_macro_pair_bigraph:NNNn \* \tipaunistar 3 { }
534 \__tipauni_new_macro_pair_bigraph:NNNn \* \tipaunistar Z { }
535 \__tipauni_new_macro_pair_bigraph:NNNn \: \tipaunicolon R { }
536 \__tipauni_new_macro_pair_bigraph:NNNn \; \tipaunisemicolon A { }

```

```

537 \__tipauni_new_macro_pair_bigraph:NNNn \; \tipaunisemicolon G { }
538 \__tipauni_new_macro_pair_bigraph:NNNn \; \tipaunisemicolon B { }
539 \__tipauni_new_macro_pair_bigraph:NNNn \; \tipaunisemicolon E { }
540 \__tipauni_new_macro_pair_bigraph:NNNn \; \tipaunisemicolon H { }
541 \__tipauni_new_macro_pair_bigraph:NNNn \; \tipaunisemicolon J { }
542 \__tipauni_new_macro_pair_bigraph:NNNn \; \tipaunisemicolon L { }
543 \__tipauni_new_macro_pair_bigraph:NNNn \; \tipaunisemicolon N { }
544 \__tipauni_new_macro_pair_bigraph:NNNn \; \tipaunisemicolon R { }
545 \__tipauni_new_macro_pair_bigraph:NNNn \; \tipaunisemicolon U { }
546 \__tipauni_new_char_bigraph:NNn || { }
547 \__tipauni_new_char_bigraph:NNn " " { }
548 \clist_map_inline:nn
549 {
550   {5}{}, {A}{}, {6}{}, {2}{}, {B}{}, {C}{}, {D}{ø}, {9}{ø}, {E}{},
551   {3}{}, {g}{}, {G}{}, {7}{}, {H}{}, {L}{}, {4}{}, {1}{}, {I}{},
552   {J}{}, {M}{}, {W}{}, {N}{η}, {8}{}, {O}{}, {F}{}, {R}{}, {K}{},
553   {S}{}, {T}{}, {O}{}, {U}{}, {V}{}, {X}{}, {Y}{}, {Z}{},
554   {P}{}, {Q}{},
555   {:}{}, {;}{}, {!}{}, {&}{}, {@}{ø}, {l}{}, {"}{ }
556 }
557 { \__tipauni_new_char_mono:Nn #1 }
558 \ExplSyntaxOff

```

The following commands define the long commands for dependent diacritics.

```

559 %%-- Dependent diacritic marks
560 %%--** Voiceless
561 \DeclareUnicodeAccent{\textsupring}{TU}{"030A}%%`
562 \DeclareUnicodeAccent{\textsubring}{TU}{"0325}%%
563 \DeclareTextCommand{\r}{TU}{\tipauniring}
564 \protected\def\tipauniring{\@ifstar{\TipaUniSubRing}{\TipaUniSupRing}}
565 \NewDocumentCommand\TipaUniSupRing{ m }{\textsupring{\textipa{#1}}}
566 \NewDocumentCommand\TipaUniSubRing{ m }{\textsubring{\textipa{#1}}}
567 %%--** Voiced
568 \DeclareUnicodeAccent{\textsupwedge}{TU}{"030C}%%`
569 \DeclareUnicodeAccent{\textsubwedge}{TU}{"032C}%%
570 \DeclareTextCommand{\v}{TU}{\tipauniwedge}
571 \protected\def\tipauniwedge{\@ifstar{\TipaUniSubWedge}{\TipaUniSupWedge}}
572 \NewDocumentCommand\TipaUniSupWedge{ m }{\textsupwedge{\textipa{#1}}}
573 \NewDocumentCommand\TipaUniSubWedge{ m }{\textsubwedge{\textipa{#1}}}
574 %%--** More rounded
575 \DeclareUnicodeAccent{\textsubrhalfring}{TU}{"0339}%%
576 \NewDocumentCommand\tipaunisubrhalfring{ m }{\textsubrhalfring{\textipa{#1}}}
577 %%--** Less rounded
578 \DeclareUnicodeAccent{\textsublhalfring}{TU}{"031C}%%
579 \NewDocumentCommand\tipaunisublhalfring{ m }{\textsublhalfring{\textipa{#1}}}
580 %%--** Advanced
581 \DeclareUnicodeAccent{\textsubplus}{TU}{"031F}%%
582 \NewDocumentCommand\tipaunisubplus{ m }{\textsubplus{\textipa{#1}}}
583 %%--** Retracted
584 \DeclareUnicodeAccent{\textsupbar}{TU}{"0304}%%`
585 \DeclareUnicodeAccent{\textsubbar}{TU}{"0320}%%
586 \DeclareTextCommand{\=}{TU}{\tipaunibar}
587 \protected\def\tipaunibar{\@ifstar{\TipaUniSubBar}{\TipaUniSupBar}}
588 \NewDocumentCommand\TipaUniSupBar{ m }{\textsupbar{\textipa{#1}}}
589 \NewDocumentCommand\TipaUniSubBar{ m }{\textsubbar{\textipa{#1}}}

```

```

590 %%---** Mid-centralized
591 \DeclareUnicodeAccent{\textovercross}{TU}{"033D}%%
592 \NewDocumentCommand\tipauniovercross{ m }{\textovercross{\textipa{#1}}}
593 %%---** Breathy voiced
594 \DeclareUnicodeAccent{\textsupumlaut}{TU}{"0308}%%~
595 \DeclareUnicodeAccent{\textsubumlaut}{TU}{"0324}%%
596 \DeclareTextCommand{\~}{TU}{\tipauniumlaut}
597 \protected\def\tipauniumlaut{\@ifstar{\TipaUniSubUmlaut}{\TipaUniSupUmlaut}}
598 \NewDocumentCommand\TipaUniSupUmlaut{ m }{\textsupumlaut{\textipa{#1}}}
599 \NewDocumentCommand\TipaUniSubUmlaut{ m }{\textsubumlaut{\textipa{#1}}}
600 %%---** Creaky voiced
601 \DeclareUnicodeAccent{\textsuptilde}{TU}{"0303}%%~
602 \DeclareUnicodeAccent{\textsubtilde}{TU}{"0330}%%~
603 \DeclareTextCommand{\~}{TU}{\tipaunitilde}
604 \protected\def\tipaunitilde{\@ifstar{\TipaUniSubTilde}{\TipaUniSupTilde}}
605 \NewDocumentCommand\TipaUniSupTilde{ m }{\textsuptilde{\textipa{#1}}}
606 \NewDocumentCommand\TipaUniSubTilde{ m }{\textsubtilde{\textipa{#1}}}
607 %%---** Linguo-labialized
608 \DeclareUnicodeAccent{\textseagull}{TU}{"033C}%%
609 \NewDocumentCommand\tipauniseagull{ m }{\textseagull{#1}}
610 %%---** Velarized
611 \DeclareUnicodeAccent{\textsuperimposetilde}{TU}{"0334}%%
612 \NewDocumentCommand\tipaunisuperimposetilde{ m }{\textsuperimposetilde{#1}}
613 \NewDocumentCommand\vl{ m }{\textsuperimposetilde{\textipa{#1}}}
614 %%---** Raised
615 \DeclareUnicodeAccent{\textraising}{TU}{"031D}%%
616 \NewDocumentCommand\tipauniraising{m}{\textraising{#1}}
617 %%---** Lowered
618 \DeclareUnicodeAccent{\textlowering}{TU}{"031E}%%
619 \NewDocumentCommand\tipaunilowering{m}{\textlowering{#1}}
620 %%---** Advanced tongue root
621 \DeclareUnicodeAccent{\textadvancing}{TU}{"0318}%%
622 \NewDocumentCommand\tipauniadvancing{m}{\textadvancing{#1}}
623 %%---** Retracted tongue root
624 \DeclareUnicodeAccent{\textretracting}{TU}{"0319}%%
625 \NewDocumentCommand\tipauniretracting{m}{\textretracting{#1}}
626 %%---** Dental
627 \DeclareUnicodeAccent{\textsubbridge}{TU}{"032A}%%
628 \NewDocumentCommand\tipaunisubbridge{ m }{\textsubbridge{#1}}
629 %%---** Apical
630 \DeclareUnicodeAccent{\textinvsubbridge}{TU}{"033A}%%
631 \NewDocumentCommand\tipauniinvsubbridge{ m }{\textinvsubbridge{#1}}
632 %%---** Tie bar (above)
633 \DeclareTextCommand\tipaunitexttoptiebar{TU}[2]{#1\symbol{"0361}#2}
634 \NewDocumentCommand\texttoptiebar{ m }{\tipaunitexttoptiebar#1}
635 \DeclareTextCommand\tipaunit{\@ifstar{\textbottomtiebar}{\texttoptiebar}}

```

Lastly the code for environment IPA is provided by the following.

```

636 \NewDocumentEnvironment{IPA}{+b}{\textipa{#1}}{}
637 \endpackage

```

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