

Documentation for the nsłxIPA Keyboard

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This manual describes version 1.1 of the nsłxIPA keyboard. The most recent version is available at:

<http://sanders.phonologist.org/nsłxIPAkeyboard/>

1 Purpose and Overall Keyboard Design

The nsLxIPA keyboard is designed for relatively easy and intuitive Unicode input of characters from the International Phonetic Alphabet (IPA) directly from the keyboard, without having to use opaque codes or other windows to access the characters. Note that the nsLxIPA keyboard is a Mac-specific keyboard layout; there may be ways of converting it for use on other systems, but it may not work as intended, if it even works at all.

The nsLxIPA keyboard was created using Ukelele, a free program for creating and modifying Mac keyboard layouts, written by John Brownie of the Summer Institute of Linguistics (SIL). I highly recommend it if you find yourself frequently needing special characters that are not available from your regular keyboard or if you want to make your own modifications to the nsLxIPA keyboard to suit your needs. Ukelele is available from the SIL's website at:

<http://scripts.sil.org/ukelele>

While choosing the layout of the characters on the nsLxIPA keyboard, I had the following principles in mind, listed here roughly in order of importance:

- Every official IPA character should be available.
- The underlying keyboard layout should be the ordinary Mac US keyboard (henceforth the “normal keyboard”), and if a keystroke on the normal keyboard produces a valid IPA character, it should do so on the nsLxIPA keyboard as well. For example, because **option+o** produces ⟨ø⟩ on the normal keyboard, it does so on the nsLxIPA keyboard.
- The layout of the nsLxIPA keyboard should be L^AT_EX friendly, so that common special characters in L^AT_EX, such as ⟨~⟩, ⟨\$⟩, ⟨%⟩, ⟨&⟩, and ⟨\⟩, can be typed on the nsLxIPA keyboard with the same keystrokes as on the normal keyboard.
- More common IPA characters should use keystrokes with fewer keys than less common characters. For example, the two-key keystrokes **shift+s** and **option+s** produce the more commonly used characters ⟨f⟩ and ⟨s⟩, while the three-key keystroke **shift+option+S** produces the less commonly used character ⟨ſ⟩.
- When possible, IPA characters that are visually similar and/or represent phonetically similar sounds should be produced by the same base key, differing by which modifier keys need to be pressed. What counts as “similar” is not always uniquely defined, and choices have been made to make the keyboard as intuitive and as systematic as possible. For example, ⟨ɔ⟩ is visually similar to ⟨c⟩ by 180° rotation, but as an IPA character, it represents a sound phonetically similar to that represented by ⟨o⟩. In this case, ⟨ɔ⟩ is assigned to the keystroke **shift+o** to fit the phonetic pattern established by **shift+e**, **shift+i**, **shift+u**, and **shift+y**, which produce characters representing the lower/lax vowels ⟨e⟩, ⟨i⟩, ⟨u⟩, and ⟨y⟩.
- When possible, a modifier key should have generally predictable functions, so that it is easier to guess which keystroke is needed to produce a particular character. However, as a low-ranking design principle, it is sometimes violated. For example, most **shift** keystrokes produce small capitals and/or characters representing fricatives or lower/lax vowels, though **shift+n** produces ⟨ŋ⟩ rather than ⟨n⟩, which is instead produced by **shift+option+n**.

2 Installation and Usage

After downloading the `nsLxIPA.keylayout` file, move it to your `/Library/Keyboard Layouts/` folder. This is a system folder and may be protected, depending on your system version and settings, so you may be asked to enter your administrator password. Once the `nsLxIPA.keylayout` file is in the correct folder, open the Keyboard pane in system preferences and select the Input Sources tab, which should give you a window with a list of your input sources (i.e. those keyboards which are currently available for use) on the left.

Add a new input source by clicking the plus sign below the list of input sources and search for the `nsLxIPA` keyboard; you should be able to browse to it directly through the Others group of keyboards, but you can also type its name in the search bar. Select the `nsLxIPA` keyboard from the list that appears on the right and click Add. The `nsLxIPA` keyboard should appear in the list of input sources. You may also want to be sure that the Show Input menu in menu bar option at the bottom of the window is checked, so that you can always see what your current input source is; click it on and off and watch the menu bar at the top of the screen to see where it appears (usually between the battery meter and the clock).

To make an available input source currently active, you can either select it from the input menu on the menu bar, or you can use a keyboard shortcut (you can view or change these keyboard shortcuts in the Shortcuts tab of the Keyboard system preferences by selecting Input Sources and following the on-screen directions; by default, **command+k** and **shift+command+k** will cycle through the available input sources). Once the `nsLxIPA` keyboard is the currently active input source, you can type phonetic characters in any Unicode-aware window with a Unicode font.

In the rest of this document, I describe how IPA characters are assigned to keystrokes on the `nsLxIPA` keyboard, first organized by keystrokes and keyboard layout (§3), and then organized by the arrangement of symbols on IPA charts (§4).

3 Layout of Characters by Keystroke

There are two main types of keystrokes to access characters on the `nsLxIPA` keyboard: unmodified keystrokes (those in which a single key is pressed; see §3.1) and modified keystrokes (those in which one or two modifier keys, **shift** and/or **option**, are pressed at the same time as a base key; see §3.2 for modified keystrokes with **shift** as the sole modifier key, §3.3 for modified keystrokes with **option** as the sole modifier key, and §3.4 for modified keystrokes with **shift** and **option** pressed together as the modifier keys).

Keys and keystrokes are notated here in bold monospaced font, modified keystrokes are notated by prefixing the modifier key(s) to the base key separated by +, and a keystroke's output is given in serif font (and enclosed by angle brackets when part of ordinary text). For example, the modified keystroke **shift+d** produces the character ⟨ð⟩.

3.1 Unmodified Keystrokes

All unmodified keystrokes produce the same output on the `nsLxIPA` keyboard as on the normal keyboard, except for the unmodified keystroke **g**, which produces the single-story (upright script) ⟨g⟩, the official IPA character for a voiced velar plosive. If needed, the double-story (looptail) ⟨ḡ⟩ can be produced with the keystroke **shift+option+8** (see §3.4). The diagram in Figure 1 shows the output for all unmodified keystrokes, with yellow highlighting indicating keystrokes whose outputs on the normal keyboard are already official IPA symbols (so they remain the same on the `nsLxIPA`

keyboard), and pink highlighting indicating keystrokes (here, only **g**) whose outputs on the ns \backslash xIPA keyboard differ from the output of the same keystroke on the normal keyboard. A second version of the ns \backslash xIPA keyboard, called ns \backslash xIPAg, is available for download. It is identical to the ns \backslash xIPA keyboard, except it has the keystroke assignments for ⟨g⟩ and ⟨g⟩ reversed, so that **g** on the ns \backslash xIPAg keyboard produces ⟨g⟩, while **shift+option+8** produces ⟨g⟩.

`	1	2	3	4	5	6	7	8	9	0	-	=	delete
tab	q	w	e	r	t	y	u	i	o	p	[]	\
caps lock	a	s	d	f	g	h	j	k	l	;	'	return	
shift	z	x	c	v	b	n	m	,	.	/	shift		
fn	control	option	command					command	option		△		
											◀	▼	▶

Figure 1: ns \backslash xIPA outputs for unmodified keystrokes

3.2 shift Keystrokes

The diagram in Figure 2 shows the output for all **shift** keystrokes, with pink and yellow highlighting following the conventions established in Figure 1 and green highlighting indicating the modifier key(s) (here, **shift**). In most cases, a **shift** keystroke produces an IPA character that is intuitively

~	!	@	#	\$	%	^	&	*	()	-	+	delete
tab	ɛ	ɣ	ɛ	ʀ	θ	ɣ	ʊ	ɪ	ɔ	ϕ	{	}	
caps lock	ɑ	ʃ	ð	ʀ	ɣ	h	j	l	ɫ	:	"	return	
shift	ʒ	ʒ	ç	ʊ	β	ɳ	ɳ	<	>	ʔ	shift		
fn	control	option	command					command	option		△		
											◀	▼	▶

Figure 2: ns \backslash xIPA outputs for **shift** keystrokes

related to the output of the unmodified base key, as shown in Figure 3. The relationship may be typographic similarity and/or phonetic similarity between the sounds represented by those characters in the IPA, with four **shift** keystrokes with less intuitive outputs that warrant explanation.

The keystroke **shift+k** produces the small capital ⟨L⟩. There are eight IPA base characters for laterals (plus one diacritic for lateral release), and since only four characters can ordinarily be assigned to keystrokes for a given base key (except for dead keys; see §3.3.2 and §3.3.3), four characters can be assigned to **l** (the most obvious choice of base key for laterals), but the remaining characters must be assigned elsewhere. I assigned ⟨L⟩ to **shift+k** because ⟨k⟩ and ⟨L⟩ both represent velar consonants, and **k** is adjacent to **l**, so there is both phonetic similarity and keystroke proximity

shift+ h i r y	shift+ a e i o u y
small capital H I R Y	related vowel ɑ ɛ ɪ ɔ ʊ ʏ
shift+ b c d g h j	shift+ l m n v
related fricative β ɸ ð ɣ ɦ j	misc. similarity ɫ ɱ ɲ ʋ
shift+ p s t x z	shift+ k q w /
related fricative φ ʃ θ ʒ ʒ	less intuitive ɮ œ ʁ ʔ

Figure 3: select nsLxIPA outputs for **shift** keystrokes, grouped by similarity to output of base key

to rely on as a mnemonic. In addition, two other lateral characters are also assigned to modified keystrokes with base key **k**: **option+k** produces ⟨ɫ⟩ and **shift+option+k** produces ⟨ɱ⟩ (see §3.3 and §3.4). The final lateral character ⟨ɮ⟩ is assigned to **option+y** due to 180° rotation (see §3.3).

The keystroke **shift+q** produces the small capital o-e ligature ⟨œ⟩ because **option+q** produces the lowercase o-e ligature ⟨œ⟩ on the nsLxIPA keyboard (see §3.3), just as it does on the normal keyboard, so the visual and phonetic similarity is to the output of **option+q** rather than to **q** itself.

The keystroke **shift+w** produces the rams horn ⟨ʁ⟩, because there is vague visual similarity between ⟨w⟩ and ⟨ʁ⟩, and both characters represent back vocoids in the IPA.

Finally, the keystroke **shift+/** produces the glottal stop character ⟨ʔ⟩ rather than the visually similar question mark ⟨?⟩ produced on the normal keyboard, because ⟨ʔ⟩ is much more commonly needed in phonetic transcription than ⟨?⟩. This is the only exception where a **shift** keystroke for a non-letter base key produces a different character from the normal keyboard. If needed, the regular question mark can be produced with the keystroke **option+.** (see §3.3).

3.3 option Keystrokes

Most **option** keystrokes produce a character directly (see §3.3.1), but some are “dead keys”, which do not produce any output until a secondary keystroke is made (see §3.3.2 and §3.3.3). The diagram in Figure 4 shows the output for all **option** keystrokes; dead keys are highlighted in blue, with green, pink, and yellow highlighting following the conventions established in Figures 1 and 2.

˘	clicks	™	ʒ	ç	∞	super- scripts	¶	•	ə	◦	—	tones	delete
tab	œ	Λ	á	ɪ	ɫ	ʌ	¨	ˆ	ø	ˈ	“	‘	ƒ
caps lock	ɐ	ʂ	ɖ	f	ɠ	ɦ	ʃ	ɮ	ɭ	ɹ	æ	return	
shift	ʒ	≈	˘	Λ	B	˜,ɲ	ʍ	rhotics	ʔ	ʔ	shift		
fn	control	opt	command					command	option		△	▽	▷

Figure 4: nsLxIPA outputs for **option** keystrokes

3.3.1 option Keystrokes with Direct Output

As with **shift** keystrokes, most **option** keystrokes produce IPA characters that are intuitively related to the output of the unmodified base key, as shown in Figure 5, with some having less intuitive outputs that warrant explanation.

option+ a m r v w y	option+ d l s t z
180° rotation ɐ ʊ ɪ ʌ ɯ ʏ	related retroflex ɖ ɭ ʂ ʈ ʐ
option+ b g	option+ 3 9 ;
small capital ɓ ɡ	misc. similarity ɜ ɞ :
option+ h j o	option+ k p q ' . / \
barred/slashed ɦ ʝ ø	less intuitive ɨ ' œ æ ? ʔ ʕ

Figure 5: select ns\lxIPA outputs of **option** keystrokes, grouped by similarity to output of base key

The keystroke **option+k** produces the belted ⟨ɨ⟩, one of the three lateral characters assigned to a modified keystroke with **k** as the base key (see §3.2 for initial discussion). There is no particular similarity here, except adjacency to **l**. Note that **option+k** and **shift+option+k** produce a pair of related outputs, ⟨ɨ⟩ and ⟨ɥ⟩, which represent voiceless and voiced lateral fricatives in the IPA.

The keystroke **option+p** produces the primary stress tick mark ⟨ˈ⟩. There is no particular similarity here, except that *primary* begins with /p/. Note that **option+p** and **shift+option+p** produce a pair of related outputs, ⟨ˈ⟩ and ⟨ˌ⟩, which represent primary and secondary stress in the IPA.

The keystrokes **option+q** and **option+'** produce the o-e and a-e ligatures ⟨œ⟩ and ⟨æ⟩, just as they do on the normal keyboard.

The keystroke **option+.** produces the ordinary question mark ⟨?⟩. There is no particular similarity, except that **.** is adjacent to **/**, where ⟨?⟩ is normally produced.

The keystrokes **option+ /** and **option+ ** produce the barred glottal stop ⟨ʔ⟩ and reversed glottal stop ⟨ʕ⟩ because **shift+ /** produces the glottal stop ⟨ʔ⟩ (see §3.2), so the visual and phonetic similarity is to the output of the related **shift+ /** keystroke rather than to the output of **/** or **** themselves.

3.3.2 Dead Key option Keystrokes: Accents

Six of the dead key **option** keystrokes produce precombined accented vowels, as shown in Figure 6. Five of these are the same dead keys as on the normal keyboard. The sixth, **option+c**, is a dead key for the háček accent ⟨ˇ⟩. The mnemonic is that the word for this accent, *haček*, has a háček over the letter *c*. Note that **option+n** also produces a non-accented character ⟨ɲ⟩ when the secondary keystroke is **n** (see §3.3.3).

option+c a e i o u	option+i a e i o u	option+u a e i o u
rising tone ǎ ě ĭ ǔ ů	falling tone â ê î ô û	centralized ä ë ĭ ö ü
option+e a e i o u	option+n a e i o u	option+` a e i o u
high tone á é í ó ú	nasalized ã ĕ ĭ õ ũ	low tone à è ì ò ù

Figure 6: dead key outputs of **option** keystrokes that produce accented characters

3.3.3 Dead Key **option** Keystrokes: Other Characters

Five of the dead key **option** keystrokes produce non-accented IPA characters, as shown in Figure 7. As discussed in §3.3.2, one of these, **option+n**, is a dead key that usually produces an vowel with a tilde, but when the secondary keystroke is **n**, the output is not ⟨ñ⟩ but ⟨ɲ⟩, because ⟨ñ⟩ is a non-IPA character often used to represent the palatal nasal officially represented by ⟨ɲ⟩ in the IPA.

option+n n	option+6 1 2 3 4 5
palatal nasal ɲ	non-IPA tone superscripts ̌ ̍ ̎ ̏ ̐
option+1 c l p t	option+= 1 2 3 4 5
clicks ɸ ǀ ǃ Ǆ	tone letters ̎̌ ̎̍ ̎̎ ̎̏ ̎̐
option+6 g h j l n w ? ⇒	option+, e n r w ⇒
IPA superscripts ɣ ɦ ʝ ʎ ɳ ʷ ʶ ʷ ⇒	rhotics/retroflexes ɻ ɺ ɽ ɿ ɻ̌

Figure 7: dead key outputs of **option** keystrokes that produce other characters

The keystroke **option+1** is a dead key that produces four click characters, based on phonetic similarity to the voiceless stop or lateral represented in the IPA by the normal output of the secondary keystroke. Thus, because ⟨p⟩, ⟨t⟩, and ⟨c⟩ represent voiceless bilabial, dental/alveolar, and palatal stops, **option+1** followed by **p**, **t**, or **c** produces the IPA character for a bilabial click ⟨ǀ⟩, dental click ⟨ǃ⟩, or palatal click ⟨Ǆ⟩; similarly, **option+1** followed by **l** produces the IPA character for a lateral click ⟨ǂ⟩. The fifth IPA click character ⟨ǁ⟩ is produced by **shift+1**, just as on the normal keyboard (see §3.2), which is why the other clicks characters are also produced with this base key.

The keystroke **option+6** is a dead key that produces eight IPA superscript characters, five of which are based on obvious typographic similarity to the base key: ⟨^h⟩, ⟨^j⟩, ⟨^l⟩, ⟨ⁿ⟩, and ⟨^w⟩. The keystroke **option+6** followed by **g** produces ⟨^ɣ⟩ because ⟨g⟩ and ⟨^ɣ⟩ both represent voiced velar obstruents in the IPA (and because **shift+g** produces ⟨^ɣ⟩; see §3.2), while **option+6** followed by **/** produces ⟨^ʎ⟩ because **option+/ **produces ⟨^ʎ⟩ (see §3.3.1). The final IPA superscript ⟨^ɦ⟩ is produced by exiting out of the dead key by pressing the **right arrow** key (represented by ⇒ here). In addition, **option+6** produces superscripts for the first five number keys to accommodate their common usage for marking tone. The mnemonic for why **option+6** is a dead key for superscripts is that **shift+6** produces ⟨[^]⟩, which is often used to represent superscripting in programming languages and other situations where true typographic superscripts are not readily available.⟩****

The keystroke **option+=** is a dead key that produces five IPA tone letters, with the standardly assigned number as the base key: **option+=** followed by **1** produces ⟨̌⟩, **option+=** followed by **2** produces ⟨̍⟩, and so on, with **option+=** followed by **5** producing ⟨̐⟩. In some Unicode fonts (such as SIL’s Doulos font), adjacent tone letters will be automatically combined into a single contour tone letter; for example, ⟨̌⟩ followed by ⟨̐⟩ combines to ⟨̎̌⟩. However, not all Unicode fonts support these combinations, and since there are not yet dedicated individual Unicode characters for contour tone letters, the nšxIPA keyboard cannot currently guarantee them.

The keystroke **option+,** is a dead key that produces five characters that represent rhotacized vowels or retroflex consonants in the IPA, three of which are based on obvious typographic similarity to the base key: ⟨ɻ⟩, ⟨ɺ⟩, and ⟨ɽ⟩. The keystroke **option+,** followed by **w** produces ⟨ɿ⟩ because **shift+w** produces ⟨ɹ⟩ (see §3.2), while exiting out of the **option+,** dead key with ⇒ produces ⟨ɻ̌⟩. The only mnemonic here is that ⟨ɻ̌⟩ looks vaguely similar to the right tail ⟨ɻ̌̌⟩ used to distinguish retroflex consonants from their alveolar counterparts and to the rhotic hook combining diacritic ⟨[^]⟩ (which is produced by the dead key **shift+option+'** followed by **r**; see §3.4).

3.4 **shift+option** Keystrokes

Most **shift+option** keystrokes produce a character directly (see §3.4.1), but some are dead keys (see §3.4.2 and §3.4.3). The diagram in Figure 8 shows the output for all **shift+option** keystrokes, with colored highlighting following the conventions established in Figures 1, 2, and 4.

`	/	€	ɔ	>	fi	fl	ɰ	g	◌̂	◌̄	—	±	delete
tab	ɠ	„	ə	ʀ	r	ɥ	ʁ	i	ø	,	”	,	ʻ
caps lock	ɒ	í	ɔ̂	ĩ	ɠ	fi	f	ɰ	l	˙	combining diacritics	return	
shift	z	ʃ	ç	v	ɸ	ŋ	ɥ	↑,↗	↓,↘	ƒ	shift		
fn	control	opt	command	majuscules				command	option	◀	▶	▷	

Figure 8: keyboard layout for **shift+option** keystrokes

3.4.1 **shift+option** Keystrokes with Direct Output

As with **shift** and **option** keystrokes, most **shift+option** keystrokes produce IPA characters that are intuitively related to the output of the unmodified base key, as shown in Figure 9, with some having less intuitive outputs or behavior that warrant explanation (but which are largely predictable based on patterns in the outputs of **shift** and **option** keystrokes).

shift+option+	b d g h j v	shift+option+	a e m r
	hooktop ɸ ɔ̂ ɠ fi f v		180° rotation (+ other) ɒ ə ɥ ʀ
shift+option+	i o u	shift+option+	l n q y ʒ ;
	barred i ø ʁ		misc. similarity l ŋ ɠ ɥ ʒ ˙
shift+option+	c z	shift+option+	k p t x 8 9 0] \ /
	curly-tailed ç z		less intuitive ɰ , r ʃ g ◌̂ ◌̄ ˙ ˘ ƒ

Figure 9: non-dead key outputs of **shift+option** keystrokes grouped by similarity to base key

The keystroke **shift+option+k** produces the l-ʒ ligature ⟨ɰ⟩, one of the three lateral characters assigned to a modified keystroke with **k** as the base key (see §3.2 for initial discussion). Again, there is no particular similarity to the base key, but as noted in §3.3.1, **option+k** and **shift+option+k** produce a pair of related outputs, ⟨ɰ⟩ and ⟨ɰ̂⟩.

The keystroke **shift+option+p** produces the secondary stress tick mark ⟨˙⟩. Again, there is no particular similarity to the base key, but as noted in §3.3.1 **option+p** and **shift+option+p** produce a pair of related outputs, ⟨˙⟩ and ⟨˘⟩.

The keystroke **shift+option+t** produces the fish hook ⟨r⟩, because ⟨r⟩ represents an alveolar tap in the IPA, which is one of the allophones of the phoneme /t/ in English.

The keystroke **shift+option+x** produces the hooktop heng ⟨ʃ⟩, because ⟨ʃ⟩ represents a combination of [x] and [ʃ] in the IPA.

The keystroke **shift+option+8** produces the double-story ⟨g⟩, because ⟨g⟩ is visually similar to ⟨8⟩. As noted in §3.1, the unmodified keystroke **g** produces the single-story ⟨g⟩, and there is a second version of the nsłxIPA keyboard, called nsłxIPAg, in which these two keystrokes are reversed.

The keystroke **shift+option+]** produces the curly right single quote ⟨’⟩, just as it does on the normal keyboard.

The keystroke **shift+option+** produces the right corner ⟨ʹ⟩. There is no particular similarity here, except that \\ is in the top right corner of the keyboard.

The keystroke **shift+option+/_** produces the barred reversed glottal stop ⟨ʘ̥̄⟩ because **shift+/_** produces the glottal stop ⟨ʘ̥̄⟩ (see §3.2) and **option+/_** produces the barred glottal stop ⟨ʘ̥̄̄⟩ (see §3.3.1), so the visual and phonetic similarity is to the output of the related **shift+/_** keystroke rather than to the output of / itself.

The keystrokes **shift+option+9** and **shift+option+0** produce the tie bar ⟨⏞⏞⟩ and the linking under tie ⟨⏞⏞⟩ because of their 90° rotational symmetry with the parentheses ⟨(⟩ and ⟨)⟩ produced by **shift+9** and **shift+0**. Note that these tie diacritics must be typed in between the two characters they unite. Thus, ⟨ʘ̥̄s̥̄⟩ is produced by pressing **t** to produce ⟨t⟩ first, then **shift+option+9** to produce the tie bar, and finally **s** to produce ⟨s⟩. Also note that many fonts do not properly align the tie diacritics.

3.4.2 Dead Key **shift+option** Keystrokes: Pitch Changes and Majuscules

Three of the dead key **shift+option** keystrokes produce single characters after the secondary keystroke is pressed, as shown in Figure 10.

shift+option+,	↑ ⇒
upstep and global rise	↑ ↗
shift+option+.	↓ ⇒
downstep and global fall	↓ ↘
shift+option+space	a b c ... x y z
ordinary majuscules	A B C ... X Y Z

Figure 10: dead key outputs of **shift+option** keystrokes

The keystrokes **shift+option+,** and **shift+option+.** are dead keys that produce IPA characters for minor tone changes (upstep and downstep) and intonational changes (global rise and fall). There is no particular similarity for the choice of , and . as base keys, except that ⟨<⟩, which is normally produced on the , key, indicates an increase from left to right, so **shift+option+,** produces a dead key for increasing pitch changes; analogously, ⟨>⟩ indicates a left-to-right decrease, so **shift+option+.** produces a dead key for decreasing pitch changes. In both cases, the secondary keystroke is intuitively related to the direction of the resulting IPA arrow character.

The keystroke **shift+option+space** is a dead key that produces the ordinary majuscule version of the secondary keystroke, in case these are needed in the midst of phonetic text (e.g. to represent archiphonemes). Thus, **shift+option+space** followed by **a** produces ⟨A⟩, **shift+option+space** followed by **b** produces ⟨B⟩, and so on, for all 26 letters.

3.4.3 Dead Key **shift+option** Keystrokes: Combining Diacritics

The keystroke **shift+option+** produces a dead key for Unicode combining diacritics, as shown in Figure 11. Note that unlike the dead key **option** keystrokes that produce precombined accented vowels based on the next typed vowel (see §3.3.2), these special combining diacritics are placed on the *preceding* character, which must have already been typed; thus, to get the combining diacritic ⟨̣⟩ on the character ⟨n⟩, you must first press **n** to produce ⟨n⟩, and then **shift+option+** followed by **d** (for “dental”), which will produce the final character ⟨ṇ⟩.

shift+option+	a	b	c	d	j	l	m	n	o	r	s	u	v	x	⇐	⇒
combining diacritics	◌̣	◌̤	◌̥	◌̦	◌̧	◌̨	◌̩	◌̪	◌̫	◌̬	◌̭	◌̮	◌̯	◌̰	◌̱	◌̲
	◌̳	1	2	3	4	5	6	7	-	=	'	,	.	↑	↓	
	◌̴	◌̵	◌̶	◌̷	◌̸	◌̹	◌̺	◌̻	◌̼	◌̽	◌̾	◌̿	◌̿	◌̿	◌̿	◌̿

Figure 11: dead key outputs of **shift+option** keystrokes

Combining diacritics in Unicode are more versatile than the older dead key **option** keystrokes for precombined accented characters, because they can be placed on any arbitrary character, including characters that already have accents, as in ⟨ộ⟩. However, not all fonts have full support for combining diacritics, so you may not always get the desired results. In most cases, the secondary key needed to get a combining diacritic is intuitive, either visually similar to the diacritic itself (e.g. **m** for ⟨̣⟩) or its ordinary **shift** keystroke (e.g. **=** for ⟨̱⟩ because **shift+=** produces ⟨+⟩), or it is the first letter of the phonetic property the diacritic represents in the IPA (**a** for “apical”, **b** for “breathy”, **c** for “creaky”, etc.), but a few are less intuitive and warrant explanation.

The keystroke **shift+option+** followed **j** produces the inverted under breve ⟨̡⟩, which represents lack of syllabicity in the IPA. The mnemonic here is that ⟨j⟩ represents a non-syllabic vocoid in the IPA and has vague visual similarity in having a curved descender.

The keystroke **shift+option+** followed by a number key **1** through **7** produces a combining accent for tone, with the secondary keys **1** through **5** producing the combining diacritics for level tones (in order from lowest to highest: **1** for extra-low ◌̠ up through **5** for extra-high ◌̥), and the secondary keys **6** and **7** producing the combining diacritics for falling and rising contour tones (note that **6** produces the falling diacritic ⟨̥̂⟩ because **shift+6** produces the visually similar ⟨̂⟩).

The keystroke **shift+option+** followed by an arrow key produces a combining accent for tongue root advancement/retraction or articulator raising/lowering, with each secondary arrow key producing the combining diacritic that points in the same direction (e.g. **shift+option+** followed by the left arrow ⇐ produces the left-pointing diacritic for tongue root advancement ⟨̡̠⟩).

4 Finding Keystrokes by IPA Character

This section contains figures showing the keystrokes needed to produce the IPA characters based on their phonetic categorization. To save space, the green majuscules **S** and **O** are used as shorthand for the modifier keys **shift** and **option** in these figures, with **S0a** to be read as **shift+option+a**. Dead keys are also condensed, so **S0,r** is to be read as **shift+option+**, followed by **r**. In all cases, this notation should be unambiguous but may be a bit tricky to figure out, such as **O61065**, which is to be read as **option+6**, followed by **1**, followed by **option+6**, followed by **5**. Consonant characters are given in Figure 12, vowel characters are given in Figure 13, suprasegmentals are given in Figure 14, and diacritics are given in Figure 15.

	bilabial		labiodental		dental		alveolar		post-alveolar		retroflex		alveolo-palatal		palatal		palatal-velar		velar		uvular		pharyngeal		epiglottal		glottal		
plos	p p	b b					t t	d d			ʈ ʈ	ɖ ɖ			c c	ɟ ɟ			k k	g g	q q	ɢ ɢ			ʕ ʕ	ʔ ʔ			
impl		ɸ S0b					f S0d								ʃ S0j				ʒ S0g		ʁ S0q								
click	ɸ S0!p			 S0!t		!	!								ɸ S0!c														
lat click						 S0!l																							
nas	m m	ɱ Sm				n n							ɳ 0,n	ɲ 0nn					ŋ Sn		ɴ S0n								
trill	ʙ S0b					r r															ʀ Sr								
tap/ flap		v S0v				ɾ S0t				ɽ 0,r																			
lat flap						ɽ S0l																							
fric	ɸ Sp	β Sb	f f	v v	θ St	ð Sd	s s	z z	ʃ Ss	ʒ Sz	ʂ 0s	ʐ 0z	ç S0c	ʝ S0z	ç Sc	ɟ Sj	ɣ S0x		x x	ɣ Sg	χ Sx	ʁ S0r	ħ 0h	ʕ 0/	ħ Sh	ʕ S0/	h h	ɦ S0h	
lat fric						ɸ 0k	ɸ S0k																						
appr		ʋ Sv				ɹ 0r				ɻ 0,⇒					j j					ɰ S0m									
round appr															ɰ S0y				ʍ 0w	w w									
lat appr						ɹ l				ɻ l					ɰ 0y				ɰ L										

Figure 12: consonant characters with corresponding nsIxIPA keystrokes

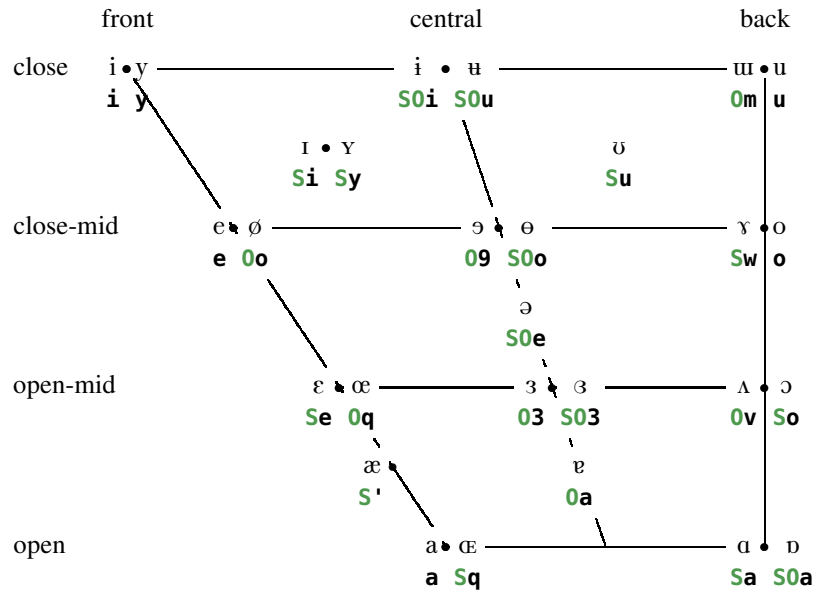


Figure 13: vowel characters with corresponding nsLxIPA keystrokes

primary stress	' Op	extra low tone	┘ ◌̣ 1 O=1 SO'1 O61
secondary stress	ˈ SOp	low tone	┘ ◌̤ 2 O=2 SO'2 O62
long	ː O;	mid tone	┘ ◌̥ 3 O=3 SO'3 O63
half-long	ˑ SO;	high tone	┘ ◌̦ 4 O=4 SO'4 O64
extra-short	◌̚ SO'u	extra high tone	┘ ◌̨ 5 O=5 SO'5 O65
minor foot group	 S\	falling tone	┘ ◌̩ or ◌̪ 51 O=50=1 SO'6 O65061
major foot group	 S\S\	rising tone	┘ ◌̥ or ◌̦ 15 O=10=5 SO'7 O61065
syllable break	· ·	upstep / downstep	↑ ↓ SO,↑ SO,↓
linking	◌◌̚ SO0	global rise / fall	↗ ↘ SO,⇒ SO,⇒

Figure 14: suprasegmental characters with corresponding nsLxIPA keystrokes


































voiceless	 S0'o	rhoticity	 S0'r	ejective	 S0]
voiced	 S0'v	breathy	 S0'b	advanced tongue root	 S0'←
aspirated	 06h	creaky	 S0'c	retracted tongue root	 S0'⇒
more rounded	 S0'.	linguolabial	 S0'm	dental	 S0'd
less rounded	 S0',	labialized	 06w	apical	 S0'a
advanced	 S0'+	palatalized	 06j	laminal	 S0'l
retracted	 S0'-	velarized	 06g	nasalized	 S0'n
centralized	 S0''	pharyngealized	 06/	nasal release	 06n
mid-centralized	 S0'x	velarized or pharyngealized	 S0'\	lateral release	 06l
syllabic	 S0's	raised	 S0'↑	no release	 S0\
non-syllabic	 S0'j	lowered	 S0'↓	tie bar for affricates	 S09

Figure 15: other diacritics with corresponding nsLxIPA keystrokes

5 Version History

- v1.0 2016/03/11 original release
- v1.1 2022/01/30 corrected no audible release diacritic [˘]

6 The Future

I currently have no specific plans to release an updated version of the nsɫxIPA keyboard. If the IPA approves any new characters, I will likely add them to the nsɫxIPA keyboard, once the characters have been assigned dedicated Unicode positions that are reliably found in common fonts. I am also open to suggestions from users who might find the keyboard easier to use with some minor modification, so if you have such suggestions, let me know.

Also, feel free to ask questions and offer suggestions about the documentation. If you find something that is worded in a particularly unclear way, tell me what it is, so that I can rewrite it. Meanwhile, enjoy the keyboard, and thanks for using it!

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