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## REPRESENTATION

**\*\*IPA** — representation for International Phonetic Alphabet

## DESCRIPTION

The **\*\*IPA** scheme provides a means for representing phonetic information via the International Phonetic Alphabet (IPA). This representation is a Humdrum adaptation of the ASCII transliteration scheme for IPA developed by Evan Kirshenbaum. The **\*\*IPA** representation permits the encoding of the basic phonetic constituents of spoken or sung utterances for most languages.

Two types of data tokens are distinguished in **\*\*IPA**: phonetic segments and silences.

Spans of silence are represented by the percent sign (%) appearing as an isolated token.

Phonetic segment tokens typically encode syllables or single-syllable words. Each syllable consists of one or more successive phonemes, where each phoneme is signified by a single character with an optional modifier. The beginning of the token may include one of three stress indicators. A stressed syllable is signified by the apostrophe ('). A less stressed syllable is signified by the comma (,). The absence of either the apostrophe or the comma indicates an unstressed syllable.

In the case of tonally inflected languages (such as all Chinese dialects), numbers may follow indicating the type of tonal inflection. For example, in Mandarin, the number 1 indicates a high tone, the number 2 indicates a rising tone, the number 3 indicates a falling-rising tone, and the number 4 indicates a falling tone.

Individual phonemes are represented according to the signifiers listed in the table given below. For example, the upper-case letter 'A' signifies the 'aw' vowel as in the standard American pronunciation of *law*, *cot* and *bother*. Any vowel or diphthong signifier can be modified by the subsequent presence of a tilde; the modified vowel is pronounced with open nasal passages — as in the French “un bon vin blanc,” which is encoded as:

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**IPA
W~
bo~
va~
blA~
*-
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In the case of consonants, two modifiers are possible. Any consonant signifier that is followed by a semicolon indicates that the front of the tongue is positioned as at the beginning of the word *yacht*. Any consonant signifier that is followed by a dash indicates that the consonant and the preceding *schwa* (see below) are pronounced as an independent syllable — as in the case of the words *battle*, *mitten* and *eaten*.

## FILE TYPE

It is recommended that files containing predominantly \*\*IPA data should be given names with the distinguishing '.ipa' extension.

## SIGNIFIERS

The following table summarizes the \*\*IPA mappings of signifiers and signifieds.

@	<b>schwa</b> <sup>†</sup> ; as in (unaccented) <i>ban<u>a</u>na</i> , <i>coll<u>i</u>de</i> , <i>al<u>o</u>ne</i> or (accented) <i>hum<u>u</u>drum</i>
V	<b>schwa</b> (IPA symbol: $\wedge$ ); as in the British pronunciation of <i>h<u>u</u>t</i>
R	<b>R</b> <sup>‡</sup> ; as in <i>bu<u>r</u>n</i> , <i>ope<u>r</u>ation</i> , <i>di<u>r</u>t</i> , <i>u<u>r</u>gent</i>
&	short <b>a</b> (IPA symbol: $\text{æ}$ ); as in <i>ma<u>t</u></i> , <i>ma<u>p</u></i> , <i>ma<u>d</u></i> , <i>ga<u>g</u></i> , <i>sna<u>p</u></i> , <i>pa<u>t</u>ch</i>
A	<b>ä</b> (IPA symbol: <i>a</i> ); as in <i>bo<u>t</u>her</i> , <i>co<u>t</u></i> , and, with most American speakers, <i>fa<u>t</u>her</i> , <i>ca<u>r</u>t</i>
a	<b>ä</b> ; <i>fa<u>t</u>her</i> as pronounced by speakers who do not rhyme it with <i>bo<u>t</u>her</i> .
E	short <b>e</b> (IPA symbol: $\text{ɛ}$ or $\text{ɶ}$ ); as in <i>ge<u>t</u></i> , <i>be<u>d</u></i> , <i>pe<u>c</u>k</i> , <i>ed<u>g</u>e</i>
i	long <b>e</b> (IPA symbol: $\text{ē}$ ); as in <i>be<u>a</u>t</i> , <i>gre<u>e</u>d</i> , <i>even<u>l</u>y</i> , <i>ea<u>s</u>y</i>
I	short <b>i</b> (IPA symbol: $\text{ɪ}$ or $\text{ɯ}$ ); as in <i>ti<u>p</u></i> , <i>ba<u>n</u>i<u>sh</u></i> , <i>acti<u>v</u>e</i>
O	<b>ö</b> (IPA symbol: $\text{o}$ or upside-down 'c'); as in <i>la<u>w</u></i> , <i>all</i> , <i>sha<u>w</u>m</i>
W	<b>oe</b> digraph (IPA symbol: $\text{œ}$ ); as in the French <i>bo<u>e</u>uf</i> , German <i>Hö<u>l</u>le</i>
u	<b>ü</b> ; as in <i>ru<u>l</u>e</i> , <i>yo<u>u</u>th</i> , <i>fe<u>w</u></i> , <i>oo<u>z</u>e</i>
U	<b>û</b> (IPA symbol: $\text{u}$ or $\text{U}$ or $\text{ω}$ ); as in <i>pu<u>l</u>l</i> , <i>wo<u>o</u>d</i> , <i>bo<u>o</u>k</i>
y	<b>ue</b> ; as in the German <i>fü<u>l</u>len</i> , <i>hü<u>b</u>sch</i> , or French <i>ru<u>e</u></i>
vowel~	following a vowel* indicates a vowel or diphthong pronounced with open nasal passages; as in the French "un bon vin blanc" ( $\text{W}^{\sim}$ $\text{bo}^{\sim}$ $\text{va}^{\sim}$ $\text{blA}^{\sim}$ )
b	<b>b</b> (IPA symbol: $\text{b}$ or $\text{č}$ ); as in <i>ba<u>b</u>y</i> , <i>ca<u>b</u>in</i> , <i>ro<u>b</u></i>
d	<b>d</b> ; as in <i>de<u>e</u>d</i> , <i>du<u>l</u>cimer</i> , <i>ade<u>r</u></i>
f	<b>f</b> ; as in <i>fe<u>e</u>l</i> , <i>cuff</i> , <i>fo<u>r</u>te</i>
g	<b>g</b> ; as in <i>go</i> , <i>ba<u>g</u></i> , <i>gi<u>f</u>t</i>
h	<b>h</b> ; as in <i>he<u>a</u>r</i> , <i>ah<u>e</u>ad</i> , <i>ho<u>r</u>n</i>
k	<b>k</b> ; as in <i>co<u>o</u>k</i> , <i>ta<u>k</u>e</i> , <i>ac<u>h</u>e</i>
x	<b>K</b> (IPA symbol: $\text{k}$ ); as in the German <i>ic<u>h</u></i> , <i>Bu<u>ch</u></i>
l	<b>l</b> ; as in <i>li<u>b</u>retto</i> , <i>li<u>l</u>y</i> , <i>po<u>o</u>l</i>
m	<b>m</b> ; as in <i>mu<u>s</u>ic</i> , <i>li<u>m</u>b</i> , <i>ny<u>m</u>ph</i>
n	<b>n</b> ; as in <i>ino</i> , <i>n<u>s</u>trument</i> , <i>own</i>
N	<b>eng</b> (IPA symbol: 'n' with a tail); as in <i>si<u>n</u>g</i> , <i>fi<u>n</u>ger</i> , <i>in<u>k</u></i>
p	<b>p</b> ; as in <i>pi<u>a</u>no</i> , <i>bee<u>p</u>er</i> , <i>li<u>p</u></i>
r	<b>r</b> ; as in <i>re<u>e</u>d</i> , <i>o<u>r</u>gan</i> , <i>ca<u>r</u></i>
s	<b>s</b> ; as in <i>se<u>e</u>k</i> , <i>so<u>u</u>rce</i> , <i>ba<u>s</u>s</i>
S	<b>sh</b> ["esh"] (IPA symbol: $\text{.}$ ); as in <i>sh<u>y</u></i> , <i>cre<u>s</u>cendo</i> , <i>spe<u>c</u>ial</i>

<sup>†</sup> (All footnotes appear at the end of this table.)

t	t; as in <u>t</u> empo, <u>t</u> ie, at <u>t</u> acca
T	<b>th</b> ["thorn"] (IPA symbol: θ); as in <u>t</u> hin, pa <u>th</u> , e <u>th</u> er
D	<b>th</b> ["eth"] (IPA symbol: ð) as in <u>t</u> hen, ei <u>th</u> er, smoo <u>th</u>
v	v; as in <u>v</u> oice, <u>v</u> ivid, <u>l</u> ive
w	w; as in <u>w</u> e, a <u>w</u> ay
j	j; as in <u>y</u> es, <u>y</u> oung, <u>c</u> ue, o <u>n</u> ion
z	z; as in <u>z</u> one, <u>r</u> aise, <u>x</u> ylophone
Z	<b>zh</b> ["yogh"§]; as in <u>m</u> ea <u>s</u> ure, <u>v</u> is <u>i</u> on, a <u>z</u> ure
consonant-	following a consonant (l-, n-, m-, or N-)** indicates a consonant preceded by a <i>schwa</i> that is pronounced as an independent syllable; as in ba <u>tt</u> le, mi <u>tt</u> en, ea <u>tt</u> en
consonant;	following a consonant,†† indicates that the front of the tongue is positioned as in the beginning of the word 'yard'
^	preceding phoneme is palatalized
ˈ	primary stress (should precede stressed sound)
,	secondary stress (should precede stressed sound)
%	silence signifier

*Summary of \*\*IPA Signifiers*

- † The IPA *schwa* is notated as an upside-down 'e'.
- ‡ The IPA symbol consists of a *schwa* with a hook.
- § The IPA *yogh* is written like a flat-topped number '3' that has been lowered in height.
- \* In IPA such vowels are marked by the presence of a tilde above the vowel.
- \*\* In IPA such consonants are marked by the presence of a vertical bar below the consonant.
- †† The IPA symbol consists of a superscript letter 'j' either following or hooked beneath the consonant.

## EXAMPLES

Sample syllables and their corresponding **\*\*IPA** encodings are given below:

**text	**IPA
book	bUk
sing	sIN
tag	t&g
now	nAU
loud	lAUd
out	AUt



site	saIt
side	saId
buy	baI
job	dZAb
gem	dZEm
edge	EdZ
join	dZOin
judge	dZ@dZ
day	deI
fade	feId
date	deIt
cape	keIp
youth	juT
few	fju
mute	mjut
cue	kju
cure	kjUr
coin	kOin
troy	trOi
bone	boUn
know	noU
beau	boU
chin	tSIn
*_	*_

The following example encodes a sentence as might be spoken by American and British speakers.

**text	**IPA	**IPA
*	*American	*British
I	aI	aI
hear	hir	hiV
the	D@	DI
sec-	'sEk	'sEk
-re-	rI	r^
-ta-	,t&	tri
-ry	ri	.
*_	*_	*_

## PERTINENT COMMANDS

The following Humdrum commands accept **\*\*IPA** encoded data as inputs:

**formant** identifies first two formant frequencies for common vowels

## TANDEM INTERPRETATIONS

The following tandem interpretations can be used in conjunction with **\*\*IPA**:

instrument	*I
instrument class	*IC
meter signatures	*M6/8
tempo	*MM96.3

*Tandem interpretations for **\*\*IPA***

## SEE ALSO

**formant (4)**

## LIMITS

The International Phonetic Alphabet itself is not well suited to the representation of clicks commonly found in African languages, and this limitation is evident in the **\*\*IPA** representation. A more precise phonetic representation also developed by Evan Kirshenbaum might be adapted as the basis for a more refined Humdrum representation.

## REFERENCES

This representation is a Humdrum adaptation of the ASCII transliteration scheme for IPA developed by Evan Kirshenbaum.