Language Manual

British English

Roger and Kate

Language Manual
British English
Roger and Kate
Edition 40
1 January 2005

This document was produced by Acapela Group. We welcome and consider all comments and suggestions. Please send them to:

Acapela Group
Box 1328
SE-171 26 Solna
Sweden

Phone +46 (0) 8 799 86 00
Fax + 46 (0) 8 799 86 01

Acapela Group
33, Boulevard Dolez
7000 Mons
Belgium

Tel: +32 (0)65 37 42 75
Fax: +32 (0)65 37 42 76

Acapela Group
3939, la Lauragaise
BP 58309
F-31683 Labege cedex
France

Tel: +33 (0)5 62 24 71 00
Fax: +33 (0)5 62 24 71 01

www.acapela-group.com

© Copyright Acapela Group 2005. All rights reserved.

List of contents

1 General

This document discusses certain aspects of text-to-speech processing for the British English text-to-speech system, in particular the different types of input characters and text that are allowed.

This version of the document corresponds to the High Density voices Roger and Kate.

1.1 Notational conventions

The following notational conventions are used in this manual:

- For linguistic entities in general, **boldface** is used.
- Input text is written in a `non proportional font`.
- Output text is written in *italics.*
- Keyboard entities are written within angle brackets < >.
- Phonetic transcriptions are written within slashes or hash marks depending on the phonetic alphabet used.

The following abbreviations are used in this manual:

LM	Letter mode
SM	Sentence mode

See the User's Guide for a description of the two different reading modes. Note that Sentence mode is sometimes referred to as Normal mode.

2 Letters in orthographic text

Characters from **A-Z** and **a-z** may constitute a word. Certain other characters are also considered as letters, notably those used as letters in other European languages, for example "**n**, **o**, **a**, **c**, **e**", see section 2.1. The apostrophe character <'> is also considered a letter, and may occur within a word, as in **didn't**, and at the end of a word, e.g. **books'**.

Characters outside of these ranges, i.e. digits and non-alphanumeric characters such as punctuation characters and currency markers etc, are not considered as letters. If such a non-letter is included within a word, the word is ended where the non-letter appears and the following letters considered belonging to a new word.

2.1 Characters treated as letters in other languages

The special letters of other European languages are read in one of two ways.

In SM, each special letter is read as a corresponding letter without the diacritic, i.e. **a** is read as an **a**, is read as an **i** etc. In LM, the name of the special character is read as indicated in table 1 below.

Character	SM	LM
Ç	*S*	*c cedilla*
ü	*u*	*u umlaut*
é	*e*	*e acute*
â	*a*	*a circumflex*
ä	*a*	*a umlaut*
à	*a*	*a grave*
å	*a*	*a with a circle*
ç	*s*	*c cedilla*
ê	*e*	*e circumflex*
ë	*e*	*e umlaut*
è	*e*	*e grave*
ï	*i*	*i umlaut*
î	*i*	*i circumflex*
ì	*i*	*i grave*
Ä	*A*	*a umlaut*
Å	*A*	*a with a circle*
É	*E*	*e acute*
ô	*o*	*o circumflex*
ö	*o*	*o umlaut*
ò	*o*	*o grave*
û	*u*	*u circumflex*
ù	*u*	*u grave*
ÿ	*y*	*y umlaut*
Ö	*O*	*o umlaut*
Ü	*U*	*u umlaut*
á	*a*	*a acute*
í	*i*	*i acute*
ó	*o*	*o acute*
ú	*u*	*u acute*
ñ	*ny*	*n tilde*
Ñ	*NY*	*n tilde*

Table 1 Characters used as letters in other European languages

3 Non-alphanumeric characters

The processing of non-alphanumeric characters varies, depending on the reading mode, context of the character, and its function within that context. There are three types of non-alphanumeric characters to be distinguished:

- Characters always processed as punctuation, and having a direct effect on the intonation and pausing in SM.
- Characters whose pronunciation varies according to context.
- Other non-alphanumeric, non-punctuation characters that are always pronounced, with no effect on the intonation or pausing.

Below is a discussion of the characters grouped by type. For each character, the pronunciation is given in the three basic reading modes.

3.1 Punctuation characters

Table 2 below lists punctuation characters permitted in the normal text input string and their readings in LM. In SM they are silent but they affect both rhythm and intonation as described in the sections below.

Character	LM
,	*comma*
:	*colon*
;	*semicolon*
" "	*quotes*
.	*full stop*
?	*question mark*
!	*exclamation mark*
(	*left parenthesis*
)	*right parenthesis*
[	*left bracket*
]	*right bracket*
{	*left brace*
}	*right brace*

Table 2 Punctuation characters

3.1.1 Comma, colon and semicolon

Comma < **,** >, colon < **:** > and semicolon < **;** > cause a brief pause to occur in a sentence, accompanied by a small rising intonation pattern just prior to the character.

3.1.2 Quotation marks

Quotes < **“ ”** > appearing around a single word or a group of words cause a brief pause before and after the quoted text.

3.1.3 Full stop

A full stop < **.** > is a sentence terminal punctuation mark which causes a falling end-of-sentence intonation pattern and is accompanied by a somewhat longer pause. A full stop may also be used as a decimal marker in a number (see section 4).

3.1.4 Question mark

A question mark <?> causes two different intonation patterns:

- For Yes/No type questions there is a rising intonation contour.
- For WH-questions (i.e. questions beginning with **who**, **what**, **where**, **when**, **why**, and **how**), there is a falling intonation pattern.

Both are accompanied by a pause.

3.1.5 Exclamation mark

The exclamation mark <!> has the same effect as the full stop, causing a falling intonation pattern followed by a pause.

3.1.6 Parentheses, brackets and braces

Parenthesis < **( )** >, brackets < **[ ]** > and braces < **{ }** > appearing around a single word or a group of words cause a brief pause before and after the bracketed text.

3.2 Control characters

In LM (only) the control characters <RETURN> and <TAB> among others are read out in all systems according to Table 3 below. The reading out of the <BACKSPACE> character is not available on all systems. Most other control characters are read out, in most cases as *control* + the appropriate letter, e.g. ^T is read as *control T*.

Character	LM
^H <BACKSPACE>	*backspace*
^I <TAB>	*tab*
^J <LINE FEED>	*line feed*
^K <VERTICAL TAB>	*vertical tab*
^M <RETURN>	*return*

Table 3 Control characters

3.3 Characters whose pronunciation varies

The pronunciation of the characters listed below varies according to their context.

Character	LM	SM
-	*dash*	(see 3.3.1 and 3.3.4)
=	*equals*	*equals* (see 3.3.4)
+	*plus*	*plus* (see 3.3.4)
*	*asterisk*	(see 3.3.2 and 3.3.4)
$	*dollar*	(see 4.5 and 3.3.3)

Table 4 Characters with varying pronunciation

All examples below show the reading in SM.

3.3.1 Hyphen

Hyphen <-> is pronounced *minus* if a digit follows the hyphen but no digit precedes it,
dash if a digit immediately precedes and follows it, and as a short pause if it is surrounded by spaces.

When hyphen is used to mark compound words it is not pronounced. Hyphen is discarded at the end of a line, and causes the two parts of the hyphenated word to be joined into a single word. In most other cases, hyphen is pronounced *dash*.

Expression	Reading
-3	*minus three*
555-4758	*555 dash 4758*
You mean – it's true?	*You mean* (pause) *it's true?*
top-down and bottom-up	*topdown and bottomup*
The hyphen- ated word is a single word	*The hyphenated word is a single word*
len = --stptr	*len equals dash dash S T P T R*

3.3.2 Asterisk

Asterisk < ***** > is pronounced *times* if a digit immediately precedes and follows it; it is pronounced *asterisk* in all other cases.

Expression	Reading
2*3	*two times three*
*bc	*asterisk b c*

3.3.3 Dollar sign

Dollar sign < **$** > is interpreted as a currency marker when a digit precedes it, see section 4.5 for examples. Then and in all other cases it is pronounced *dollar*.

Expression	Reading
$dir	*dollar dir*
$ 50	*dollar fifty*

3.3.4 Multiple occurrences of the same character

In SM, if more than three of the same character occur in sequence without a space separating the characters, only the first three occurrences will be pronounced. This is only valid for the following characters: < *** + - = }) #** >.

Expression	Reading
*****	*asterisk asterisk asterisk*
+++++	*plus plus plus*
-----	*dash dash dash*
=====	*equals equals equals*

3.4 Other non-alphanumeric characters

Each of the characters in the following table will be read as a separate word, whether or not they occur together with digits.

Character	SM	LM
¢	*cents*	*cents*
£	*pound* (see 4.5)	*pound* (see 4.5)
¥	*yen*	*yen*
€	*euro*	*euro*
#	*(silence)*	*number*
¿	*(silence)*	*inverted question mark*
½	*a half*	*a half*
¼	*a quarter*	*a quarter*
¾	*three quarters*	*three quarters*
¡	*(silence)*	*inverted exclamation mark*
©	*copyright*	*copyright*
™	*trade mark*	*trade mark*
®	*registered trade mark*	*registered trade mark*
µ	*mu*	*mu*
±	*plus or minus*	*plus or minus*
°	*degrees*	*degrees*
•	*large bullet*	*large bullet*
·	*small bullet*	*small bullet*
%	*percent*	*percent*
&	*and*	*and*
/	*oblique*	*oblique*
\	*reverse slant*	*reverse slant*
^	*caret*	*caret*
|	*vertical bar*	*vertical bar*
_	*underline*	*underline*
`	*grave*	*grave*
~	*tilde*	*tilde*
@	*at*	*at*
<	*less than*	*less than*
>	*greater than*	*greater than*
²	*squared*	*squared*

Table 5 Non-alphanumeric characters

3.5 Characters ignored by the system

All characters that are not described in section 2 and 3 and that are not phonetic symbols or digits, are ignored by the system. Normally, these characters are omitted but some of them may cause the sentence they appear in to be silent.

4 Number processing

Strings of digits that are sent to the text-to-speech converter are processed in several different ways, depending on the reading mode, format of the digit string, and the immediately surrounding punctuation or non-numeric characters. To familiarise the user with the various types of formatted and non-formatted strings of digits that are recognized by the system, we provide below a brief description of the basic number processing along with examples.

Number processing is subdivided into the following categories:

- Full number pronunciation
- Leading zero
- Decimal numbers
- Currency amounts
- Ordinal numbers
- Arithmetic operators
- Mixed digits and letters
- Time of day

Note that the date format **month/day/year** is not supported in this version.

4.1 Full number pronunciation

When LM is enabled, digit strings are read as single digits, and all punctuation marks are read.
In SM, full number pronunciation is given for the whole number part of the digit string.

Number	**Type of number**
2425	*full number*
2,425	*full number*
24.25	*24 is a full number, 25 is the decimal part*

Numbers denoting thousands, millions and billions (numbers larger than 999) may be grouped using comma (full stop is used only to indicate the decimal part of a number). The highest number read is 999999999999999 (fifteen digits). Numbers higher than this are read as separate digits, with pauses between groups of three digits.

Number	**Reading**
2580	*two thousand five hundred and eighty*
2,580	*two thousand five hundred and eighty*
25800	*twenty-five thousand eight hundred*
25,800	*twenty-five thousand eight hundred*
2580350	*two million five hundred and eighty thousand three hundred and fifty*
2,580,350	*two million five hundred and eighty thousand three hundred and fifty*
1,000,000,000	*one thousand million*
1,000,000,000,000	*one billion*
1234567890123456	*one two three* (pause) *four five six* (pause) *seven eight nine* (pause) *zero one two* (pause) *three four* (pause) *five six*
12345678901234567	*one two three* (pause) *four five six* (pause) *seven eight nine* (pause) *zero one two* (pause) *three four five* (pause) *six seven*

4.2 Exceptions to full number pronunciation

An exception is made for year pronunciation, which occurs in four-digit strings in the range of **1100** to **1999**. These strings are read as pairs of numbers if there is no decimal part following the four digits. Digit strings ending in **00** within thie same range are read as hundreds. Year pronunciation can be overridden by inserting a comma after the **1**.

Number	**Reading**
1088	*one thousand and eighty-eight*
1900	*nineteen hundred*
1988	*nineteen eighty-eight*
1,988	*one thousand nine hundred and eighty-eight*

4.3 Leading zero

Numbers that begin with 0 (zero) are read digit by digit, with pauses between groups of digits if there are four or more digits.

Number	**Reading**
09253	*zero nine two* (pause) *five three*
020	*zero two zero*

4.4 Decimal numbers

In decimal amounts, the digits to the right of the decimal point are read as single digits, with pauses occurring between groups of digits if there are four or more digits. Comma < **,** > is not recognised as a decimal marker in the British English system. Note: a leading decimal point is ignored in SM.

Number	**Reading**
3.1415	*three point one four* (pause) *one five*
234.65	*two hundred and thirty-four point six five*
1251.42	*one thousand two hundred and fifty-one point zero four two*
0.65	*zero full stop six five* (LM) *zero point six five* (SM)

4.5 Currency amounts

The following principles are valid for currency amounts:

- Numbers with zero or two decimals preceded by the currency markers **£, $, ¥** or **€** are read as currency amounts.
- A space is optional between amount and currency marker.
- The only accepted decimal marker is full stop**.**
- The decimal part (consisting of two digits) in currency amounts is read as “and nn pence” and “and nn cents”. If the decimal part is “00” it will not be read.
- A leading zero can be omitted after the symbol <**$**> but not after <**£**>, <**¥**>, and <**€**>.
- **m** or **bn** may be used after the currency markers do denote million and billion

Expression	**Reading (SM)**
$1988.45	*one thousand nine hundred and eighty-eight dollars and forty-five cents*
$1988.45	*dollar one nine eight eight full stop four five* (LM)
$200	*two hundred dollars*
$200.00	*two hundred dollars*
€1.45	*one euro and forty-five cents*
$.45	*forty-five cents*
£.45	*pound forty-five*
$ 1 million	*one million dollars*
£18 m	*eighteen million pounds*

4.6 Ordinal numbers

When the appropriate ordinalizer (**st**, **nd**, **rd**, or **th**) is appended to a digit string, the ordinal version of the full number is spoken in SM only.

Expression	**Reading**
`21st`	*twenty-first*
`42nd`	*forty-second*
`123rd`	*one hundred and twenty-third*
`95th`	*ninety-fifth*

4.7 Arithmetic operators

Numbers together with arithmetical operators are read according to the examples below. See also 3.3. Note that the date format **month/day/year** is not supported in this version.

Expression	**Reading**
`-12`	*minus twelve*
`+24`	*plus twenty-four*
`2*3`	*two times three*
`25%`	*twenty-five percent*
`3.4%`	*three point four percent*
`1/2/88`	*one oblique two oblique eighty-eight*
`1-2-88`	*one dash two dash eighty eight*

4.8 Mixed digits and letters

If a letter appears within a sequence of digits, the groups of digits will be read as numbers according to the rules above. The letter marks the boundary between the numbers. The letter will also be read.

Expression	**Reading**
`77B84Z3`	*seventy-seven B eighty-four Z three*
`+0092B87-B`	*plus zero zero* (pause) *nine two B eighty-seven B*

4.9 Time of day

Time of day is read in SM if the following format is observed:

H:M

H represents the hours, **M** represents the minutes.

Furthermore, the following rules must be observed:

- The hours and minutes must be separated by a colon < **:** >.
- The hours part must contain one or two digits.
- The minutes part must contain exactly two digits.

The time of day is read as follows:

- Whole hours from **1:00** to **12:00** are read as *o'clock*.
- Whole hours from **13:00** to **23:00** are read as *hundred*.
- **0:00** is read as *oh o'clock*.
- An optional **0** may precede **0** to **9** in the hours field, but it is not pronounced before **1:00** to **9:59**.

See next page for examples.

Expression	Reading
15:25	*fifteen twenty-five*
02:05	*two oh five*
0:30	*oh thirty*
00:45	*oh forty five*

5 British English Phonetic Text

In the current version of the text-to-speech system, SAMPA (Speech Assessment Methods Phonetic Alphabet) is used when making lexicons or using phonetic strings within texts. In earlier versions, RULSYS was used. For the voices based on RULSYS, a conversion is made automatically from SAMPA to RULSYS inside the system.

We recommend new users to use only SAMPA since this is the notation that will be used in future development. Users who are already familiar with the RULSYS alphabet still have the possibility to use it when making user lexicons for all RULSYS-based voices (among them the British voices Roger and Kate). There will be a description of RULSYS in the next section.

For the sake of clarity, SAMPA transcriptions are written within slashes (/ /) and RULSYS transcriptions within hash marks (# #). Note that neither the slashes nor the hash marks are part of the actual transcription.

The British English uses a phonetic alphabet similar to the British English subset of SAMPA. The phonetic alphabet is described below.

If the pronunciation is incorrect the user may write phonetic transcriptions in the text. Then, a PRN-tag is needed to switch to phonetic mode, see User's Guide. It is also possible to make user lexicons (see User's Guide), or change the orthography of a word (see section 7) in order to achieve the preferred pronunciation.

5.1 Consonants

The table below lists the phonetic symbols used for the British English consonants along with example words (the letters corresponding to the consonant sound are in boldface) and their transcriptions.

Consonant symbol	Example	Transcription in SAMPA
b	**b**o**b**	/b Q1 b/
d	**d**a**d**	/d {1 d/
f	**f**i**f**e	/f aI1 f/
g	**g**a**g**	/g {1 g/
k	**k**i**ck**	/k I1 k/
l	**l**u**ll**	/l V1 l/
m	**m**i**m**e	/m aI1 m/
n	**n**o o**n**	/n U:1 n/
p	**p**i**p**e	/p aI1 p/
r	**r**ow	/r @U1/
?	ice	/? aI1 s/
s	**s**au**c**e	/s O:1 s/
t	**t**o**t**	/t Q1 t/
v	**v**al**v**e	/v {1 l v/
w	**w**e	/w i:1/
j	**y**et	/j e1 t/
z	**z**oo**s**	/z U1 z/
x	lo**ch**	/l Q1 x/
tC	**ch**u**rch**	/tC 3:1 tC/
D	**th**ey	/D eI1/
h	**h**at	/h {1 t/
dZ	**j**u**dg**e	/dZ V1 dZ/
N	si**ng**	/s I1 N/
S	**sh**ip	/S I1 p/
T	**th**aw	/T O:1/
Z	vi**si**on	/v I1 Z @ n/

Table 6 Consonant symbols

5.2 Comments on phonetic symbols for consonants

5.2.1 Glottal stop

A glottal stop, represented by the phonetic symbol **/?/**, is a small sound which is often used in British English to separate two words when the second word starts with a stressed vowel. This sound can be inserted in order to improve the pronunciation, or to imitate various regional styles of speech, for instance a London (Cockney) accent.

Example	**a nice cream**	/@ n aI1 s k r i:1 m/
	an ice cream	/@ n ? aI s k r i:1 m/
	bottle	/b Q1 ? l/

5.3 Vowels

The table below lists the phonetic symbols used for the British English vowels along with example words and their transcriptions.

Vowel symbol	Example	Transcription in SAMPA
{	b**a**t	/b {1 t/
V	b**u**d	/b V1 d/
O:	br**oa**d	/b r O:1 d/
O:	b**oar**d	/b O:1 d/
A:	f**a**ther	/f A:1 D @/
A:	f**ar**	/f A:1/
aU	b**ou**t	/b aU1 t/
@	**a**bout	/@ b aU1 t/
aI	b**i**te	/b aI1 t/
e	b**e**t	/b e1 t/
3:	b**ur**n	/b 3:1 n/
e@	b**are**	/b e@1/
eI	b**ai**t	/b eI1 t/
I	b**i**t	/b I1 t/
I	rabb**i**t	/r {1 b I t/
I@	b**eer**	/b I@1/
i:	b**ee**t	/b i:1 t/
Q	b**o**b	/b Q1 b/
@U	b**oa**t	/b @U1 t/
OI	b**oy**	/b OI1/
U	b**oo**k	/b U1 k/
U@	p**oor**	/p U@1 r/
u:	b**oo**t	/b u:1 t/

Table 7 Vowel symbols

5.4 Comments on phonetic symbols for vowels

5.4.1 Pronunciation of the letter R

In the kind of (Southern) British English that the text-to-speech system is modelled on, the letter **R** is generally not pronounced in the following contexts:

- before a consonant in a word
- word-finally if the next word begins with a consonant
- before a comma or a sentence terminator < **.** > < **?** > < **!** >

Example **far** /f A:1/
farmer /f A:1 m @/

The '**r**' sound is pronounced, however, if the next sound is a vowel, and consequently /r/ is required to represent the sound.

Example **far away** /f A:1 r @ w eI/
barring /b A:1 r I N/

5.5 Extra symbols for phonetic details

In the current version of the British English synthesis certain phonetic details can be specified in phonetic text. This can be exploited in case the user wishes to achieve an unusual pronunciation, or if the transcription automatically generated by the system is inaccurate.

5.5.1 Aspiration

In Standard British English the stop sounds **P**, **T**, **K** ("voiceless", or "fortis", stops) are typically *aspirated* in certain positions of the word. That is, they are followed by a "puff of breath" before the vowel. This happens when the stop sound is followed by a stressed vowel, unless an **S** sound precedes in the same syllable; similarly, they tend to be aspirated when word initial. Also, when the consonant sounds represented by the letters / **l r w y** / follow the same stop sounds in the same positions of the word, there is aspiration, manifested by these consonants being pronounced voiceless. For instance, the word **displace** typically has an aspirated **P**, but the word **display** (where the **P** is preceded by **S** in the same syllable) has an *un*aspirated **P**.

The synthesis cannot always correctly predict when a voiceless stop is to be aspirated. The user can indicate the aspiration of a voiceless stop by placing /**_h**/ after the stop symbol.

Examples:		
	display	`/d I s p l eI1/`
	displace	`/d I s p_h l eI1 s/`
	mistake	`/m I s t eI1 k/`
	distaste	`/d I s t_h eI1 s t/`
	discuss	`/d I s k V1 s/`
	discomfort	`/d I s k_h V1 m f t/`

5.5.2 Lexical stress

In words with more than one syllable, one (and normally only one) of the syllables is more prominent than the others. This is referred to as word stress, or lexical stress. Words of one syllable also have word stress when spoken in isolation, although many may lose the stress in certain contexts.

In British English, lexical stress is often used to distinguish between two words that are spelled alike, but pronounced differently. It is therefore important to include stress marks when writing transcriptions. For example, **desert** can be pronounced either `/d e1 z @ t/` (an arid place) or `/d I z 3: t/` (to abandon). In the phonetic transcriptions the primary stress is indicated by the symbol "1" placed directly after the stressed vowel (with no space between the vowel symbol and the stress symbol). It is not possible to denote secondary stress (see section 6.4.2) in SAMPA in the current British English system.

5.5.3 Emphasis and reduction

It is also possible to emphasise or reduce the stress on a particular word in a phrase or sentence. In the input text string, this is done by placing < **_X** >, where **X** represents a single digit between **0** and **9**, within a PRN-tag (see User's Guide) immediately before the word whose prominence is to be altered. The emphasis mark can also be used in transcriptions in a user lexicon.

_2	normal stress for most words
_0	makes a word non-stressed
_1	gives stress to a normally unstressed word
_3 - **_9**	gives levels of emphatic stress

5.5.4 Foreign sounds

A few non-English sounds, which sometimes occur in the pronunciation of foreign words and names, are permitted in the transcriptions of the current version of the British English synthesis. Depending on which voice is chosen, these sounds will be rendered more or less similar to the foreign speech sounds. The sounds in question are exemplified in Table 8.

Phonetic symbol	Example	Transcription	Language of origin
A~	blanc	/b l A~1/	French
E~	vin	/v E~1/	French
O~	mont	/m O~1/	French
x	loch	/l Q1 x/	Scots
_Lw l	Llanelli	/_Lw l { n e1 _Lw l i:/	Welsh

Table 8 Symbols for foreign sounds (SAMPA)

5.5.5 Hyphen

The hyphen < **-** > in phonetic text can be used to separate parts of a compound word.

Example **bookcases** /b U1 k _- k eI s I z/

If the hyphen separating two parts of a word comes at the end of a line, the word is not spoken until the second part on the next line is also read in.

A word written in phonetic text which contains one (or more) hyphens is spoken as a complete word when the system is in SM. For a description of the use of the hyphen character in normal orthographic text, see section 3.3.1.

5.5.6 Punctuation marks

Punctuation marks in phonetic text have the same effect as in orthographic text, affecting both the rhythm and intonation of the sentence. These punctuation marks are permitted in phonetic text:

. ? ! ,

In SAMPA they are denoted /_./, /_?/, /_!/, /_**com**/ respectively.

6 The RULSYS phonetic alphabet

Note that we recommend new users to use only SAMPA since this is the notation that will be used in future development. Note also that it is only possible to use RULSYS when making user lexicons, not in the input text string.

The following differentiates RULSYS from SAMPA in the British English system:

- no spaces are used within words in transcriptions
- the lexical accent is placed before the vowel to be stressed, not after as in SAMPA
- it is possible to denote secondary stress
- there are symbols for syllabic consonants, stressed vowels, and some foreign sounds

Note that the hash marks (# #) are used to indicate RULSYS transcriptions and to differentiate them from SAMPA transcriptions; the hash marks are not part of the actual transcriptions.

If the pronunciation is incorrect the user may write phonetic transcriptions in the text. Then, a PRN-tag is needed to switch to phonetic mode, see User's Guide. It is also possible to make user lexicons (see User's Guide), or change the orthography of a word (see section 7) in order to achieve the preferred pronunciation.

6.1 RULSYS Consonants

The table below lists the phonetic symbols used for the British English consonants along with example words (the letters corresponding to the consonant sound are in boldface) and their transcriptions.

Consonant symbol	Example	Transcription in RULSYS
B	**b**o**b**	#B'ohB#
D	**d**a**d**	#D'aeD#
F	**f**i**f**e	#F'ayF#
G	**g**a**g**	#G'aeG#
K	**k**i**ck**	#K'ihK#
L	**l**u**ll**	#L'ahL#
M	**m**i**m**e	#M'ayM#
N	**n**o o**n**	#N'uwN#
P	**p**i**p**e	#P'ayP#
R	**r**ow	#R'ow#
Q	ice	#Q'ayS# (See 6.3.2)
S	**s**au**c**e	#S'aoS#
T	**t**o**t**	#T'ohT#
V	va**l**v**e**	#V'aeLV#
W	**w**e	#W'iy#
Y	**y**et	#Y'ehT#
Z	**z**oo**s**	#Z'uwZ#
X	lo**ch**	#L'ohX#
ch	**ch**u**rch**	#ch'erch#
dh	**th**ey	#dh'ey#
hh	**h**at	#hh'aeT#
jh	**j**u**dg**e	#jh'ahjh#
nx	si**ng**	#S'ihnx#
sh	**sh**ip	#sh'ihP#
th	**th**aw	#th'ao#
zh	vi**si**on	#V'ihzhaxN#

Table 9 RULSYS consonants

6.2 Comments on phonetic symbols for consonants

6.2.1 Glottal stop

Glottal stop is represented by the phonetic symbol /**Q**/. See section 5.2.1 for a description of glottal stop.

Examples

a nice cream	#ax N'ayS KR'iyM#
an ice cream	#axN Q'ayS KR'iyM#
bottle	#B'ohQLs# (for the symbol **Ls**, see section 6.2.2)

6.2.2 Syllabic consonants

In a word like **little**, it is common to pronounce the final **l**-sound immediately after the **t**-sound, without an intervening vowel sound. The same applies to the **n**-sound in a word like **mutton**. Occasionally, the same phenomenon occurs with **m**-sounds, for instance if the consonant before the **m** is realised as a glottal stop (see section 5.2.1). Such consonant realisations are referred to as 'syllabic' consonants, and in the current version of the British English synthesis they are denoted as the respective consonant symbol followed by a lower-case **s**: **Ls, Ns, Ms**. See examples

Examples	**little**	`#L'ihTLs#`	
	bottle	`#B'ohTLs#`	
	bottle	`#B'ohQLs#`	(using glottal stop)
	mutton	`#M'ahTNs#`	
	bottom	`#B'ohQMs#`	(using glottal stop)

6.3 RULSYS Vowels

The table below lists the phonetic symbols used for the British English vowels along with example words and their transcriptions.

Vowel symbol	Example	Transcription in RULSYS
ae	b**a**t	#B'aeT#
ah	b**u**d	#B'ahD#
ao	br**oa**d	#BR'aoD#
ao	b**oar**d	#B'aoD#
aq	f**a**ther	#F'aqdhax#
aq	f**ar**	#F'aq#
aw	b**ou**t	#B'awT#
ax	**a**bout	#axB'awT#
ay	b**i**te	#B'ayT#
eh	b**e**t	#B'ehT#
er	b**ur**n	#B'erN#
ex	b**are**	#B'ex#
ey	b**ai**t	#B'eyT#
ih	b**i**t	#B'ihT#
ih	rabb**i**t	#R'aeBihT#
ir	b**eer**	#B'ir#
iy	b**ee**t	#B'iyT#
oh	b**o**b	#B'ohB#
ow	b**oa**t	#B'owT#
oy	b**oy**	#B'oy#
uh	b**oo**k	#B'uhK#
ur	p**oor**	#P'ur#
uw	b**oo**t	#B'uwT#

Table 10 RULSYS vowels

6.4 Extra symbols for phonetic details

In the current version of the British English synthesis certain phonetic details can be specified in phonetic text. This can be exploited in case the user wishes to achieve an unusual pronunciation, or if the transcription automatically generated by the system is inaccurate.

6.4.1 Aspiration

Aspiration is denoted by using /**Ph, Th, Kh**/. See section 5.5.1 for a detailed description of Aspiration.

Examples:

display	#DihSPL'ey#
displace	#DihSPhL'eyS#
mistake	#MihST'eyK#
distaste	#DihSTh'eyST#
discuss	#DihSK'ahS#
discomfort	#DihSKh'ahMFaxT#

6.4.2 Lexical stress

For a description of lexical stress, see section 5.2.2. In RULSYS, lexical stress is denoted by an apostrophe <'> placed before the vowel to receive the (primary) stress. There is also the option of denoting a slightly weaker level of stress, secondary stress. This is done by using <">.

Examples **cases** `#K'eySihZ#`
bookcases `#B'uhKK"eySihZ#`

6.4.3 Emphasis and reduction

In RULSYS, phrase level stress is denoted in the same way as in SAMPA. See section 5.5.3.

6.4.4 Stressed vowels

In addition to the "normal" symbols for vowels and consonants described above, the system uses some additional symbols during the internal processing of stressed vowels (vowels preceded by the marks for primary or secondary stress. The user need not use these when writing phonetic text, but they are listed here because when using the voice Kate, these symbols will be presented when the user requests the transcription for a given word. However, it is always *possible* to use these extra symbols in appropriate circumstances. Table 10 lists the extra, system-internal, phonetic symbols for stressed vowels.

System-internal symbol	Equivalent symbol	Example	Transcriptions	
Ae	ae	h**a**t	#H'AeT#	#H'aeT#
Ah	ah	b**u**t	#B'AhT#	#B'ahT#
O:	ao	b**ou**ght	#B'O:T#	#B'aoT#
A:	aq	h**ar**d	#H'A:D#	#H'aqD#
Aw	aw	h**ow**	#H'Aw#	#H'aw#
Eh	eh	b**e**t	#B'EhT#	#B'ehT#
Er	er	h**ear**d	#H'ErD#	#H'erD#
E@	ex	sc**ar**ce	#SK'E@S#	#SK'exS#
Ey	ey	s**ay**	#S'Ey#	#S'ey#
Ih	ih	h**i**t	#H'IhT#	#H'ihT#
I@	ir	p**ier**ce	#P'I@S#	#P'irS#
I:	iy	s**ee**d	#S'I:D#	#S'iyD#
Oh	oh	h**o**t	#H'OhT#	#H'ohT#
Ow	ow	l**ow**	#L'Ow#	#L'ow#
Oy	oy	b**oy**	#B'Oy#	#B'oy#
Uh	uh	p**u**t	#P'UhT#	#P'uhT#
U@	ur	t**our**	#T'U@R#	#T'urR#
U:	uw	b**oo**t	#B'U:T#	#B'uwT#

Table 11 Extra, stressed vowels

6.4.5 Foreign sounds

A few non-English sounds, which sometimes occur in the pronunciation of foreign words and names, are permitted in the transcriptions of the current version of the British English synthesis. Depending on which voice is chosen, these sounds will be rendered more or less similar to the foreign speech sounds. The sounds in question are exemplified in Table 11.

Phonetic symbol	Example	Transcription	Language of origin
A9	blanc	#BL'A9#	French
E9	vin	#V'E9#	French
O9	mont	#M'O9#	French
X	loch	#L'ohX#	Scots
Lw	Llanelli	#LwaeN'ehLwiy#	Welsh

Table 12 Symbols for foreign sounds (RULSYS)

6.4.6 Hyphen

The hyphen, < **-** >, in phonetic text can be used to separate parts of a compound word.

Example `#B'uhK-K"eySihZ#`

If the hyphen separating two parts of a word comes at the end of a line, the word is not spoken until the second part on the next line is also read in.

A word written in phonetic text which contains one (or more) hyphens is spoken as a complete word when the system is in SM. For a description of the use of the hyphen character in normal orthographic text, see section 3.3.1.

7 How to change pronunciation errors

Words that are not pronounced correctly by the text-to-speech converter can be entered in the user lexicon (see User's guide). There are two ways to do this: either, the user enters a phonetic transcription of the word (see section 6), or, the user rewrites the word orthographically. Phonetic transcriptions can also be entered directly in the text, using a PRN-tag (see User's guide).

7.1 Change the orthography

7.1.1 Spelling incorrectly

It is possible to intentionally misspell a word by trying to spell a word in a more phonetic manner, i.e., choosing non-ambiguous letter combinations to represent difficult sounds. For example, the letters **ch** and **ae** in **archaeological** might better be represented by the letters **k** and **ee**, which are closer to the actual sounds in the word.

Examples **Feldstein** can be misspelled **Feldstine** to rhyme with **pine**
polled can be misspelled **poled**

7.1.2 Use of hyphen

A hyphen character can be used within a word to separate two letters that might otherwise be incorrectly pronounced together.

Example **hothouse** can be written **hot-house**
sidelong can be written **side-long**

7.1.3 Expanding acronyms

Very few acronyms are handled by the current British English system (see section 8). Therefore, it may be very useful to expand them in the user dictionary. Since acronyms should be expanded to more than one word it may be difficult to enter a proper transcription. It is much easier to enter the words in question orthographically. The examples below show some acronyms and their expanded readings.

Examples	**GB**	Great Britain
	FAQ	frequently asked questions

7.2 Using phonetic text

When you are unable to correct a pronunciation error by misspelling the word, phonetic text should be used to produce the desired pronunciation. When phonetic text is used, the system bypasses the normal spelling pronunciation rules, and pronounces each phonetic symbol "literally", according to the examples listed in Tables 6 and 7.

7.2.1 Choosing the right phonetic symbols

A helpful way to transcribe in phonetic text is to work with a dictionary. Normally, dictionaries give the pronunciation for each word. They also provide a pronunciation key to show how to pronounce the special symbols used in the pronunciation guide. Similarly, Tables 6 and 7 give the pronunciation key for the special phonetic symbols used in British English for the text-to-speech system.

Using a dictionary, look up the word you want to transcribe. Next to the word you should find the pronunciation. Working with the dictionary's pronunciation key and Tables 6 and 7, convert the dictionary pronunciation symbols to the appropriate British English symbols for the text-to-speech converter. Symbols that are used in the dictionary to mark syllable or word boundaries should be ignored. Be sure to include the stress assignment information since lexical stress is an important part of a word's pronunciation.

Example:
Suppose we want to transcribe the place name **Pompeii**. We consult a dictionary and find an entry that looks like this:

> Pompeii (pom'-pa) n. Ancient city in Italy.

Among the symbols listed in the dictionary's pronunciation key are the following:

> **p** (pop), **o** (hot), **m** (mom), **a** (say), ' (primary stress), **-** (syllable boundary)

Using Tables 6 and 7, we find the following corresponding symbols:

> **p** (pipe), **Q** (bob), **m** (mom), **eI** (bait), ' (primary stress)

Now we can transcribe **Pompeii** using the British English phonetic symbols for the text-to-speech converter. Note that the syllable boundary symbol is not included.

```
/p Q m p eI1/
```

8 Abbreviations

In the current version of the British English text-to-speech system, the following abbreviations are recognized in all contexts (in SM only). These abbreviations are mostly case-sensitive and require no full stop in order to be recognised as abbreviations. In SM, if a full stop accompanies the abbreviation, the sentence is terminated at the abbreviation.

The user lexicon may be used to redefine any of these abbreviations, or to create your own.

The table below shows how some common abbreviations are treated in the three reading modes:

Abbreviation	LM	SM
cm	*C M*	*centimetres*
ctrl	*C T R L*	*control*
dr	*D R*	*doctor*
etc	*E T C*	*et cetera*
lb	*L B*	*pounds*
ltd	*L T D*	*limited*
ml	*M L*	*millilitres*
mm	*M M*	*millimetres*
mr	*M R*	*mister*
mrs	*M R S*	*missis*
ms	*M S*	*miz*
rd	*R D*	*road*
sq	*S Q*	*square*

Table 13 Abbreviations in the British English system

Notes:
1) The letter < **m** > is pronounced as *million* in some currency expressions, see section 4.5.
2) When followed by the symbol < **²** >, the letter < **m** > is pronounced as *metres*.
3) If < **rd** > is directly preceded by a digit it is processed as an ordinalizer in SM.