Language Manual

HQ, CO, and HD British English

Language Manual: HQ, CO, and HD British English

Published 24 July 2013
Copyright © 2010-2013 Acapela Group

This document was produced by Acapela Group. We welcome and consider all comments and suggestions. Please, use the *Contact Us* link at our website: http://www.acapela-group.com

Table 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 Quality (HQ) and Colibri (CO) British English voices.

Please note that the *User's Guide*, mentioned several times in the manual, is called *Help* in some applications.

> Note: For efficiency reasons, the processing described in this document has a different behaviour in some Acapela Group products. Those products are:
>
> • Acapela TTS for Windows Mobile
>
> • Acapela TTS for Linux Embedded
>
> • Acapela TTS for Symbian
>
> For these products, the default processing of numbers, phone numbers, dates and times has been simplified for the low memory footprint (LF) voice formats. Developers have the possibility to change the default behaviour from *simplified* to *normal* preprocessing by setting corresponding parameters in the configuration file of the voice. Please see the documentation of these products for more information. In the following chapters, each simplification will be described by the indication *[not SP]* following the description of the standard behaviour. The *SP* in the indication stands for *Simplified Processing*.

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, i.e. *ñ, ç, é*. These letters are not pronounced as in their native languages though, they are pronounced as regular *n, c, e* when occurring in a word

Characters outside of these ranges, i.e. numbers, punctuation characters and other non-alphanumeric characters, are not considered as letters.

3 Punctuation characters

Punctuation marks appearing in a text affect both rhythm and intonation of a sentence. The following punctuation characters are permitted in the normal input text string: *, : ; " " . ? ! ( ) [ ] { }*

3.1 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.

3.2 Quotation marks

Quotes '""' appearing around a single word or a group of words cause a brief pause before and after the quoted text.

3.3 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 chapter *Number processing*) and in abbreviations (see chapter *Abbreviations*).

3.4 Question mark

A question mark '*?*' ends a sentence and causes question-intonation, first rising and then falling.

3.5 Exclamation mark

The exclamation mark '*!*' is treated in a similar manner to the full stop, causing a falling intonation pattern followed by a pause.

3.6 Parentheses

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

4 Other non alphanumeric characters

4.1 Non-punctuation characters

The characters listed below are processed as non-letter, non-punctuation characters. Some are pronounced at all times and others are only pronounced in certain contexts, which are described in the following sections of this chapter.

Table 4.1. Non-punctuation characters

Symbol	Reading
/	slash
+	plus
$	dollar
£	pound
€	euro
¥	yen
<	less than
>	greater than
%	percent
^	circumflex
|	pipe
~	tilde
@	at
=	equals
^{2}	(see below)
^{3}	(see below)
-	(see below)
*	(see below)

4.2 The ^{2} and ^{3} signs

The reading of expressions with ^{2} and ^{3} is:

Expression	Reading
mm^2	millimeters squared
cm^2	centimeters squared
m^2	meters squared
km^2	kilometers squared
mm^3	millimeters cubed

Expression	Reading
cm³	centimeters cubed
m³	meters cubed
km³	kilometers cubed

4.3 Symbols whose pronunciation varies depending on the context

4.3.1 Hyphen

A hyphen '-' is pronounced *minus* in two cases:

1. if followed by a digit and no other digit is found in front of the hyphen, i.e. as in the pattern -X but not in X-Y or X -Z where X, Y, and Z are numbers.

2. if followed by a digit and an equals sign '=', i.e. as in the pattern X-Y=Z. Space is allowed between digits, hyphen and equals sign.

If there is no equals sign, as in X-Y or X -Z, the hyphen is pronounced *dash*.

In certain date formats, in between days or years, the hyphen is pronounced *to*. In other cases the hyphen is never pronounced.

Expression	Reading	
-3	minus three	
44-3	forty-four dash three	
44-3=41	forty-four minus three equals forty-one	
44 - 3 = 41	forty-four minus three equals forty-one	
15-20 October	the fifteenth to twentieth of October	[not SP]
6-10 Nov	the sixth to tenth of November	[not SP]
1998-2004	nineteen ninety-eight to two thousand and four	
02-02-2002	the second of February two thousand and two	
low-income	low income	
mother-in-law	mother in law	

4.3.2 Asterisk

Asterisk '*' is pronounced *multiplied by* if enclosed by digits and followed by equals sign '='. In other cases it is pronounced *asterisk*.

Expression	Reading
2*3	two asterisk three
2*3=6	two multiplied by three equals six
*bc	asterisk b c

5   Number Processing

Strings of digits that are sent to the text-to-speech converter are processed in several different ways, depending on the format of the string of digits 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 recognised 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
Dates
Telephone numbers

5.1   Full number pronunciation

Full number pronunciation is given for the whole number part of the digit string.

Example

2425	full number
2,425	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 space or comma (not full stop). In order to achieve the right pronunciation the grouping must be done correctly.

The rules for grouping of numbers are the following:

- Numbers are grouped in groups of three starting at the end.

- The first group in a number may consist of one, two, or three digits.

- If a group, other than the first, does not contain exactly three digits, the sequence of digits is not interpreted as a full number.

- The highest number read is 999999999999 (twelve digits). Numbers higher than this are read as separate digits.

Number	Reading
2580	two thousand five hundred and eighty
2 580	"
2,580	"
25800	twenty-five thousand eight hundred
25 800	"
25,800	"
2580350	two million five hundred and eighty thousand three hundred and fifty
2 580 350	"
2,580,350	"
1000000000	one billion
23 456 789 012	twenty-three billion four hundred and fifty-six million seven hundred and eighty-nine thousand and twelve
1234567890123	one two three four five six seven eight nine zero one two three

5.2   Leading zero

Numbers that begin with *0* (zero) are read digit by digit.

Number	Reading
09253	zero nine two five three
020	zero two zero

5.3   Decimal numbers

Comma or full stop may be used when writing decimal numbers.

The full number part of the decimal number (the part before comma or full stop) is read according to the rules in the section *Full number pronunciation*. The decimals (the part after comma or full stop) are read as separate digits. Note: A number containing a comma followed by exactly three digits is not read as a decimal number but as a full number, following the rules in the section *Full number pronunciation*.

Number	Reading
16.234	sixteen point two three four
3.1415	three point one four one five
1251.04	one thousand two hundred and fifty-one point zero four
1,251.04	one thousand two hundred and fifty-one point zero four
2,50	two comma five zero

Number	Reading
2.50	two point five zero
3,141	three thousand one hundred and forty-one

5.4   Currency amounts

The following principles are followed for currency amounts:

- Numbers with zero, one, or two decimals preceded or followed by either the currency markers *£, $, ¥* or *€* or the abbreviations *EUR, USD* or *DM* are read as currency amounts.

- Numbers with zero, one, or two decimals followed by the words *pounds, dollars, yen* or *euros* (singular or plural) are read as currency amounts.

- Accepted decimal markers are comma ',' and full stop '.'.

- The decimal part (consisting of one or two digits) in currency amounts is read as *and nn pence*, *and nn cents*, or *and nn pfennigs* respectively.

- If the decimal part is *00* it will not be read.

Example	Reading	
$15.00	fifteen dollars	
15.00 USD	fifteen dollars	[not SP]
15.00£	fifteen pounds	
15.00 euros	fifteen euros	[not SP]
15.00 EUR	fifteen euros	[not SP]
€ 200.50	two hundred euros and fifty cents	
15.45 DM	fifteen deutschmarks and forty-five pfennigs	[not SP]
1,000,000 ¥	one million yen	

There is also the possibility of writing large amounts as follows:

$ 1 million	one million dollars

5.5   Ordinal numbers

Numbers are read as ordinals in the following cases:

- The number is followed by a month name or one of the month name abbreviations and the number is smaller or equal to 31. The number may be preceded by a day or an abbreviation for a day.

- The number consists of a day interval followed by a month nameabbreviation.

- The number is followed by *st, nd, rd, th, d*.

The valid abbreviations for months are: *Jan, Feb, Mar, Apr, Jun, Jul, Aug, Sept, Oct, Nov,* and *Dec*.

The valid abbreviations for days are: *Mon, Tue, Wed, Thu, Thurs, Fri, Sat,* and *Sun*.

The abbreviations above are only expanded to names of months and days when appearing in correct date contexts.

Expression	Reading	
3 January	the third of January	[not SP]
3 Jan	the third of January	[not SP]
Tuesday 3 Jan	Tuesday the third of January	[not SP]
15-16 January	the fifteenth to sixteenth of January	[not SP]
2nd May	the second of May	[not SP]
4th Jun 2007	the fourth of June 2007	[not SP]
the 21st Century	the twenty-first century	
her 22nd novel	her twenty-second novel	
in 3rd place	in third place	
a 77th birthday party	a seventy-seventh birthday party	

5.6   Arithmetic operators

Numbers together with arithmetical operators are read according to the examples below.

Expression	Reading
-12	minus twelve
14-2	fourteen dash two
14-2=12	fourteen minus two equals twelve
+24	plus twenty-four
2+3	two plus three
2+3=5	two plus three equals five
2*3	two asterisk three
2*3=6	two multiplied by three equals six
2/3	two thirds
6/2=3	six divided by two equals three
25%	twenty-five percent
3.4%	three point four percent

5.7   Mixed digits and letters

If one or more upper-case letters appear within an alphanumeric sequence, the letters are read one by one. The numbers are read according to the examples below.

Expression	Reading
77B184Z3	seventy-seven B one hundred and eighty-four Z three
0092B87-B	zero zero ninety-two B eighty-seven B
FT2892B87Z	F T twenty-eight ninety-two B eighty-seven Z
TN12345L5	T N one two three four five L five

5.8   Time of day

The colon is used to separate hours, minutes and seconds. Abbreviations such as *A.M.* and *P.M.* (possible variants: *a.m., am, AM, p.m., pm, PM*) may follow or precede the time, with a space inserted between the time and the abbreviation.

In pattern *a* below, the letter *h or H* may replace colon. Full stop is also a valid separator if one of the mentioned abbreviations is used.

Time intervals can be denoted using a hyphen: *8-10 pm*.

Possible patterns are:

> a. *hh:mm* or *h:mm*
>
> b. *hh:mm:ss* or *h:mm:ss*
>
> c. *hh:mm'ss"* or *h:mm'ss"*
>   Example: 12:30'45"

h = hour, *m* = minute, *s* = second.

In pattern a:

If the *mm*-part is equal to *00*, this part will not be read. Instead, *o'clock* will be added if the hours are less than 13, or *hundred hours* will be added if the hours are greater than or equal to 13.

Expression	Reading	
9:00	nine o'clock	
9h00	nine o'clock	[not SP]
9:30 pm	nine thirty p m	
9h30 pm	nine thirty p m	[not SP]
9.30 pm	nine thirty p m	[not SP]
13:00	thirteen hundred hours	
13h00	thirteen hundred hours	[not SP]
12:00	noon	
12h00	noon	[not SP]
0:00	midnight	
0h00	midnight	[not SP]

In pattern b:

An *and* will be inserted before the *ss*-part, and *seconds* will be added after it. If the *ss*-part is equal to *00*, this part will not be read.

Expresion	Reading
10:24:00	ten twenty-four
10:24:00 A.M.	ten twenty-four a m
10:24:20	ten twenty-four and twenty seconds

In pattern c:

Pattern (c) follows the rules for pattern (b).

5.9 Year

Numbers between 1100 and 1999 are always read as hundreds (year reading) with the exception of numbers containing decimals. Years (2 or 4 digits) can also be followed by *s* or *'s* to indicate decades.

Expression	Reading	
1988	nineteen eighty-eight	[not SP]
1939-45	nineteen thirty-nine to forty-five	[not SP]
1088	one thousand eighty-eight	
1988.0	one thousand nine hundred and eighty-eight point zero	
1988.32	one thousand nine hundred and eighty-eight point three two	
September 1999	September nineteen ninety-nine	[not SP]
1980s	nineteen eighties	[not SP]
70's	seventies	
1980's	nineteen eighties	[not SP]

5.10 Dates

The valid formats for dates are:

> 1. *dd-mm-yyyy*, *dd.mm.yyyy*, and *dd/mm/yyyy*
>
> 2. *dd-mm-yy*, *dd.mm.yy*, and *dd/mm/yy*

yyyy is a four-digit number, *yy* is a two-digit number, *mm* is a month number between 1 and 12 and *dd* a day number between 1 and 31. Hyphen, full stop, and slash may be used as delimiters. In all formats, one or two digits may be used in the *mm* and *dd* part. Zeros may be used in front of numbers below 10.

Examples of valid formats and their readings:

Type 1:	Reading
10-02-2003 or 10-2-2003	the tenth of February two thousand and three
10.02.2003 or 10.2.2003	"
10/02/2003 or 10/2/2003	"

Type 2:	Reading
10-02-03 or 10-2-03	the tenth of February two thousand and three
10.02.03 or 10.2.03	"
10/02/03 or 10/2/03	"

[not SP] Ranges of days and years are also supported.

Expression	Reading
1998-1999	nineteen ninety-eight to nineteen ninety-nine
1939-45	nineteen thirty-nine to forty-five
2002/3	two thousand two to three
14-15 January	the fourteenth to fifteenth of January
October 19-20	October the nineteenth to twentieth

[not SP] Other possible formats include:

Expression	Reading
Monday, 15 January	Monday the fifteenth of January
Monday 15 January	Monday the fifteenth of January
Mon, January 15	Monday January the fifteenth
Mon January 15	Monday January the fifteenth
19 April 2007	the nineteenth of April two thousand and seven
April 19 2007	April the nineteenth two thousand and seven
May 1953	May nineteen fifty-three
3 May	third of May

5.11 Phone numbers

In this section the patterns of digits that are recognized as phone numbers are described. [not SP] In the pronunciation of phone numbers, all numbers are read out digit by digit with pauses between groups of numbers. The abbreviations *tel* and *mob* can be used in front of all the formats recognized by the system

5.11.1 Ordinary phone numbers

Sequences of digits in the following formats are treated as phone numbers.

The following sequences of digits can be separated by a space or a hyphen:

Format

xxxxx xxxxxx

xxxxx xxx xxx

xxxxx xxxxx

xxxx xxxxxxx

xxxx xxx xxxx

xxxx xxxxxx

xxx xxxx

xx xx xx

xxx xxxx xxxx

(*area code*) xxxx xxxx

(*area code*) xxxxxxx

(*area code*) xxxxxx

(*area code*) xxxxx

(*area code*) xxx xxxx

(*area code*)-xxx-xxxx

The *area code* is a sequence of *0* followed by 2 to 7 digits.

The following sequences can only appear in these formats:

Format

xxxx/xxx-xxxx

xxx/xxx-xxx

xxx-xxx-xxx

(x)-xxx-xxx

(xx)-xxx-xxx

(xxx)-xxx-xxx

(x).xxxx.xxx.xxx

(x)-xxxx-xxx-xxx

(xx).xxxx.xxx.xxx

(xx)-xxxx-xxx-xxx

(xxx).xxxx.xxx.xxx

(xxx)-xxxx-xxx-xxx

The sequence *xxx-xxx* is recognized as a phone format only if preceded by *tel, mob, tel:, mob:*.

5.11.2 International phone numbers

All preceding formats can be recognised if preceded by international prefix and a space:

00x	+x	00(x)	+(x)
00xx	+xx	00(xx)	+(xx)
00xxx	+xxx	00(xxx)	+(xxx)

6   How to change the pronunciation

Words that are not pronounced correctly by the text-to-speech converter can be entered in the user lexicon (see *User's guide*). In this lexicon, the user enters a phonetic transcription of the word (see chapter *British English Phonetic Text*). Phonetic transcriptions can also be entered directly in the text, using the *PRN* tag (see *User's guide*).

7 British English Phonetic Text

The British English text-to-speech system uses the British English subset of the SAMPA phonetic alphabet (*Speech Assessment Methods Phonetic Alphabet*) with some modifications. The symbols are written with a space between each phoneme.

Only the symbols listed here may be used in phonetic transcriptions. Symbols not listed here are not valid in phonetic transcriptions and will be ignored if included in the user lexicon or in a *PRN* tag.

7.1 Consonants

Table 7.1. Symbols for the British English consonants

Symbol	Word	Phonetic text	Comment
b	bad	b {1 d	
t			
	stop	s t Q1 p	
	tomorrow	t @ m Q1 r @U	
t_h	top	t_h Q1 p	
p			
	sport	s p O:1 t	
	potato	p @ t_h eI1 t @U	
p_h	pad	p_h {1 d	
d	date	d eI1 t	
k			
	scone	s k Q1 n	
	campaign	k { m p_h eI1 n	
k_h	cone	k_h @U1 n	
g	gag	g {1 g	
m	man	m {1 n	
n	nose	n @U1 z	
r	rose	r @U1 z	
l	let	l e1 t	
L	adult	{1 d V L t	
N	ring	r I1 N	
f	fat	f {1 t	
v	vote	v @U1 t	
s	sat	s {1 t	
z	zoo	z u:1	
S	shin	S I1 n	
tS	chin	tS I1 n	

Symbol	Word	Phonetic text	Comment
Z	measure	m e1 Z @	
dZ	gin	dZ I1 n	
D	this	D I1 s	
T	thin	T I1 n	
w	wait	w eI1 t	
j	yacht	j Q1 t	
h	hit	h I1 t	
hj	exhume	e k s hj u:1 m	
hl	Llandaff	hl {1 n d @ f	Welsh allophone
x	loch	l Q1 x	Scottish allophone

7.2   Vowels

Table 7.2. Symbols for the British English vowels

Symbol	Word	Phonetic text	Comment
A:	father	f A:1 D @	
O:	four	f O:1	
I	bit	b I1 t	
i:	neat	n i:1 t	
u:	zoo	z u:1	
V	hut	h V1 t	
U	put	p_h U1 t	
{	pat	p_h {1 t	
e	net	n e1 t	
@	allow	@ l aU1	
eI	main	m eI1 n	
aI	high	h aI1	
OI	boy	b OI1	
@U	nose	n @U1 z	
aU	pout	p_h aU1 t	
3:	fur	f 3:1	
Q	dot	d Q1 t	
I@	near	n I@1	
e@	there	D e@1	
U@	sure	S U@1	
i	locally	l @U1 k @ l i	

Symbol	Word	Phonetic text	Comment
u	punctual	p_h V1 N k tS u @ L	
A~	renaissance	r e n eI1 s A~ s	French vowel
E~	vin	v E~1	French vowel
O~	avignon	{1 v i n j O~	French vowel
l=	battleaxe	b {1 t l= { k s	only before vowels
L=	battle	b {1 t L=	word finally or before consonants
m=	atheism	eI1 T i I z m=	
n=	sudden	s V1 d n=	
r=	history	h I1 s t r= i	

7.3 Lexical stress

A lexical accent is used to indicate the level of prominence (or emphasis) of a syllable in a word. In British English, some words can be differentiated by the position of this lexical accent. The word *record* is an example of this since it can be both a noun (*a record: /r e1 k O: d/*) or a verb (*to record: /r I k_h O:1 d/*). Practically all words in British English have a lexical accent even if it does not always serve to differentiate between two different words. It is therefore important to include stress marks when writing phonetic transcriptions.

In the phonetic transcriptions, primary accent is indicated by the symbol */1/* placed directly after (no space) the accented vowel. Secondary accent is indicated by the symbol */2/*. Some examples:

devastating	/d e1 v @ s t eI2 t I N/
devastation	/d e2 v @ s t eI1 S n=/
devote	/d I v @U1 t/
devotee	/d e2 v @ t_h i:1/

7.4 Glottal stop

A glottal stop, represented by the phonetic symbol */?/*, is a small sound which is often used to separate two words when the second word starts with a stressed vowel. This sound can be inserted in a transcription in order to improve the pronunciation.

7.5 Pause

An underscore */_/* in a phonetic transcription generates a small pause.

8   Abbreviations

In the current version of the British English text-to-speech system, the abbreviations in the table below are recognized in all contexts. These abbreviations are mostly case-insensitive (except for those indicated below by "*") and require no full stop in order to be recognized as an abbreviation.

As previously mentioned, there are also abbreviations for the days of the week and the months (see chapter *Ordinal numbers*).

Table 8.1. Abbreviations

Abbreviation	Reading
kg	kilograms
°C	degrees Celsius
°F	degrees Fahrenheit
°K	degrees Kelvin
asap	A S A P
b/f	before
blvd	boulevard
cm	centimeters
corp	corporation
DM*	Deutschmark
eg	for example
etc	et cetera
ft	feet
gal	gallons
gov	governor
hr	hour
hrs	hours
ie	that is
jr	junior
km	kilometers
Km/h	kilometers per hour
mg	milligrams
ml	milliliters
mm	millimeters
mph	miles per hour
mr	mister
mrs	missis
ms	miss

Abbreviation	Reading
mt	mount
prof	professor
sgt	sergeant
sr	senior
tsp	teaspoon
vs	versus
gen	general
ltd	limited
dept	department
ct	court
rd	road
av	avenue
ctrl	control
lb	pounds

Some abbreviations are expanded differently depending on their position in the sentence. For example, *dr* and *st* are expanded into *drive* and *street* if they appear after a capitalized noun. They are expanded into *doctor* and *saint* when they appear before a capitalized noun.

Example	**Reading**
Main st.	Main street
St John.	Saint John
Bayview dr.	Bayview drive
Dr. Jones.	Doctor Jones

m, g and *in.* are expanded only when appearing after a number.

Example	**Reading**	
25 m	twenty-five meters	
30 in.	thirty inches	(note that the period is mandatory here)
45 g	forty-five grams	

9   Web-addresses and email

Web-addresses and email-addresses are read as follows:

- *www* is read as three *w*'s spelled letter by letter.

- Full stops '.' are read as *dot*, hyphens '-' as *dash*, underscore '_' as *underscore*, slash '/' as *slash*.

- *us, uk, fr* and all the other abbreviations for countries are spelled out letter by letter.

- The @ is read *at*.

- Words/strings (including *org*, *com* and *edu*) are pronounced according to the normal rules of pronunciation in the system and in accordance with the lexicon.

String	Reading
www.acapela-group.com	w w w dot acapela dash group dot com
http://www.acapela-group.com	h t t p colon slash slash w w w dot acapela dash group dot com
smith@yahoo.uk	smith at yahoo dot u k
jane_smith@yahoo.uk	jane underscore smith at yahoo dot u k