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RealSpeak Telecom Software Development Kit

User Guide Greek V 4.0



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RealSpeak Telecom SDK

Chapter I

Greek Text-To-Speech System

User Guide for Greek
V4.0



Chapter I

Greek Text-To-Speech System

Introduction

This section provides operational instructions for the RealSpeak Telecom Text-To-Speech system for Greek. It reviews the functionality of the system, and describes the way in which the user can customize the pronunciation of input texts. This part also describes issues that are particular to the Greek Text-To-Speech system. It introduces the Greek phonetic alphabet and it discusses some language-specific features of the Greek Text-To-Speech system.

Preparing a text for Text-To-Speech

In general, there are four ways to intervene in the pronunciation of text:

- By using control sequences
- By entering phonetic input
- By using a user dictionary or a user ruleset
- By using one of the supported API's

These mechanisms are described in the Programmer's Guide. In this part, however, the specifications for Greek are fully described.

Native Character Set

The native character set of the Greek TTS system is Windows-1253; it has the printable characters in the ASCII range 1-127 as a subset. Note that TTS input encoded in another supported character set is converted to the native character set for that language before it is processed internally. Consequently, input must be representable in the native character set even if it is encoded in another character set supported by the API.

Using Control Sequences

For a description of the various supported markup languages (independent from the language), refer to the **Programmer's Guide**.



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Remark: <ESC> represents the escape character “\x1B” (decimal 27) that generates the ASCII character 27 (Hex 1B).

Below, you find a quick reference table for the RealSpeak native control sequences for Greek.



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Quick Reference of the RealSpeak native Control Sequences for Greek

Sequence	Description	Range	Default	Delimiter
<code><ESC> \vol=x\ </code>	Volume (x : 0 .. 100)	0 = silence 10 = low 100 = high	80	No
<u>For example:</u> <ESC>\vol=10\ μπορώ να μιλήσω χαμηλόφωνα, <ESC>\vol=90\ αλλά επίσης και δυνατά.				
<code><ESC> \rate=x\ </code>	Speech Rate (x : 1 .. 100)	1 = slow 100 = fast	50	No
<u>For example:</u> Μπορώ <ESC>\rate=70\ να αυξήσω την ταχύτητα <ESC>\rate=20\ ή να την μειώσω.				
<code><ESC> \rate_wpm= xxx\ </code>	Word per minute (xxx: 1..1000)	Voice- specific (see subsequent table)	Voic e- speci fic	No
<u>For example:</u> Μπορώ <ESC>\rate_wpm=350\ να αυξήσω την ταχύτητα <ESC>\rate_wpm=110\ ή να την μειώσω.				



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Sequence	Description	Range	Default	Delimiter
<ESC>Mx	Read mode; some read modes are not supported in e-mail mode	x = 0..3: 0 = character-by-character 1 = word-by-word (not supported in e-mail mode) 2 = sentence-by-sentence 3 = line-by-line (not supported in e-mail mode)	2	Yes
	<p><u>For example:</u></p> <p><ESC>M0 Μήλα (The word "Μήλα" will be spelled.)</p> <p><ESC>M1 Παρακαλώ αγόρασε μήλα. (This sentence will be read word by word.)</p> <p><ESC>M2 Παρακαλώ αγόρασε μήλα. Αγόρασε και πορτοκάλια αν βρεις. (This input will be read sentence by sentence.)</p> <p><ESC>M3 Μπανάνες Γάλα Σιτάρι (This input will be read as a list, with a pause at the end of each line.)</p>			
<ESC>Wx	Wait Period	0 = no wait period 1 = 200 millisecond wait period 9 = 1800 millisecond wait period	2	Yes



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Sequence	Description	Range	Default	Delimiter
	<u>For example:</u> <ESC>W2 Μετά από αυτή την πρόταση θα υπάρξει μία μικρή παύση <ESC>W9 Μετά από αυτή την πρόταση θα ακολουθήσει μια μακρά παύση. Πρόσεξες την διαφορά ;			
<ESC> \Pause=xxx\ 	Long Pause	xxx is the duration of the pause in milliseconds; the supported range is 1 ..65535 msec		No
	<u>For example:</u> Μπορείς να εισάγεις παύσεις στο κείμενο με την ένδειξη η οποία καθορίζει την διάρκεια <ESC>\Pause=1500\ της παύσης.			



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Sequence	Description	Range	Default	Delimiter
<ESC>"	Sentence Accent			No
<p><u>For example:</u> <ESC>"ο Γιάννης έρχεται αύριο. (i.e. όχι ο Δημήτρης) ο Γιάννης έρχεται <ESC>"αύριο (i.e.όχι σήμερα)</p> <p><u>Note:</u> Manually inserted sentence accents may have no effect in RealSpeak, as the RealSpeak synthesis module may have reasons to override the requested sentence accent..</p>				
<ESC>C	Continuation			No
<p><u>For example:</u> 15 δρχ. Ελλάδας 15 δρχ. <ESC>C Ελλάδας</p> <p>In the first of the above examples, the text-to-speech system will detect an end-of-sentence after δρχ. and hence pause before pronouncing the second part of the input. In order to make the system pronounce the entire input as one sentence, a continuation sequence should be inserted.</p>				
<ESC>E	End-of-Message			Yes
<p><u>For example:</u> Η Ε.Ε. έχει δικιά της νομοθετικά όργανα. Ο Γιάννης δουλεύει για την Ε.Ε. <ESC>E . Το ίδιο και ο Δημήτρης</p> <p>In the first of the above examples, the text-to-speech system will appropriately read the input as one sentence. In the second example, the system would likewise read the two sentences of the input as one sentence. The sequence <ESC>E forces the system to read the entire input as two separate sentences.</p>				
<ESC>/+	Phonetic Input (L&H+ phonetic alphabet)			No



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Sequence	Description	Range	Default	Delimiter
	For example: <ESC>/+'tre.xo<ESC>/+			
<ESC>\tn=x \	Guide text normalization; limited support in e-mail mode	Spell=spell mode	Normal	No
	For example: <ESC>\tn=normal\ That's spelled <ESC>\tn=spell\Πάτρα<ESC>\tn=normal\ normal\ 			
<ESC>F	Reset to Default			Yes
	For example: <ESC>\vol=10\ Η ένταση είναι ρυθμισμένη χαμηλά. <ESC>F Τώρα έχει ρυθμιστεί στο προκαθορισμένο επίπεδο. <ESC>\rate=10\ Η ένταση είναι ρυθμισμένη χαμηλά. <ESC>F Τώρα έχει ρυθμιστεί στο προκαθορισμένο επίπεδο.			
<ESC>\voice=s\	Set the voice (if more than one voice is available)	s = string; the name of the voice		Yes
<ESC>\mrk=n\	Insert a bookmark	n = 0..2147483647		No
<ESC>\p\	Insert a paragraph boundary			Yes
<ESC>\audio="s"\	Insert an audio document; not supported in e-mail mode	s = string; the URI of a document with an appropriate MIME type		Yes



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Speech Rates in Words per Minute for Greek Voices

Words per minute		
Voice	Range	Default
ALEXANDROS	Min = 78 Max = 312	112

Entering phonetic input

How to proceed

To switch from orthographic to phonetic mode, insert <ESC>/+ to use the L&H+ phonetic alphabet. The phonetic input mode remains active until the command is explicitly reset by entering <ESC>/+ again.

The phonetic input string is composed of symbols of the L&H+ phonetic alphabet (see phonetic table below). Examples are given in the phonetic table below.



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In addition to the phonetic symbols, it is advised to use the following characters in the phonetic input string:

Special characters		
L&H + Symbol	Meaning	As in:
' (ASCII 39, Hex 27)	primary word stress	<ESC>/+ 'Je.ros <ESC>/+ (το ουσιαστικό γέρος) vs. <ESC>/+ Je.'ros <ESC>/+ (το επίθετο γερός)
.	syllable boundary	<ESC>/+ si.la.'vi <ESC>/+ (συλλαβή)
#	silence (pause)	<ESC>/+ 'i.pa#e.la_e.'Do <ESC>/+ (είπα:έλα εδώ)

Note that the use of punctuation marks remains useful within phonetic input to assure a correct intonation. Each punctuation mark needs to be preceded by an asterisk.

For example:

<ESC>/+ e.'xTes_*, 'e.fi.Ga_no. 'ris *. <ESC>/+
(Εχθές, έφυγα νωρίς)

Punctuation Marks	
L&H+ Symbol	Meaning
_	Word delimiter
*,	End of declarative
*,	Comma
*!	End of exclamation
*?	End of question
*;	Semicolon
*:	Colon



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The Greek L&H+ and UNIPA Phonetic Alphabets

Vowels				
L&H+ Symbol	L&H+ Transcription	UNIPA Symbol	UNIPA Transcription	As in:
a	xa.'ra	a	xa.'ra	χαρά
e	ce.'re.a	e	ce.'re.a	κεραία
i	i.Ci.ti.'ko	i	i.Ci.ti.'ko	ηχητικό
o	'o.los	o	'o.los	όλος
u	'pu.la	u	'pu.la	πούλα

Consonants				
L&H+ Symbol	L&H+ Transcription	UNIPA Symbol	UNIPA Transcription	As in:
f	'fa.ka	f	'fa.ka	φάκα
v	'va.le	v	'va.le	βάλει
s	'so.ni	s	'so.ni	σώνει
z	'zo.ni	z	'zo.ni	ζώνη
p	'pa.re	p	'pa.re	πάρε
b	'be.no	b	'be.no	μπαινω
t	'ti.no	t	'ti.no	τίνω
d	'di.no	d	'di.no	ντύνω
D	'Di.no	D	'Di.no	δίνω
T	'Ti.ma	T	'Ti.ma	θύμα
g	a.ga.'ri.a	g	a.ga.'ri.a	αγγαρεία
k	ka.'ko	k	ka.'ko	καιό
x	xa.'ra	x	xa.'ra	χαρά
G	'Ga.la	G	'Ga.la	γάλα
m	'ma.na	m	'ma.na	μάννα
n	'no.stos	n	'no.stos	νόστος
n~	'n~a.to	n~	'n~a.to	νιάτο
l	'la.ma	l	'la.ma	λάμα
l~	/'i.l~os/	l~	'i.l~os	ήλιος
r	'ri.ma	r	'ri.ma	ρήμα
p&s	'p&se.ma	p+s	'p+s.e.ma	ψέμα
k&s	k&sa.'na	k+s	k+s.a.'na	ξανά
t&s	'e.t&si	t&s	'e.t+s.i	έτσι



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d&z	‘d&za.ki	d+z	‘d+za.ki	τζάνι
c	‘ci.ma	c	‘ci.ma	κύμα
C	‘Ce.ri	C	‘Ce.ri	χέρι
j-	‘j-o.nis	j-	‘j-o.nis	γαιώνης
J	‘Je.la	J	‘Je.la	γέλα



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NOTE

- Note that the L&H+ alphabet is not SSML compliant. For SSML, use the UNIPA alphabet.

Using a User Dictionary

For information on how to create and use user dictionaries, please refer to the User Configuration chapter of the RealSpeak Telecom Programmer's Guide.

Using the Microsoft SAPI5 Lexicon

Microsoft SAPI5 provides lexicons so that users and applications can specify pronunciation and part-of-speech information for particular words. As such, all SAPI compliant Text-To-Speech engines should use these lexicons to guarantee uniformity of pronunciation and part of speech information.

There are two types of lexicons in SAPI: user lexicons and application lexicons.

User Lexicons

Each user who logs in to a computer will have a User Lexicon. Initially, this lexicon is empty; words can be added either programmatically, or by using an engine's add/remove words UI component (for example, the sample application Dictation Pad provides an Add/Remove Words dialog).

Application Lexicons

Applications can create and ship their own lexicons of specialized words. These lexicons are fixed and cannot be edited.

Detailed information on how to use the MS SAPI5 lexicons can be found in the manual "Microsoft Speech SDK V5.1", chapter "ISpLexicon Interface".

The Greek SAPI5 Phoneme List



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To add entries to the lexicon, the user should use a set of language specific phonemes. The language specific phoneme list for Greek is given below.

SAPI5 Symbols			
SAPI5 Symbol	SAPI5 Transcription	As in:	SAPI Phone ID
A	X A R A A	χαρά	0061
EH	CY EH RA EH A	κεραία	025B
I	I C I T I K O	ηχητικό	0069
O	O L O S	όλος	006F
U	P U L A	πούλα	0075
F	F A K A	φάκα	0066
V	V A L E	βάλε	0076
S	S O N I	σώνει	0073
Z	Z O N I	ζώνη	007A
P	P A R A EH	πάρε	0070
T	T I N O	τείνω	0074
D	D I N O	ντίνω	0064
DH	DH I N O	δίνω	00F0
TH	TH I M A	θύμα	03B8
G	A G A R A I A	αγγαρεία	0067
K	K A K O	κακό	006B
X	X A R A A	χαρά	0078
GH	GH A L A	γάλα	0263
M	M A N A	μάννα	006D
N	N O S T O S	νόστος	006E
NJ	NJ A T O	νάτο	0272
L	L A M A	λάμα	006C
LJ	I L J O S	ήλιος	028E



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RA	RA I M A	ρήμα	0279
P+S	P+S EH M A	ψέμα	0070+ 0073
K+S	K+S A N A	ξανά	006B + 0073
TS	E TS I	έτσι	0074 0361 0073
DZ	DZ A K I	τζάκι	0064 0361 007A
CT	CT I M A	κύμα	0063
C	C EH RA I	χέρι	00E7
JD	JD O N I S	γκιώνης	025F
CJ	CJ EH L A	γάλα	029D

SAPI5 Symbols			
SAPI5 Symbol	Meaning	As in:	SAPI Phone ID
- (hyphen)	syllable boundary	h eh - 1 l ow !	1
! (exclamation mark)	sentence terminator	h eh - 1 l ow !	2
&	word boundary	h eh - 1 l ow & , h aw & ao r & y uw ?	3
, (comma)	sentence terminator	h eh - 1 l ow & , h aw & ao r & y uw ?	4
. (period)	sentence terminator	h eh - 1 l ow .	5
? (question mark)	sentence terminator	h eh - 1 l ow ?	6
_ (underscore)	silence	h eh - 1 l ow _ h aw & ao r & y uw ?	7
1	primary stress	h eh - 1 l ow !	8



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2	secondary stress	ax - 2 f r ih - k ax - n ay - 1 z ey - sh ax n	9
---	------------------	--	---



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Notes on the Greek Text-To-Speech System

The Greek Text-To-Speech system has been designed to allow a correct pronunciation of any input written according to the rules of Greek orthography. The following cases, however, require special attention.

Cardinal Numbers

Cardinal numbers up to 7 digits are pronounced as full numbers. Periods may be used to separate groups of digits. Digit strings consisting of more than 7 digits are pronounced digit by digit. A number starting with a zero is automatically spelled.

For example:

1234567 *ένα εκατομμύριο διακόσιες τριάντα τέσσερις χιλιάδες πεντακόσια εξήντα επτά*

1.234 *χίλια διακόσια τριάντα τέσσερα*

005 *μηδέν μηδέν πέντε*

Decimal Numbers

Decimal numbers may consist of up to 7 digits before and 3 after the comma. Periods may be used to separate groups of digits in the string before the comma. The digits after the comma are pronounced as numbers when the decimal part is up to 3 digits (except if the first digit is 0) and are pronounced one by one when the decimal part is longer.

For example:

2,4 *δύο κόμμα τέσσερα*

3,14 *τρία κόμμα δεκατέσσερα*

0,014 *μηδέν κόμμα μηδέν ένα τέσσερα*



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Ordinal Numbers

The strings 1^{ος}, 2^{ος}, 3^{ος} and all cardinal numbers up to 3 digits followed by the appropriate ordinal suffix are pronounced as ordinal numbers.

For example:

14^{ος} *δέκατος τέταρτος*

345^{ος} *τριακοστός τεσσαρακοστός πέμπτος*



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Telephone Numbers

Telephone numbers are read in pairs or as a single digit followed by a group of digits in some cases of 3 digit numbers. You can either use a space or a period to separate a groups of digits. The first digit group is surrounded by parentheses and indicates the area code. It is pronounced as a single digit followed by a double digit when it consists of 3 digits and a pause is inserted when the number is read.

For example:

(210) 56 84 932 δύο δέκα πενήντα έξι ογδόντα τέσσερα
εννέα τριάντα δύο

(210) 45.67.876 δύο δέκα σαράντα πέντε εξήντα επτά οκτώ
εβδομήντα έξι

Even international formats are read correctly: the country code, indicated by a + sign, is read as one number, preceded by “μηδέν μηδέν.” The rest of the telephone number is read as mentioned above. In this format, the area code can be either surrounded by parentheses or not.

For example:

+30 210 45 36 953 μηδέν μηδέν τριάντα δύο δέκα
σαράντα πέντε τριάντα έξι
εννέα πενήντα τρία

(+30) 210 65 78 367 μηδέν μηδέν τριάντα δύο δέκα
εξήντα πέντε εβδομήντα οκτώ
τρία εξήντα επτά

+30 (210) 89 25 638 μηδέν μηδέν τριάντα δύο δέκα
ογδόντα εννέα είκοσι πέντε
έξι τριάντα οκτώ



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ID number

A capital letter followed by a string of 6 digits will be identified as an ID number. The capital letter will be pronounced followed by the numbers in group of 2 digits. Even when a space separates the letter from the 6 digit string the number will be identified as an ID number.

For example:

X 564787	χι πενήντα έξι σαράντα επτά ογδόντα επτά
T347865	ταφ τριάντα τέσσερα εβδομήντα οκτώ εξήντα πέντε

Dates

The Greek Text-To-Speech system reads dates in the following formats:

- European format: (only unambiguous European formats):

Day (1 or 2 digits) / month (1 or 2 digits) / year (2 to 4 digits)
Day (1 or 2 digits) - month (1 or 2 digits) - year (2 to 4 digits)

For example:

13/12/78 δεκατρείς δωδεκάτου εβδομήντα οκτώ

24-8-1907 εικοσι τέσσερις ογδού χίλια
εννιακόσια επτά

- Written format with fully written day and month names:

For example:

1 Απριλίου	πρώτη απριλίου
Δευτέρα 15 Δεκεμβρίου 1998	Δευτέρα δεκαπέντε



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*Δεκεμβρίου χίλια
εννιακόσια
εννενήντα οκτώ*

Finally, dates consisting of a year indication, preceded by the words or “π.Χ.”, or followed by “μ.Χ.”, and names of months followed by a year indication are supported.

For example:

750 π.Χ. *επτακόσια πενήντα προ Χριστού*
Οκτώβριος 2000: *Οκτώβριος δύο χιλιάδες*

Time Indications

Time indications will be correctly pronounced when written in one of the following formats:

Hours only

6 P.M. *έξι προ μεσημβρίαν*
12 μ.μ. *δώδεκα μετά μεσημβρίαν*

Hours:minutes

11:15 *έντεκα και δεκαπέντε*
8:30 π.μ. *οκτώ και τριάντα προ μεσημβρίαν*
5:20 μ.μ. *πέντε και είκοσι μετά μεσημβρίαν*
9:00 *εννέα ακριβώς (1:00 – 9:00)*
13:00 *δεκατρείς ακριβώς (13:00 – 24:00)*

Durations can be indicated by adding a third group of digits:

Hours:minutes:seconds

12:15:20 *δώδεκα ώρες δεκαπέντε λεπτα είκοσι δευτερόλεπτα*



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07:55:46 *επτά ώρες πενήντα πέντε λεπτά
σαράντα έξι δευτερόλεπτα*



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Currencies

The Greek Text-To-Speech system correctly handles the currency symbols €, \$, £ and ¥. The currency signs may precede or follow the numeral.

For example:

€34	<i>τριάντα τέσσερα ευρώ</i>
\$40	<i>σαράντα δολλάρια</i>
£20	<i>είκοσι στερλίνες</i>
¥5	<i>πέντε γιεν</i>

These currency signs can also be followed or preceded by decimal amounts. Decimal numbers up to 7 digits before and 3 digits after the decimal point are pronounced correctly.

For example:

€10,89	<i>δέκα κόμμα ογδόντα εννέα ευρώ</i>
3,45£	<i>τρία κόμμα σαράντα πέντε στερλίνες</i>
¥635,87	<i>εξακόσια τριάντα πέντε κόμμα ογδόντα επτά γεν</i>

The currency abbreviations USD, GBP should follow the numeral.

For example:

2 USD:	<i>δύο δολλάρια ΗΠΑ</i>
5 GBP:	<i>πέντε λίρες Αγγλίας</i>



Chapter I

Also the most common currency abbreviations from around the world are supported. These abbreviations can follow or precede the amount and are expanded.

For example:

1 EUR *ένα ευρώ*

Other currencies are written in full words and have to follow the numeral.

Abbreviations

The Greek text-to-speech system contains a dictionary with the most common abbreviations, such as *κ.τ.λ.*, *χλμ* including case sensitive ones.

For example:

π.χ. *παραδείγματος χάριν*

π.Χ. *προ Χριστού*

Abbreviations that end with “.” and are followed by a word that starts with a capital letter are expanded but lead to sentence break-up, inserting a short pause.

Abbreviations that are NOT in the dictionary will be spelled out or read as words depending on their graphotactic structure.

Acronyms and Initialisms

The Greek Text-To-Speech system contains a standard dictionary with acronyms and initialisms such as: E.E., H.E. etc.

Acronyms are abbreviations formed by combining the first letter(s) of a group of words. They are pronounced as words.

E.g. NATO, UNESCO

Initialisms are abbreviations formed by combining the first letter of each part of a group of words. Initialisms are spelled.

E.g. E.E., H.E.

RealSpeak Telecom SDK

Chapter II

Appendix

User Guide for Greek
V4.0

Appendix

Appendix: Greek voice and language strings

The RealSpeak Telecom Text-To-Speech system now supports selecting the voice and language via a string as well as a define (please see the definition for the function **TtsInitialize()** in the *Programmers Guide* and also the *Backwards Compatibility Guide* for details). The name strings for the currently supported Greek voices are listed in the table below.

Greek Voice Name Strings	
Voice	Name String
Alexandros	“Alexandros”

The string to use to set the language to Greek is “Greek.”