QB64 Languages & keyboards

Index

Version	Date	Author	Comments
A01.00	05/06/20	moises1953	Alpha version. Spanish keyboard only
B01.01	12/06/20	moises1953	First results after help of RhoSigma
B02.01	19/06/20	moises1953	Added description of KEYHIT operation, Added accents table, more keyboards, reestructured flowcontrol of accents. More tests. Candidate first release.
B02.02	21/06/20	moises1953	Added sugestions and bug corrections of RhoSigma: ³ → ⁿ mapping (179 → 252), added dblcar code for Ins/Del keys, moved the IF CVI(dblcar) THEN block out of the SELECT block, added a check for Alt+number ASCII input in the 0-255 range. Supressed copy of code: string constants fail to paste in QB64

QB64 Languages & keyboards

QB64 works with an 8-bit character set, which allows 256 different characters, while Windows processes texts in unicode (UTF-16) since 2018, thus allowing all the necessary characters for all the languages of the world, however it maintains a 8-bit local page system for different groups of nations, which is what comes to QB64, unless Windows is set to unicode. The most popular on the Internet is the UTF-8.

For occidental countries the page that Windows configure is CP1252 (USA, Canada, Latin America, Iceland, Ireland, United Kingdom, Portugal, Spain, France, Netherlands, Germany, Switzerland, Italy, Austria, Nordic countries, South Africa, Australia, New Zealand and Indonesia), while for Central and Eastern Europe the CP1250 is used (Polish, Czech, Slovak, Hungarian, Slovenian, Bosnian, Croatian, Serbian (Latin script), Romanian and Albanian).

QB64 maps the characters it will display, as if they had been encoded with the original MSDOS page, which is the extended ASCII code page CP437, looking for a character on the windows page (presumably CP1252) that looks the same or similar, for example, Ñ has the unicode code 209, which is the same as that used on page CP1252, while on CP437 it was 165, therefore it is necessary to map 209 to 165 in order for Ñ to appear, however this mapping has only been done at the presentation level, but not at the keyboard level, therefore when the Ñ is typed, in a spanish keyboard, it is not captured according to the presentation mapping, but receives 209 and therefore shows the image of 209 on the CP437, which is ±. That means, it is possible to use the mapping table in reverse to map the keyboard captures, what should have been done.

On the other hand, to access certain symbols, it is necessary to use the [AltGr] key to obtain the alternative character, which should capture the same code, but this is not the case in INKEY$, which returns a non-unique compound code, which therefore does not allows you to map it, which is another flaw of INKEY$. In general the INKEY$ function does not behave like in QuickBasic:

1) Suffer the problems of not key mapping
    1. you cannot type local characters: Ñ ñ ç Ç º ª ¡ ¿
    2. characters accessible with AltGr are not captured: € \ | @ # {} []
2) Accents do not work, therefore it is not possible to type accented letters: á é í ó ú
3) Alt <number> does not work, so Greek letters and other symbols are not available

However, the KEYHIT function delivers the characters according to the configured page code, whether they are a direct key, accented or with [AltGr], so in this case the corresponding code is obtained from page CP1252 and therefore does not depend on the key pressed, so it works for all keyboards that use the same Windows CP1252 page. For example, typing @ provides the code 64, which is also 64 in the CP437, and it does not matter if the keyboard has it or it was necessary to access it using [AltGr], while if you type € (euro), which is 128 in unicode and on page CP1252, but does not exist in CP437, however it can be mapped to the lowercase epsilon ϵ of the Greek alphabet, which is similar to it and is code 238 (its position in CP437), therefore when mapping 128 generated by the € key in Windows with page CP1252, you can redirect to 238, which is where the ϵ is on CP437. This ϵ is the unicode 949 (U03B5), which was initially mapped to ASCII code 238, with an instruction: MAPUNICODE 949 TO 238, but which is intended to be captured from the keyboard by pressing [AlrGr] [€], which generates the code 128.

Unfortunately the KEYHIT function returns the changes of a key, so it does not solve the problem of modifiers [Alt], [Control], [Shift], nor does it allow pressing the [Alt] key to type from 0 to 255 to generate a ASCII code, therefore additional code is required to emulate the INKEY$ and to be able to generate all the two-character codes beginning with 0, which correspond to the pressing of the modifiers [Alt], [Control], [Shift]. As you can see this manual text input in QB64 is only for keyboard, but windows can capture text from voice.

Solution

If the CP1252 language is configured in the IDE, it works quite well except that when in text mode, the border and corner stripes of the frame are other characters, since this page does not have the frame drawing characters, but it still maps to the page CP437, so it is necessary to change the mapping using _MAPUNICODE instructions in the program itself, which is inconsistent.

For this solution to be complete it might be necessary:

- To be able to choose the mapping to the page between the CP437, for compatibility with the migration of QuickBasic applications, or another page for access to more regions and languages.
  - For the IDE
  - Within the application itself, at run time, making it start by default on the page that has the IDE configured
- Adapt the IDE to a graphic display mode
  - Create a graphic cursor or use Windows
  - Draw the box
- ….

However, the correct thing would be to read the code page configured in Windows and use it without any configuration. (for example `GetKeyboardLayout`).

The definitive solution will be to redo INKEY$ capturing the queue of messages that reach the execution window, obtaining the independent translation of its origin (including virtual keyboard or voice), according to the configured code page, so that there is no need to map anything, leaving KEYHIT as is. In any case, it would be a matter of analyzing the `WM_CHAR` messages and performing a mapping if necessary for compatibility, but not for consistency, since what is received is what is typed, in any keyboard configuration.

It would be necessary to check how the messages of the special keys arrive, such as the function keys, and if necessary, map them to the DOS configuration to maintain compatibility.

Hopefully, eventually everything will end up in unicode, so at some point it will be necessary to address its use in QB64.

The workaround is to create a function that emulates INKEY$ that does the reverse mapping of the key codes to the codes on the CP437 so that the corresponding key is displayed on any keyboard on the same page CP1252, and looks at the modifier keystrokes.

InkeyHit project

The initial purpose of this project is to have an INKEY$ emulation that works in Windows for the USA and Western Europe, so that the usual local keyboards of the area covered by the Windows-1252 page can be used, while the QB64 team decides how to resolve INKEY$ compatibility with QuickBasic.

This will require capturing the keystrokes using KEYHIT and mapping from each local keyboard to the codes on the page CP437 currently used by QB64 for compatibility with QuickBasic in the initial MSDOS.

Unfortunately the way that KEYHIT receives the dead keys (Alt, Control, Shift, accents...), and some other character, is not independent of the keyboard layout, which requires discriminating the mapping based on the connected keyboard, complicating the project, since it is not a simple mapping.

KEYHIT operation

KEYHIT returns the one and two byte ASCII codes, the OpenGL virtual key, and the unicode code when Windows is set to unicode.

Typically the KEYHIT character codes are produced when a key is pressed: a positive one, which indicates a press or repeat, and a negative one, which indicates that the key has been released, but there are keys that only produce a negative code.

This table, which corresponds to the ASCII table, represents the key codes delivered by KEYHIT when you press the corresponding key, even with capital letters, when Windows is configured in a code page CP1250, CP1251, CP1252 ... and not in unicode:

Cod	Key	Cod	Key	Cod	Key	Cod	Key	Cod	Key	Cod	Key	Cod	Key	Cod	Key
8	BkSp	9	Tab			13	Intro			27	Esc				
32	Space	33	!	34	“	35	#	36	$	37	%	38	&	39	'
40	(	41	)	42	*	43	+	44	,	45	-	46	.	47	/
49	1	50	2	51	3	52	4	53	5	54	6	55	7	56	8
48	0	57	9	58	:	59	;	60	<	61	=	62	>	63	?
64	@	65	A	66	B	67	C	68	D	69	E	70	F	71	G
72	H	73	I	74	J	75	K	76	L	77	M	78	N	79	O
80	P	81	Q	82	R	83	S	84	T	85	U	86	V	87	W
88	X	89	Y	90	Z	91	[	92	\	93	]	94	^	95	_
96	`	97	a	98	b	99	c	100	d	101	e	102	f	103	g
104	h	105	i	106	j	107	k	108	l	109	m	110	n	111	o
112	p	113	q	114	r	115	s	116	t	117	u	118	v	119	w
120	x	121	y	122	z	123	{	124	|	125	}	126	~	127	⌂

The extended table, from 128 to 255 are those of the configured code page, for example in the USA and Western Europe the CP1252, so that on a keyboard that has the €, which is the code 128 in the CP1252, KEYHIT will receive 128 when pressed and -128 when released.

Code page extension CP1252:

Cod	Key	Cod	Key	Cod	Key	Cod	Key	Cod	Key	Cod	Key	Cod	Key	Cod	Key
128	€	129		130	‚	131	ƒ	132	„	133	…	134	†	135	‡
136	ˆ	137	‰	138	Š	139	‹	140	Œ	141		142	Ž	143	
144		145	‘	146	’	147	“	148	”	149	•	150	–	151	—
152	˜	153	™	154	š	155	›	156	œ	157		158	ž	159	Ÿ
160		161	¡	162	¢	163	£	164	¤	165	¥	166	¦	167	§
168	¨	169	©	170	ª	171	«	172	¬	173		174	®	175	¯
176	°	177	±	178	²	179	³	180	´	181	µ	182	¶	183	·
184	¸	185	¹	186	º	187	»	188	¼	189	½	190	¾	191	¿
192	À	193	Á	194	Â	195	Ã	196	Ä	197	Å	198	Æ	199	Ç
200	È	201	É	202	Ê	203	Ë	204	Ì	205	Í	206	Î	207	Ï
208	Ð	209	Ñ	210	Ò	211	Ó	212	Ô	213	Õ	214	Ö	215	×
216	Ø	217	Ù	218	Ú	219	Û	220	Ü	221	Ý	222	Þ	223	ß
224	à	225	á	226	â	227	ã	228	ä	229	å	230	æ	231	ç
232	è	233	é	234	ê	235	ë	236	ì	237	í	238	î	239	ï
240	ð	241	ñ	242	ò	243	ó	244	ô	245	õ	246	ö	247	÷
248	ø	249	ù	250	ú	251	û	252	ü	253	ý	254	þ	255	ÿ

These codes are generated when pressing a live key (that represents a character), being able to repeat if it is kept pressed, but not when releasing it, on the contrary the dead keys such as caps, control, alt and accents, only generate codes when releasing it and therefore isolated negatives.

Dead keys also generate virtual key codes, with an absolute value greater than 100,000, both when pressing and releasing. Are 2 types of dead keys:

1. Modifiers: Shift, Control, Alt: -16, -17, -18
2. Accents: acute, serious, circumflex, umlaut ... (they vary according to the keyboard layout)

An important difference between INKEY$ and KEYHIT is how they work when using the CTRL, ALT, or SHIFT modifier keys. INKEY$ returns a different code if you hold down the CTRL, ALT, or SHIFT key before pressing a key, while KEYHIT will only deliver different codes with the capitals of the basic ASCII code, for the rest it will return the same code regardless of which modifiers are used, therefore it was necessary to use KEYDOWN to see which modifier keys were pressed when receiving a key code. When the [AltGr] key is pressed, KEYHIT returns the codes Alt (100307) and Ctrl (100306), and the same negatives when released.

The keys that generate 2-byte codes where the first is CHR$ (0) are (second byte):

1. Function keys: F1 to F10
    1. Alone: 59 to 68.; <=>? @ ABCD
    2. Modified (must be added): [Alt]: + 45 [Ctrl]: + 35 [Shift]: + 25
2. Function keys: F11, F12
    1. Alone: 133, 134
    2. Modified (must be added): [Alt]: + 6 [Ctrl]: + 4 [Shift]: + 2
3. Scroll keys: Start, ↑, RePag, ←, →, End, ↓, AvPag, Insert, Delete
    1. Alone: 71,72,73,75,77,79,80,81,82,83 GHIKMOPQRS
    2. Ctrl (add): Start, RePag, ←, →, End, AvPag, Ins, Del: 71,73,75,77,79,81 wästuvÆô

Since KEYHIT does not combine the modifier keys [Alt] [Ctrl] and some [Shift], it will be necessary to emulate Quickbasic's INKEY$, and in the same way combine the accents keys that are applied depending on the keyboard.

Codes for some dead key accents under your keyboards. Each column represents the negative code delivered by KEYHIT when using the keyboard indicated in the row.

Teclado	KBID	-186	-187	-191	-192	-219	-220	-221	-222		
Danish (da-DK)	1030	^¨				`´					
German (de-DE)	1031				¨		^	`´			
Swiss (de-CH)	2055				¨	´		`^			
Spanish (es-ES)	1034	^`							¨´		
French (fr-FR)	1036				´			¨^			
Belgian (fr-BE)	2060				´		`	¨^			
Swiss (fr-CH)	4108										
Portugues (pt-PT)	1040	`´	¨	^							
Neerland (nl-NL)	1043				`´			^¨			
Swedish (sv-SE)	1053	^¨				`´					

It can be seen that the same key does not generate the same code, therefore it will be necessary to make a large control block to map accented letters taking into account the keyboard.

Reverse mapping of the CP437 page

Since QB64 maps unicodes to the 255 fundamental ASCII characters so that they have the codes and appearance of MSDOS in the presentation, direct inverse mappings for keyboards can be obtained by inverting the accessible part of this unicode table -> CP437:

000: 32,9786,9787,9829,9830,9827,9824,8226,9688,9675,9689,9794,9792,9834,9835,9788
016: 9658,9668,8597,8252,182,167,9644,8616,8593,8595,8594,8592,8735,8596,9650,9660
032: 32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47
048: 48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63
064: 64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79
080: 80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95
096: 96.97.98.99,100,101,102,103,104,105,106,107,108,109,110,111
112: 112,113,114,115,116,117,118,119,120,121,122,123,124,125,126.8962
128: 199,252,233,226,228,224,229,231,234,235,232,239,238,236,196,197
144: 201,230,198,244,246,242,251,249,255,214,220,162,163,165,8359,402
160: 225,237,243,250,241,209,170,186,191,8976,172,189,188,161,171,187
176: 9617.9618.9619.9474.9508.9569.9570.9558.9557.9571.9553.9559.9565.9564.9563.9488
192: 9492.9524.9516.9500.9472.9532.9566.9567.9562.9556.9577.9574.9568.9552.9580.9575
208: 9576,9572,9573,9561,9560,9554,9555,9579,9578,9496,9484,9608,9604,9612,9616,9600
224: 945,223,915,960,931,963,181,964,934,920,937,948,8734,966,949,8745
240: 8801,177,8805,8804,8992,8993,247,8776,176,8729,183,8730,8319,178,9632,32

As you can see the codes from 32 to 126 that are original ASCII, match both unicode, such as CP1252, and CP437, but for the rest the unicode characters most similar to the symbols of CP437 have been brought, which occupy that place.

For example MAPUNICODE 199 TO 128, takes the unicode image 199 (Hex: C7), which is Ç, to code 128, as corresponds to the old page CP437 of the original PC in then 80's, so if CHR$(128) is printed a Ç is output, but however pressing the [Ç] key displays the character corresponding to 199 on the CP437, which is a frame sign ╠.

Keyboard mapping

The sequence of numbers that follow are pairs of numbers that represent KEYHIT key codes to be replaced by the one that follows after a>, that is, if a 128 is received, it must be replaced by a 238, a 161 by a 173 and so on. successively. In short, the keyboard mapping of KEYHIT codes that need it from 1 to 255.

This sequence has been obtained by removing the list of codes less than 255 from the presentation mapping of the CP437, ordering it, and adding some special key codes such as '€ ☼ø |'.

128>238 161>173 162>155 163>156 164>15 165>157 166>124 167>21 170>166 171>174
172>170 176>248 177>241 178>253 179>252 181>230 182>20 183>250 186>167 187>175
188>172 189>171 191>168 196>142 197>143 198>146 199>128 201>144 209>165 214>153
220>154 223>225 224>133 225>160 226>131 228>132 229>134 230>145 231>135 232>138
233>130 234>136 235>137 236>141 237>161 238>140 239>139 241>164 242>149 243>162
244>147 246>148 247>246 248>126 249>151 250>163 251>150 252>129 255>152

These mappings have been expressed in the function by means of two constants KeyLook that represents the key code obtained by KEYHIT and KeyMapi that represents the code that must replace it to bring it to the CP437 page of QB64. In the function they appear at the begining:

```
CONST KeyLook = "€¡¢£¤¥¦§ª«¬¯°±²µ¶·º»¼½¿ÄÅÆÇÉÑÖÜßàáâäåæçèéêëìíîïñòóôö÷øùúûüÿ"
CONST KeyMapi = "î›œ#¿|#¦®ªøñýæ#ú§¯¬«¨Ž₺'€₺¥™šá… ƒ„†‘‡Š,ˆ‰❷¡Œ‹¤•¢“”öè–£–①˜"
```

NOTE: Do not copy this strings to the QB64 IDE: they will not appear correctly.

InkeyHit$, an emulation of INKEY$ for page CP1252

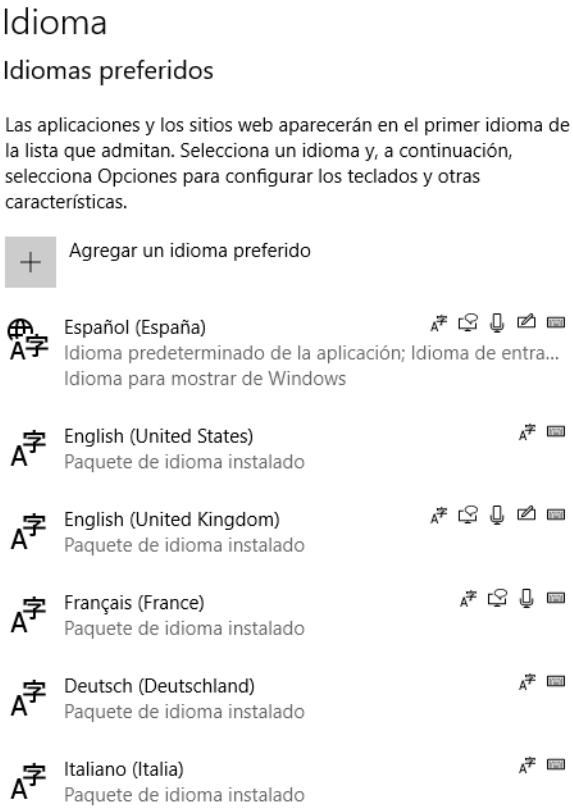
The embryon code of the project. Includes keyboard automatic detection: da-DK, de-DE, de-CH, en-US, en-GB, es-ES, fr-FR, fr-BE, fr-CH, it-IT, nl-NL, sv-SE, pt-PT.

It' is contained in InKeyhit-v0202.bas

Due to different use of codes, copying the code from here does alter the maping strings, so you must acces then .BAS file to copy the QB64 code.

Tests

The tests of the InkeyHit$ function have been carried out with the simulation of some keyboards that use the code page CP1252, in a Windows 10 in Spanish language with a Spanish keyboard, configuring several keyboards and preferred languages, making the keyboard changes in the task bar, paying attention to the following groups of keys:



1. Alphabet keys, upper and lower case.
2. Numbers of the main keyboard and the numeric
3. Punctuation marks:! ', .-;: _
4. National letters in keyboard: ñÑçÇÜ
5. Symbols [AltGr]: € \ | @ # {}] [
6. Accented letters using accent: áéíóúÿàâä
7. Function keys, except [Alt] [F4]
8. Scroll keys
9. ASCII code: [Alt] number
10. Control characters: [Control] a-z

The summary is recorded in this table, where
OK means it works, - not aplicable because there are no such keys, and 'no' means it doesn't work:

Teclado	Code	1.Alfa	2.Num	3.Punt	4.Nat.	5.Altgr	6.Ace	7.Fxx*	8.Scrol	9.Alt-n	10.Ctrl
Dansk (da-DK)	1030	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
German (de-DE)	1031	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Swiss (de-CH)	2055	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
English (en-US)	1033	OK	OK	OK	-	-	-	OK	OK	OK	OK
English (en-GB)	2057	OK	OK	OK	OK	OK[1]	-	OK	OK	OK	OK
Español (es-ES)	1034	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Français (fr-FR)	1036	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Belge (fr-BE)	2060	OK	OK	OK	OK	OK	OK[2]	OK	OK	OK	OK
Swiss (fr-CH)	4108	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Italliano (it-IT)	1040	OK	OK	OK	OK	OK	-	OK	OK	OK	OK
Neerland (nl-NL)	1043	OK	OK	OK	OK	OK	OK[2]	OK	OK	OK	OK
Swedish (sv-SE)	1053	OK	OK	OK	OK	OK	OK[2]	OK	OK	OK	OK

* [Alt] F4 closes the application, cannot be used.

[1] Except for [AltGr] AIOU → ´, in CP437 there is no ÁÍÓÚ, perhaps can be replaced by lowercase.
[2] Incomplete: missing: ~ (accent, there are no vowels with that accent in CP437)

'Keys with only negative codes (not preceded by a positive one) depend on the keyboard layout. At the moment it will be identified by GetKeyboardLayout, which does not detect the changes by the taskbar until the program is restarted, while the mapping does.

Project status and expectations

The project is in beta candidate phase. The author will use it in his own project.

The tests have been carried out by the author with a Windows 10 in Spanish (es-ES) and also configuring da-DK, de-DE, de-CH, en-US, en-GB, fr-FR, fr-BE, fr-CH,It-IT,nl-NL,sv-SE, configuring preferred languages and switching between them through the taskbar, and RhoSigma from the QB64 forum, in German (de-DE), but more tests are needed with more original keyboards with the purpose of both discover defects or validate, such as proposing new keyboards of the target area, such as Irish or Norwegian, for which it is necessary to discover the codes of the silent keys that determine accents, other than ~, and complete the table to facilitate the programing.

We want to receive help and requests in the following areas:

1) Test results: Specify operating system, language and keyboard, as well as results, at least in the categories of the table used in the test chapter, with the pertinent notes.
2) Proposals for the inclusion of languages or keyboards, on condition that they provide the codes of the silent keys that generate accented letters, and cooperate in the tests.
3) Proposals for methodological improvements, such as a method to find more mappable characters than the initial 54, and the 4 added ones.
4) Proposals for substituting characters in the mapping, either because they are missing, or because they are more similar, more common, etc …
5) Proposals to improve the operation of the code, or its maintainability
6) Optimization proposals.
7) Others.

The expectation is to cover all the occidental countries that use the CP1252.

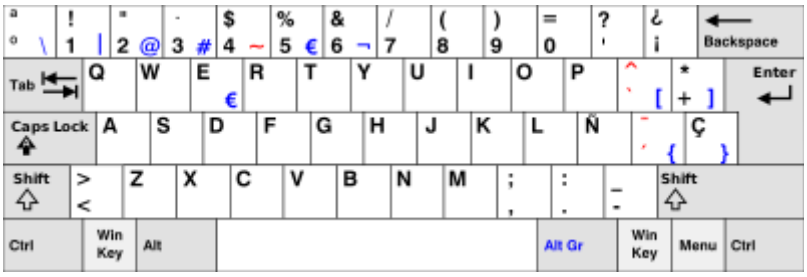
Tools

Keyhit-Test.bas shows the input codes of KEYHIT function, and the mapping aplied. Allows to see codes of your keyboard.

CP437 Reverse table-v0100.bas shows the reverse mapping extracted of the actual page using the Mapunicode function.

Layout of some keyboards that use page CP1252.

Qwerty España:
es-ES: 1034

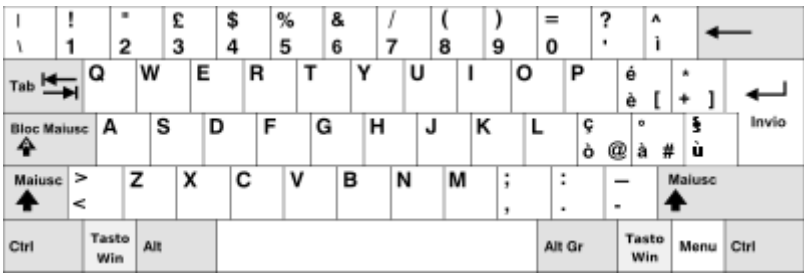


Qwerty US:
en-US: 1033

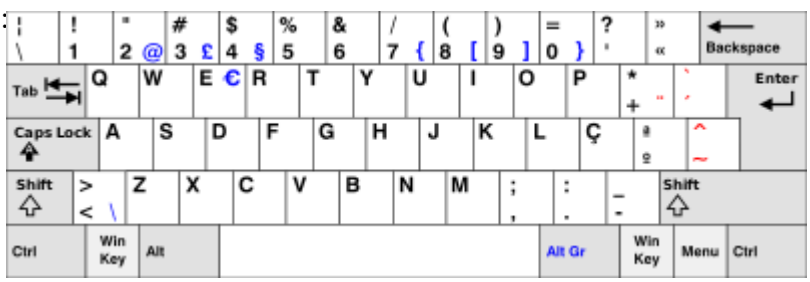
Qwerty UK:
en-EN: 2057

Qwertz Deutch:
& Austrian
de-DE: 1031

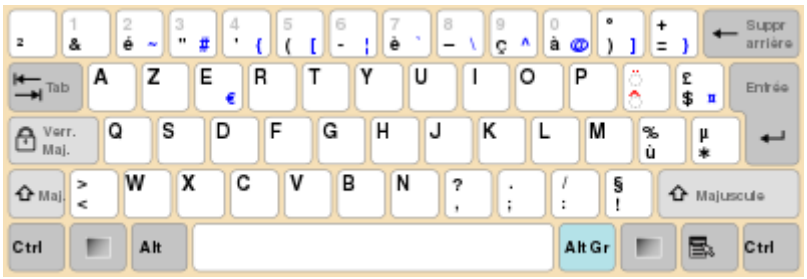
Qwerty Italiano:
it-IT: 1040



Qwerty Portuguese:
pt-PT: 2070



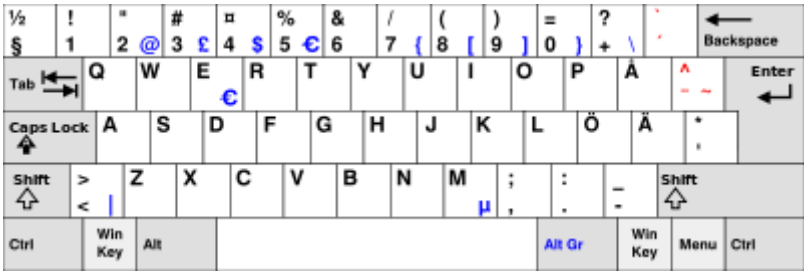
Azerty French:
fr-FR: 1036



Azerty Belge:
fr-BE: 2060

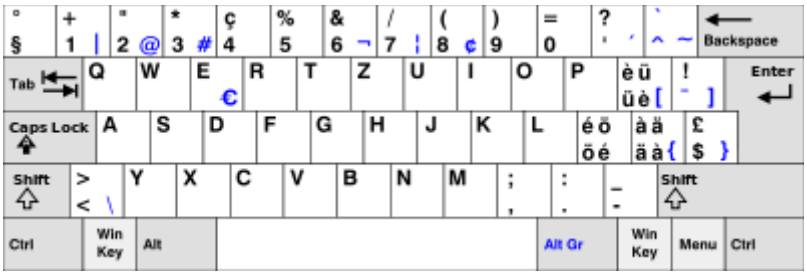
Qwerty Danish:
da-DK: 1030

Sweden:
sv-SE:1053



Dutch:
nl-NL:1043

Swiss:
& Luxemburg
de-CH: 2055
fr-CH: 4108
it-CH: 2064



https://docs.microsoft.com/en-us/openspecs/windows_protocols/ms-lcid/a9eac961-e77d-41a6-90a5-ce1a8b0cdb9c

Code Pages with their symbol and unicode in the center

CP437

	-0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-A	-B	-C	-D	-E	-F
0-	FSP 2007 **0**	☺ 263A **1**	☻ 263B **2**	♥ 2665 **3**	♦ 2666 **4**	♣ 2663 **5**	♠ 2660 **6**	• 2022 **7**	◘ 25D8 **8**	○ 25CB **9**	◙ 25D9 **10**	♂ 2642 **11**	♀ 2640 **12**	♪ 266A **13**	♫ 266B **14**	☼ 263C **15**
1-	► 25BA **16**	◄ 25C4 **17**	↕ 2195 **18**	‼ 203C **19**	¶ 00B6 **20**	§ 00A7 **21**	▬ 25AC **22**	↨ 21A8 **23**	↑ 2191 **24**	↓ 2193 **25**	→ 2192 **26**	← 2190 **27**	∟ 221F **28**	↔ 2194 **29**	▲ 25B2 **30**	▼ 25BC **31**
2-	SP 0020 **32**	! 0021 **33**	" 0022 **34**	# 0023 **35**	$ 0024 **36**	% 0025 **37**	& 0026 **38**	' 0027 **39**	(0028 **40**	) 0029 **41**	* 002A **42**	+ 002B **43**	, 002C **44**	- 002D **45**	. 002E **46**	/ 002F **47**
3-	0 0030 **48**	1 0031 **49**	2 0032 **50**	3 0033 **51**	4 0034 **52**	5 0035 **53**	6 0036 **54**	7 0037 **55**	8 0038 **56**	9 0039 **57**	: 003A **58**	; 003B **59**	< 003C **60**	= 003D **61**	> 003E **62**	? 003F **63**
4-	@ 0040 **64**	A 0041 **65**	B 0042 **66**	C 0043 **67**	D 0044 **68**	E 0045 **69**	F 0046 **70**	G 0047 **71**	H 0048 **72**	I 0049 **73**	J 004A **74**	K 004B **75**	L 004C **76**	M 004D **77**	N 004E **78**	O 004F **79**
5-	P 0050 **80**	Q 0051 **81**	R 0052 **82**	S 0053 **83**	T 0054 **84**	U 0055 **85**	V 0056 **86**	W 0057 **87**	X 0058 **88**	Y 0059 **89**	Z 005A **90**	[005B **91**	\ 005C **92**	] 005D **93**	^ 005E **94**	_ 005F **95**
6-	` 0060 **96**	a 0061 **97**	b 0062 **98**	c 0063 **99**	d 0064 **100**	e 0065 **101**	f 0066 **102**	g 0067 **103**	h 0068 **104**	i 0069 **105**	j 006A **106**	k 006B **107**	l 006C **108**	m 006D **109**	n 006E **110**	o 006F **111**
7-	p 0070 **112**	q 0071 **113**	r 0072 **114**	s 0073 **115**	t 0074 **116**	u 0075 **117**	v 0076 **118**	w 0077 **119**	x 0078 **120**	y 0079 **121**	z 007A **122**	{ 007B **123**	| 007C **124**	} 007D **125**	~ 007E **126**	⌂ 2302 **127**
8-	Ç 00C7 **128**	ü 00FC **129**	é 00E9 **130**	â 00E2 **131**	ä 00E4 **132**	à 00E0 **133**	å 00E5 **134**	ç 00E7 **135**	ê 00EA **136**	ë 00EB **137**	è 00E8 **138**	ï 00EF **139**	î 00EE **140**	ì 00EC **141**	Ä 00C4 **142**	Å 00C5 **143**
9-	É 00C9 **144**	æ 00E6 **145**	Æ 00C6 **146**	ô 00F4 **147**	ö 00F6 **148**	ò 00F2 **149**	û 00FB **150**	ù 00F9 **151**	ÿ 00FF **152**	Ö 00D6 **153**	Ü 00DC **154**	¢ 00A2 **155**	£ 00A3 **156**	¥ 00A5 **157**	₧ 20A7 **158**	ƒ 0192 **159**
A-	á 00E1 **160**	í 00ED **161**	ó 00F3 **162**	ú 00FA **163**	ñ 00F1 **164**	Ñ 00D1 **165**	ª 00AA **166**	º 00BA **167**	¿ 00BF **168**	⌐ 2310 **169**	¬ 00AC **170**	½ 00BD **171**	¼ 00BC **172**	¡ 00A1 **173**	« 00AB **174**	» 00BB **175**
B-	░ 2591 **176**	▒ 2592 **177**	▓ 2593 **178**	| 2502 **179**	┤ 2524 **180**	╡ 2561 **181**	╢ 2562 **182**	╖ 2556 **183**	╕ 2555 **184**	╣ 2563 **185**	║ 2551 **186**	╗ 2557 **187**	╝ 255D **188**	╜ 255C **189**	╛ 255B **190**	┐ 2510 **191**
C-	└ 2514 **192**	┴ 2534 **193**	┬ 252C **194**	├ 251C **195**	─ 2500 **196**	┼ 253C **197**	╞ 255E **198**	╟ 255F **199**	╚ 255A **200**	╔ 2554 **201**	╩ 2569 **202**	╦ 2566 **203**	╠ 2560 **204**	═ 2550 **205**	╬ 256C **206**	╧ 2567 **207**
D-	╨ 2568 **208**	╤ 2564 **209**	╥ 2565 **210**	╙ 2559 **211**	╘ 2558 **212**	╒ 2552 **213**	╓ 2553 **214**	╫ 256B **215**	╪ 256A **216**	┘ 2518 **217**	┌ 250C **218**	▉ 2588 **219**	▄ 2584 **220**	▌ 258C **221**	▐ 2590 **222**	▀ 2580 **223**
E-	α 03B1 **224**	β 03B2 **225**	Γ 0393 **226**	π 03C0 **227**	Σ 03A3 **228**	σ 03C3 **229**	µ 00B5 **230**	τ 03C4 **231**	Φ 03A6 **232**	Θ 0398 **233**	Ω 03A9 **234**	δ 03B4 **235**	∞ 221E **236**	∅ 2205 **237**	∈ 2208 **238**	∩ 2229 **239**
F-	≡ 2261 **240**	± 00B1 **241**	≥ 2265 **242**	≤ 2264 **243**	⌠ 2320 **244**	⌡ 2321 **245**	÷ 00F7 **246**	≈ 2248 **247**	° 00B0 **248**	∙ 2219 **249**	· 00B7 **250**	√ 221A **251**	ⁿ 207F **252**	² 00B2 **253**	■ 25A0 **254**	NBSP 00A0 **255**

CP1252

Windows-1252 (CP1252)

	_0	_1	_2	_3	_4	_5	_6	_7	_8	_9	_A	_B	_C	_D	_E	_F
0_ 0	NUL 0000 *0*	SOH 0001 *1*	STX 0002 *2*	ETX 0003 *3*	EOT 0004 *4*	ENQ 0005 *5*	ACK 0006 *6*	BEL 0007 *7*	BS 0008 *8*	HT 0009 *9*	LF 000A *10*	VT 000B *11*	FF 000C *12*	CR 000D *13*	SO 000E *14*	SI 000F *15*
1_ 16	DLE 0010 *16*	DC1 0011 *17*	DC2 0012 *18*	DC3 0013 *19*	DC4 0014 *20*	NAK 0015 *21*	SYN 0016 *22*	ETB 0017 *23*	CAN 0018 *24*	EM 0019 *25*	SUB 001A *26*	ESC 001B *27*	FS 001C *28*	GS 001D *29*	RS 001E *30*	US 001F *31*
2_ 32	SP 0020 *32*	! 0021 *33*	" 0022 *34*	# 0023 *35*	$ 0024 *36*	% 0025 *37*	& 0026 *38*	' 0027 *39*	(0028 *40*	) 0029 *41*	* 002A *42*	+ 002B *43*	, 002C *44*	- 002D *45*	. 002E *46*	/ 002F *47*
3_ 48	0 0030 *48*	1 0031 *49*	2 0032 *50*	3 0033 *51*	4 0034 *52*	5 0035 *53*	6 0036 *54*	7 0037 *55*	8 0038 *56*	9 0039 *57*	: 003A *58*	; 003B *59*	< 003C *60*	= 003D *61*	> 003E *62*	? 003F *63*
4_ 64	@ 0040 *64*	A 0041 *65*	B 0042 *66*	C 0043 *67*	D 0044 *68*	E 0045 *69*	F 0046 *70*	G 0047 *71*	H 0048 *72*	I 0049 *73*	J 004A *74*	K 004B *75*	L 004C *76*	M 004D *77*	N 004E *78*	O 004F *79*
5_ 80	P 0050 *80*	Q 0051 *81*	R 0052 *82*	S 0053 *83*	T 0054 *84*	U 0055 *85*	V 0056 *86*	W 0057 *87*	X 0058 *88*	Y 0059 *89*	Z 005A *90*	[005B *91*	\ 005C *92*	] 005D *93*	^ 005E *94*	_ 005F *95*
6_ 96	` 0060 *96*	a 0061 *97*	b 0062 *98*	c 0063 *99*	d 0064 *100*	e 0065 *101*	f 0066 *102*	g 0067 *103*	h 0068 *104*	i 0069 *105*	j 006A *106*	k 006B *107*	l 006C *108*	m 006D *109*	n 006E *110*	o 006F *111*
7_ 112	p 0070 *112*	q 0071 *113*	r 0072 *114*	s 0073 *115*	t 0074 *116*	u 0075 *117*	v 0076 *118*	w 0077 *119*	x 0078 *120*	y 0079 *121*	z 007A *122*	{ 007B *123*	| 007C *124*	} 007D *125*	~ 007E *126*	DEL 007F *127*
8_ 128	€ 20AC *128*		‚ 201A *130*	ƒ 0192 *131*	„ 201E *132*	… 2026 *133*	† 2020 *134*	‡ 2021 *135*	ˆ 02C6 *136*	‰ 2030 *137*	Š 0160 *138*	‹ 2039 *139*	Œ 0152 *140*		Ž 017D *142*	
9_ 144		‘ 2018 *145*	’ 2019 *146*	“ 201C *147*	” 201D *148*	• 2022 *149*	– 2013 *150*	— 2014 *151*	˜ 02DC *152*	™ 2122 *153*	š 0161 *154*	› 203A *155*	œ 0153 *156*		ž 017E *158*	Ÿ 0178 *159*
A_ 160	NBSP 00A0 *160*	¡ 00A1 *161*	¢ 00A2 *162*	£ 00A3 *163*	¤ 00A4 *164*	¥ 00A5 *165*	¦ 00A6 *166*	§ 00A7 *167*	¨ 00A8 *168*	© 00A9 *169*	ª 00AA *170*	« 00AB *171*	¬ 00AC *172*	SHY 00AD *173*	® 00AE *174*	¯ 00AF *175*
B_ 176	° 00B0 *176*	± 00B1 *177*	² 00B2 *178*	³ 00B3 *179*	´ 00B4 *180*	µ 00B5 *181*	¶ 00B6 *182*	· 00B7 *183*	¸ 00B8 *184*	¹ 00B9 *185*	º 00BA *186*	» 00BB *187*	¼ 00BC *188*	½ 00BD *189*	¾ 00BE *190*	¿ 00BF *191*
C_ 192	À 00C0 *192*	Á 00C1 *193*	Â 00C2 *194*	Ã 00C3 *195*	Ä 00C4 *196*	Å 00C5 *197*	Æ 00C6 *198*	Ç 00C7 *199*	È 00C8 *200*	É 00C9 *201*	Ê 00CA *202*	Ë 00CB *203*	Ì 00CC *204*	Í 00CD *205*	Î 00CE *206*	Ï 00CF *207*
D_ 208	Ð 00D0 *208*	Ñ 00D1 *209*	Ò 00D2 *210*	Ó 00D3 *211*	Ô 00D4 *212*	Õ 00D5 *213*	Ö 00D6 *214*	× 00D7 *215*	Ø 00D8 *216*	Ù 00D9 *217*	Ú 00DA *218*	Û 00DB *219*	Ü 00DC *220*	Ý 00DD *221*	Þ 00DE *222*	ß 00DF *223*
E_ 224	à 00E0 *224*	á 00E1 *225*	â 00E2 *226*	ã 00E3 *227*	ä 00E4 *228*	å 00E5 *229*	æ 00E6 *230*	ç 00E7 *231*	è 00E8 *232*	é 00E9 *233*	ê 00EA *234*	ë 00EB *235*	ì 00EC *236*	í 00ED *237*	î 00EE *238*	ï 00EF *239*
F_ 240	ð 00F0 *240*	ñ 00F1 *241*	ò 00F2 *242*	ó 00F3 *243*	ô 00F4 *244*	õ 00F5 *245*	ö 00F6 *246*	÷ 00F7 *247*	ø 00F8 *248*	ù 00F9 *249*	ú 00FA *250*	û 00FB *251*	ü 00FC *252*	ý 00FD *253*	þ 00FE *254*	ÿ 00FF *255*

Letter Number Punctuation Symbol Other Undefined Differences from ISO-8859-1