

QWERTY

QWERTY (/kwɜːrti/) is a keyboard design for Latin-script alphabets. The name comes from the order of the first six keys on the top left letter row of the keyboard (Q W E R T Y). The QWERTY design is based on a layout created for the Sholes and Glidden typewriter and sold to E. Remington and Sons in 1873. It became popular with the success of the Remington No. 2 of 1878, and remains in ubiquitous use.

-	!	@	#	\$	%	^	&	*	()	0	-	+	=	Backspace
Tab ↲	Q	W	E	R	T	Y	U	I	O	P	{	}	[]	\
Caps Lock ↪	A	S	D	F	G	H	J	K	L	:	:	=	Enter ↴		
Shift ↗	Z	X	C	V	B	N	M	<	>	?	Shift ↘				
Ctrl	Win Key	Alt									Alt	Win Key	Menu	Ctrl	

ANSI QWERTY keyboard layout (US)



A laptop computer keyboard using the QWERTY layout

Contents

History

- [Differences from modern layout](#)
- [Substituting characters](#)
- [Combined characters](#)
- [Contemporary alternatives](#)

Properties

Computer keyboards

- [Diacritical marks](#)
- [Other keys and characters](#)

Specific language variants

- [English](#)
- [Canada](#)
- [United Kingdom](#)
- [UK Apple keyboard](#)
- [United States](#)
- [Czech](#)
- [Danish](#)
- [Dutch \(Netherlands\)](#)
- [Estonian](#)
- [Faroese](#)
- [French \(Canada\)](#)
- [Greek](#)
- [German](#)
- [Icelandic](#)
- [Irish](#)
- [Italian](#)
- [Latvian](#)
- [Lithuanian](#)
- [Maltese](#)
- [Norwegian](#)
- [Polish](#)
- [Portuguese](#)
- [Brazil](#)
- [Portugal](#)
- [Romanian \(in Romania and Moldova\)](#)
- [Slovak](#)
- [Spanish](#)
- [Spain](#)
- [Latin America, officially known as Spanish Latinamerican sort](#)
- [Swedish](#)
- [Turkish](#)
- [Vietnamese](#)

Multilingual variants

- [United Kingdom \(Extended\) Layout](#)
- [Mac OS](#)
- [Windows](#)
- [Chrome OS](#)

US-International

US-International in the Netherlands

Apple International English Keyboard

Canadian Multilingual Standard

Finnish multilingual

EurKEY

Alternatives

Comparison to other keyboard input systems

Half QWERTY

See also

References

Informational notes

Citations

External links

History

The QWERTY layout was devised and created in the early 1870s by Christopher Latham Sholes, a newspaper editor and printer who lived in Kenosha, Wisconsin. In October 1867, Sholes filed a patent application for his early writing machine he developed with the assistance of his friends Carlos Glidden and Samuel W. Soule.^[1]

The first model constructed by Sholes used a piano-like keyboard with two rows of characters arranged alphabetically as shown below:^[1]

-	3	5	7	9	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
2	4	6	8	.	A	B	C	D	E	F	G	H	I	J	K	L	

The construction of the "Type Writer" had two flaws that made the product susceptible to jams. Firstly, characters were mounted on metal arms or type bars, which would clash and jam if neighbouring arms were pressed at the same time or in rapid succession. Secondly, its printing point was located beneath the paper carriage, invisible to the operator, a so-called "up-stroke" design. Consequently, jams were especially serious, because the typist could only discover the mishap by raising the carriage to inspect what had been typed.

Sholes struggled for the next five years to perfect his invention, making many trial-and-error rearrangements of the original machine's alphabetical key arrangement. The study of bigram (letter-pair) frequency by educator Amos Densmore, brother of the financial backer James Densmore, is believed to have influenced the array of letters, but the contribution was later called into question.^[2]:This is a blog. Need better source. Others suggest instead that the letter groupings evolved from telegraph operators' feedback.^[3]

In November 1868 he changed the arrangement of the latter half of the alphabet, O to Z, right-to-left.^[4] In April 1870 he arrived at a four-row, upper case keyboard approaching the modern QWERTY standard, moving six vowel letters, A, E, I, O, U, and Y, to the upper row as follows:^[5]

2	3	4	5	6	7	8	9	-
A	E	I	.	?	Y	U	O	,
B	C	D	F	G	H	J	K	L
Z	X	W	V	T	S	R	Q	P

In 1873 Sholes's backer, James Densmore, successfully sold the manufacturing rights for the Sholes & Glidden Type-Writer to E. Remington and Sons. The keyboard layout was finalized within a few months by Remington's mechanics and was ultimately presented:^[6]

2	3	4	5	6	7	8	9	-	,
Q	W	E	.	T	Y	I	U	O	P
Z	S	D	F	G	H	J	K	L	M
A	X	&	C	V	B	N	?	;	R

After they purchased the device, Remington made several adjustments, creating a keyboard with essentially the modern QWERTY layout. These adjustments included placing the "R" key in the place previously allotted to the period key. Apocryphal claims that this change was made to let salesmen impress customers by pecking out the brand name "TYPE



Keys are arranged on diagonal columns to give space for the levers.

WRITER QUOTE" from one keyboard row are not formally substantiated.^[6] Vestiges of the original alphabetical layout remained in the "home row" sequence DFGHJKL.^[7]

The modern layout is:

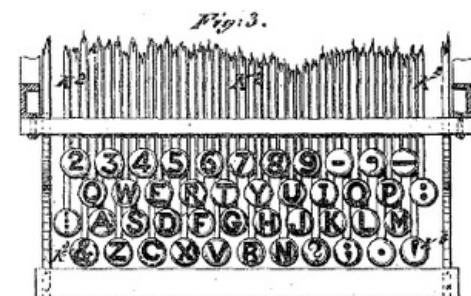
1	2	3	4	5	6	7	8	9	0	-	=
Q	W	E	R	T	Y	U	I	O	P	[\
A	S	D	F	G	H	J	K	L	;	'	
Z	X	C	V	B	N	M	,	.	/		

The QWERTY layout became popular with the success of the Remington No. 2 of 1878, the first typewriter to include both upper and lower case letters, using a shift key.

Differences from modern layout

Substituting characters

The QWERTY layout depicted in Sholes's 1878 patent is slightly different from the modern layout, most notably in the absence of the numerals 0 and 1, with each of the remaining numerals shifted one position to the left of their modern counterparts. The letter M is located at the end of the third row to the right of the letter L rather than on the fourth row to the right of the N, the letters X and C are reversed, and most punctuation marks are in different positions or are missing entirely.^[8] 0 and 1 were omitted to simplify the design and reduce the manufacturing and maintenance costs; they were chosen specifically because they were "redundant" and could be recreated using other keys. Typists who learned on these machines learned the habit of using the uppercase letter I (or lowercase letter L) for the digit one, and the uppercase O for the zero.^[9]



Christopher Latham Sholes's 1878 QWERTY keyboard layout

Combined characters

In early designs, some characters were produced by printing two symbols with the carriage in the same position. For instance, the exclamation point, which shares a key with the numeral 1 on post-mechanical keyboards, could be reproduced by using a three-stroke combination of an apostrophe, a backspace, and a period. A semicolon (;) was produced by printing a comma (,) over a colon (:). As the backspace key is slow in simple mechanical typewriters (the carriage was heavy and optimized to move in the opposite direction), a more professional approach was to block the carriage by pressing and holding the space bar while printing all characters that needed to be in a shared position. To make this possible, the carriage was designed to advance forward only after releasing the space bar.

The 0 key was added and standardized in its modern position early in the history of the typewriter, but the 1 and exclamation point were left off some typewriter keyboards into the 1970s.^[10]

In the era of mechanical typewriters, combined characters such as é and õ were created by the use of dead keys for the diacritics (‘, ~), which did not move the paper forward. Thus the ‘ and e would be printed at the same location on the paper, creating é.

Contemporary alternatives

There were no particular technological requirements for the QWERTY layout,^[6] since at the time there were ways to make a typewriter without the "up-stroke" typebar mechanism that had required it to be devised. Not only were there rival machines with "down-stroke" and "frontstroke" positions that gave a visible printing point, the problem of typebar clashes could be circumvented completely: examples include Thomas Edison's 1872 electric print-wheel device which later became the basis for Teletype machines; Lucien Stephen Crandall's typewriter (the second to come onto the American market) whose type was arranged on a cylindrical sleeve; the Hammond typewriter of 1887 which used a semi-circular "type-shuttle" of hardened rubber (later light metal); and the Blickensderfer typewriter of 1893 which used a type wheel. The early Blickensderfer's "Ideal" keyboard was also non-QWERTY, instead having the sequence "DHIATENSOR" in the home row, these 10 letters being capable of composing 70% of the words in the English language.^[11]

Properties

Alternating hands while typing is a desirable trait in a keyboard design. While one hand types a letter, the other hand can prepare to type the next letter, making the process faster and more efficient. Furthermore, when a string of letters is typed with the same hand, the chances of stuttering are increased and a rhythm can be broken, thus decreasing speed and increasing errors and fatigue. In the QWERTY layout many more words can be spelled using only the left hand than the right hand. In fact, thousands of English words can be spelled using only the left hand, while only a couple of hundred words can be typed using only the right hand^[12] (the three most frequent letters in the English language, ETA, are all typed with the left hand). In addition, more typing strokes are done with the left hand in the QWERTY layout. This is helpful for left-handed people but disadvantages right-handed people.

Contrary to popular belief, the QWERTY layout was not designed to slow the typist down,^[4] but rather to speed up typing. Indeed, there is evidence that, aside from the issue of jamming, placing often-used keys farther apart increases typing speed, because it encourages alternation between the hands.^[13] There is another origin story in the Smithsonian that the QWERTY keyboard was made for telegraph operators and has this layout to make it easy for the telegraph operator to work.^{[13][14][15]} (On the other hand, in the German keyboard the Z has been moved between the T and the U to help type the frequent digraphs TZ and ZU in that language.) Almost every word in the English language contains at least one vowel letter, but on the QWERTY keyboard only the vowel letter "A" is on the home row, which requires the typist's fingers to leave the home row for most words.

A feature much less commented-on than the order of the keys is that the keys do not form a rectangular grid, but rather each column slants diagonally. This is because of the mechanical linkages - each key is attached to a lever, and hence the offset prevents the levers from running into each other - and has been retained in most electronic keyboards. Some keyboards, such as the Kinesis or TypeMatrix, retain the QWERTY layout but arrange the keys in vertical columns, to reduce unnecessary lateral finger motion.^{[16][17]}

Computer keyboards

The first computer terminals such as the Teletype were typewriters that could produce and be controlled by various computer codes. These used the QWERTY layouts and added keys such as escape (ESC) which had special meanings to computers. Later keyboards added function keys and arrow keys. Since the standardization of PC-compatible computers and Windows after the 1980s, most full-sized computer keyboards have followed this standard (see drawing at right). This layout has a separate numeric keypad for data entry at the right, 12 function keys across the top, and a cursor section to the right and center with keys for Insert, Delete, Home, End, Page Up, and Page Down with cursor arrows in an inverted-T shape.^[18]



The standard QWERTY keyboard layout used in the US. Some countries, such as the UK and Canada, use a slightly different QWERTY (the @ and " are switched in the UK); see [keyboard layout](#)

Diacritical marks

Different computer operating systems have methods of support for input of different languages such as Chinese, Hebrew or Arabic. QWERTY was designed for English, a language with accents appearing only in a few words of foreign origin. Thus, QWERTY keyboards have no standard way of typing these "diacritics". The standard US keyboard for Microsoft Windows has no provision for it at all; the need was later met by the so called "US-International" keyboard layout, which uses dead keys to type accents without having to add more keys. The same principle is used in the standard "US" keyboard layout for MacOS, but in a different way. Third-party layouts exist that try to overcome this shortcoming, necessarily customised for a limited subset of languages. Most European PC keyboards (Windows, Linux, ChromeOS but not MacOS) have an AltGr key (Alternative Graphics key, replaces the right Alt key) that enables easy access to the most common diacritics used in the territory where sold. (Where this key is not provided, some layouts provide its equivalent using ctrl+alt+the letter to be accented, which can mean some chords that require additional manual dexterity).

Depending on the operating system and sometimes the application program being used, there are many ways to generate Latin characters with accents independently of the layout in use. Naturally, this can lead to confusion, when the imprints on the keys are different from what the software produces.

Other keys and characters

Specific language variants

Minor changes to the arrangement are made for other languages. There are a large number of different keyboard layouts used for different languages written in Latin script. They can be divided into three main families according to where the Q, A, Z, M, and Y keys are placed on the keyboard. These are usually named after the first six letters, for example this QWERTY layout and the AZERTY layout.

In this section you will also find keyboard layouts that include some additional symbols of other languages. But they are different from layouts that were designed with the goal to be usable for multiple languages (see [Multilingual variants](#)).

The following sections give general descriptions of QWERTY keyboard variants along with details specific to certain operating systems. The emphasis is on Microsoft Windows.

English

Canada

English-speaking Canadians have traditionally used the same keyboard layout as in the United States, unless they are in a position where they have to write French on a regular basis. French-speaking Canadians respectively have favoured the Canadian French keyboard layout (see below).



The CSA keyboard

United Kingdom

The United Kingdom and Ireland^[nb 1] use a keyboard layout based on the 48-key version defined in the (now withdrawn) British Standard BS 4822.^[19] It is very similar to that of the United States, but has an AltGr key and a larger Enter key, includes £ and € signs and some rarely used EBCDIC symbols (¬, ¡), and uses different positions for the characters @, ", #, ~, \, and ¡.

The BS 4822:1994 standard did not make any use of the AltGr key and lacked support for any non-ASCII characters other than ¬ and £. It also assigned a key for the non-ASCII character broken bar (¡), but lacks one for the far more commonly used ASCII character vertical bar (|). It also lacked support for various diacritics used in the Welsh alphabet, and the Scottish Gaelic alphabet; and also is missing the letter yogh, þ, used very rarely in the Scots language. Therefore, various manufacturers have modified or extended the BS 4822 standard:

- The B00 key (left of Z), shifted, results in vertical bar (|) on some systems (e.g. Windows UK/Ireland keyboard layout and Linux/X11 UK/Ireland keyboard layout), rather than the broken bar (¡) assigned by BS 4822 and provided in some systems (e.g. IBM OS/2 UK166 keyboard layout)
- The E00 key (left of 1) with AltGr provides either vertical bar (|) (OS/2's UK166 keyboard layout, Linux/X11 UK keyboard layout) or broken bar (¡) (Microsoft Windows UK/Ireland keyboard layout)

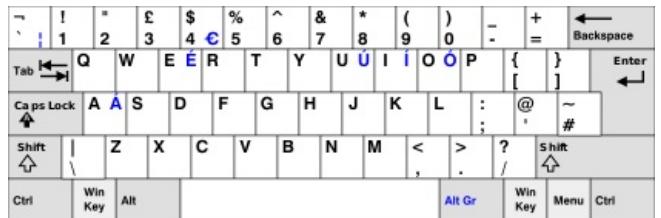
UK Apple keyboard

The British version of the Apple Keyboard does not use the standard UK layout. Instead, some older versions have the US layout (see below) with a few differences: the £ sign is reached by $\text{Shift} + 3$ and the # sign by $\text{Option} + 3$, the opposite to the US layout. The € is also present and is typed with $\text{Option} + 2$. Umlauts are reached by typing $\text{Option} + \text{U}$ and then the vowel, and ß is reached by typing $\text{Option} + \text{S}$.

Newer Apple "British" keyboards use a layout that is relatively unlike either the US or traditional UK keyboard. It uses an elongated return key, a shortened left Shift with ~ and ~ in the newly created position, and in the upper left of the keyboard are § and ± instead of the traditional EBCDIC codes. The middle-row key that fits inside the return key has \ and Pipe symbol.

United States

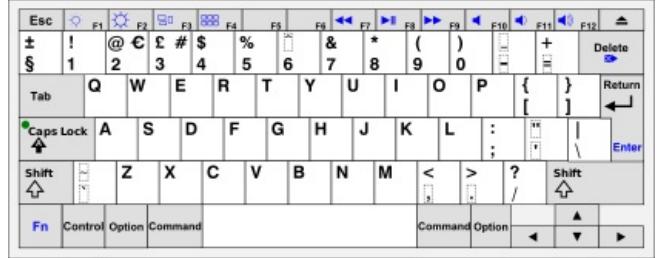
The arrangement of the character input keys and the Shift keys contained in this layout is specified in the US national standard ANSI-INCITS 154-1988 (R1999) (formerly ANSI X3.154-1988 (R1999)),^[20] where this layout is called "ASCII keyboard". The complete US keyboard layout, as it is usually found, also contains the usual function keys in accordance with the international standard ISO/IEC 9995-2, although this is not explicitly required by the US American national standard.



United Kingdom and Ireland (except Mac) keyboard layout

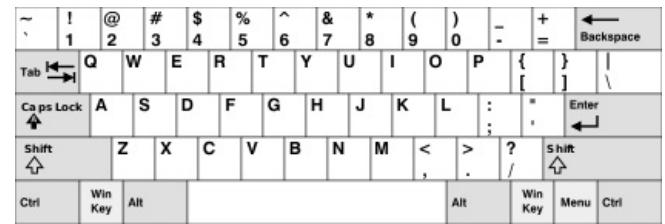


United Kingdom Keyboard layout for Linux



United Kingdom version of Apple keyboard

US keyboards are used not only in the United States, but also in many other English-speaking places, (except UK and Ireland), including India, Australia, Anglophone Canada, Hong Kong, New Zealand, South Africa, Malaysia, Singapore, Philippines, and Indonesia that uses the same 26-letter alphabets as English. In many other English-speaking jurisdictions (e.g., Canada, Australia, the Caribbean nations, Hong Kong, Malaysia, India, Pakistan, Bangladesh, Singapore, New Zealand, and South Africa), local spelling sometimes conforms more closely to British English usage, although these nations decided to use a US English keyboard layout. Until Windows 8 and later versions, when Microsoft separated the settings, this had the undesirable side effect of also setting the language to US English, rather than the local orthography.



United States keyboard layout

The US keyboard layout has a second Alt key instead of the AltGr key and does not use any dead keys; this makes it inefficient for all but a handful of languages. On the other hand, the US keyboard layout (or the similar UK layout) is occasionally used by programmers in countries where the keys for []{} are located in less convenient positions on the locally customary layout.^[21]

On some keyboards the enter key is bigger than traditionally and takes up also a part of the line above, more or less the area of the traditional location of the backslash key (\). In these cases the backslash is located in alternative places.^[22] It can be situated one line above the default location, on the right of the equals sign key (=).^{[23][24]} Sometimes it is placed one line below its traditional situation, on the right of the apostrophe key ('') (in these cases the enter key is narrower than usual on the line of its default location).^[25] It may also be two lines below its default situation on the right of a narrower than traditionally right shift key.^[26]

A variant of this layout is used in Arabic-speaking countries.

This variant has the | \ key to the left of Z, ~ ` key where the | \ key is in the usual layout, and the > < key where the ~ ` key is in the usual layout.^[27]

Czech

The typewriter came to the Czech-speaking area in the late 19th century, when it was part of Austria-Hungary where German was the dominant language of administration. Therefore, Czech typewriters have the QWERTZ layout. However, with the introduction of imported computers, especially since the 1990s, the QWERTY keyboard layout is frequently used for computer keyboards. The Czech QWERTY layout differs from QWERTZ in that the characters (e.g. @#\$& and others) missing from the Czech keyboard are accessible with AltGr on the same keys where they are located on an American keyboard. In Czech QWERTZ keyboards the positions of these characters accessed through AltGr differs.



Czech QWERTY keyboard layout

Danish

Both the Danish and Norwegian keyboards include dedicated keys for the letters Å/å, Æ/æ and Ø/ø, but the placement is a little different, as the Å and Ø keys are swapped on the Norwegian layout. (The Finnish-Swedish keyboard is also largely similar to the Norwegian layout, but the Ø and Å are replaced with Ö and Å.) On some systems, the Danish keyboard may allow typing Ö/ö and Å/ä by holding the AltGr or Option key while striking Ø and Å, respectively.) Computers with Windows are commonly sold with ØØÆ and ÅÆØ printed on the two keys, allowing same computer hardware to be sold in Denmark, Finland, Norway and Sweden, with different operating system settings.



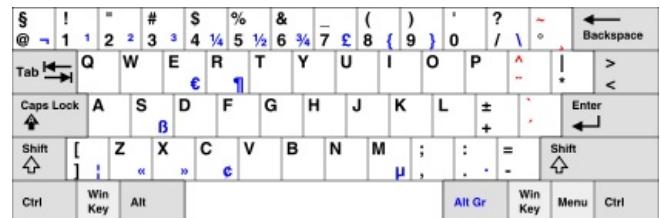
Danish keyboard layout

Dutch (Netherlands)

Though it is seldom used (most Dutch keyboards use US International layout),^[28] the Dutch layout uses QWERTY but has additions for the € sign, the diaeresis (‘), and the braces ({}) as well as different locations for other symbols. An older version contained a single-stroke key for the Dutch character IJ/ij, which is usually typed by the combination of I and J. In the 1990s, there was a version with the now-obsolete florin sign (Dutch: guldensteken) for IBM PCs.

In Flanders (the Dutch-speaking part of Belgium), "AZERTY" keyboards are used instead, due to influence from the French-speaking part of Belgium.

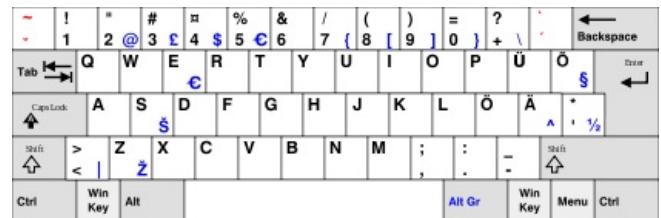
See also #US-International in the Netherlands below.



Dutch (Netherlands) keyboard layout

Estonian

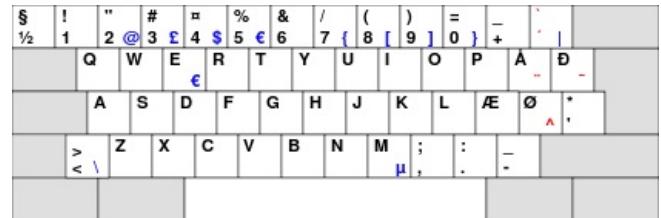
The keyboard layout used in Estonia is virtually the same as the Swedish layout. The main difference is that the Å and ” keys (to the right of P) are replaced with Ü and Ö respectively (the latter letter being the most distinguishing feature of the Estonian alphabet). Some special symbols and dead keys are also moved around.



Estonian keyboard layout

Faroese

The same as the Danish layout with added Đ (Eth), since the Faroe Islands are a self-governed part of the Kingdom of Denmark.



Faroese keyboard layout

French (Canada)

For other French Keyboard layouts, see [AZERTY](#)

This keyboard layout is commonly used in Canada by French-speaking Canadians. It is the most common layout for laptops and stand-alone keyboards aimed at the Francophone market. Unlike the AZERTY layout used in France and Belgium, it is a QWERTY layout and as such is also relatively commonly used by English speakers in the US and Canada (accustomed to using US standard QWERTY keyboards) for easy access to the accented letters found in some French loanwords. It can be used to type all accented French characters, as well as some from other languages, and serves all English functions as well. It is popular mainly because of its close similarity to the basic

US keyboard commonly used by English-speaking Canadians and Americans, historical use of US-made typewriters by French-Canadians, and is the standard for keyboards in Quebec. It can also easily map to a standard English QWERTY keyboard with the sole loss the guillemet/degree sign key. Its significant difference from the US standard is that the right Alt key is reconfigured as an AltGr key that gives easy access to a further range of characters (marked in blue and red on the keyboard image).



Canadian French keyboard layout

In some variants, the key names are translated to French:

- **⇪ Caps Lock** is **Fix Maj** or **Verr Maj** (short for *Fixer/Verrouiller Majuscule*, meaning *Lock Uppercase*).
 - **↵ Enter** is **↵ Entrée**.^[29]
 - **Esc** is **Échap**.

Greek

- The stress accents, indicated in red, are produced by pressing that key (or shifted key) followed by an appropriate vowel.
 - Use of the "AltGr" key may produce the characters shown in blue.



Modern Greek keyboard layout

German

Germany, Austria, Switzerland, Liechtenstein, and Luxembourg use QWERTZ layouts, where the letter Z is to the right of T.

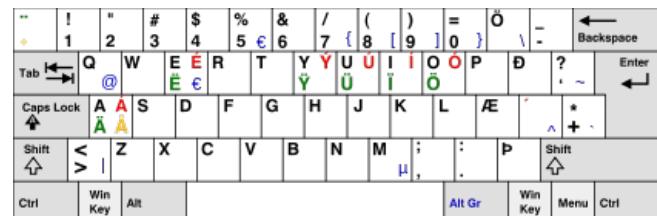
Icelandic

The Icelandic keyboard layout is different from the standard QWERTY keyboard because the Icelandic alphabet has some special letters, most of which it shares with the other Nordic countries: Þ/þ, Ð/ð, Æ/æ, and Ö/ö. (Æ/æ also occurs in Norwegian, Danish and Faroese, Ð/ð in Faroese, and Ö/ö in Swedish, Finnish and Estonian. In Norwegian Ö/ö could be substituted for Ø/ø which is the same sound/letter and is widely understood).

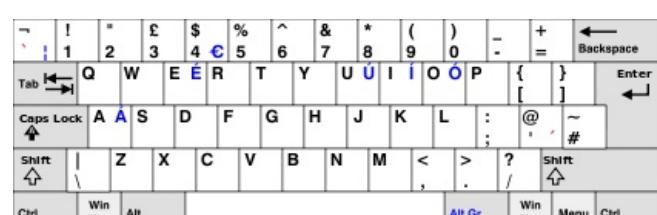
The letters Á/á, Ý/ý, Ú/ú, Í/í, and É/é are produced by first pressing the dead key and then the corresponding letter. The Nordic letters Å/å and Ä/ä can be produced by first pressing , which also works for the non-Nordic ÿ, Ü/ü, ï/ï, and Ë/ë. These letters are implemented for ease of communication in other Nordic languages. The key: **AltGr + +** for ` (grave accent) and **AltGr + '** for ^ (circumflex).

Irish

Microsoft Windows includes an Irish layout which supports acute accents with `AltGr` for the [Irish language](#) and grave accents with the  dead key for [Scottish Gaelic](#). The other [Insular Celtic languages](#) have their own layout. The UK or UK-Extended layout is also frequently used.



Icelandic keyboard layout



Microsoft Windows Irish layout

Italian

- Braces (right above square brackets and shown in purple) are given with both AltGr and Shift pressed.
 - The tilde (~) and backquote (`) characters are not present on the Italian keyboard layout (with Linux, they are available by pressing AltGr + ↑ Shift + i, and AltGr + ↑ Shift + ' ; Windows might not recognise these keybindings).
 - When using Microsoft Windows, the standard Italian keyboard layout does not allow one to write 100% correct Italian language, since it lacks capital accented vowels, and in particular the È key. The common workaround is writing E' (E followed by an apostrophe) instead, or relying on the auto-correction feature of several word processors when available. It is possible to obtain the È symbol in MS Windows by typing Alt + 0 2 0 0 . Mac users, however, can write the correct accented character by pressing ↑ Shift + ⌥ Option + È or, in the usual Mac way, by pressing the correct key for the accent (in this case Alt + 9) and subsequently pressing the wanted letter (in this case ↑ Shift + È). Linux

users can also write it by pressing the **e** key with **↑ Caps Lock** enabled.

There is an alternate layout, which differs only in disposition of characters accessible through **AltGr**, and includes the tilde and the curly brackets. It is commonly used in IBM keyboards.

Italian typewriters often have the **QZERTY** layout instead.

The Italian-speaking part of **Switzerland** uses the **QWERTZ** keyboard.

Latvian

Although rarely used, a keyboard layout specifically designed for the Latvian language called **ŪGJRMV** exists. The Latvian QWERTY keyboard layout is most commonly used - its layout is the same as latin ones, but with a dead key, which allows entering special characters (āčēīķīlnšūž, sometimes ū and ū). The most common dead key is the apostrophe ('), which is followed by Alt+Gr (Windows default for Latvian layout). Some prefer using the tick (`).

Lithuanian

Where in standard QWERTY the number row is located, you find in Lithuanian QWERTY: **Ą, Č, E, Ą, I, Š, U, Ū, Ž**, instead of their counterparts **1, 2, 3, 4, 5, 6, 7, 8, =**. If you still want to use the numbers of the mentioned 'number row', you can create them in combination with the **AltGr**-key. Aside from these changes the keyboard is standard QWERTY. Besides QWERTY, the **AŽERTY** layout without the adjustment of the number row is used.

Maltese

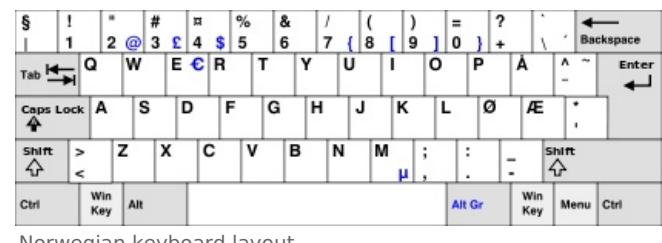
The **Maltese** language uses Unicode (UTF-8) to display the Maltese diacritics: **ċ Ċ; ġ Ģ; ķ Ħ; ż Ż** (together with **à Ā; è Ě; i Į; ò Ö; ù Ü**). There are two standard keyboard layouts for Maltese (https://www.mita.gov.mt/MediaCenter/Images/1_Fonts_Pic1.jpg), according to "MSA 100:2002 Maltese Keyboard Standard"; one of 47 keys and one of 48 keys. The 48-key layout is the most popular.

Norwegian

The **Norwegian** languages use the same letters as **Danish**, but the Norwegian keyboard differs from the Danish layout regarding the placement of the **Ø**, **Æ** and **** (backslash) keys. On the **Danish** keyboard, the **Ø** and **Æ** are swapped. The **Swedish** keyboard is also similar to the **Norwegian** layout, but **Ø** and **Æ** are replaced with **Ö** and **Ä**. On some systems, the **Norwegian** keyboard may allow typing **Ö/ö** and **Ä/ä** by holding the **AltGr** or **⌥ Option** key while striking **Ø** and **Æ**, respectively.

There is also an alternative keyboard layout called **Norwegian with Sámi**, which allows for easier input of the characters required to write various **Sámi** languages. All the **Sámi** characters are accessed through the **AltGr** key.

On Macintosh computers, the **Norwegian** and **Norwegian extended** keyboard layouts have a slightly different placement for some of the symbols obtained with the help of the **⇧ Shift** or **⌥ Option** keys. Notably, the **\$** sign is accessed with **⇧ Shift + 4** and **¢** with **⇧ Shift + ⌥ Option + 4**. Furthermore, the frequently used **@** is placed between **Æ** and **Return**.



Norwegian keyboard layout

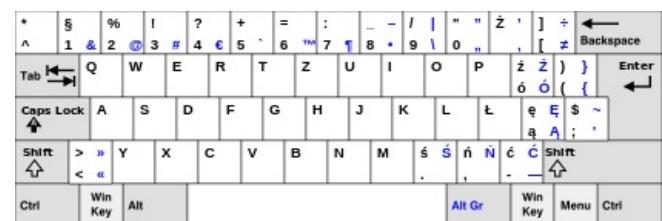


Norwegian with Sámi

Polish

Most typewriters use a **QWERTZ** keyboard with **Polish** letters (with diacritical marks) accessed directly (officially approved as "Typist's keyboard", Polish: *klawiatura maszynistki*, Polish Standard PN-87), which is mainly ignored in Poland as impractical (custom-made keyboards, e.g., those in the public sector as well as some Apple computers, present an exception to this paradigm); the "Polish programmer's" (Polish: *polski programisty*) layout has become the *de facto* standard, used on virtually all computers sold on the Polish market.

Most computer keyboards in Poland are laid out according to the **standard US** visual and functional layout. Polish diacritics are accessed by using the **AltGr** key with a corresponding similar letter from the base Latin alphabet. Normal capitalization rules apply with respect to **Shift** and **Caps Lock** keys. For example, to enter "Ż", one can type **Shift+AltGr+X** with **Caps Lock** off, or turn on **Caps Lock** and type **AltGr+X**.



Polish typist's keyboard (QWERTZ PN-87)

Both ANSI^[30] and ISO^[31] mechanical layouts are common sights, and even some non-standard^[32] mechanical layouts are in use. ANSI is often preferred, as the additional key provides no additional function, at least in Microsoft Windows where it duplicates the backslash key, while taking space from the Shift key. Many keyboards do not label *AltGr* as such, leaving the *Alt* marking as in the US layout - the right *Alt* key nevertheless functions as *AltGr* in this layout, causing possible confusion when keyboard shortcuts with the *Alt* key are required (these usually work only with the left *Alt*) and causing the key to be commonly referred to as *right Alt* (Polish: *prawy Alt*).^[33] However, keyboards with *AltGr* marking are available and it is also officially used by Microsoft when depicting the layout.^[34]

Key combinations to obtain Polish characters (Windows)

Caps Lock state	In combination with	Keystroke									
		A	C	E	L	N	O	S	Z	X	U
Off	right Alt	ą	ć	ę	ł	ń	ó	ś	ż	ź	€
	Shift & right Alt	À	Ć	Ę	Ł	Ń	Ó	Ś	Ż	Ź	
On	right Alt	À	Ć	Ę	Ł	Ń	Ó	Ś	Ż	Ź	€
	Shift & right Alt	ą	ć	ę	ł	ń	ó	ś	ż	ź	

Note: On Polish programmer keyboard, right Alt plays the role of *AltGr*



Polish programmer's keyboard

Also, on MS Windows, the tilde character "˜" (*Shift*+`) acts as a dead key to type Polish letters (with diacritical marks) thus, to obtain an "Ł", one may press *Shift*+` followed by L. The tilde character is obtained with (*Shift*+`) then *space*.

In Linux-based systems, the euro symbol is typically mapped to Alt+5 instead of Alt+U, the tilde acts as a normal key, and several accented letters from other European languages are accessible through combinations with left Alt. Polish letters are also accessible by using the compose key.

Software keyboards on touchscreen devices usually make the Polish diacritics available as one of the alternatives which show up after long-pressing the corresponding Latin letter.^{[35][36]} However, modern predictive text and autocorrection algorithms largely mitigate the need to type them directly on such devices.

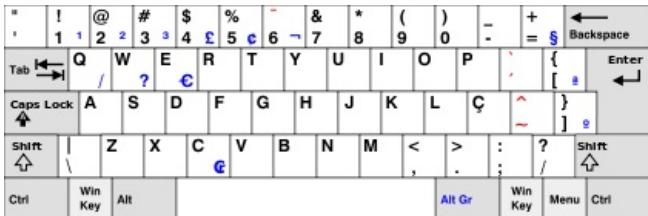
Portuguese

Brazil

The Brazilian computer keyboard layout is specified in the ABNT NBR 10346 variant 2 (alphanumeric portion) and 10347 (numeric portion) standards.

Essentially, the Brazilian keyboard contains dead keys for five variants of diacritics in use in the language; the letter Ç, the only application of the cedilla in Portuguese, has its own key. In some keyboard layouts the **AltGr**+C combination produces the ¢ character (Unicode 0x20A2), symbol for the old currency cruzeiro, a symbol that is not used in practice (the common abbreviation in the eighties and nineties used to be Cr\$). The cent sign ¢, is accessible via **AltGr**+5, but is not commonly used for the centavo, subunit of previous currencies as well as the current real, which itself is represented by R\$. The Euro sign € is not standardized in this layout. The masculine and feminine ordinals ª and º are accessible via **AltGr** combinations. The section sign § (Unicode U+00A7), in Portuguese called *parágrafo*, is nowadays practically only used to denote sections of laws.

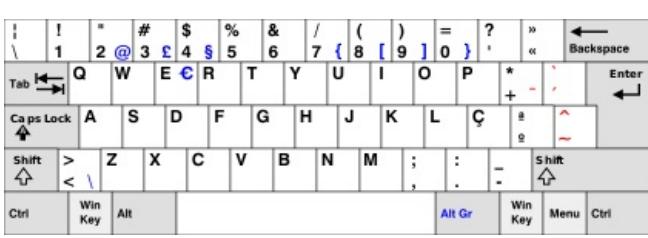
Variant 2 of the Brazilian keyboard, the only which gained general acceptance (MS Windows treats both variants as the same layout),^[37] has a unique mechanical layout, combining some features of the ISO 9995-3 and the JIS keyboards in order to fit 12 keys between the left and right Shift (compared to the American standard of 10 and the international of 11). Its modern, IBM PS/2-based variations, are thus known as 107-keys keyboards, and the original PS/2 variation was 104-key. Variant 1, never widely adopted, was based on the ISO 9995-2 keyboards. To make this layout usable with keyboards with only 11 keys in the last row, the rightmost key (/?) has its functions replicated across the **AltGr**+Q, **AltGr**+W, and **AltGr**+E combinations.



Portuguese (Brazil) keyboard layout

Portugal

Essentially, the Portuguese keyboard contains dead keys for five variants of diacritics; the letter Ç, the only application of the cedilla in Portuguese, has its own key, but there are also a dedicated key for the ordinal indicators and a dedicated key for quotation marks. The **AltGr**+E combination for producing the euro sign € (Unicode 0x20AC) has become standard. On some QWERTY keyboards the key labels are translated, but the majority are labelled in English.



Portuguese (Portugal) keyboard layout

During the 20th century, a different keyboard layout, HCESAR, was in widespread use in Portugal.

Romanian (in Romania and Moldova)

The current Romanian National Standard SR 13392:2004 establishes two layouts for Romanian keyboards: a "primary"^[38] one and a "secondary"^[39] one.

The "primary" layout is intended for traditional users who have learned how to type with older, Microsoft-style implementations of the Romanian keyboard. The "secondary" layout is mainly used by programmers as it does not contradict the physical arrangement of keys on a US-style keyboard. The "secondary" arrangement is used as the default Romanian layout by Linux distributions, as defined in the "X Keyboard Configuration Database".^[40]

There are four Romanian-specific characters that are incorrectly implemented in versions of Microsoft Windows until Vista came out:

- Ș (U+0218, S with comma), incorrectly implemented as Ș (U+015E, S with cedilla)
- ș (U+0219, s with comma), incorrectly implemented as ș (U+015F, s with cedilla)
- Ț (U+021A, T with comma), incorrectly implemented as Ț (U+0162, T with cedilla)
- ț (U+021B, t with comma), incorrectly implemented as ț (U+0163, t with cedilla)

The cedilla-versions of the characters do not exist in the Romanian language (they came to be used due to a historic bug).^[41] The UCS now says that encoding this was a mistake because it messed up Romanian data and the letters with cedilla and the letters with comma are the same letter with a different style.^[42]

Since Romanian hardware keyboards are not widely available, Cristian Secără has created a driver that allows Romanian characters to be generated with a US-style keyboard in all versions of Windows prior to Vista through the use of the AltGr key modifier.^[43]

Windows Vista and newer versions include the correct diacritical signs in the default Romanian Keyboard layout.

This layout has the Z and Y keys mapped like in English layouts and also includes characters like the 'at' (@) and dollar (\$) signs, among others. The older cedilla-version layout is still included albeit as the 'Legacy' layout.

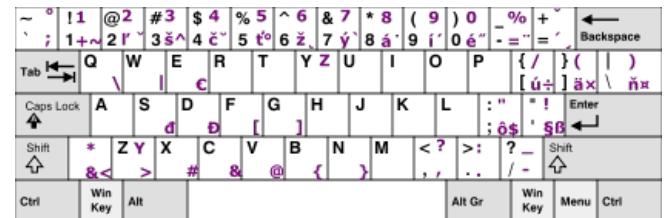
Slovak

In Slovakia, similarly to the Czech Republic, both QWERTZ and QWERTY keyboard layouts are used. QWERTZ is the default keyboard layout for Slovak in Microsoft Windows.



Aranjamentul primar din noul standard SR 13392:2004 (varianta „standard” în noul layout xkb)

Romanian keyboard layout



Slovak QWERTY/Z keyboard layout

Spanish

The Spanish keyboard layout is used to write in Spanish and in other languages of Spain such as Catalan, Basque, Galician, Aragonese, Asturian and Occitan. It includes N for Spanish, Asturian and Galician, the acute accent, the diaeresis, the inverted question and exclamation marks (¿, ¡), the superscripted o and a (º, ¸) for writing abbreviated ordinal numbers in masculine and feminine in Spanish and Galician, and finally, some characters required only for typing Catalan and Occitan, namely Ç, the grave accent and the interpunct (punt volat / punt interior, used in *I·l, n·h, s·h*; located at Shift-3). It can also be used to write other international characters, such as those using a circumflex accent (used in French and Portuguese among others) or a tilde (used in both Spanish and Portuguese), which are available as dead keys. However, it lacks two characters used in Asturian: H and L (historically, general support for these two has been poor - they aren't present in the ISO 8859-1 character encoding standard, or any other ISO/IEC 8859 standard). Several alternative distributions, based on this one or created from scratch, have been created to address this issue (see the Other original layouts and layout design software section for more information).



Spanish keyboard layout

On most keyboards, € is marked as Alt Gr + E and not Alt Gr + 5 as shown in the image. However, in some keyboards, € is found marked twice. An alternative version exists, supporting all of ISO 8859-1.^[27]

Spanish keyboards are usually labelled in Spanish instead of English, its abbreviations being:

Spanish label	English equivalent
Insertar (Ins)	Insert (Ins)
Suprimir (Supr)	Delete (Del)
Retroceder página (Re Pág)	Page up (PgUp)
Avanzar página (Av Pág)	Page down (PgDn)
Inicio	Home
Fin	End
Imprimir pantalla / Petición de sistema (Impr Pant/PetSis)	Print Screen / System request (PrtScn/SysRq)
Bloqueo de mayúsculas (Bloq Mayús)	Caps Lock
Bloqueo numérico (Bloq Num)	Num Lock
Bloqueo de desplazamiento (Bloq Despl)	Scroll Lock
Pausa / Interrumpir (Pausa/Inter)	Pause/Break
Intro	Enter

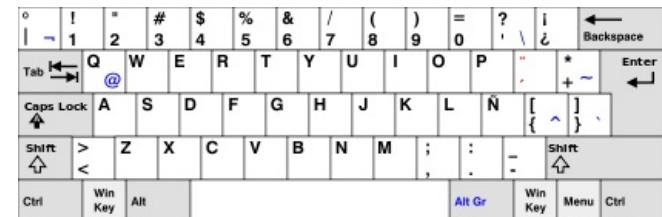
On some keyboards, the c-cedilla key (ç) is located one or two lines above, rather than on the right of, the acute accent key ('). In some cases it is placed on the right of the plus sign key (+),^{[44][45]} while in other keyboards it is situated on the right of the inverted exclamation mark key (¡).^{[46][47]}

Latin America, officially known as Spanish Latinamerican sort

The Latin American Spanish keyboard layout is used throughout Mexico, Central and South America. Before its design, Latin American vendors had been selling the Spanish (Spain) layout as default.

Its most obvious difference from the Spanish (Spain) layout is the lack of a Ç key; on Microsoft Windows it lacks a tilde (~) dead key, whereas on Linux systems the dead tilde can be optionally enabled. This is not a problem when typing in Spanish, but it is rather problematic when typing in Portuguese, which can be an issue in countries with large commercial ties to Brazil (Argentina, Uruguay and Paraguay).

Normally "Bloq Mayús" is used instead of "Caps Lock", and "Intro" instead of "Enter".



Latin American Spanish keyboard layout

Swedish

The central characteristics of the Swedish keyboard are the three additional letters Å/å, Ä/ä, and Ö/ö. The same visual layout is also in use in Finland and Estonia, as the letters Ä/ä and Ö/ö are shared with the Swedish language, and even Å/å is needed by Swedish-speaking Finns. However, the Finnish multilingual keyboard adds new letters and punctuation to the functional layout.

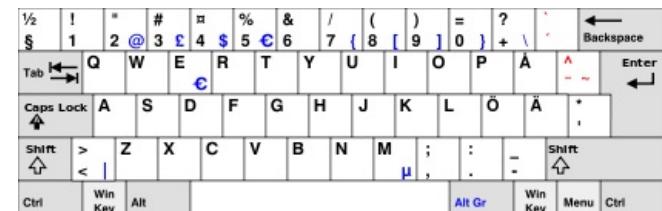
The Norwegian keyboard largely resembles the Swedish layout, but the Ö and Ä are replaced with Ø and Æ. The Danish keyboard is also similar, but it has the Ø and Æ swapped. On some systems, the Swedish or Finnish keyboard may allow typing Ø/ø and Æ/æ by holding the AltGr or Option key while striking Ö and Ä, respectively.

The Swedish with Sámi keyboard allows typing not only Ø/ø and Æ/æ, but even the letters required to write various Sámi languages. This keyboard has the same function for all the keys engraved on the regular Swedish keyboard, and the additional letters are available through the AltGr key.

On Macintosh computers, the Swedish and Swedish Pro keyboards differ somewhat from the image shown above, especially as regards the characters available using the Shift or Option keys. Shift+§ (on the upper row) produces the ¤ sign, and Shift+4 produces the € sign. The digit keys produce @£\$¤\$/]~ with Option and ;"‰¤%{ with Option + Shift.

On Linux systems, the Swedish keyboard may also give access to additional characters as follows:

- first row: AltGr + ; and AltGr + Shift + ;
- second row: AltGr + @ and AltGr + Shift + @



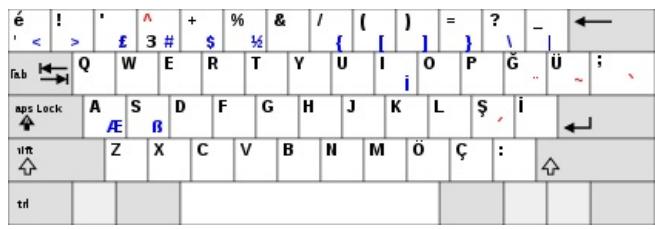
Swedish Windows keyboard layout

- third row: **AltGr** æ $\text{\textcircled{B}}$ $\text{\textcircled{D}}$ $\text{\textcircled{H}}$ $\text{\textcircled{J}}$ $\text{\textcircled{K}}$ $\text{\textcircled{L}}$ $\text{\textcircled{O}}$ $\text{\textcircled{E}}$ $\text{\textcircled{X}}$
- fourth row: **AltGr** $/$ $<$ $\text{\textcircled{C}}$ $"$ $n\mu$ $,$ and **AltGr** $/$ $<$ $\text{\textcircled{C}}$ $'$ $N\text{\textcircled{o}}$ $..$

Several of these characters function as dead keys.

Turkish

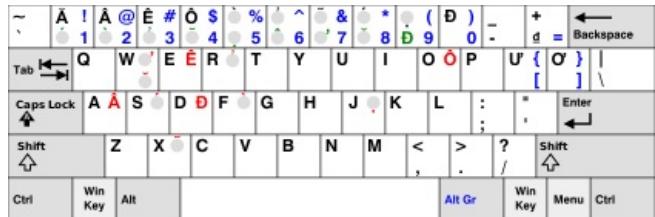
Today the majority of Turkish keyboards are based on QWERTY (the so-called Q-keyboard layout), although there is also the older F-keyboard layout specifically designed for the language.



Turkish Q-keyboard layout

Vietnamese

The Vietnamese keyboard layout is an extended Latin QWERTY layout. The letters Ā, Â, Ė, and Ô are found on what would be the number keys 1-4 on the US English keyboard, with 5-9 producing the tonal marks (grave accent, hook, tilde, acute accent and dot below, in that order), 0 producing Đ, = producing the đồng sign (đ) when not shifted, and brackets ([]) producing U' and O.^[48]



Vietnamese keyboard layout

Multilingual variants

Multilingual keyboard layouts, unlike their pendends designed for one language, try to enable writing several languages on the same number of keys. Mostly this is done by adding a virtual layer next to the $\text{\textcircled{U}}$ Shift-key by means of **AltGr**, which in turn contains further symbols/dead symbols of the desired languages.

This section also tries to arrange the layouts in ascending order by the number of possible languages and not chronologically according to the Latin alphabet as usual.

United Kingdom (Extended) Layout

Mac OS

Apple's Mac OS X does not include UK Extended, as it has key combinations for accents on any keyboard layout.

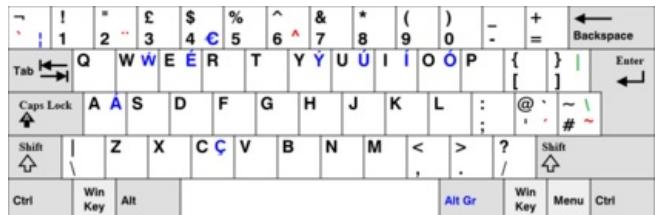
Windows

From Windows XP SP2 onwards, Microsoft has included a variant of the British QWERTY keyboard (the "United Kingdom Extended" keyboard layout) that can additionally generate several diacritical marks. This supports input on a standard physical UK keyboard for many languages without changing positions of frequently used keys, which is useful when working with text in Welsh, Scottish Gaelic and Irish — languages native to parts of the UK (Wales, parts of Scotland and Northern Ireland respectively).

In this layout, the grave accent key becomes, as it also does in the US International layout, a dead key modifying the character generated by the next key pressed, but the apostrophe, double-quote, tilde and circumflex (caret) keys are not changed. Instead, the additional characters are obtained using the **AltGr** key. The extended keyboard is software installed from the Windows control panel, and the extended characters are not normally engraved on keyboards.

The UK International keyboard uses mostly the AltGr key to add diacritics to the letters a, e, i, n, o, u, w and y (the last two being used in Welsh) as appropriate for each character, as well as to their capitals. Pressing the key and then a character that does not take the specific diacritic produces the behaviour of a standard keyboard. The key presses followed by spacebar generate a stand-alone mark..

- grave accents (e.g. à, è, etc.) are generated by pressing the grave accent/backtick key $\text{\textcircled{A}}$, which is now a dead key,



United Kingdom Extended Keyboard Layout for Windows



United Kingdom Extended Keyboard Layout for Linux

then the letter. Thus **[Shift]+[a]** produces à, as used by Scots Gaelic.

- acute accents (e.g. á) are generated by pressing the **[AltGr]** key together with the letter (or **[AltGr]+[']** – acting as a dead key combination – followed by the letter). Thus **[AltGr]+[a]** produces á, as used in Irish. (Some programs use the combination of **[AltGr]** and a letter for other functions, in which case the **[AltGr]+[']** method must be used to generate acute accents).
- a circumflex may be added by **[AltGr]+[6]**, acting as a dead key combination, followed by the letter. Thus **[AltGr]+[6]** then **[a]** produces â, **[AltGr]+[6]** then **[w]** produces the Welsh letter w.
- diaeresis or umlaut (e.g. ä, ë, ö, etc.) is generated by a dead key combination **[AltGr]+[2]**, then the letter. Thus **[AltGr]+[2][a]** produces ä.
- tilde (e.g. ã, ñ, õ, etc., as used in Spanish and Portuguese) is generated by dead key combination **[AltGr]+[#]**, then the letter. Thus **[AltGr]+[#][a]** produces ã.
- cedilla (e.g. ç) under c is generated by **[AltGr]+[C]**, and the capital letter (Ç) is produced by **[AltGr]+[Shift]+[C]**



United Kingdom International Keyboard Layout for Linux

The **[AltGr]** and letter method used for acutes and cedillas does not work for applications which assign shortcut menu functions to these key combinations.

These combinations are intended to be mnemonic and designed to be easy to remember: the circumflex accent (e.g. â) is similar to the free-standing circumflex (caret) (^), printed above the **[6]** key; the diaeresis/umlaut (e.g. ö) is visually similar to the double-quote ("") above **[2]** on the UK keyboard; the tilde (~) is printed on the same key as the **[#]**.

The UK *extended* layout is almost entirely transparent to users familiar with the UK layout. A machine with the extended layout behaves exactly as with the standard UK, except for the rarely used grave accent key, **[`]**. This makes this layout suitable for a machine for shared or public use in which some use the extended functions.

Despite being created for multilingual users, UK-Extended in Windows does have some gaps — there are many languages that it cannot cope with, including Romanian and Turkish, and all languages with different character sets, such as Greek and Russian. It also does not cater for thorn (þ, Þ) in Old English, the ß in German, the œ in French, nor for the å, æ, ø, ð, þ in Nordic languages.

Chrome OS

The UK Extended layout in Chrome OS provides all the same combinations as with Windows, but adds many more symbols and dead keys via AltGr.

[`]	[!]	["½"]	[\$½]	%½	^½	&½	*™	(±))°	-̄	+̄
tab	QΩ	WŴ	EÉ	R®	TӮ	YÝ	UÚ	IÍ	OÓ	Pƿ	{᷑
	AÁ	S᷑	D᷑	F᷑	G᷑	H᷑	J᷑	K&	L᷑	:᷑	@᷑
shift	 	Z<	X>	CÇ	V'	B"	N᷑	M᷑	<×	>+	?᷑
	\ 	z«	x»	cç	v"	b"	n᷑	m᷑	,	.	/᷑

Notes: Dotted circle (᷑) is used here to indicate a dead key. The **[`]** key is the only one that acts as a free-standing dead key and thus does not respond as shown on the key-cap. All others are invoked by AltGr.

[AltGr]+[Shift]+[0] (°) is a degree sign; **[AltGr]+[Shift]+[M] (º)** is a masculine ordinal indicator

Dead keys

- [`+letter]** produces grave accents (e.g., à/À) (**[`+`]** produces a standalone grave sign).
- [AltGr]+[2](release) letter** produces diaeresis accents (e.g., ä/Ä)
- [AltGr]+[6](release) letter** produces circumflex accents (e.g., â/Â)
- [AltGr]+[=](release) letter** produces (mainly) comma diacritic or cedilla below the letter e.g., §/\$
- [AltGr]+[Shift]+[=](release) letter** produces a hook (diacritic) on vowels (e.g., a/A)
- AltGr+[same as AltGr+2**
- AltGr+[same as AltGr+#**
- [AltGr]+[{(release) letter}** produces overrings (e.g., å/Å)
- [AltGr]+{ (release) letter** produces macrons (e.g., ā/Ā)
- [AltGr]+j (release) letter** produces mainly horn (diacritic)s (e.g., à/À)
- [AltGr]+[Shift]+j (release) letter** is a dead key that appears to have no function (as of January 2020)
- [AltGr]+; (release) letter** produces acute accents (e.g., ź/Ž)
- [AltGr]+[Shift]+; (release) letter** is another dead key that appears to have no function
- [AltGr]+'[release) letter** produces acute accents (e.g., á/Á)
- [AltGr]+[Shift]+'[release) letter** produces caron (haček) diacritics (e.g., ď/Ď)
- [AltGr]+#[release) letter** produces tilde diacritics (e.g., ã/Ã)

- AltGr + \uparrow Shift + # (release) letter produces inverted breve diacritics (e.g., á/Á)
- AltGr + / (release) letter produces mainly underdots (e.g., à/A)
- AltGr + \uparrow Shift + / (release) letter produces mainly overdots (e.g., à/À)

Finally, any arbitrary Unicode glyph can be produced given its hexadecimal code point: $\text{ctrl} + \uparrow \text{Shift} + \text{u}$, release, then the hex value, then space bar or $\leftarrow \text{Return}$. For example $\text{ctrl} + \uparrow \text{Shift} + \text{u}$ (release) 1 2 3 4 space produces the Ethiopic syllable SEE, አ.

US-International

An alternative layout uses the physical US keyboard to type diacritics in some operating systems (including Windows). This is the US-International layout setting, which uses the right Alt key as an AltGr key to support many additional characters directly as an additional shift key. (Since many smaller keyboards don't have a right Alt key, Windows also allows Ctrl + Alt to be used as a substitute for AltGr.) This layout also uses keys ' , " , " ^ and ~ as dead keys to generate characters with diacritics by pressing the appropriate key, then the letter on the keyboard. The international keyboard is a software setting installed from the Windows control panel^[49] or similar; the additional functions (shown in blue) may or may not be engraved on the keyboard, but are always functional. It can be used to type most major languages from Western Europe: Afrikaans, Danish, Dutch, English, Faroese, Finnish, French, German, Icelandic, Irish, Italian, Norwegian, Portuguese, Scottish Gaelic, Spanish, and Swedish. Some less common western and central European languages (such as Welsh, Maltese, Czech and Hungarian), are not fully supported by the US-International keyboard layout because of their use of additional diacritics or precomposed characters.



A diacritic key is activated by pressing and releasing it, then pressing the letter that requires the diacritic. After the two strokes, the single character with diacritics is generated. Note that only certain letters, such as vowels and "n", can have diacritics in this way. To generate the symbols ', ` , " , ^ and ~, when the following character is capable of having a diacritic, press the Spacebar after the key.

Characters with diacritics can be typed with the following combinations:

- ' + vowel → vowel with acute accent, e.g., ' + e → é
- ` + vowel → vowel with grave accent, e.g., ` + e → è
- " + vowel → vowel with diaeresis (or umlaut), e.g., " + e → ë
- ^ + vowel → vowel with circumflex accent, e.g., ^ + e → ê
- ~ + a, n or o → letter with tilde, e.g. ~ + n → ñ, ~ + o → õ
- ' + c → ç (Windows) or c (X11)

The US-International layout is not entirely transparent to users familiar with the conventional US layout; when using a machine with the international layout setting active, the commonly used single- and double-quote keys and the less commonly used grave accent, tilde, and circumflex (caret) keys behave unexpectedly. This could be disconcerting on a machine for shared or public use.

There are also alternative US-International mappings, whereby modifier keys such as shift and alt are used, and the keys for the characters with diacritics are in different places from their unmodified counterparts. For example, the right-Alt key may be remapped as an AltGr modifier key or as a compose key and the dead key function deactivated, so that they (the ASCII quotation marks and circumflex symbol) can be typed normally with a single keystroke.

US-International in the Netherlands

The standard keyboard layout in the Netherlands is US-International, as it provides easy access to diacritics on common UK- or US-like keyboards. The Dutch layout is historical, and keyboards with this layout are rarely used. Many US keyboards sold do not have the extra US-International characters or AltGr engraved on the keys, although € (AltGr + 5) always is; nevertheless, the keys work as expected even if not marked. Many computer-literate Dutch people have retained the old habit of using Alt + number codes to type accented characters; others routinely type without diacritics, then use a spelling checker to produce the correct forms.

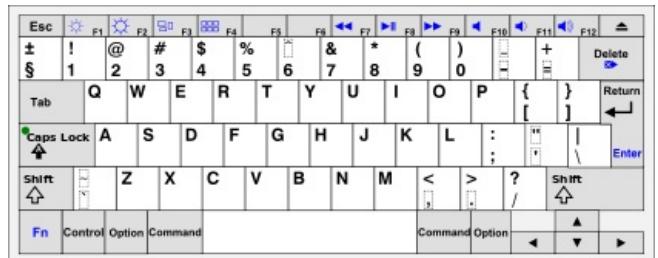
Apple International English Keyboard

There are three kinds of Apple Keyboards for English: the United States, the United Kingdom and International English. The International English version features the same changes as the United Kingdom version, only without substituting # for the £ symbol on $\uparrow \text{Shift} + 3$, and as well lacking visual indication for the € symbol on $\text{Option} + 2$ (although this shortcut is present with all Apple QWERTY layouts).

Differences from the US layout are:

1. The ~ key is located on the left of the Z key, and the ^ key is located on the right of the T key.
2. The ± key is added on the left of the 1 key.

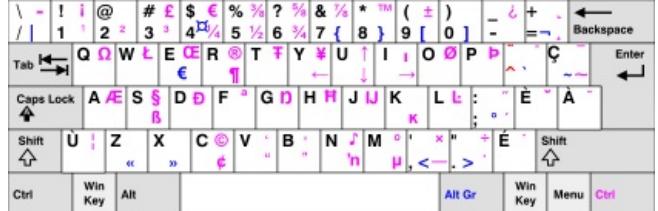
3. The left **Shift** key is shortened and the **Return** key has the shape of inverted L.



International English version of Apple keyboard

Canadian Multilingual Standard

The Canadian Multilingual Standard keyboard layout is used by some Canadians. Though the caret (^) is missing, it is easily inserted by typing the circumflex accent followed by a space.



Canadian Multilingual Standard keyboard layout

Finnish multilingual

The visual layout used in Finland is basically the same as the Swedish layout. This is practical, as Finnish and Swedish share the special characters Ä/ä and Ö/ö, and while the Swedish Å/å is unnecessary for writing Finnish, it is needed by Swedish-speaking Finns and to write Swedish family names which are common.

As of 2008, there is a new standard for the Finnish multilingual keyboard layout, developed as part of a localization project by CSC. All the engravings of the traditional Finnish-Swedish visual layout have been retained, so there is no need to change the hardware, but the functionality has been extended considerably, available through the **AltGr** key, as well as dead keys, which allow typing a wide variety of letters with diacritics (e.g., Ç/ç, G/g, Ž/ž).^{[50][51]}

Based on the Latin letter repertory included in the Multilingual European Subset No. 2 (MES-2) of the Unicode standard, the layout has three main objectives. First, it provides for easy entering of text in both Finnish and Swedish, the two official languages of Finland, using the familiar keyboard layout but adding some advanced punctuation options, such as dashes, typographical quotation marks, and the non-breaking space (NBSP).

Second, it is designed to offer an indirect but intuitive way to enter the special letters and diacritics needed by the other three Nordic national languages (Danish, Norwegian and Icelandic) as well as the regional and minority languages (Northern Sámi, Southern Sámi, Lule Sámi, Inari Sámi, Skolt Sámi, Romani language as spoken in Finland, Faroese, Kalaallisut also known as Greenlandic, and German).

As a third objective, it allows for relatively easy entering of particularly names (of persons, places or products) in a variety of European languages using a more or less extended Latin alphabet, such as the official languages of the European Union (excluding Bulgarian and Greek). Some letters, like Ł/l needed for Slavic languages, are accessed by a special "overstrike" key combination acting like a dead key.^[52] However, the Romanian letters ř/s and ţ/t (S/s and T/t with comma below) are not supported; the presumption is that ſ/s and ţ/t (with cedilla) suffice as surrogates.

EurKEY

EurKEY, a multilingual keyboard layout which is intended for Europeans, programmers and translators uses true QWERTY (US layout) as base just adding a third and fourth layer available through the **AltGr** key and **AltGr**+**Shift**. These additional layers allows the users to type the symbolism of many European languages, special characters, the Greek alphabet (via dead keys), and many common mathematical symbols.

Unlike most of the other QWERTY layouts which are standards for a country or region, EurKEY is not a standard of the European Union yet that's why a petition of EurKEY as European standard was started.



Finnish multilingual keyboard layout



EurKEY keyboard layout

To address the ergonomics issue of QWERTY, EurKEY Colemak-DH was also developed a Colmak-DH version with the EurKEY design principals.

Alternatives

Several alternatives to QWERTY have been developed over the years, claimed by their designers and users to be more efficient, intuitive, and ergonomic. Nevertheless, none have seen widespread adoption, partly due to the sheer dominance of available keyboards and training.^[53] Although some studies have suggested that some of these may allow for faster typing speeds,^[54] many other studies have failed to do so, and many of the studies claiming improved typing speeds were severely methodologically flawed or deliberately biased, such as the studies administered by August Dvorak himself before and after World War II. Economists Stan Liebowitz and Stephen Margolis have noted that rigorous studies are inconclusive as to whether they actually offer any real benefits,^[55] and some studies on keyboard layout have suggested that, for a skilled typist, layout is largely irrelevant – even randomized and alphabetical keyboards allow for similar typing speeds to QWERTY and Dvorak keyboards, and that switching costs always outweigh the benefits of further training on whichever keyboard you already use.

The most widely used such alternative is the Dvorak keyboard layout; another alternative is Colemak, which is based partly on QWERTY and is claimed to be easier for an existing QWERTY typist to learn while offering several supposed optimisations.^[56] Most modern computer operating systems support these and other alternative mappings with appropriate special mode settings, with some modern operating systems allowing the user to map their keyboard in any way they like, but few keyboards are made with keys labeled according to any other standard.

Comparison to other keyboard input systems

Comparisons have been made, between Dvorak, Colemak, QWERTY, and other keyboard input systems, namely stenotype or its electronic implementations (e.g., Plover an opensource project [1] (<http://plover.stenoknight.com/>)). However, stenotype is a fundamentally different system, which relies on Phonetics and simultaneous key presses or chords. Although stenography has long been known as a faster and more accurate typing system, adoption has been limited, likely due to the historically high cost of equipment, steeper initial learning curve, and low awareness of the benefits within primary education and in the general public.

The first typed shorthand machines appeared around 1830, with English versions gaining popularity in the early 1900s. Traditionally, stenotype output required interpretation back to longhand by a trained professional, comparable to reading Gregg shorthand, which was very much in vogue at the time and taught publicly until the 1980s. Gregg shorthand also did not require much more than training and a pen, however machines gradually gained traction in the courtroom. Modern electronic stenotype machines or programs such as Plover Steno, output to written language, which provides an experience similar to other keyboard setups that immediately produce legible work.

Half QWERTY

A half QWERTY keyboard is a combination of an alpha-numeric keypad and a QWERTY keypad, designed for mobile phones.^[57] In a half QWERTY keyboard, two characters share the same key, which reduces the number of keys and increases the surface area of each key, useful for mobile phones that have little space for keys.^[57] It means that 'Q' and 'W' share the same key and the user must press the key once to type 'Q' and twice to type 'W'.

See also

- [AZERTY](#)
- [HCESAR](#)
- [QWERTZ](#)
- [JCUKEN](#)
- [Colemak Keyboard](#)
- [Dvorak keyboard layout](#)
- [KALQ keyboard split-screen touchscreen thumb-typing Android-only 2013 beta](#)
- [Keyboard monument](#)
- [Maltron keyboard](#)
- [Path dependence](#)
- [Repetitive strain injury](#)
- [Text entry interface](#)
- [Thumb keyboard](#)
- [Touch typing](#)
- [Velotype](#)
- [Virtual keyboard](#)
- [WASD](#)



The Nokia E55 uses a half QWERTY keyboard layout.

References

Informational notes

1. There is a separate Gaelic keyboard layout, but this is rarely used. In all common operating systems that have a different selection for Irish, this refers to the layout that is identical with the UK layout, not the Irish Gaelic layout; the latter tends to be called Gaelic or similar and supports Scottish Gaelic as well. The other Insular Celtic languages have their own layout.

Citations

1. US 79868 (<https://worldwide.espacenet.com/textdoc?DB=EPODOC&IDX=US79868>), Shole, C. Latham; Carlos Glidden & Samuel W. Soule, "Improvement in Type-writing Machines", issued 14 July 1868
2. Koichi Yasuoka: The Truth of QWERTY (<http://yasuoka.blogspot.com/2006/08/sholes-discovered-that-many-english.html>), entry dated 1 August 2006.
3. Stamp, Jimmy. "Fact of Fiction? The Legend of the QWERTY Keyboard" (<http://blogs.smithsonianmag.com/design/2013/05/fact-of-fiction-the-legend-of-the-qwerty-keyboard/>). *Smithsonian Magazine*. Smithsonian Institution. Retrieved 6 May 2013.
4. Koichi and Motoko Yasuoka: Myth of QWERTY Keyboard, Tokyo: NTT Publishing, 2008. pp.12-20 (<https://books.google.com/books?id=tEsAMggMKoMC&pg=PA8>)
5. Koichi and Motoko Yasuoka: Myth of QWERTY Keyboard, Tokyo: NTT Publishing, 2008. pp.24-25 (<https://books.google.com/books?id=tEsAMggMKoMC&pg=PA20>)
6. Koichi and Motoko Yasuoka: On the Prehistory of QWERTY (<http://kanji.zinbun.kyoto-u.ac.jp/~yasuoka/publications/PreQWERTY.html>), ZINBUN, No.42, pp.161-174, 2011.
7. David, Paul A. (1985), "Clio and the Economics of QWERTY", *American Economic Review*, American Economic Association, 75 (2): 332–337, JSTOR 1805621 (<https://www.jstor.org/stable/1805621>)
8. US 207559 (<https://worldwide.espacenet.com/textdoc?DB=EPODOC&IDX=US207559>), Sholes, Christopher Latham, issued 27 August 1878
9. Weller, Charles Edward (1918). The early history of the typewriter (<https://archive.org/details/earlyhistorytyp00wellgoog>), La Porte, Indiana: Chase & Shepard, printers, hdl:2027/nyp.33433006345817 (<https://hdl.handle.net/2027%2Fnyp.33433006345817>)
0. See for example the Olivetti Lettera 36 (<http://www.mrmartinweb.com/type.htm#olivetti>), introduced in 1972
1. Shermer, Michael (2008). The mind of the market (<https://archive.org/details/mindofmarketcomp00sher/page/50>). Macmillan. p. 50 (<https://archive.org/details/mindofmarketcomp00sher/page/50>). ISBN 978-0-8050-7832-9.
2. Diamond, Jared (April 1997), "The Curse of QWERTY" (<http://discovermagazine.com/1997/apr/thecurseofqwerty1099>), *Discover*, retrieved 29 April 2009, "More than 3,000 English words utilize QWERTY's left hand alone, and about 300 the right hand alone."
3. "...at least one study indicates that placing commonly used keys far apart, as with the QWERTY, actually speeds typing, since consecutive letters are often typed with alternate hands" (<http://www.straightdope.com/columns/read/221/was-the-qwerty-keyboard-purposely-designed-to-slow-typists>). straightdope.com.
4. Stamp, Jimmy. "Fact of Fiction? The Legend of the QWERTY Keyboard" (<http://www.smithsonianmag.com/arts-culture/fact-of-fiction-the-legend-of-the-qwerty-keyboard-49863249/>).
5. Madrigal, Alexis C. "The Lies You've Been Told About the Origin of the QWERTY Keyboard" (<https://www.theatlantic.com/technology/archive/2013/05/the-lies-youve-been-told-about-the-origin-of-the-qwerty-keyboard/275537/>).
6. Kinesis – Ergonomic Benefits of the Contoured Keyboard (<http://www.kinesis-ergo.com/benefits.htm>) Archived (<https://web.archive.org/web/20100328105633/http://www.kinesis-ergo.com/benefits.htm>) 28 March 2010 at the Wayback Machine – Vertical key layout
7. TypeMatrix. "TypeMatrix - The Keyboard is the Key" (<http://typematrix.com/2030/why.php>). typematrix.com.
8. Castillo, M. (2 September 2010). "QWERTY, @, &, #" (<https://doi.org/10.3174%2Fajnr.a2228>). *American Journal of Neuroradiology*. 32 (4): 613–614. doi:10.3174/ajnr.a2228 (<https://doi.org/10.3174%2Fajnr.a2228>). PMID 20813871 (<https://pubmed.ncbi.nlm.nih.gov/20813871>).
9. BS 4822: Keyboard allocation of graphic characters for data processing (British Standard), British Standards Institution, 1994, "[t]his standard has been declared obsolescent as it is no longer felt to be relevant"
0. ANSI INCITS 154-1988 (R1999) Office Machines and Supplies - Alphanumeric Machines - Keyboard Arrangement (formerly ANSI X3.154-1988 (R1999)) (<https://web.archive.org/web/20130131061059/http://webstore.ansi.org/RecordDetail.aspx?sku=ANSI%20INCITS%20154-1988%20%28R1999%29>) (retrieved 2012-07-04)
1. "Editing Lisp Code with Emacs" (<http://www.cliki.net/Editing%20Lisp%20Code%20with%20Emacs>). CLiki. Retrieved 4 January 2008.
2. Where is the backslash key located on my keyboard? (http://www.sharpened.net/helpcenter/answers/location_of_backslash_key), Sharpened.net
3. "Keyboard for programmers", *Stackoverflow* (http://oneapiprod.synnex.com/image_technote/l95194895.jpg) (JPEG)
4. "US keyboard", *SLES* (http://doc.opensuse.org/products/SLES/SLES-admin/images/keyboard_us.png) (JPEG), OpenSUSE
5. Aske, Jon, Typing accented letters and other special characters on a PC (or Mac) (<https://web.archive.org/web/20120304071511/http://www.lrc.salemstate.edu/aske/accents.htm>), Department of Foreign Languages, Salem State University, archived from the original (<http://www.lrc.salemstate.edu/aske/accents.htm>) on 4 March 2012
6. US Tastaturbelegung: amerikanische Tastatur (<https://web.archive.org/web/20120529030527/http://www.in4mation.de/services/uskeyboard.html>) [US keyboard design] (in German), DE: in4mation, archived from the original (<http://www.in4mation.de/services/uskeyboard.html>) on 29 May 2012, retrieved 23 March 2013
7. "Microsoft Keyboard Layouts" (<https://web.archive.org/web/20170713161234/https://msdn.microsoft.com/en-us/globalization/mt644793.aspx>). Microsoft. Archived from the original (<https://msdn.microsoft.com/en-us/globalization/mt644793.aspx>) on 13 July 2017. Retrieved 26 May 2017.
8. Koenen, Liesbeth; Smits, Rik (1 January 2004). Handboek Nederlands (<https://books.google.com/?id=jXvIAAAAMAAJ&dq=ibm>). Bijleveld. ISBN 9789061319566 – via Google Books.
9. "Fren-Canadian keyboard" (<http://www3.uakron.edu/modlang/french/images/kbd4.gif>). uakron.edu. Retrieved

27 November 2010.

0. "Logitech K120 Keyboard czarna USB - Klaviatury przewodowe - Sklep komputerowy - x-kom.pl" (<http://www.x-kom.pl/p/57307-klawiatura-przewodowa-logitech-k120-keyboard-czarna-usb.html>). *x-kom.pl*. Retrieved 27 January 2017.
1. "Logitech Corded Keyboard K280e - Klaviatury przewodowe - Sklep komputerowy - x-kom.pl" (<http://www.x-kom.pl/p/217752-klawiatura-przewodowa-logitech-corded-keyboard-k280e.html>). *x-kom.pl*. Retrieved 27 January 2017.
2. "SHIRU Klaviatura przewodowa - Klaviatury przewodowe - Sklep komputerowy - x-kom.pl" (<http://www.x-kom.pl/p/320320-klawiatura-przewodowa-shiru-klawiatura-przewodowa.html>). *x-kom.pl*. Retrieved 27 January 2017.
3. "Klawiatura. Dlaczego są z nią problemy? Gdzie są polskie litery?" (<https://yestok.pl/gen/y15.php>). *yestok.pl*. Retrieved 27 January 2017.
4. "Polish (Programmers) Keyboard Layout" (<https://web.archive.org/web/20170702072831/http://www.microsoft.com/resources/msdn/goglobal/keyboards/kbdpl1.html>). Microsoft. Archived from the original (<http://www.microsoft.com/resources/msdn/goglobal/keyboards/kbdpl1.html>) on 2 July 2017. Retrieved 5 June 2013.
5. "Jak używać ekranu dotykowego" (http://softonet.pl/publikacje/poradniki/Tani.tablet.z.Windows-jak.i.do.czego.go.uzywac_611/3). *softonet.pl*. Retrieved 27 January 2017.
6. "Test HTC One M9" (http://gsmonline.pl/artykuly/test-htc_one_m9-recenzja). *gsmonline.pl*. Retrieved 27 January 2017.
7. "Pimping your Brazilian keyboard" (<http://www.siao2.com/2006/10/07/799605.aspx>). *Developer network*. Microsoft. 7 October 2006. Retrieved 30 March 2012.
8. "RO", *Diacritice* (<https://web.archive.org/web/20110927165518/http://diacritice.sourceforge.net/imagini/ro.png>), Sourceforge, archived from the original (<http://diacritice.sourceforge.net/imagini/ro.png>) (PNG) on 27 September 2011
9. "RO US", *Diacritice* (https://web.archive.org/web/20110927165528/http://diacritice.sourceforge.net/imagini/ro_us.png), Sourceforge, archived from the original (http://diacritice.sourceforge.net/imagini/ro_us.png) (PNG) on 27 September 2011
0. *X keyboard config* (<http://www.freedesktop.org/wiki/Software/XKeyboardConfig>) (wiki), Free desktop
1. "S-uri si t-uri" (https://web.archive.org/web/20121125032145/http://www.secarica.ro/html/s-uri_si_t-uri.html). RO: Secarica. 20 October 2011. Archived from the original (http://www.secarica.ro/html/s-uri_si_t-uri.html) on 25 November 2012. Retrieved 30 March 2012.
2. "Cedilla vs Comma" (<https://www.unicode.org/L2/L2013/13155-cedilla-comma.pdf>) (PDF). Retrieved 9 December 2015.
3. "RO Keyboard" (http://www.secarica.ro/html/ro_keyboard.html) (in Romanian). RO: Secarica. 20 October 2011. Retrieved 30 March 2012.
4. *Spanish Keyboard layout and special alt characters Spain (Spanish) version* (<https://web.archive.org/web/20130530224210/http://mylingos.com/keyboards/spanishspain.html>), MyLingos, archived from the original (<http://mylingos.com/keyboards/spanishspain.html>) on 30 May 2013, retrieved 23 March 2013
5. *Spanish (Traditional Sort) Keyboard Overlays* (http://www.trantor.fi/AC_Spanish_Traditional_keyboard_overlay_sticker.htm), FI: Trantor
6. *Commons*
7. *Foreign language Keyboard layout: type foreign languages, spanish keyboard layout, French, German, Italian* (<http://www.translationsoftware4u.com/keyboard-layout.php>), Translation Software
8. "KEYBOARDS VIETNAM + USA + UK + CANADA + FRANCE + GERMANY" (<http://just.nicepeople.free.fr/kbd/>). free.fr.
9. How to use the United States-International keyboard layout in Windows 7, in Windows Vista, and in Windows XP (<http://support.microsoft.com/kb/306560>), Microsoft, 17 August 2009
0. *SFS 5966* (<http://sales.sfs.fi/sfs/servlets/ProductServlet?action=showproduct&productid=210467>) (keyboard layout), Finnish Standards Association SFS, 3 November 2008, retrieved 19 April 2015. Finnish-Swedish multilingual keyboard setting.
1. Kotoistus (12 December 2006), *Uusi näppäinasettelu* (https://web.archive.org/web/20150427111436/http://kotoistus.fi/nappaimisto_htm) [*Status of the new Keyboard Layout*] (in Finnish and English), CSC IT Center for Science, archived from the original (http://kotoistus.fi/nappaimisto_htm) (presentation page collecting drafts of the Finnish Multilingual Keyboard) on 27 April 2015, retrieved 19 April 2015
2. "Precomposed characters in the new Finnish keyboard layout specification" (<https://web.archive.org/web/20160304105405/http://kotoistus.fi/kbpcse.pdf>) (PDF). Kotoistus. 29 June 2006. p. 10. Archived from the original (<http://kotoistus.fi/kbpcse.pdf>) (PDF) on 4 March 2016. Retrieved 19 April 2015.
3. Gould, Stephen Jay (1987) "The Panda's Thumb of Technology." (<https://archive.org/details/bullyforbrontosa00step/page/59>) *Natural History* 96 (1): 14-23; Reprinted in *Bully for Brontosaurus*. New York: W.W. Norton. 1992, pp. 59-75.
4. Paul David, "Understanding the economics of QWERTY: the necessity of history", *Economic history and the modern economist*, 1986
5. Liebowitz, Stan; Margolis, Stephen E. (1990), "The Fable of the Keys", *Journal of Law and Economics*, 33 (1): 1-26, CiteSeerX 10.1.1.167.110 (<https://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.167.110>), doi:10.1086/467198 (<https://doi.org/10.1086%2F467198>)
6. Krzywinski, Martin. "Colemak - Popular Alternative" (<http://mkweb.bcgsc.ca/carpalx/?colemak>). *Carpalx - keyboard layout optimizer*. Canada's Michael Smith Genome Sciences Centre. Retrieved 4 February 2010.
7. "Half-QWERTY keyboard layout - Mobile terms glossary" (<http://www.gsmarena.com/glossary.php3?term=half-qwerty-keyboard>). GSMArena.com. Retrieved 31 January 2011.

External links

- Article on QWERTY and Path Dependence from EH.NET's Encyclopedia (<https://web.archive.org/web/20060113120201/http://www.eh.net/encyclopedia/article/puffert.path.dependence>)
 - QWERTY Keyboard History (<https://web.archive.org/web/20080527223912/http://www.ideafinder.com/history/inventions/qwerty.htm>)
 - QWERTY Keyboard in Mobiles (<https://web.archive.org/web/20110708055946/http://www.bakwaash.com/2011/07/05/mobile-phone-terminologies/>)
 - Android phones with QWERTY keyboards (<https://web.archive.org/web/20160502220014/http://merelinc.com/art-and-design/qwerty-android-phones-amazing-buttons>)
-

Retrieved from "<https://en.wikipedia.org/w/index.php?title=QWERTY&oldid=1000123495>"

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