A keyboard is the set of typewriter-like keys that enables you to enter data into a computer. Computer keyboards are similar to electric-typewriter keyboards but contain additional keys.

→ A keyboard's primary function is to act as an **input device**.
→ Using a keyboard, a person can type a document, use keystroke shortcuts, access menus, play games and perform a variety of other tasks.
→ Keyboards can have different keys depending on the manufacturer, the operating system they're designed for, and whether they are part of a laptop or attached to a desktop computer.
→ These keys are called as **keycaps**. Keycaps allow for easy to see text on a keyboard as well as easy to use keys.
→ Most keyboards have between 80 and 110 keys. The keys on computer keyboards are often classified as follows:

- **alphanumeric keys** -- letters and numbers
- **punctuation keys** -- comma, period, semicolon, and so on.
- **special keys** -- function keys, control keys, arrow keys, Caps Lock key, and so on.

![Function keys](image)

- **Typing (alphanumeric) keys.** These keys include the same letter, number, punctuation, and symbol keys found on a traditional typewriter.
- **Control keys.** These keys are used alone or in combination with other keys to perform certain actions. The most frequently used control keys are Ctrl, Alt, the Windows logo key ``, and Esc.
- **Function keys.** The function keys are used to perform specific tasks. They are labeled as F1, F2, F3, and so on, up to F12. The functionality of these keys differs from program to program.
**KEYBOARDS**

- **Navigation keys.** These keys are used for moving around in documents or webpages and editing text. They include the arrow keys, Home, End, Page Up, Page Down, Delete, and Insert.

- **Numeric keypad.** The numeric keypad is handy for entering numbers quickly. The keys are grouped together in a block like a conventional calculator or adding machine.

The following illustration shows how these keys are arranged on a typical keyboard. Your keyboard layout might be different.

![Keyboard Diagram](image)

- **Other keys**
  
  **I. PrtScn (or Print Screen)**

  pressing PrtScn captures an image of your entire screen (a "screen shot") and copies it to the Clipboard in your computer's memory. From there you can paste it (Ctrl+V) into Microsoft Paint or another program and, if you want, print it from that program.

  **II. ScrLk (or Scroll Lock)**

  In a few programs, pressing Scroll Lock changes the behavior of the arrow keys and the Page Up and Page Down keys; pressing these keys causes the document to scroll without changing the position of the cursor or selection. Your keyboard might have a light indicating whether Scroll Lock is on.

  **III. Pause/Break**

  This key is rarely used. In some older programs, pressing this key pauses the program or, in combination with Ctrl, stops it from running.
KEYBOARDS

❖ Types of keyboards

The different types of keyboards available, depending on the layout of the keyboard are, QWERTY and AZERTY.

The QWERTY keyboards are most commonly used nowadays and have the six alphabets (Q,W,E,R,T,Y) in the first row of the keyboard.

The AZERTY keyboards are used primarily, in the French countries.

Another type is Dvorak, a keyboard designed for speed typing. Unlike the traditional QWERTY keyboard, the Dvorak keyboard is designed so that the middle row of keys includes the most common letters. In addition, common letter combinations are positioned in such a way that they can be typed quickly.

The types of keyboards vary according to their connection with the CPU, the application, the layout of the keys and some special function keyboards.

Other types are standard keyboard, Ergonomic Keyboards, Wireless Keyboards, gaming keyboards, virtual keyboards etc.

Ergonomics refers to the study of methods that can reduce stress on muscles to avoid repetitive strain injury. Ergonomic keyboards are designed in such a way that typing can be done putting the least amount of stress on the fingers and wrist.

Wireless keyboards do not need to be connected to the computer via a wire. This makes it very convenient for the user to use the keyboard comfortably. Wireless keyboards use three basic types of connections, Bluetooth, Infrared (IR), and Radio Frequency to connect to the computer.

Gaming keyboards are designed specifically for gamers. They include features meant to enhance gaming experience, as well as provide convenient usage for gamers. They include features like volume control, key lighting, programmable keys,
interchangeable keys, touch screens to customize the keyboard, in-built joysticks, fancy lighting, etc.

Virtual keyboards are software devices that let you input data just like a hardware keyboard. They open up as an application and can be controlled by a mouse or via a touch screen. They are mainly used in devices which do not necessarily require a keyboard, like a tablet or a smart-phone.

**Inside the Keyboard:**

A keyboard is a lot like a miniature computer. It has its own processor and circuitry that carries information to and from that processor. A large part of this circuitry makes up the key matrix.

The key matrix is a grid of circuits underneath the keys. In all keyboards (except for capacitive models), each circuit is broken at a point below each key. When you press a key, it presses a switch, completing the circuit and allowing a tiny amount of current to flow through. The mechanical action of the switch causes some vibration, called bounce, which the processor filters out. If you press and hold a key, the processor recognizes it as the equivalent of pressing a key repeatedly.

When the processor finds a circuit that is closed, it compares the location of that circuit on the key matrix to the character map in its read-only memory (ROM).

A character map is basically a comparison chart or lookup table. It tells the processor the position of each key in the matrix and what each keystroke or combination of keystrokes represents. For example, the character map lets the processor know that pressing the a key by itself corresponds to a small letter "a," but the Shift and a keys pressed together correspond to a capital "A."

A computer can also use separate character maps, overriding the one found in the keyboard. This can be useful if a person is typing in a language that uses letters that don't have English equivalents on a keyboard with English letters.
KEYBOARDS

_keyboard switches_

There are two main types of keyboards: one of them is capacitive and all the other types of switches used in keyboards are mechanical in nature. Each provides a different level of **audible** and **tactile** response -- the sounds and sensations that typing creates. Mechanical key switches include:

- Rubber dome
- Membrane
- Metal contact
- Foam element

An example of a mechanical contact keyswitch.
**Capacitive** switches are considered to be non-mechanical because they do not physically complete a circuit like most other keyboard technologies. Instead, current constantly flows through all parts of the key matrix. Each key is spring-loaded and has a tiny plate attached to the bottom of it. When you press a key, it moves this plate closer to the plate below it. As the two plates move closer together, the amount of current flowing through the matrix changes. The processor detects the change and interprets it as a key press for that location. Capacitive switch keyboards are expensive, but they have a longer life than any other keyboard. Also, they do not have problems with bounce since the two surfaces never come into actual contact.

An example of a capacitance keyswitch.
Rubber dome switches are very common. They use small, flexible rubber domes, each with a hard carbon center. When you press a key, a plunger on the bottom of the key pushes down against the dome, and the carbon center presses against a hard, flat surface beneath the key matrix. As long as the key is held, the carbon center completes the circuit. When the key is released, the rubber dome springs back to its original shape, forcing the key back up to its at-rest position. Rubber dome switch keyboards are inexpensive, have pretty good tactile response and are fairly resistant to spills and corrosion because of the rubber layer covering the key matrix.
Rather than having a switch for each key, membrane keyboards use a continuous membrane that stretches from one end to another. A pattern printed in the membrane completes the circuit when you press a key. Some membrane keyboards use a flat surface printed with representations of each key rather than keycaps. Membrane keyboards don't have good tactile response, and without additional mechanical components they don't make the clicking sound that some people like to hear when they're typing. However, they're generally inexpensive to make.

![Exploded view of a full travel membrane keyboard showing unitized frame, space layer, adhesive layers, and base plate.](image)

**Metal contact** and **foam element** keyboards are increasingly less common. Metal contact switches simply have a spring-loaded key with a strip of metal on the bottom of the plunger. When the key is pressed, the metal strip connects the two parts of the circuit. The foam element switch is basically the same design but with a small piece of spongy foam between the bottom of the plunger and the metal strip, providing a better tactile response. Both technologies have good tactile response, make satisfyingly audible "clicks," and are inexpensive to produce. The problem is that the contacts tend to wear out or corrode faster than on keyboards that use other technologies. Also, there is no barrier that prevents dust or liquids from coming in direct contact with the circuitry of the key matrix.
† Keyboard operations

The following links list some of the most common keyboard shortcuts used in Windows.

1. ‘Alt’ + ‘letter’ - activates the menu represented by the letter, where letter is the underlined letter in the menu title for example ‘File’ would be ‘Alt’ + ‘F’.
2. ‘Ctrl’ + ‘Z’ - Undo the last action.
3. ‘Alt’ + ‘Tab’ - Quickly switch between current running programs.
4. ‘Windows Key’ + ‘D’ - Shows your desktop.
6. ‘Windows Key’ + ‘U’ - Displays the Windows utility manager dialog box for controlling accessibility options.
7. ‘Ctrl’ + ‘C’ - Copies selected text\graphics to the clipboard.
8. ‘Ctrl’ + ‘V’ - Pastes text\graphics from the clipboard.
9. ‘Ctrl’ + ‘X’ - Cuts selected text\graphics to the clipboard.

Below is a short-listing of some of the common functions of the function keys. As mentioned above not all programs support function keys and may perform different tasks then those mentioned below.

F1
- Almost always used as the help key, almost every program opens a help screen when this key is pressed.
- Enter CMOS Setup.
- Windows Key + F1 would open the Microsoft Windows help and support center.
- Open the Task Pane.

F2
- In Windows renames a highlighted icon, file, or folder in all versions of Windows.
- Alt + Ctrl + F2 opens document window in Microsoft Word.
- Ctrl + F2 displays the print preview window in Microsoft Word.
- Quickly rename a selected file or folder.
- Enter CMOS Setup.

F3
- Often opens a search feature for many programs including Microsoft Windows when at the Windows Desktop..
- In MS-DOS or Windows command line F3 will repeat the last command.
- Shift + F3 will change the text in Microsoft Word from upper to lower case or a capital letter at the beginning of every word.
- Windows Key + F3 opens the Advanced find window in Microsoft Outlook.
- Open Mission Control on an Apple computer running Mac OS X.
F4

- Open find window in Windows 95 to XP.
- Open the address bar in Windows Explorer and Internet Explorer.
- Repeat the last action performed (Word 2000+).
- Alt + F4 closes the program window currently active in Microsoft Windows.
- Ctrl + F4 closes the open window within the current active window in Microsoft Windows.

F5

- In all modern Internet browsers, pressing F5 will refresh or reload the page or document window.
- Open the find, replace, and go to window in Microsoft Word.
- Starts a slideshow in PowerPoint.

F6

- Move the cursor to the Address bar in Internet Explorer, Mozilla Firefox, and most other Internet browsers.
- Ctrl + Shift + F6 opens to another open Microsoft Word document.

F7

- Commonly used to spell check and grammar check a document in Microsoft programs such as Microsoft Word, Outlook, etc.
- Shift + F7 runs a Thesaurus check on the word highlighted.
- Turns on Caret browsing in Mozilla Firefox.

F8

- Function key used to enter the Windows startup menu, commonly used to access Windows Safe Mode.
- Used by some computers to access the Windows Recovery system, but may require a Windows installation CD
- Displays a thumbnail image for all workspaces in Mac OS

F9

- Refresh document in Microsoft Word.
- Send and receive e-mail in Microsoft Outlook.
- Opens the Measurements toolbar in Quark 5.0.
- With Mac OS 10.3 or later, displays a thumbnail for each window in a single workspace.
- Using the Fn key and F9 at the same time opens Mission Control on an Apple computer running Mac OS X.

F10

- In Microsoft Windows activates the menu bar of an open application.
- Shift + F10 is the same as right-clicking on a highlighted icon, file, or Internet link.
- Access the hidden recovery partition on HP and Sony computers.
- Enter CMOS Setup.
- With Mac OS 10.3 or later, shows all open Windows for the active program.

F11
KEYBOARDS

- Enter and exit full screen mode in all modern Internet browsers.
- Ctrl + F11 as computer is starting to access the hidden recovery partition on many Dell computers.
- Access the hidden recovery partition on eMachines, Gateway, and Lenovo computers.
- With Mac OS 10.4 or later, hides all open windows and shows the Desktop.

F12

- Open the Save as window in Microsoft Word.
- Ctrl + F12 opens a document In Word.
- Shift + F12 saves the Microsoft Word document (like Ctrl + S).
- Ctrl + Shift + F12 prints a document in Microsoft Word.
- Preview a page in Microsoft Expression Web.
- Open Firebug or browser debug tool.
- With an Apple running Mac OS 10.4 or later, F12 shows or hides the Dashboard.
- Access the list of bootable devices on a computer at startup, allowing you to select a different device to boot from (Hard drive, CD or DVD drive, Floppy drive, USB drive, Network)

F13 - F24

Early IBM computers also had keyboards with F13 through F24 keys. However, these keyboards are no longer used.

❖ Keyboard Encoder

What does a Keyboard Encoder do?

Our Keyboard Encoders convert input from devices such as keypads or switches into PC keyboard signals. The Encoder looks exactly like a keyboard to your PC. Pressing a button on a keypad connected to the keyboard encoder or activating a switch you have connected to the encoder will produce a keystroke on the PC just as if it were coming from a keyboard. Your PC will also boot without your keyboard attached, since the encoder supplies all the required communication to the PC.

Why use a Keyboard Encoder?

Many PC applications rely on input from the keyboard to perform certain actions or execute commands. The keyboard encoder allows the user to send these commands from his own device, such as a pushbutton switch, instead of pressing a key on the keyboard. In addition, many PC programs do not require the use of a full keyboard. Use of a Keyboard Encoder allows restriction of the keys available to operators by using another input device. You may interface your own keypad or switches to emulate any of the standard keys from your PC keyboard. The encoders can be used with a keypad that is more suitable to environmental conditions than a standard PC keyboard.

Can I still use my own keyboard?

Our Keyboard Encoder products feature a port to connect your standard PC keyboard. You may use your own keyboard, although it is not required for the Encoder operation. The Keyboard Encoder will supply all necessary communication to your PC on power up.
What types of computers do the Encoders work with?

Use our Keyboard Encoders with PC AT, XT, PS2, Pentium, and compatible computers. We offer versions with either 5 pin DIN or 6 pin miniDIN connectors. We also have USB products as well, which interface to your USB port.

Do I need to supply power to the Encoder?

Keyboard Encoders used with a PC do not require an additional power supply. Our Encoders use the power from your PC keyboard Port.

Do you have RS-232 interfaces?

The Hagstrom Electronics KE24 Keyboard Encoder supports RS-232 communication. This product is programmable and the RS-232 port may be used in a number of ways. Data received on this port may be translated into PC keyboard signals; Keystrokes from a PC keyboard may be directed out to this port instead of the PC; Keypads or Switches scanned on the I/O header may have their responses sent to the RS-232 port. Our KE72 unit also features an RS-232 port which will receive ASCII characters and convert them into keystrokes.