

Building Mechanical Keyboards

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Definition

A mechanical keyboard is a computer peripheral that allows users to input information such as letters and digits into a computer. It is a direct upgrade to what was the typewriter because of their similar functionalities. They both serve the purpose of replacing the pen or pencil in terms of communication or writing. One thing about keyboards is that they have changed over the years with the features keyboards have. Some keyboards in the present have a separate set of keys to function as a macro-key, a string of inputs to do a certain task, such as copy and paste.

Overview & Components & Explanation

Mechanical keyboards have their own community that are invested in adjusting and modifying their keyboard, such as how it sounds and how it feels. All of these depend on the components of a keyboard. These components include:


1. Switches. A mechanical actuator that sends the information from the keyboard to the computer to determine what characters are being pressed from each keystroke, a press of a key that a person types. The acoustic quality of a switch is highly dependent on the overall keyboard such as certain materials and sometimes the keycaps can also affect it as well. (Fig. 1 below)
 - a. Different types of switches include the main three:
 - i. “Clicky” switches; known for their signature clicky noise when typing. This is a switch that is very popular in most pre-built gaming keyboards and in a more general market.
 - ii. Linear switches; known for their smoothness when pressing down, their quieter volume, and their element known in the community as “thock”. “Thockiness” is a much deeper sound that happens as a person types.
 - iii. Tactile switches; known for the clicky feeling when actuating, or the pressing down of a key. It is also known to be an in-between switch since it has a quieter sound but the consumer can still feel a click as they press down like a clicky switch.


Cherry MX Switch Comparison





2. Form factors. There are different sizes that are all primarily judged on one's preference. There are form factors such as (Fig 2 below):
- Full size or 100%. This is the default size that most people with a computer have, which is a keyboard that includes the function row (the keys at the top of the keyboard labeled F1 to F12), the number pad (a pad on the far right of the keyboard that have a calculator-like layout), typing, arrow keys, and number row.
 - Tenkeyless or 80%. This is very similar to the full size
 - 75%. This size consists of the main parts of the full size keyboard which include the main typing and control (letters and keys such as shift key and ctrl key), number row, and function row. It is a more compact version of the 80%.
 - 65%. This is one of the smaller sizes where there is no numpad, no function row but still has some arrow keys and some of the edit keys. This is also a very popular keyboard form factor due to the amount of space consumers have on their desk.
 - 60%. This is similar to the 65% but there are no arrow keys and no edit keys. It is only the number row and the main typing.
 - 40%. This is the barebones form factor for mechanical keyboards because there is no number row, function row or any of the other extra keys. It is only typing and the control keys.


KEYBOARDS


100% FULLSIZE
 FULL SIZE KEYBOARD. MOST LIKELY SAME LAYOUT YOU CURRENTLY HAVE.

80%
 ALL THE KEYS YOU NEED MINUS A NUMBER PAD. THE MISSING 20% ARE YOUR NUMBERS.

75%
 ALL YOUR KEYS BUT IN THE MOST COMPACT SPACE POSSIBLE. ARROWS INCLUDED.

65%
 COMPACT BUT HITS ALL THE SWEET SPOTS. MISSING FUNCTION KEYS BUT ARROW KEYS ARE HERE.

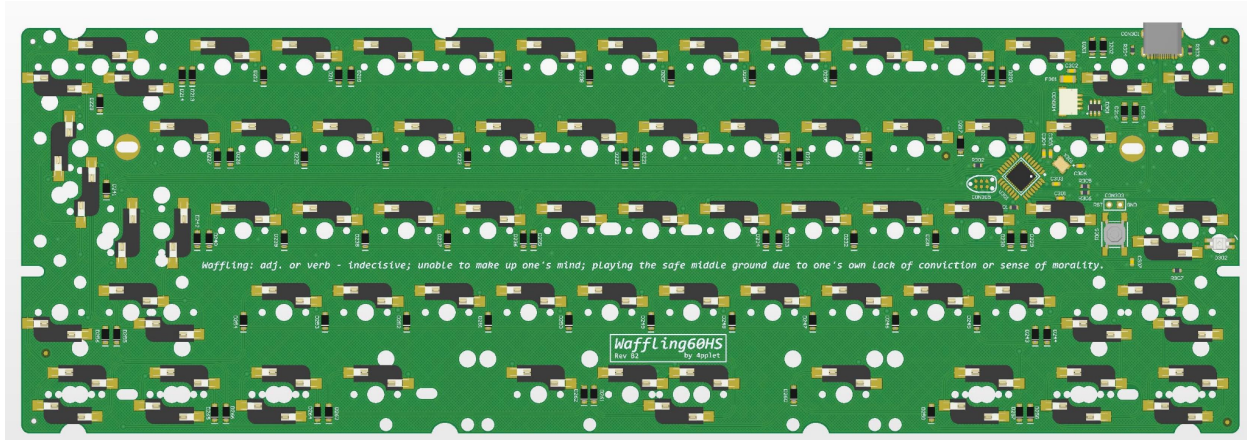
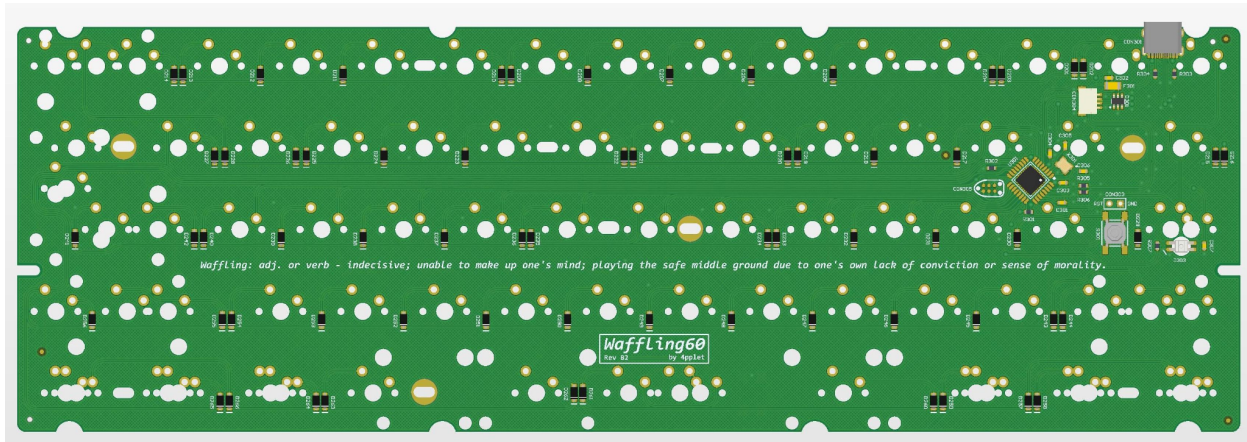
60%
 ONE OF THE MOST FAMOUS AND COMPACT LAYOUTS. PARTS ARE WIDELY AVAILABLE. WILL NEED TO USE LAYERS IN ORDER TO USE MISSING KEYS (ARROW KEYS).

40%
 SMALL KEYBOARD IF THERE EVER WAS ONE. BARE NECESSITIES. WILL NEED TO LEARN HOW TO LAYER AND CONFIGURING HOW YOU WANT ALL THIS TO WORK.

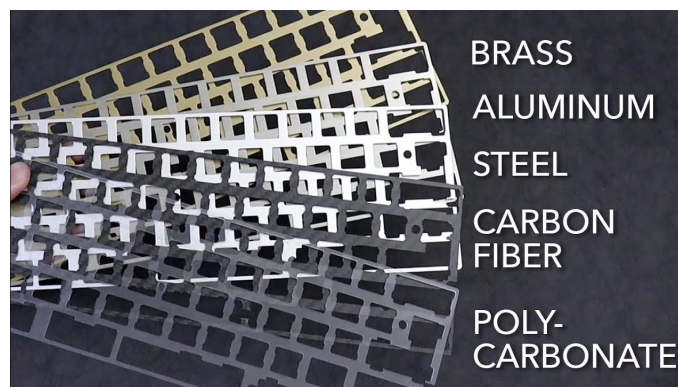
ALL IN ALL THERE ARE A LOT OF OPTIONS TO CHOOSE FROM. THESE REPRESENT SOME OF THE MORE COMMON LAYOUTS BUT ARE MERELY SUGGESTIONS. MISSING KEYS CAN ALWAYS BE CONFIGURED USING "LAYERS" WHICH IS A SET OF KEYS YOU PRESS IN ORDER TO ACHIEVE A KEYSTROKE FUNCTION.

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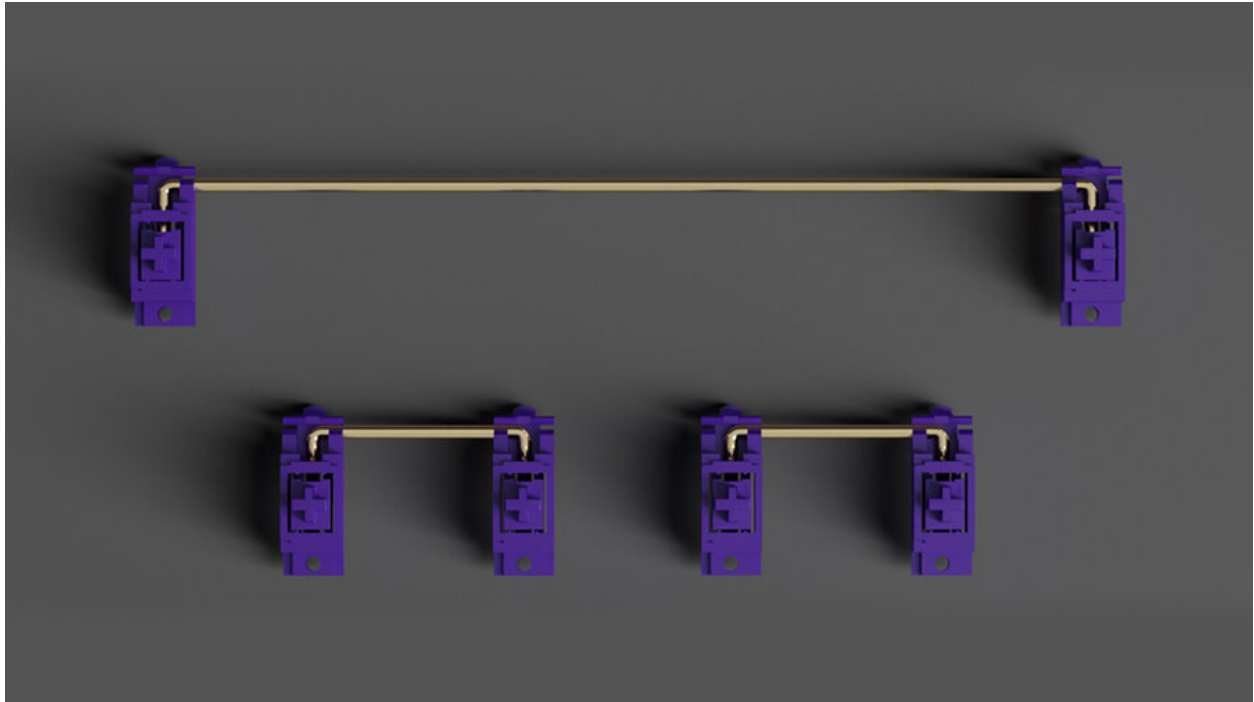
- PCB. Also known as a printed circuit board, this is known as the “heart” of the keyboard. This is how the keyboard is able to send information to the computer on what keystroke has been pressed and where every component is centralized. The switches connect to the PCB with the five contact points; three plastic pins for stability and two metal pins to transfer the information from the keystroke into the PCB and into the computer. The PCB and the switch can be connected via the soldering method where it melts metal to form a bond between the switch and PCB. Then there are hot swappable PCBs that have a switch within the PCB to connect the two metal pins for that same connection. (Fig 3 below)



- Plate. This is a metal plate that sits in between the switches and PCB to connect everything as one unit. There is no actual use for the plate to be there, but it does affect the acoustics of the keyboard depending on the specific material. (Fig 4 below)



5. Stabilizers. These are support pieces that help with the stability of the longer keys such as the spacebar, the shift keys, and the enter key. They disperse the pressing down force across the keycap so there wouldn't be a need to press the longer keys exactly where the switch is. (Fig 5 below)



6. Keycaps. This is the aesthetics part of a keyboard. There is no practical use in having expensive keycaps. But some of the materials of certain keycaps can also affect the acoustics. (Fig 6 below)



7. Case. This is also another part of the aesthetics where it's the outside of the case. This is a preference to where a case could be all aluminum or made out of polycarbonate. (Fig 7 below)



Conclusion

Mechanical keyboards are extremely customizable and modular with all of the parts that one can purchase. Everything is based on one's preferences, some may like their keyboards quieter and others the opposite. One thing that is universal amongst keyboards is the consumer's budget. There are differences when it comes to quality of the materials. Some cheaper keycaps might use cheaper plastics that are prone to smudging while the more expensive ones have thicker plastic for different acoustics.

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