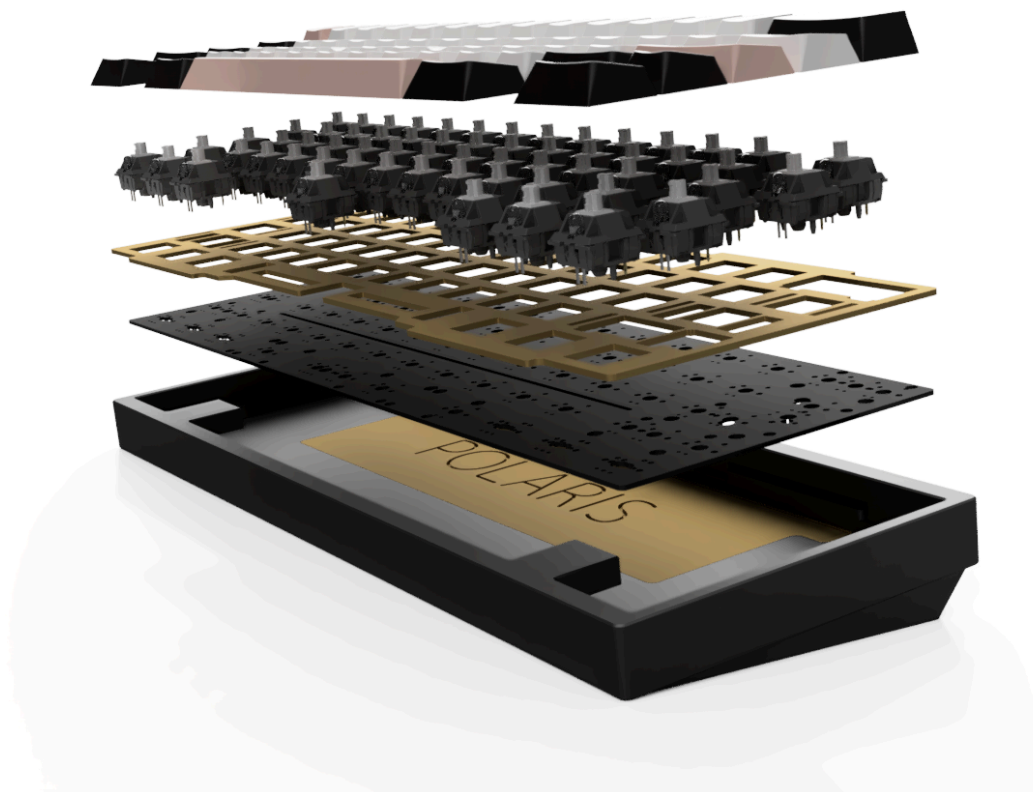# Section 2 - A case study

It's difficult to make a keyboard decision without knowing what to look out for.

What's in a keyboard?

The structure of a keyboard is usually as follows:

- Keycap - The plastic bits of the keys that you press.
- Switch - The bits below the keycaps that are part of the electronic circuit.
- Plate - What the switches snap in to. Usually secured to the case in one way or another.
- PCB - What does all the electronic work. Scans the switches for keystrokes.
- Case - The exterior. What you can see and touch from the outside that isn't a key.

A case of preference?

Since custom keyboard kits usually do not come with switches and keycaps bundled, let's look into the rest of the board.

The case is the easiest one to explain - it is simply the outer shell. Usually comprised of either one part or two halves, its material, finish, color, and design are crucial to the aesthetics of the keyboard, and will usually be a big determining factor in whether you want the keyboard or not to begin with.

One feature oft found in higher end boards is a weight - usually a heavy metal chunk of brass, steel, or similar adds mass to the board. This may help in preventing your board from moving around on the desk during heavy use.

Also, one thing to note is that the case does have an effect on typing sound. Internal geometry may change sound significantly, and low-profile boards which expose the switches are generally disliked due to their sound properties and aesthetics.

Above: Low profile board on left, high profile board on right. Generally you'll find that custom keyboards are high profile for good reason.

The factors on the plate

The plate is key in determining the board's final feel and sound. It is the sheet which the switches snap into, and it is the plane which receives all of the impact from your fingertips as you type.

Three things to consider are material, mounting method, and layout.

Material

Plates come in all sorts of materials, but the most common choices are listed below.

For the metals:

- Aluminum is a very common choice. It is a fairly soft metal which is comfortable to use, has decently deep typing sound, and is very resistant to corrosion and rust. It is also known to pair well with just about any switch, unlike other materials which may be a bit more pickier.
- Steel plates are oft found in affordable and off-the-shelf keyboards, and is generally disliked in the realm of custom keyboards. Stiff, harsh, and pingy describe this plate material, with extended use leading to significant finger strain.
- Brass plate is a typical choice for putting acoustics first in a keyboard. It is a very stiff choice, albeit not as harsh as steel, and tends to offer the deepest typing sounds. Before committing, you may wish to carefully consider the balance between acoustics and typing feel.

For the others:

- Polycarbonate is a very popular plate choice to pair with linears, due to its very soft feel which maximizes typing comfort over extended time. If you are looking to maximize typing feel, this may be one good choice to consider.
- FR-4, a fiberglass used as the core of circuit boards, is a choice that has been growing in popularity as of late. It sits between polycarbonate and aluminum in both feel and sound.

Mounting method

Usually, the plate is the part which connects the keys to the case. How the plate is connected to the case has a noticeable effect on the behavior of the keyboard itself.

Here are a few popular options:

- Top mount has been around since the very first custom keyboards in the late 2000s, and still remains a top pick for even the highest end boards. The plate is connected to the upper half of the case by screw points, allowing the plate to flex downwards on impact to relieve harshness.
- Bottom mount is rarely seen nowadays, and is the opposite of top mount - the plate secures to the lower half of the case. When done incorrectly, the plate may be held rigidly along the rims, leading to reduced comfort.
- Sandwich mount is exactly as described - the plate is sandwiched between the case halves and locked into place. When done correctly, it can make the plate edge a case accent and reduce cost and parts quantity, but in general leads to a very stiff typing feel.
- Integrated plate is again exactly as described - the plate is built into a case half as a single object and is non-detachable. This is usually the stiffest, most inconsistent typing experience of the bunch.
- Gasket mount is slowly becoming widespread, but is a very vague term. In general, it uses some non-stiff material, such as silicone dampers or foam pads, to absorb the typing impact and vibrations. When done correctly, it can lead to significant improvements in typing comfort and acoustics, but do watch out for subpar implementations.
- Leafspring mount is another mounting style rapidly rising in popularity. The plate is secured to the case via long slots or arms to allow the center portion to flex downwards with minimal effort, reducing the harshness of typing.

Knowing your preferences in mounting styles can help to cut down on the options to choose from, but always be aware that there are both good and bad implementations of any of these.

For an even further look, check out a list of mounting styles by Thomas Baart.

Layout

Switches snap into the plate. To put it very simply, to make a certain layout within a keyboard, the plate needs the cutouts in the correct places.

Don't forget to check what layout compatibility options each plate has to avoid disappointments later on.

The circuitry choices

The PCB handles scanning the switches for keystrokes and barfing them out to the computer. The PCB also determines what features are available on the keyboard itself.

Some features that you may wish to look out for are as follows:

- Backlight - Some PCBs allow installation of LEDs in each switch, as well as toggling their brightness during use. This is becoming much harder to find as the community moves away from fancy LED effects in general.
- Full RGB - Some PCBs have RGB LEDs built in under each switch position, allowing for full color effects during typing. Note that to take advantage of this, you must use switches with translucent housings, for opaque switches would simply block out the light.
- Indicator LEDs - A more understated option well-suited for many, this allows for installation of a LED which toggles on or off depending on the state of lock keys, such as caps lock. This may be installed within a switch, or may be located in a bezel space instead.
- Hotswap - Normal PCBs require the use of soldering to connect each switch to the PCB. Hotswap sockets allow keyboard assembly without any high-temperature tool at all, as well as disassembly at will by pulling the switches out of the sockets. This will be further explained in the next section regarding switches.

Key positioning

In the realm of custom keyboards, most keyboards are reprogrammable, in that you can configure just about any key to type any letter.

What isn't as configurable is the physical positioning of the keys once built. Take a few minutes to check the common physical layout options available:

TKL (Tenkeyless)
The tried and true, with nearly four decades of history behind it. Dropping the numpad, the keyboard compacts down to a size fit for modern use while maintaining nearly full functionality. Often found in the higher end as flagship keyboards of each brand.

75%
Downsizing the TKL further, this layout retains the function and arrow keys suitable for modern use while doing away with the rest.

60%
The tiny board that could. Simplifies the keyboard down to only the main alphanumeric cluster, freeing up significant desk space while allowing for more portable use. Usually, a function key changes select keys to fn and arrow keys when pressed, allowing for full keyboard

functionality in tiny size.

65%

Adds one column to a 60% to add physical arrow keys back in. If your typical use involves heavy arrow key usage, this may be a top choice.

Sub-60%

Enter the world of 50, 40, even 30% boards that cram functionality into the tiniest footprints. Makes use of heavy layer shifting akin to holding shift to change characters being typed.

Ortholinear

The grid of keys. All the keys are lined up in both row and column for a very uniform look and compact size.

Column-Stagger

Oft referred to as ergonomic layouts, these stagger the keys vertically to match the curvature of the fingers for comfortable typing.

A mass of information

Yes, that is quite a bit of information to discuss in one page. It doesn't cover every possible detail of a keyboard, so go forth in your quest for an endgame keyboard with an open mind when it comes to new information. But do congratulate yourself for covering this much information in such short time - after all, choosing a keyboard is no easy task.

Next comes a section on switches.