Keyboard Spotlight

AKUMA 80%

Material: Aluminum
Color: Anodized E-White
Group Buy: September 2022

Functional Aesthetics

Functional Aesthetics

Designing Custom Mechanical Keyboards

— Chester Middleton

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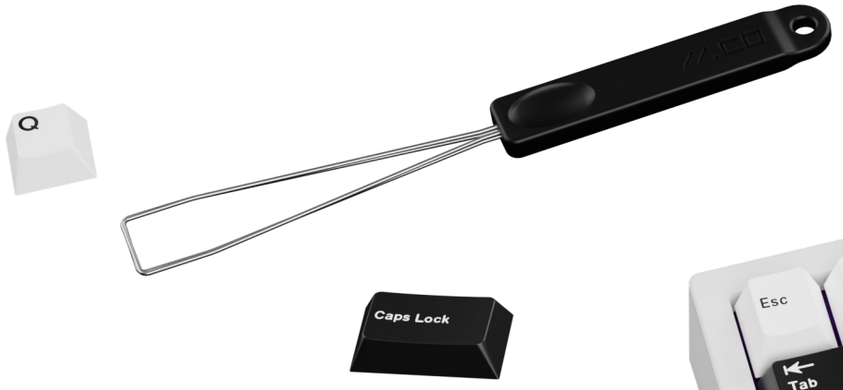


The Keyboard

To most, a keyboard is simply a tool that allows them to communicate and interact with the digital space. However, some people have started putting more thought into their day-to-day interactions with keyboards. There is a growing community of enthusiasts who love to do everything from building, designing, sculpting, and assembling their own custom parts and accessories for mechanical keyboards.

To start, it’s important to know why people care so much as to spend sometimes hundreds of dollars upgrading and building a custom mechanical keyboard. To keyboard enthusiasts, it’s simply natural to put that much thought and care into the tools you use for work and entertainment, just as natural as having nice shoes for athletics, or a nice knife for cooking. This is especially true in the modern world, where people work in digital fields and type all day.

Custom mechanical keyboards can take many shapes and forms, fitting a person’s hand size, having more ergonomic layouts, having a special type and sound feel, or having a certain aesthetic that complements an overall full desk setup. Many steps have been taken to get to where we are today, so let’s start by talking about the history of the keyboard.

In the beginning was the word, and the word was typed on the Glidden and Sholes Type-Writer.

— The Bible, probably

Chapter 1 — Keyboards: A Brief History

The rise of modern keyboards and typing machines began as early as 1575 when an Italian printmaker named Francesco Rampazette created a machine called the ‘Scittura Tattile’. This machine was made to impress letters into paper and was very primitive. In the coming years, many variations and concepts were created as patents for typing and recording data. However, none had managed to become commercially successful.

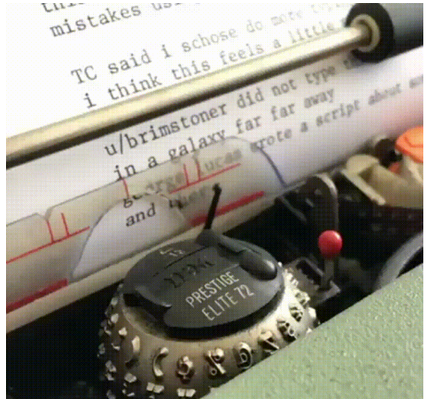
Fast forward to 1868 when a Pennsylvania-born newspaper publisher and politician named Christopher Latham Sholes, along with Frank Haven Hall, Carlos Glidden, and Samuel W. Soule, patented a typing machine in Milwaukee, Wisconsin. The machine was created by a clockmaker named Matthias Schwalbach. Soon after, however, Sholes disowned the machine and would no longer recommend it.

Soon after, Hall, Glidden, and Soule sold their shares to Densmore and Sholes, who then made an agreement with E. Remington and Sons (then famous as a manufacturer of sewing machines) to commercialize and produce the machine under the name ‘Glidden and Sholes Type-Writer’. This was the first usage and origin of the term ‘typewriter’.

By around 1910, the mechanical typewriter started to reach a stage of standardization and was enjoyed by the public both at work and at home. Most typewriters were manufactured so that each key was attached to a typebar that had the corresponding letter molded, in reverse, into the type-writers striking head.

When a key was struck briskly and firmly, the typebar hit a small ribbon made of fabric, making a printed mark on the paper wrapped around a cylindrical platen. There were small changes in models from manufacturer to manufacturer, but the layout and typing experience stayed generally the same.

Inventions and patents came over the years to create a more dynamic and wide-ranging typing experience. For example, original typewriters shipped without Shift Keys and Tab Keys, which were later added to improve business flow and significantly improve the typing experience. Other notable inventions for the typewriter included Three-bank Typewriters, which reduced the number of keys and bars so that each bar could create 3 characters. This was significant for journalists in World War I. Color, Character Sizes, Noiseless Designs, Dead Keys, and Electric Systems were all introduced by some manufacturers to create more accessibility and situational tools depending on each user's needs, location, and individual interests.



A revolution of the typewriting system came in 1961, when an industrial designer and American architect named Eliot Fette Noyes spent twenty-one years developing and designing for the electronics manufacturer IBM.

In 1961, he designed the IBM Selectric 1 typewriter, the first electric typewriter to really take off to commercial success. This typewriter used a special system: a small golf ball-sized object had the letters on its faces, and a complex series of mechanics would drive the ball into place and type using electric motors. The Selectric was produced until the 1980s with three total models that evolved slightly over the decades. The Selectric II and III improved the typing experience and expanded the character set, allowing for more accessibility.

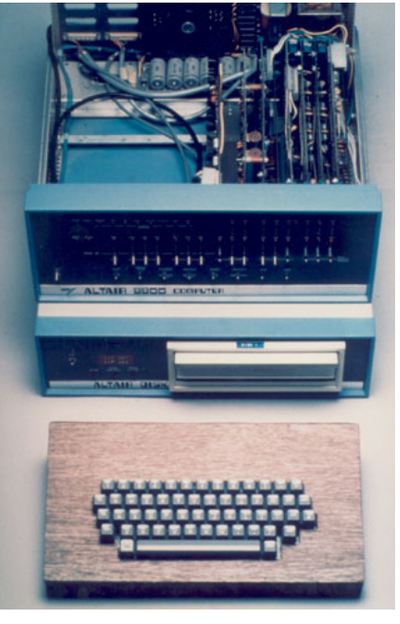
Keyboard Spotlight

Fuji65

Material: Aluminum
Color: Anodized Blue
Group Buy: March 2021

Enter the computer keyboard. While typewriters were commonly used by business and consumers alike until the 1970s, the new invention known as the computer then emerged into the market. This was the beginning of the computer keyboard, commonly used in early computers that were the size of an entire room. ENIAC (The Electronic Numerical Integrator and Computer) was the first computer constructed and a teletype system was used to input data into the computer on small cards that contained the code typed by the operator and inserted.

As the march of technology moved inevitably further, the BINAC was the first to use a new input/output method. The teletype was electromagnetically controlled and input data to print results. Leading into 1964, M.I.T. and Bell Labs created the MULTICS computer, which was a multi-user system with the first video display terminal, or VDT. Text was instantly visible on the screen as it was typed, which made communicating commands, programs, and controls more efficient than any previous method of input. By the late 1970s, all computers were using VDT, and all keyboards were electric input mechanical keyboards.



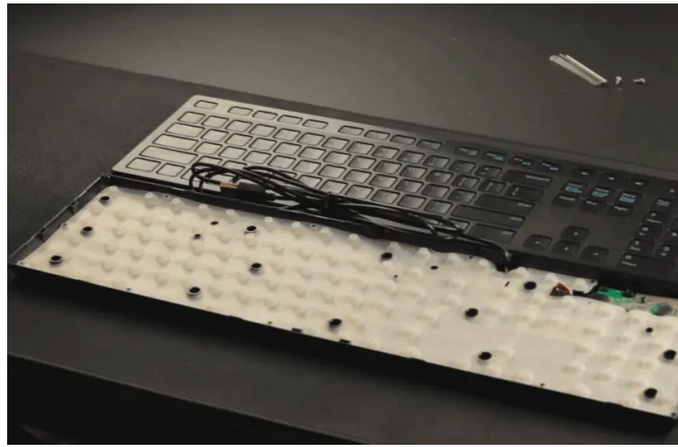
The first computers that were sold in the 1970s were built from scratch, piece by piece, and were very heavy, since the primary target market was computer programmers and engineers. The focus in building these at the time was entirely dependent on function, with no thought given to visual looks or aesthetics. Keyboards at the time had no covers and were exposed, letting the user see the complex weave of machinery.

With the adoption of personal computers for home use, some keyboards were created with a built-in system for the computer. In the mid-1970s, Imsai and Altair created the first small PCs for consumers, referred to as the S100 series. These machines provided basic computing essentials and lacked floppy disks or hard drives, making users unable to save data onto the machine. These first machines also only came with switches for input, with IBM selling separate converted electric typewriters for inputting data. Since it wasn't provided with the purchase, if a user wanted a keyboard for data entry, they would have to build their own, not unlike today!

Coming into the late 1970s, Apple, Radio Shack, and Commodore all decided it was time to enter the market, seeing potential in mass-produced computer keyboards. This was the beginning of the precedent that all computers would ship with a keyboard, and eventually, a mouse.

In 1981, IBM released its first personal home computer, with the famous Model M keyboard shipping alongside it in 1986. The Model M was majorly successful due to its ease of access, simple layout, and light build. The IBM Model M was a mechanical keyboard built with high-quality materials, giving users a snappy and tactile feeling when typing.

In the 1990s, membrane switches started to enter the market. Membrane switches are a mesh of unified keys, which rely on a pressure pad to input a digit when pressing on the keys. Very little, if any, tactile feedback can be felt when typing on a membrane keyboard. There was a noted significant drop in product quality when the membrane switches were introduced, as they were cheaper to produce and easier to manufacture. The aesthetics of these new keyboards were that they were portable, slim, and lightweight. Although these slight benefits were seen as great innovation to some, some felt that this was superficial and actually hurt the typing experience as a step down from the mechanical keyboard's tactility.



Keyboard Spotlight

Portico 75

Material: Polycarbonate
Color: Clear
Group Buy: In-stock until 2021

The development of new keyboards from manufacturers such as Apple, Dell, HP, and many more continued into today, where most modern keyboards shipped with a purchased computer are membrane.

To the custom keyboard community, which we will explore, this has been a sad development that has lost the nuances of what makes a keyboard such an amazing and interesting invention.

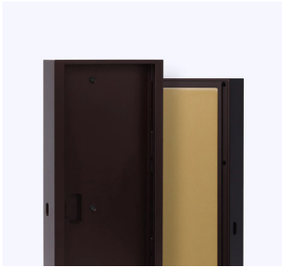
Around the mid-2000s, mechanical keyboards started to creep back into the market with brands like the Matias Tactile Pro. Blogs began to pop up about the “Greatest Keyboards of All Time” featuring the Model M by IBM and the AEK II by Apple. Keyboards for gaming started to rise in 2007 but were

still a very niche community only found by those searching hard for them.

By the late 2000s and into the early 2010s, mechanical keyboards started becoming more mainstream. Numerous boards featuring the legendary Cherry MX style switches started to rise, online communities for the hobby started to form, and people began talking about how to find good and high-quality custom keyboards. This all culminates in the current era, where custom keyboards can be considered a still-niche but growing and booming tech industry, featured around a loving community of designers, high-end collectors, makers, and enthusiasts.

With the hobby as it is, kits are created specifically for handmade personalization. Keycaps come in a plethora of color schemes, themed after games, regions, history, and more. Every aspect of the keyboard is now custom, you can choose which mechanical switch feels the best to type on, which stabilizers have the best noise reduction, or what type of foam brings the sound profile you want for your board. You can also even find handmade custom cables. It's an extremely exciting time to be a part of the community, and there are both avenues for money to be made, and for money to be spent.

In the next chapter, we'll dive into the details and components of modern custom mechanical keyboards.



My Mama always said life was like a mechanical keyboard. You never know what you’re gonna get.

— Forrest Gump, probably

Chapter 2 — The Anatomy of a Keyboard

Case

The case holds the entire keyboard together, but also contributes to the aesthetics, sounds, or style of the board.

PCB

The Printed Circuit Board (PCB) is the heart of the keyboard and what connects to the computer to send and receive data.

Plate

The plate is the piece that holds the switches into place and provides a solid connection to the PCB. Various materials can change the typing experience.

Stabilizers

Stabilizers or “Stabs” are small and barely noticeable, but provide the most vital sound quality as they stabilize the larger keys and reduce the rattle.

Switches

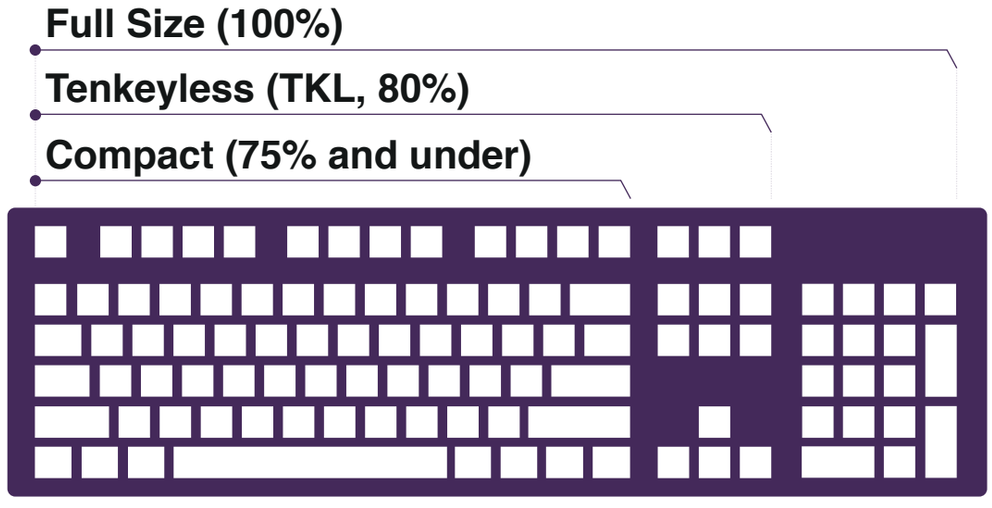
Switches are the most important factor in the sound and feel of a keyboard. Each switch type has different pressure, bump, and smoothness.

Keycaps

Keycaps are a key factor in deciding the visual aesthetic of your keyboard. Made out of plastic that varies per manufacturer or price.

Keyboard Layouts

Throughout history, keyboards have changed in layouts and accessibility features. At first, typewriters only had the alphanumeric keys and modifiers for the user to type with, but as time went on, function keys, numpads, and other useful features expanded the ability of computer keyboards. Modern mechanical keyboards typically follow a naming scheme of different layouts developed for a user's taste. A programmer who uses the numpad often may still opt for a numpad included, or a gamer may opt for a smaller format to give more mouse room. The development of custom layouts has made strides in ergonomics and comfort for the user.



Special Layouts

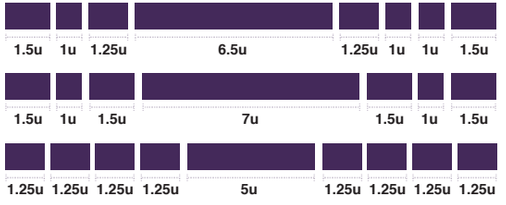
Split, Ergonomic

Ortho

Modifiers

Standard Bottom Row

Non-Standard Bottom Row



Keyboard Profiles

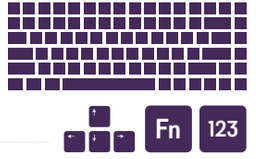
Staircase

Contoured

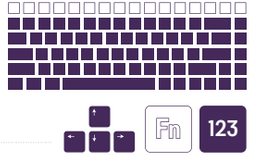
Flat

Chiclet

75%
86-88 Keys



65%
65-68 Keys



60%
59-64 Keys

40%
39-41 Keys

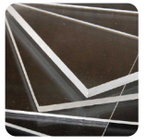
Keyboard layouts are an important factor in the buying and decision-making process as well. For example, in the keyboard on the right, the person building it accidentally ordered a kit that doesn't have support for split micro-spacebars!

Depending on the manufacturer and individual designers, some kits may not have support for specific layouts, such as the European Norde layout. This also includes special 40%, ergonomic, numpad, F13, and split keycap kits that are typically provided as alternate and optional purchases, along with novelty keys, which we will talk about later.

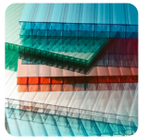
When ordering a kit, make sure that you are aware of the layout and configuration and plan accordingly by purchasing the necessary add-ons for your keycap set if they provide one or alternatively finding a different set that you like.

Keyboard Cases

Materials



Acrylic
The cheaper material for lower-end or budget keyboards.



ABS / Polycarbonate
Extremely common material for lower to mid-end boards.

Aluminum
Heavy-built, often found on higher-end keyboards.

Wood
High end, typically found in custom commissions.

2 Piece Construction

Consists of a case and PCB/plate combination. The PCB and plate are only counted as a single piece since the designer may choose to opt-out the plate.

3 Piece Construction

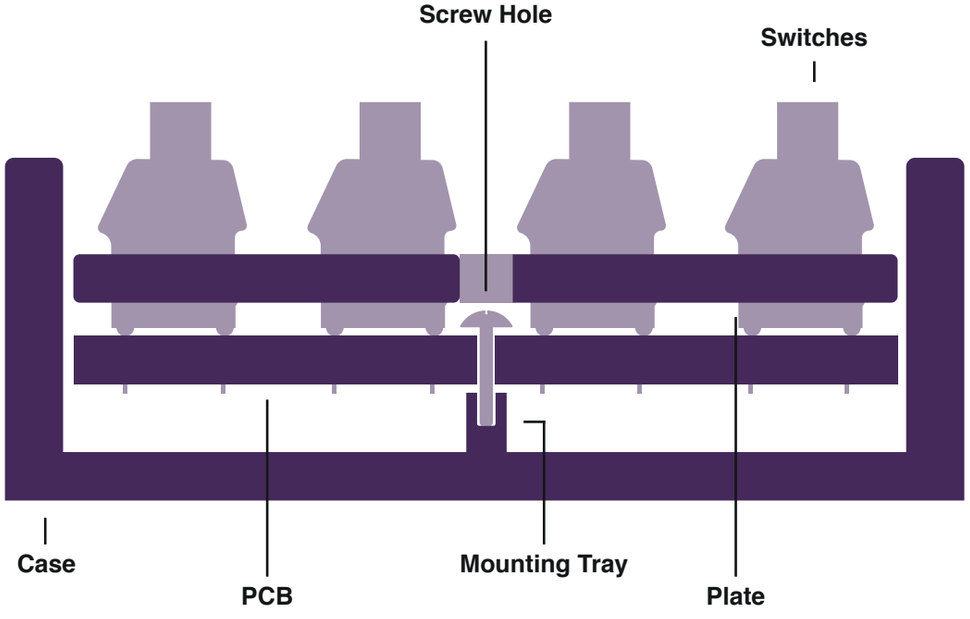
Similar to the two-piece construction kit but also included often with a top frame or other custom elements designed by the maker.

Keyboard Spotlight

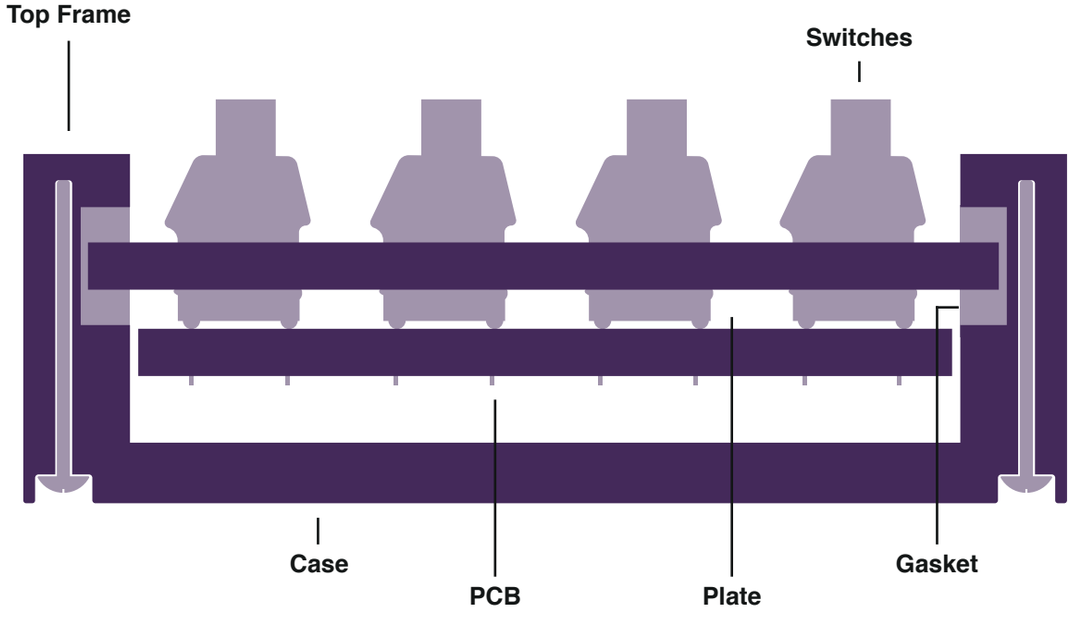
Beak 6.5

Material: 6063 Aluminium
Color: E-White
Group Buy: March 2022

Screw Mounted



Gasket Mounted



Keyboard Mounting

Cases can come in multiple styles of mounting for holding the plate into the case and creating different typing feels. Most high-end keyboards are usually gasket-mounted, which uses cushions to reduce sound and increase flex. Screw-mounted is the cheaper option, which holds the plate in place with screws but offers no flex or difference to the typing experience. Some odd or cheaper keyboards sometimes utilize clips to hold, which can easily break or crack when modding, so most keyboard enthusiasts avoid these lower-end types.

Plates and PCBs

The plate and PCB are the main internals of the keyboard and are mounted in various ways previously covered.

PCBs come in various different styles, including the two main options:

Hot-swap is the most common and allows the user to simply press switches into place for the connection to be made to small hot swap sockets soldered to the PCB and often produced by manufacturers like Kailh.

Soldered PCBs can be found that require soldering for each pin on the switch.

Plates also provide different sounds and typing feels depending on the material, thickness, and mounting option they are made with. Some kits allow the user to swap out plates for different optional materials.

For example, a steel plate that is screw-mounted will not budge at all and may provide a higher pitched sound when typing, while an FR4 plate (high-density fiber) with a gasket mount will have a larger amount of flex and sound more “Thoccy”; a term invented by the community to describe bassy keyboard noises.

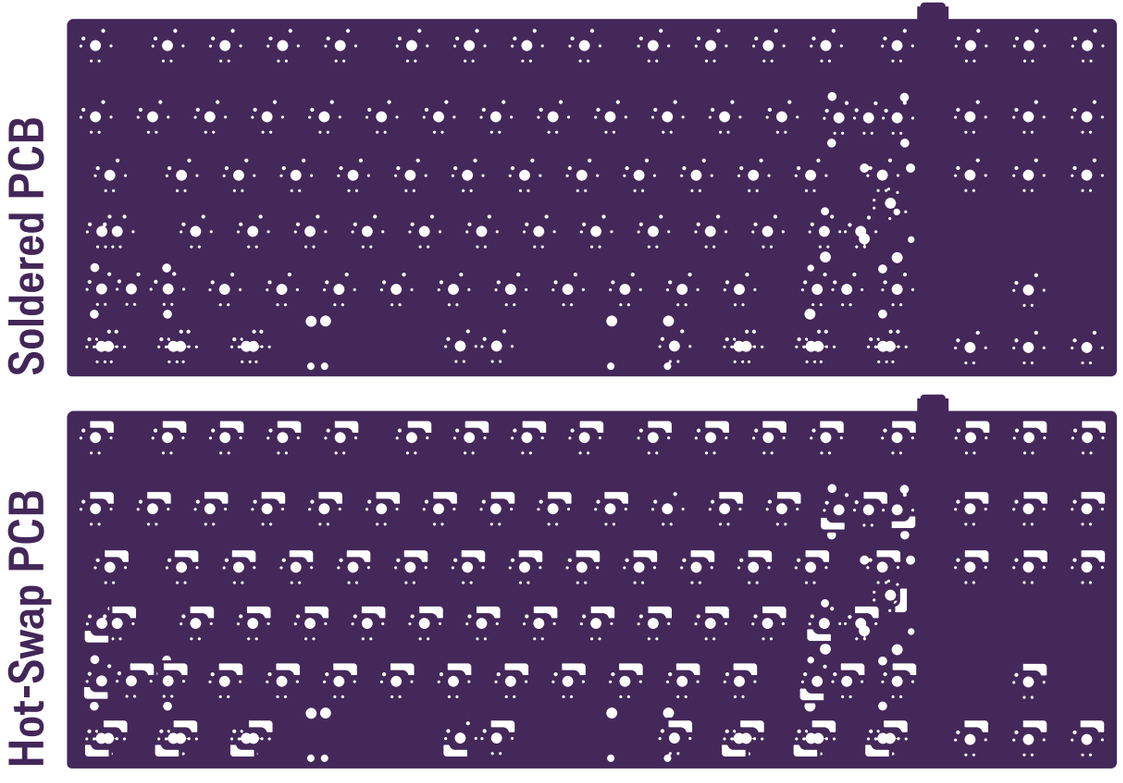
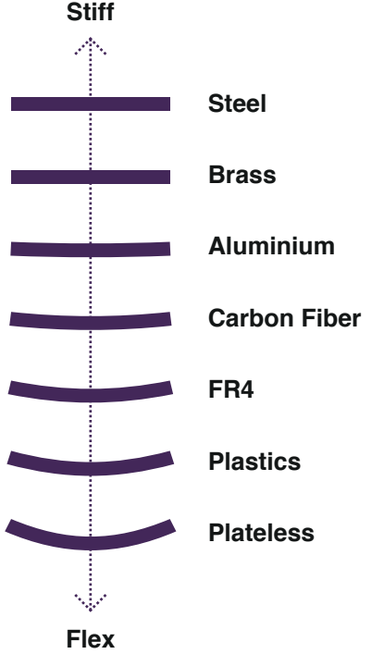


Plate Material Comparisons



Stabilizers

Everybody has typed on a keyboard where the spacebar sounded like rummaging through a junk drawer.

The stabilizers do exactly as they are named: stabilize the larger keys on a keyboard to eliminate shake and rattle. They are measured in units similar to keycaps.

For example, a 6.25u spacebar is exactly 6.25 keycaps long. A typical TKL keyboard would have four 2u stabilizers and one 6.25u stabilizer.

Depending on the seller, they can come in whole kits or be purchased individually based on the needs of a keyboard's personalized layout.

Switches

A switch is composed of various parts that create a mechanical activation when pressure is applied to the switch's stem via a keycap. In the shown examples, there is a Cherry MX-branded style switch, which has become the baseline standard for modern mechanical keyboards. Most store-bought mechanical keyboards include a variation of the Cherry original red, blue, or brown switch.

Types of Switches

Linear
These switches simply move smoothly up and down with no clicks.

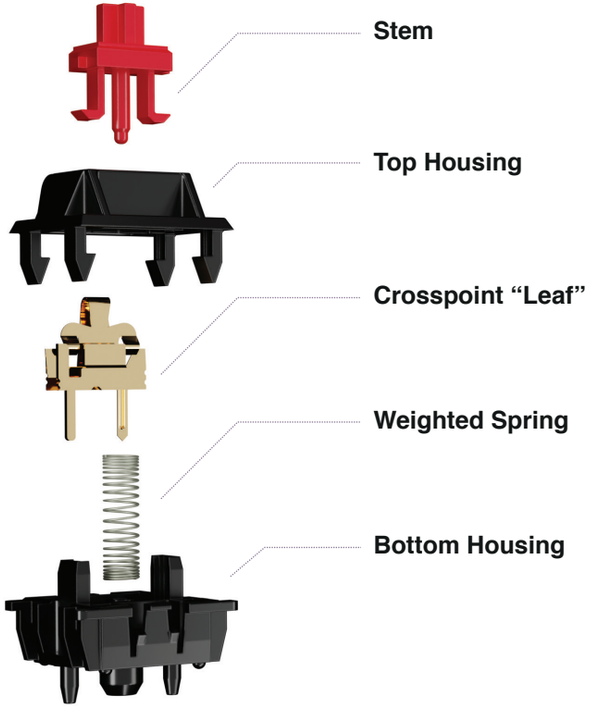
Tactile
These switches provide a bump in the middle of travel to give the user feedback.

Clicky
These switches are similar to tactile but have a click sound when a key is pressed.

Switch Force

0-55 cN	Light
55-75 cN	Medium
75-95 cN	Heavy
95+ cN	Super Heavy

Anatomy of a Switch



Technical Terminology

Operation Force
Force needed to press the key is measured in centinewton (cN) or gram-force (gf).

Activation Point
The point at which the keypress is recognized by the keyboard is also known as actuation.

Total Travel
Provide a bump in the middle of travel to give the user feedback.

Reset Position
distance at which the key is deactivated and ready to be activated again.

Tactile Position
The point where you feel the bump on a switch, not present in linear switches.

Keyboard Spotlight

Rotor

Material: 6063 Aluminium
Color: Brown Gray (Pantone 405c)
Group Buy: June 2022

The variety that comes with switches makes them one of the most customizable aspects of a keyboard. For example, an Aliaz Silent switch is designed to be quiet, has 70g of actuation force, is tactile, and has a transparent housing for RGB passthrough. Over the years, thousands of switches have been developed based on the classic Cherry MX stem.

This doesn't mean that there aren't other switches designed for different stems, but the level of modularity and compatibility significantly drops, as not many companies are developing for other platforms.

Companies even offer switch testers that you can purchase to try out many different switches and varieties.

With switches at the point in the market where they are, you'll have no issue finding what feels best for you, other than those switches possibly not being in stock!

Keycaps

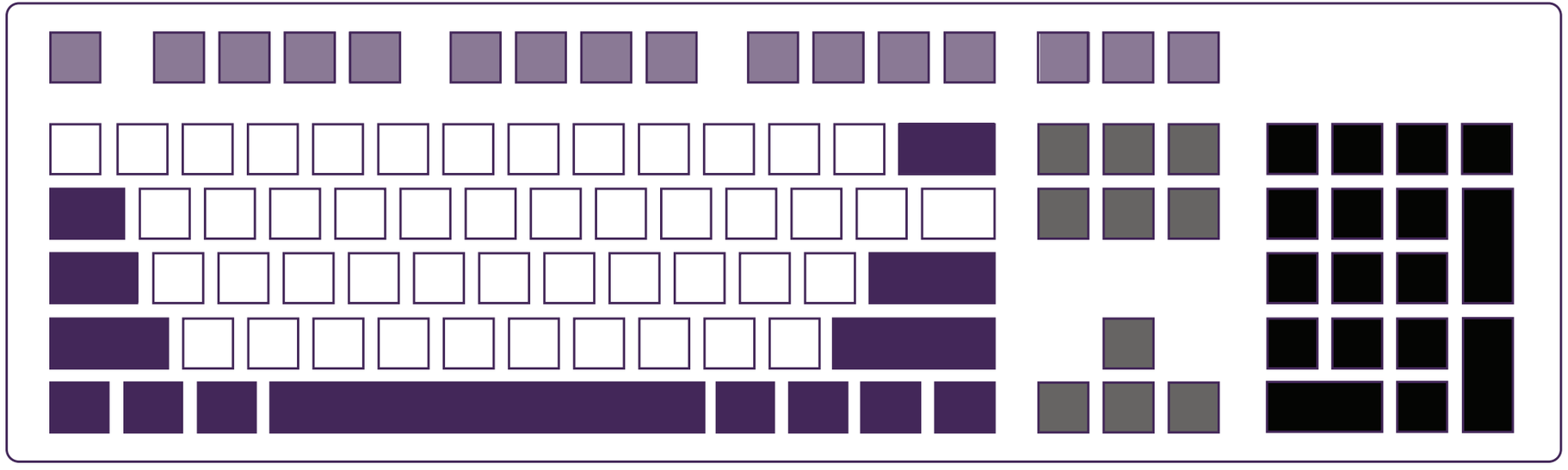
The life-blood of any theme when building your own custom keyboard is the keycaps. Keycaps have many materials and styles that they can come in, but let’s talk first about kitting.

Similar to previously mentioned stabilizers, making sure your chosen keycap set fits your board and layout is the most important part of the decision making process.

Sets are manufactured by many individual manufacturers, including but not limited to GMK, Milky Way, PBTFans, ePBT, and more. Each manufacturer uses different processes on how they create their keys and what profiles those keys are in.

Let’s dive into the many materials and profiles to consider when picking your first keycap set.

Keycap Terminology and Layouts



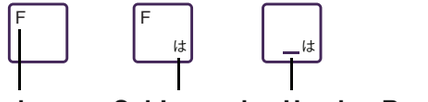
Modifiers

Alphas

Function Row

Navigation and Arrow Keys

Numpad

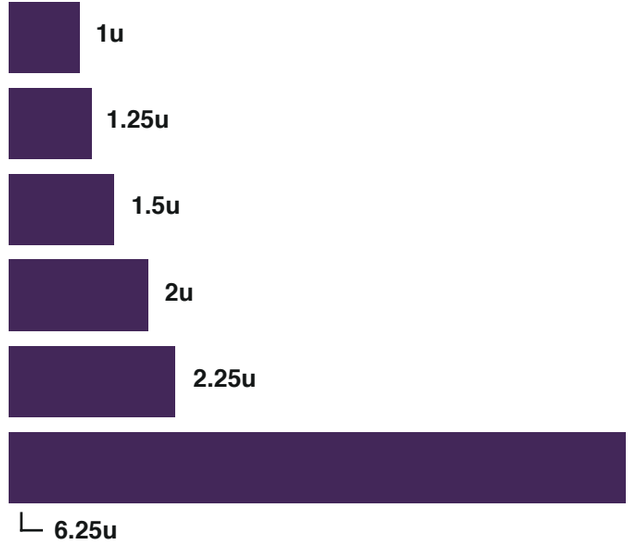


Legend

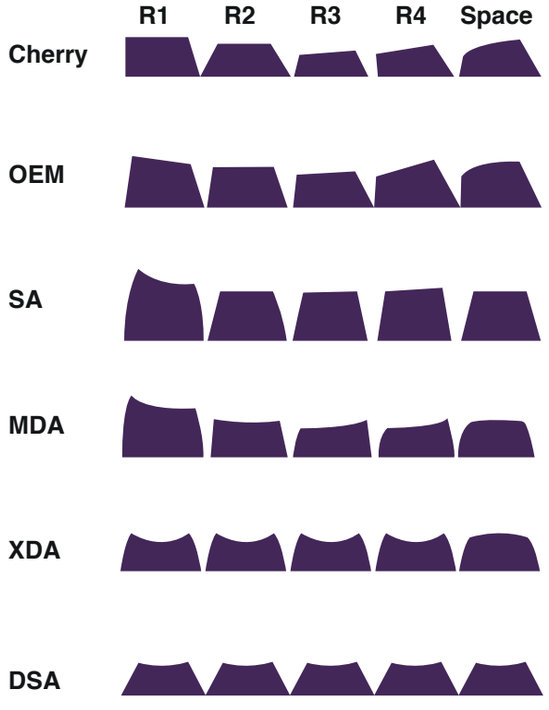
SubLegend

Homing Bar

Keycap Sizes



Keycap Profiles



Keycap Materials

ABS Plastics
Impact-resistant, lightweight, and durable. Uncoated ABS keycaps are prone to slowly becoming shiny over time due to low manufacturing costs.

PBT Plastics
A more chalky feel and higher resistance to key shine than that of ABS, also heavier than ABS and less common due to higher production costs.

POM Plastics
Similar to PBT, resistant to shine, and heavier compared to ABS. Less common than ABS and PBT due to the highest production costs. Also has a very smooth feel due to low amounts of friction.

Keycap Printing Methods

A Double Shot Injection Molding
This is produced when two layers of plastic are molded into each other. With this method, markings cannot be worn off and the character can achieve a high level of visual contrast.

B Dye Sublimation
The process where heat is used to impregnate a material with a colored dye. Dye sublimation requires that the dye must be darker than the material being used to print on, which limits color range and options.

C Pad Printing
Pads are dipped into an ink color, and then pressed onto the keycap to form a layer of ink on top of the keycap. This is a flexible process (i.e., various colors can be used) but the ink is prone to wearing out faster.

D Screen Printing with UV Coating
Also called silk screen printing, the letters will be hollowed in a specially made woven mesh. When the paint is brushed, paint fills the hollow parts and prints a letter on a keycap, then a UV coating is added to the cap.

E Laser Ablation
The transparent plastic is covered in paint, and then a laser burns off the paint to expose the transparent plastic in the shape of the character chosen. This process is more prone to wear than others.

F Laser Etching
A Laser is used to burn the required letters or characters into the keycaps. This printing process is mainly used for white, grey, and wooden keycaps. There are color options for laser engraving, but less common.

Membrane? Where we’re going, we don’t need membrane.

— Back to the Future, probably

Chapter 3 — Buyer Bewares

But how do I build a custom keyboard, anyway!?

Building custom keyboards by hand isn't necessarily hard, but requires patience and the knowledge of what you're doing. Many have compared the process to that of an adult lego set, or building model cars. Depending on the level of commitment you sign up for, the amount of knowledge changes.

First, let's start with a case. Choosing the case you want is entirely up to what catches your eye or personal preference on layouts. Ensure that you know what's included in the kit of the case you buy. Did it come with stabilizers? a PCB? Is it a pre-built with no assembly required?

Once you've got that sorted out, your next choice would likely be the keycaps, choosing something that fits well with the color and look of the case you chose.

But wait, something's not right. All the keyboards you saw online aren't on sale. You apparently missed something called a "Group Buy"? What does that mean, are you never going to get the chance to buy that board?

The reality is that with the niche community existing as it is, we've encountered some growing pains that halt or slow our industry. The amazing boards that are the work of talented engineers and artists are only sold in limited quantities for a limited time. We call this the "Group Buy" system.

First, let's explain what a group buy is and how a person gets there. It starts on a forum called GeekHack, where a person who came up with an idea runs what's called an "Interest Check".

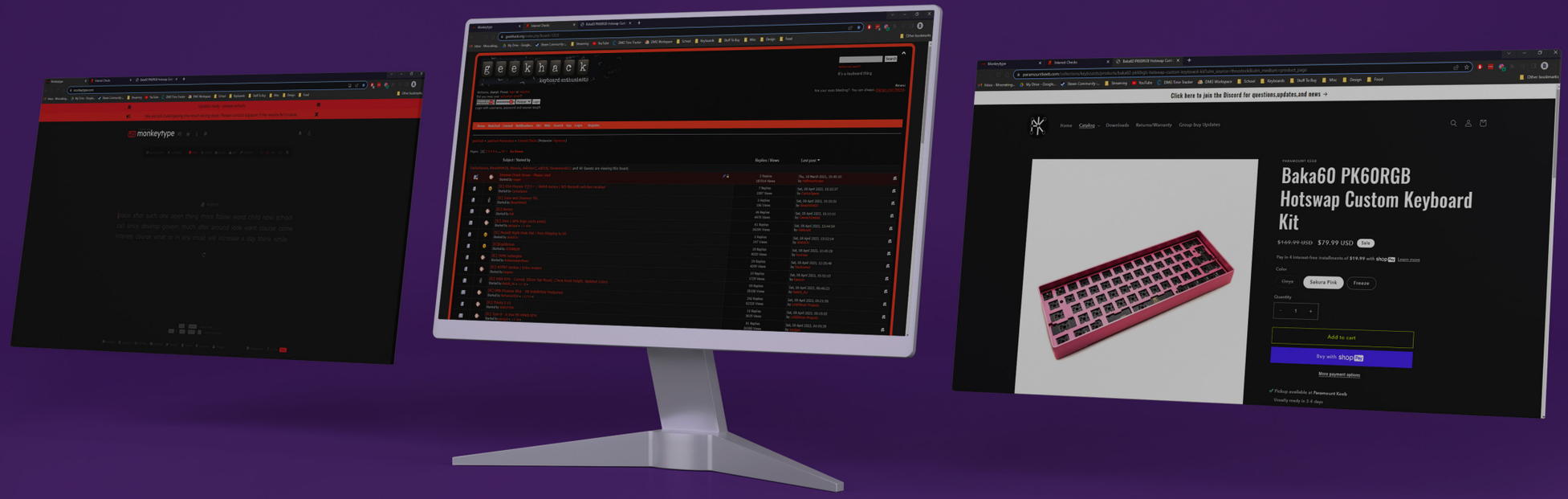
The interest check system works so that when you bring your idea to the GeekHack forum, you gauge the interest and momentum of your project by getting user feedback. When working with a manufacturer and developing your own keycap set, you must reach a minimum amount of interest to be considered by the manufacturer.

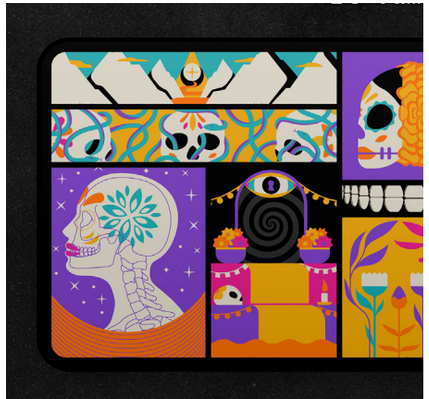
Buyer Bewares

Usually, you would wait until your project is pretty far along before starting the interest check, as starting too soon could backfire, causing users to not like your proposal.

Once you have a project in interest check, you spend time reaching out to manufacturers, vendors from each region, and artisan/novelty makers for collaborations. All of this is expected for you to learn and do on your own.

Once you've been accepted and the manufacturer plans to produce your set, it's time to move towards the group buy phase. The group buy phase is when the set is put on sale for consumers to purchase, but that doesn't mean the set is in production just yet.





After entering Group Buy, a customer is simply buying into the idea of your keycap set. They send the money similar to a pre-order, but if the set doesn't reach the "MOQ" or Minimum Order Quantity, then the set can't be produced and the customers are refunded. If the set you made does reach MOQ, then the set will be produced, however, there will be a lead time for production depending on the time it takes for that manufacturer to produce the set, as well as how many sets are already in line to be produced.

For example, GMK manufacturer's Mictlan set by designer Vheissu was sold in a group buy in June 2022, however, those who purchased the keycaps will not get them until September of 2023. This also is the same system that is used for most mouse pads, switches, and keyboard kits.

Keyboard Spotlight

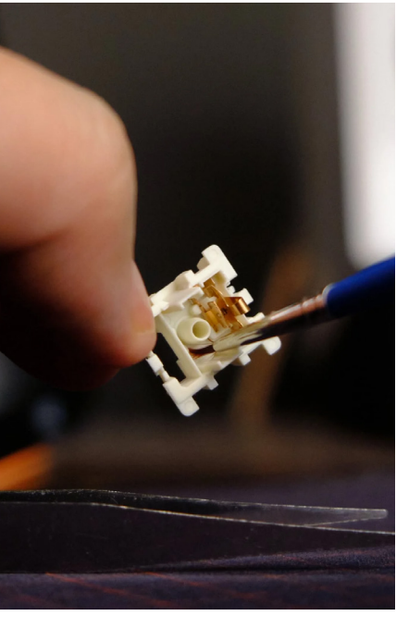
KBD8X MKII

Material: Polycarbonate
Color: Black Clear
Group Buy: In-Stock as of 2023

Once the sets are produced, the keycaps are sent to the customers and finally put into circulation.

Finally, you have your keycaps and board, but what switches should you choose? As choosing switches is down to personal preference, it might be in your best interest to purchase switch testers or sample packs that include a variety of different switches to feel what's right for you.

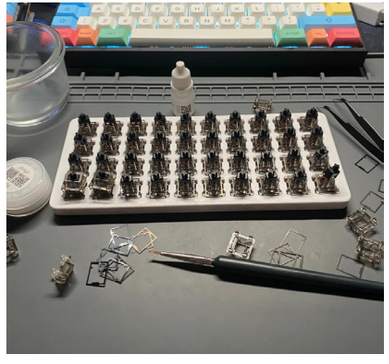
Something extremely important to the feel of a switch is whether or not it is lubed or unlubed, and other small modifications.

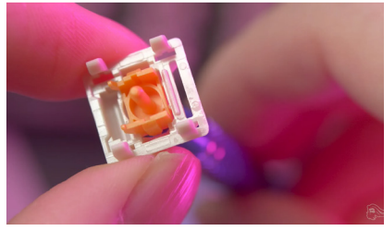


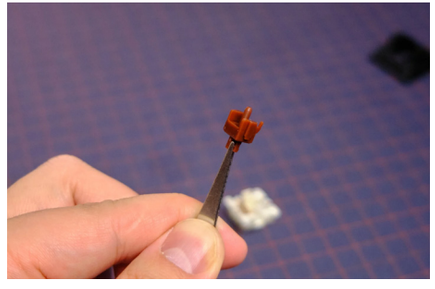
The art of lubing a switch involves disassembling each switch into its core parts. You then take machine lube in very small amounts and apply it with a fine paintbrush to the inner bottom housing, the spring, and the stem. Typical lube types used in the community are Krytox 205g0, Krytox 105 Oil, Tribosys 3203, and Tribosys 3204.

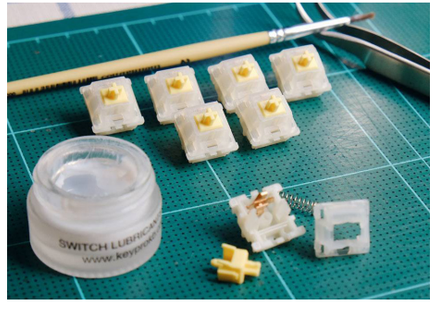
Each lube will affect the switches in different ways, making them smoother, sound better, and activate easier. A typical process would involve lubing the bottom housings and stems with Krytox 205g0, then placing all the springs in a small baggie and shaking it with some drops of Krytox 105 Oil.

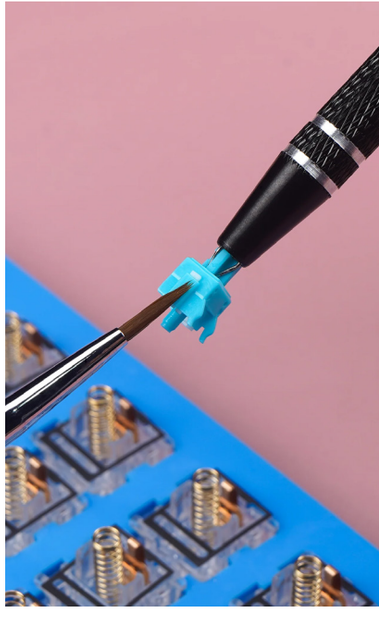
Other modifications to switches include putting switch films in them, which stabilizes the housing connections and creates less rattle and shake inside the switch. Optionally, you can also swap the springs inside the switch out with more durable or higher force springs that increase travel time or allow for a new type of feel with the switch. Some switches come with pre-packaged upgrades to the springs included.

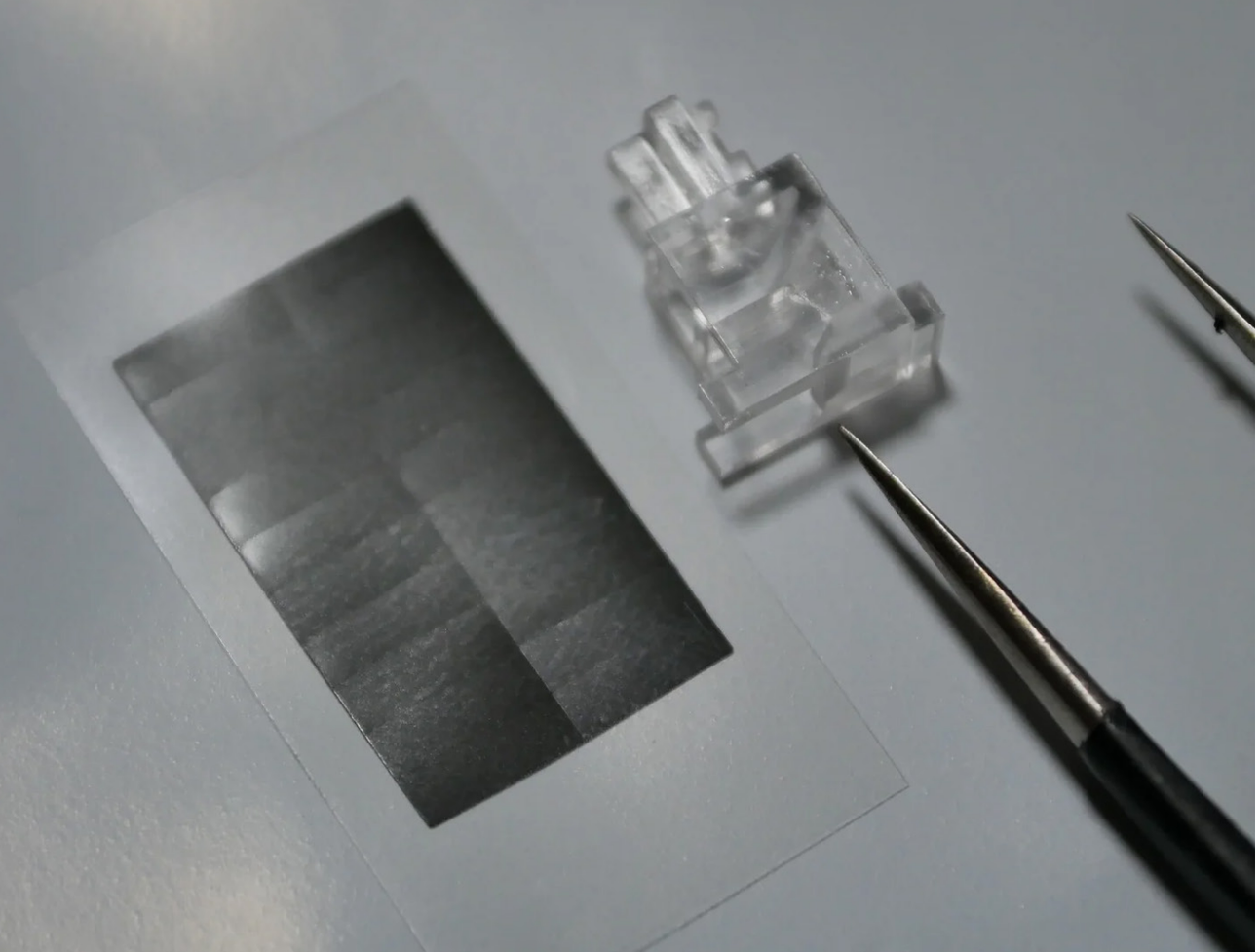












Once you have your switches picked out, and you've chosen to lube them or not, next is the stabilizers.

Stabilizers are less of an optional modification experience. Tuning your stabs is imperative to the sound and feel of your keyboard, as unlubed stabilizers will sound scratchy, tangy, or rattle a lot. But how do you go about getting stabs?

Picking your stabilizers is not as hard as switches; however, the only thing to watch out for is whether your PCB is screw-mounted or plate-mounted. The keyboard kit you buy will specify which you will need. Once your stabilizers arrive, the first thing to do is tune them. Taking the metal wires, very slightly bend the metal back to being straight so it's able to lay flat.

Some stabilizers may need to be clipped, which is the process of taking small jewelry wire cutters and cutting the two protruding feet on the bottom of the stem.

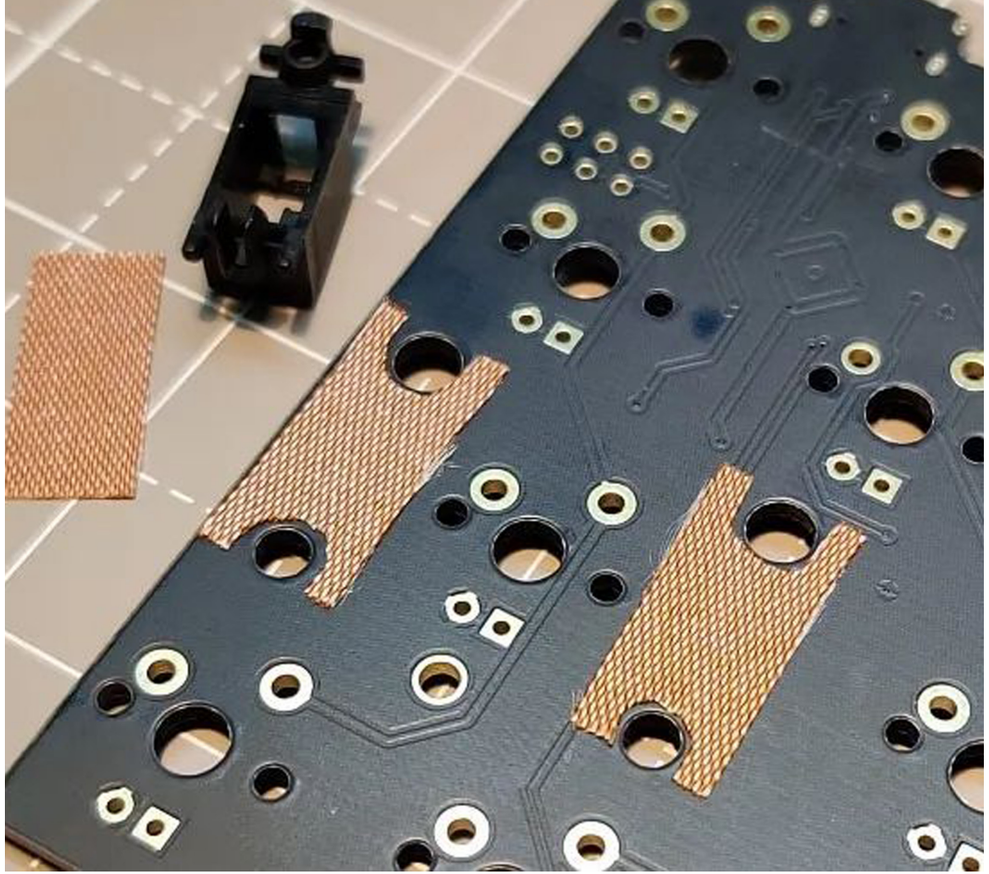
The lubing process for stabs is similar to switches, applying a small amount to the inside of the housing and outside of the stem. The only difference for stabs is using dielectric grease on the stabilizer wire.

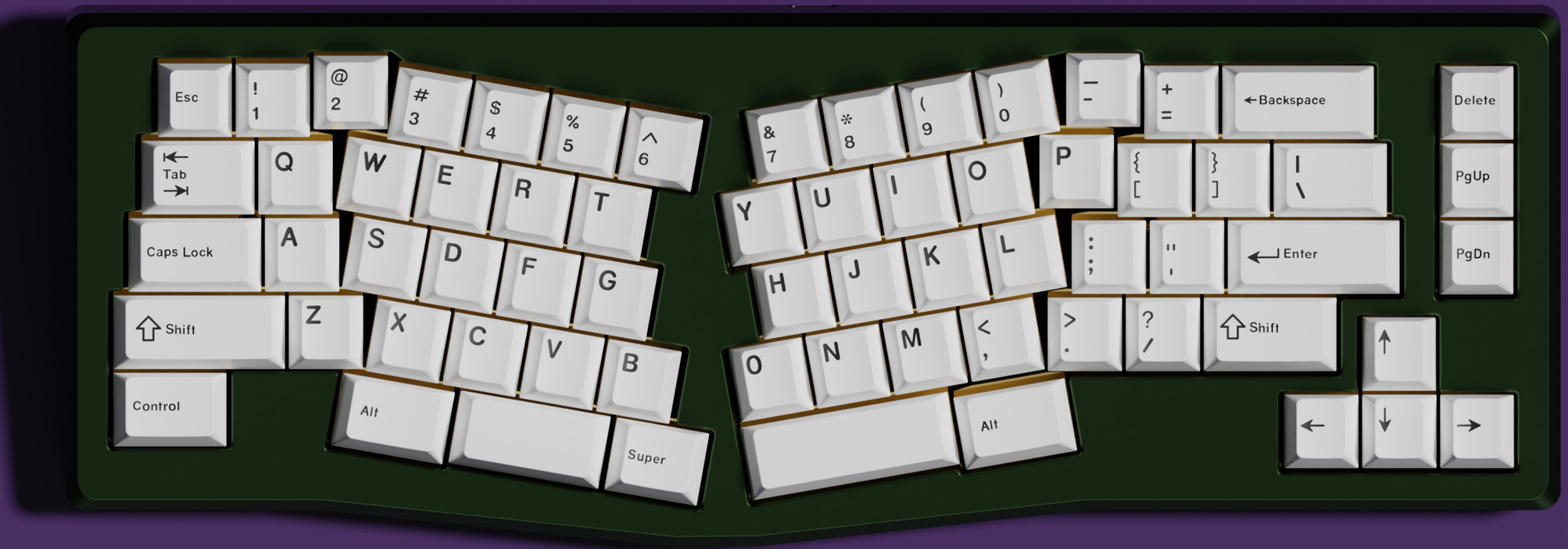
Finally, all the parts have arrived and are laid out, but before actually assembling the board, let's go over some miscellaneous mods you can do to improve a keyboard's sound.

The Tempus mod is a fantastic mod that helps dampen the sound of a hollow case, which can be done by taking painter's tape or masking tape and putting layers over the keyboard. The amount of layers is up to preference.

The next mod is the band-aid mod, where you put small strips of band-aids underneath the stabilizers. This helps stabilize the stabs even further and reduce the rattle.

Lastly, the holee mod is when you add a small strip inside the stab housing that cushions the wire when the stab is being pressed down.





Keyboard Spotlight

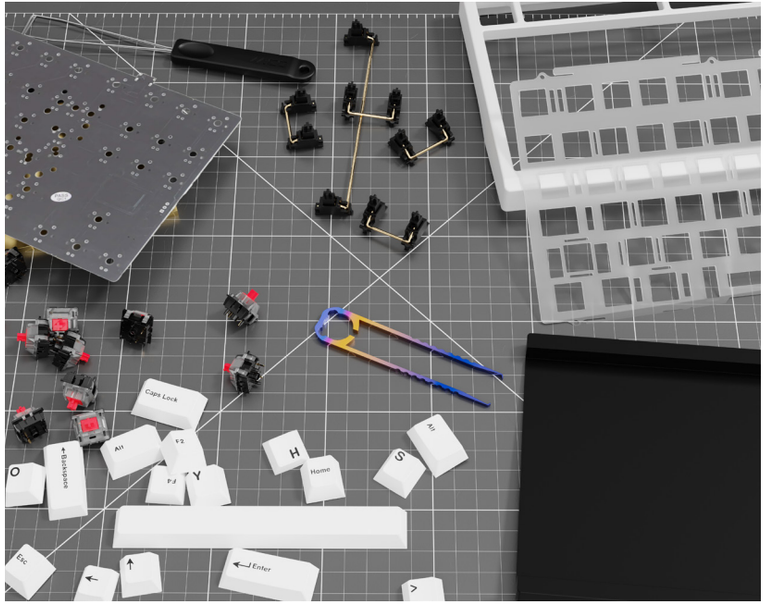
Maja

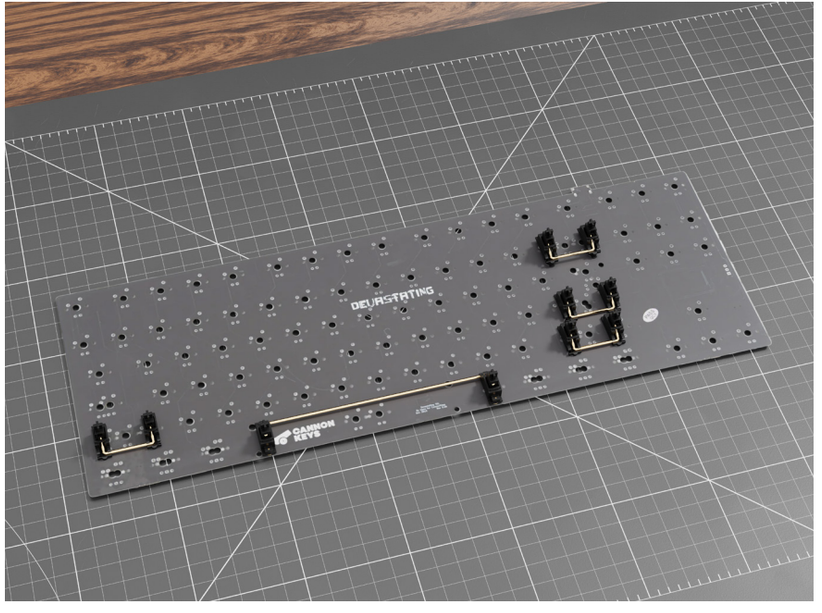
Material: Aluminum
Color: Pine Green
Group Buy: November 2021

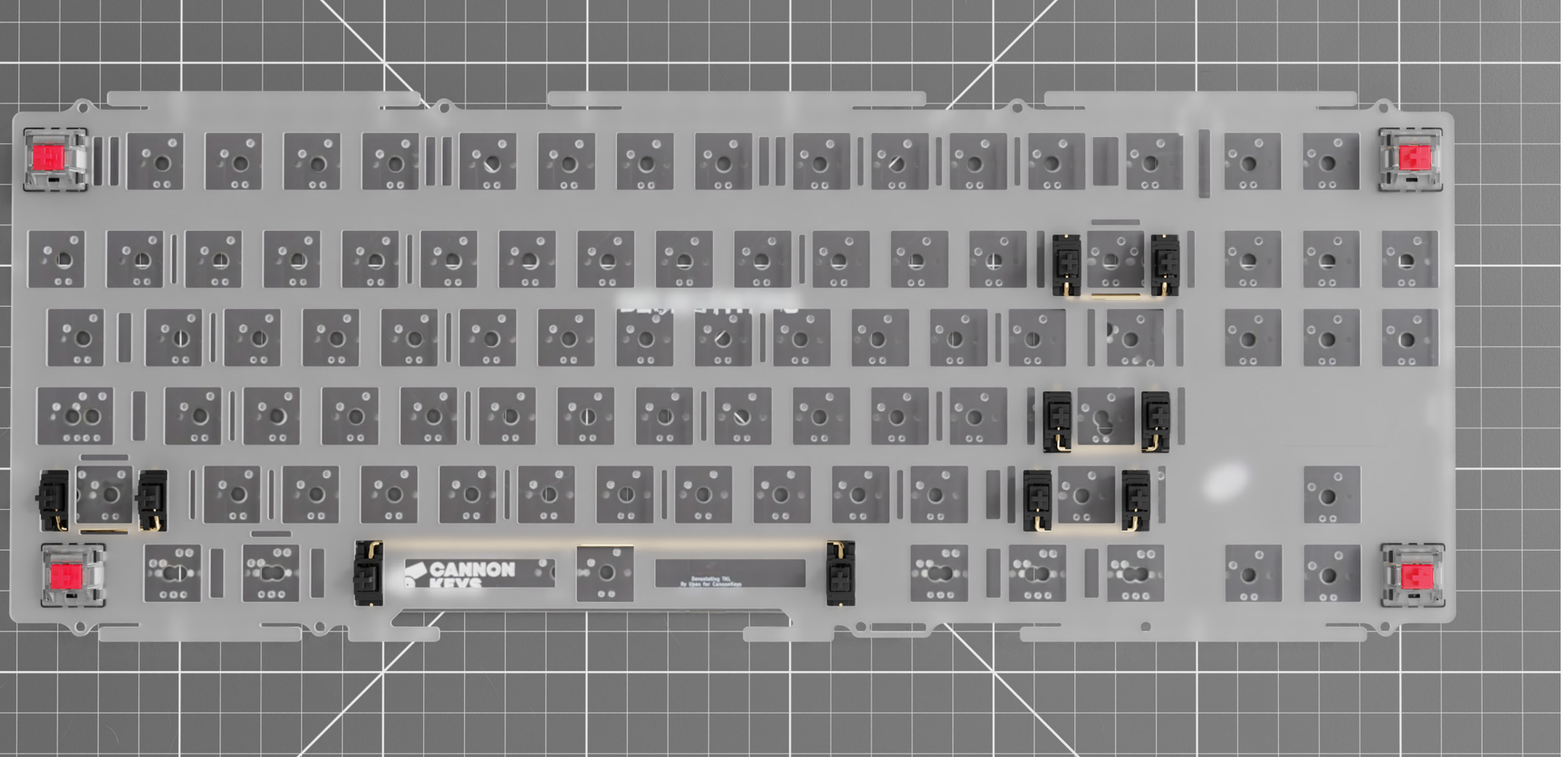
Let’s start the building process. To begin, we will disassemble your board kit if it comes already put together, making sure to handle the PCB with care. For the purpose of demonstration, we’ll be using an Akuma TKL. If it’s not put together from the start, as is the case with some kits, then ignore the last step. Once we have all the pieces laid out, we will grab the PCB and stabilizers.

The first step will be to take the stabilizers and place them into the PCB, ensuring that you have the right stabilizers, either plate mounted or screw mounted. If the stabilizers are screw mounted, we will place them directly on the PCB. If they are plate mounted, they will go inside the plate. In our case, we are using screw mounted stabilizers.

Make sure you add any mods you plan on doing beforehand, such as a band-aid mod or a holee mod, and properly tune your stabilizers before placing them in. Further tuning may be required after everything is assembled.



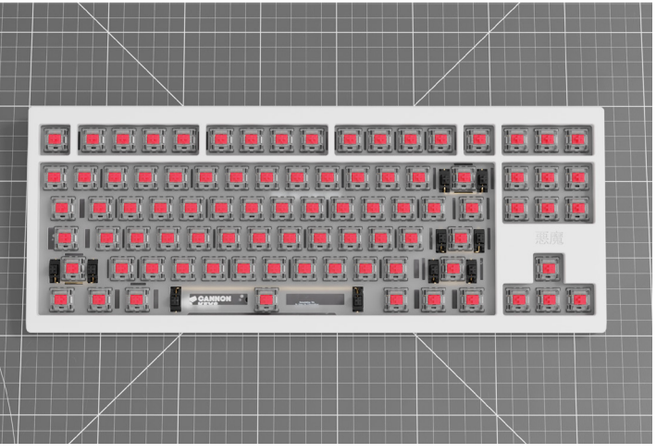




Once the stabilizers are in, the next step is to add the plate and use four switches in each corner to bind the plate to the PCB. When attaching switches to a PCB, be careful and align them properly with their sockets so as not to bend the pins when pushing them in. Most cases of bent pins can be fixed with a small amount of pressure to put them back in place, but some cases can ruin the switch and require additional ones. This is also why it is important to order a few extra switches or an extra pack for building. In the case of soldering, one would need to solder each switch into place to create a hold and electrical flow, however, we will be using a hot-swappable PCB and therefore will not solder.

Once the switches are in and the last switches are placed, next we will add the plate to the bottom case to mount the board. Before this, however, it’s best to test the board now. Websites like VIA provide accurate testing for custom keyboards, so you can simply plug your keyboard in to the PC now before adding it to the case.

In this case, we are using a gasket-mounted keyboard, so we will screw the plate into the bottom board rather than the PCB in a screw mounted keyboard. We will then test the stabilizers and tune them before adding the top case.



After the top mount is on, it's finally time for the icing on the cake! Let's add the keycaps, but make sure the stabilizers are properly tuned first.

At this point, using a needle syringe with some lube is the best way to make sure your stabilizers feel perfect if they are feeling underlubed. After that, you can add the spacebar back and enjoy the clicky clacky sounds!

Congratulations, you've successfully built your first keyboard! But if you've fallen in love with the hobby like some, then this won't be your last! You'll collect more keyboards, learn more about the history behind them, and maybe even start designing your own.

Magic keyboard on my desk, whose which beauty is the best?

— Sleeping Beauty, probably

Creating and designing your own keycap sets is not out of the realm of possibilities, in fact, it's much simpler than you would think. Given that you understand all that was mentioned about mechanical keyboards, all one needs is a strong concept, enough interest, and some time to design and flesh it out.

What sets apart great keycap sets from ones that don't generate interest is the concept and theme. A great theme with unique and interesting colors and good design all culminate together to create a set that most would be willing to spend over a hundred dollars for. Whether or not you have a fine arts degree, a design associate's degree, or you

simply study design in your spare time, you can create a custom keycap set.

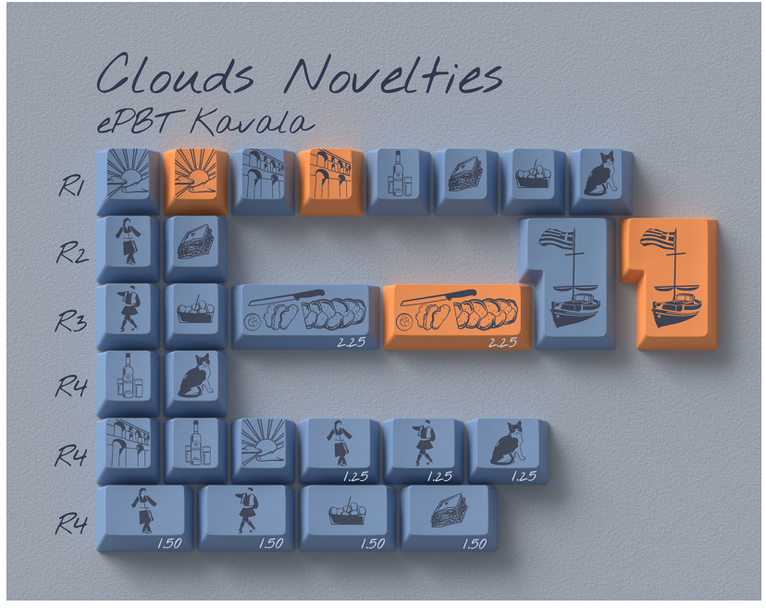
Designing custom keycap sets isn't the only source of income within the hobby, however. As previously mentioned, there is a growing community of artisan and craft makers creating everything from custom cables for connecting the keyboard to handmade and sculpted artisan keycaps, and even custom-made desk mats that either fit a theme or live on their own.

Of course, collaborating with these makers when designing a keycap set is also a great way to draw interest, as well as creating your own desk mats and novelties that pair well with your concept.

There are those who make money by designing for other designers. Creating social media posts, advertisements, and renders for someone's project can be a small way to earn some income on the side and gain recognition in the community.

Designers are typically approached when people are searching for logos for their sets, as well as novelty designs for the keycaps in the theme. A designer may also be approached to create a deskmat for a client, or to create social media reels and advertisements to draw interest to their set. Finally, being proficient in programs like Blender and knowing how to use an add-on like the Keyboard Render Kit would give the designer the ability to showcase a client's keycap sets in many ways to attract attention.

These are, of course, not the only ways to make money as a designer in the scene, but just an idea of how to do so.



You may ask, “Where do I start when making a custom keycap set?” To answer this, let’s turn to traditional design education and start by conceptualizing your first keycap set.

Depending on your preferred process, it may be best to start with what feels most natural to you. If you enjoy sketching and want to begin by creating novelties and developing the set’s visual look, that’s a legitimate starting point.

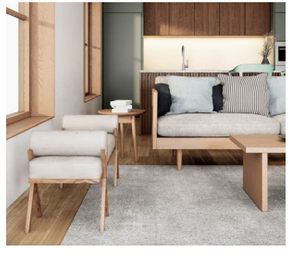
Most designers, however, begin by selecting colors using a keyboard render kit or a web app like KLE(Keyboard) Layout Editor to test their colors in accurate renders.

The key decisions involved in designing a custom keycap set include choosing the theme, colors, style, font, materials, manufacturers, logo, packaging, vendors, and collaborations. While some designers may choose to create their own font and go the extra mile, it’s important to keep in mind that interest in your set is essential for it to be commercially produced.

Keyboard Spotlight

Austin FCFS

Material: 6303 Aluminum
Color: Silver
Group Buy: January 2022



Something that you may find could help you in designing a set could be creating a mood board and finding visual reference. In the case of GMK Japandi, a lot of thought was put into creating a design based around Japanese architecture mixed with Scandinavian interior design.

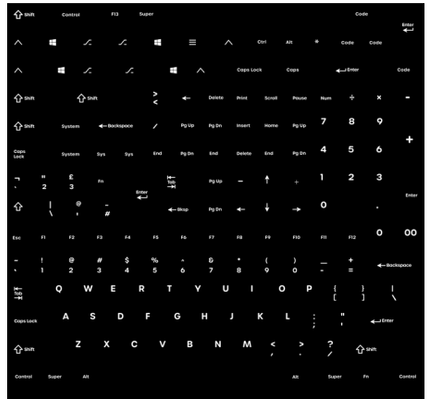
Research was done to find common colors, themes, symbols, and ideas within the Japandi space as a whole, and how that can be applied to a design for a custom mechanical keyboard.

Here is a collection of test renders, early colors, and ideas of how the Japandi set came to be. After this was finished, we move on to more in-depth and smaller choices for your keycap set.For PBT

Orange Twist, one of the main influences of the set was the orange twisted Dole Whip commonly found in American ice cream shops. A summery, refreshing treat with a mesmerizing twisting orange color scheme.

When designing the novelties, emphasis was put on making “twisting” novelty keys that follow the pattern and design of the desk mat. For the font, a rounded and simple sans-serif was chosen to complement the playful and soft nature of ice cream, and the color “Cone brown” was chosen to create a legible legend that also fit within the theme.

Further novelties were also in development that included small icons of ice cream, cones, and other theme related symbols.

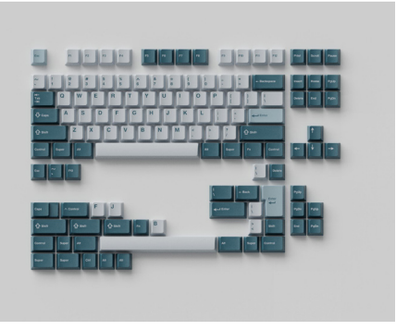


Once you have your concept fleshed out and you're happy with the design, the next step is learning how to do kitting for your set.

Kitting is when the designer chooses what material their keycap set is made out of, chooses a manufacturer, and then creates a base kit to the specifications of the manufacturer's requirements.

It's important to know what keys are available, how your manufacturer can print, what limitations you have, and what price range you want your kit to be in.

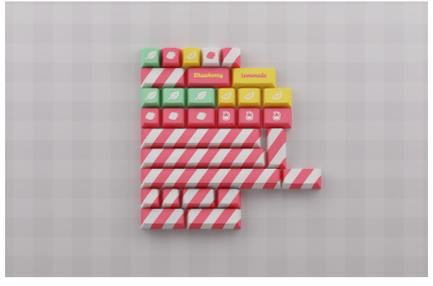
A heavier base kit with more support will be more expensive, which could cause more customers to pass on purchasing your set.

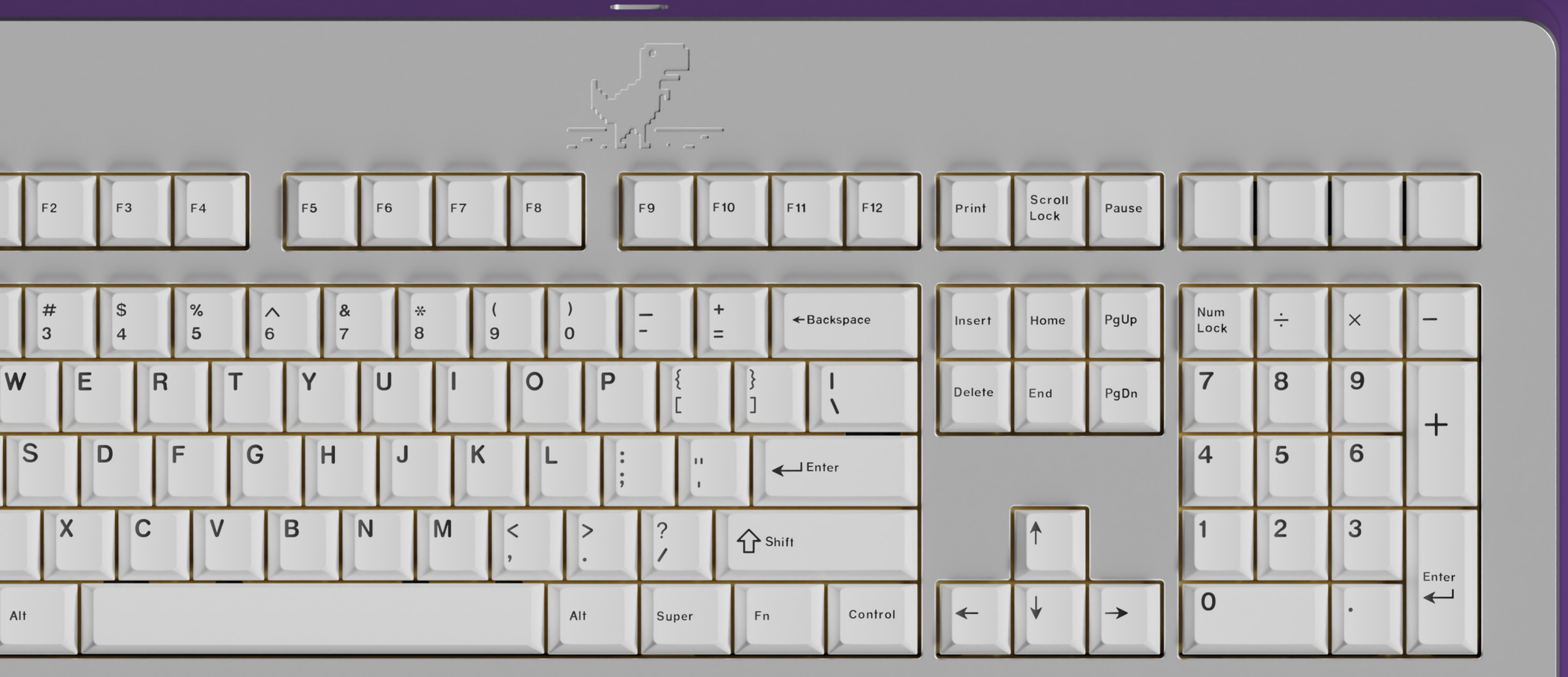


Other than what is included in your base kit, you can also optionally produce alternate kits to extend support to users willing to pay the extra price for an extension kit. For example, 40% keyboard users may not find the correct support for their specific spacebars and shift keys in the base kit.

This could also be the case for base kits without numpads. The novelties, as mentioned before, are special printed keycaps with themed symbols or styles based around the set. Almost every set online has a novelty set as it can set your keycaps apart from other keycaps in similar color schemes or styles. Different manufacturers have different access to certain sizes, as well as different requirements for their base kits.

Some require base kits with more support that end up being more expensive with the benefit of supporting more customers, but some may require the designer to create different sets and remove something like the numpad from their base kit to bring the cost of the kit down below costing more than one hundred dollars.





Keyboard Spotlight

Dino 104

Material: 6303 Aluminum
Color: Silver
Group Buy: September 2022

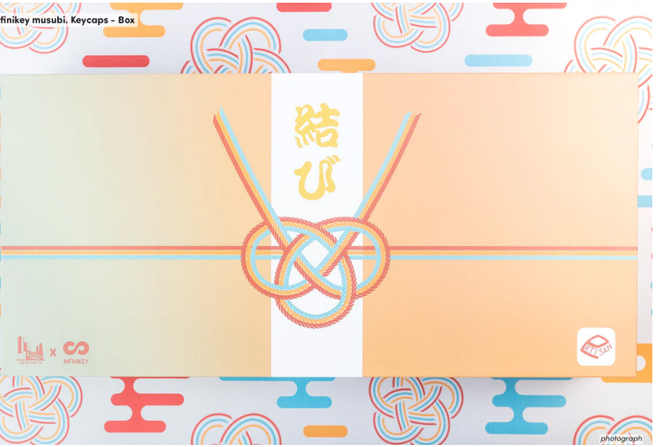
Manufacturers will need some sort of physical connection to the printing process to know your colors. Just having hex codes of your colors won't be enough to truly translate what the exact color will look like in physical print.

This is where Pantone comes in, and it's advisable that any real maker in the keyboard space has a set of uncoated and coated Pantone swatches to use.

Pantone swatches are physical colors that exist to guide designers on what they see, as no computer screen can truly recreate what a color looks like once printed or used in the manufacturing process for boards and keycaps alike.

Some manufacturers, like GMK, use pre-selected colors that allow you to work without the need for Pantone. This can be good for simple designs but will end up significantly limiting color choices when wanting to do something more advanced.

As a designer, it might come in handy in your career to have swatches for color and paper anyway, so consider it a worthy investment.



Once you've reached out to manufacturers and vendors, it's time to find your collaborators, fine-tune the set, and create the packaging for your finished product.

First, manufacturers will send you trials and early samples of your set, where you will carefully check the colors and print quality until you are satisfied with the final look. After that, you'll either reach out to or be contacted by small makers with offers for collaborations in cables and artisan keycaps (this can also be done earlier in the process if you've generated enough interest and excitement).

Lastly, you'll design sleek and stylish packaging that will serve as a nice surprise for the customer.

Ask yourself not only what you think customers would like from a business perspective, but also what you would like to see being produced in the form of the tiny plastic we love so much.

The most successful designs, both in the keyboard world and in the professional design world, are those where every detail is given masterful levels of attention and dedication. Passion is what drives this community, and it should be what drives you to create within that community, not monetary gain or benefit.

If you decide to start creating your own sets, make sure to share them, and you'll find many people who share your passion and dedication for the craft.

You’re gonna need a bigger keyboard.

— Jaws, probably

Chapter 4 — Conclusion

So, we've arrived at the end of our journey. We've covered everything about the custom keyboard community, from its history starting out as mechanical typewriters to the dark age of membrane to the modern customization options we have today.

The custom keyboard community of today is a loving and tight-knit group of people who put effort and dedication into their craft, spending

hours and days modding each and every aspect of their keyboard. We always dream of our “end-game” keyboard, but in reality, once we reach that end-game, a new end-game is just around the corner.

The truth is, we love the collection and building aspects just as much as typing, so to give up on what we believe is the best keyboard we can build is ultimately naive. A new board, a new switch, or some new way of experiencing the art of type will come, and we’ll be right there to start spending ludicrous amounts of money on it.

As designers, we view the keyboard as a medium for creating our design, which is done mostly digitally in the modern age, but how much thought have we put into the design of the keyboard itself until now?

Maybe this book in the end will make you put a little more thought into those small keys in front of you, those that you type on every day.

They may take our lives, but they may never take our keyboards!

— Braveheart, probably

Colophon

Colophon

Book Design: Chester Middleton

Title Typeface: Helvetica

Book Typeface: Dico Typewriter

Inside Pages: 80lb. Satin

Cover: Hard-Bound Gloss Lamination

Dated April 9th, 2023

Edinboro University Of Pennsylvania

Why Keyboards?

This book is a love letter to keyboards. So much detail and precision has been put into the art of keyboards over the years, dating all the way back to the typewriter. Over the past few years, I've become a huge geek in all types of word processing machines throughout history. I've built and created my own boards, keycaps, cables, and artisans all for the sake of furthering my own design skills, as well as pursuing my hobby.

My current collection sits at five keyboards, ranging in price from one hundred to six hundred dollars. I also build for clients, which allows me to fund my own endeavors in the keyboard community. This hobby means so much more to me than just machines you type on, and you'll never see me with a membrane keyboard.

It's not over yet, either. I consider this the first draft of this book. Many revisions and additions will be added over the years as I and the hobby both continue to evolve over time.

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Keyboard Spotlight

Ikki68 Aurora

Material: Polycarbonate
Color: Clear Mint
Group Buy: March 2023

Special Thanks

Shelle Barron

For a collection of historical typewriters that were donated to me out of the kindness of her heart.

Jewell Melissa

Who helped me fine-tune and perfect the pacing of this book, and assisted in bringing the concept to life.

Scott Gladd

For helping me realize my visions and pushing me to make my best work.

Ashton Rider

For supporting and assisting me throughout the entirety of this book in the short time needed to make it.