A Complete Guide To Mechanical Keyboards

BY BEN FRAIN

How much thought have you put into your primary input device? Ever considered how much better your interface with your computer might be? In this article, we dive into the possibilities of mechanical keyboards. The different layouts, switch types, etc. Strap yourself in — this will be a deep dive!

Generally speaking, it's possible to define a keyboard as mechanical if it uses mechanical switches for each key.

Firstly, let's consider the everyday alternative to mechanical switches. Typical, inexpensive, everyday computer keyboards often employ rubber dome switches. As the name implies, these are constructed with a sheet of rubber domes above electrical switches. You press down on a key and the dome collapses causing the key to be switched. You lift up your finger a little and the rubber dome plops back into shape and the key is no longer pressed. Rubber dome switches are popular because they are so cheap compared to manufacture. However, they are certainly not the best way of solving the problem of registering a keypress.

Mechanical switches offer a range of tactility unavailable with rubber dome keyboards. Mechanical keyboards are enjoying a renaissance, which although has been going on for a number of years, is really starting to gain more widespread adoption since being embraced by the gaming community.

Now, before we get much further into this, I feel it's my duty to be quite candid. I often read people justifying mechanical keyboards due to the fact that they 'last longer'. Whilst this is possibly true, I don't ever remember wearing a keyboard out. And you could probably buy a lifetime of budget keyboards and still have change left compared to the costs of a mechanical keyboard.

Buying a mechanical keyboard is not an exercise in sound economics. It's about finding the best possible version, for you, of a tool you use almost every day. A keyboard that has just the right layout, feel, and aesthetics. The sheer wealth of permutations when it comes to mechanical keyboards can be mind-boggling. In this article, we will concentrate on the broadest strokes. The considerations we feel are most important to understand if you entertain purchasing a mechanical keyboard.

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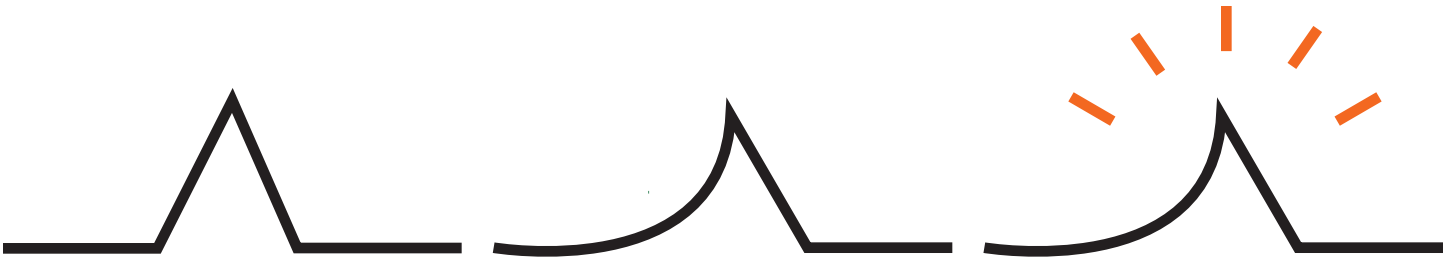
TYPES OF SWITCHES



A **LINEAR SWITCH** is just like a linear animation, there are no curves, you press down and the resistance feels constant all the way down until the switch 'bottoms out'.

A **TACTILE SWITCH** is more like an easeInQuart animation curve; there is a sort of bump at the top you have to get over and then it moves down like a linear switch until bottoming out. This little bit of tactile resistance at the top of the keypress is what earns them the label of 'tactile'.

A **CLICKY SWITCH** is a bit more simple to communicate. It has a similar kind of bump at the top like a tactile switch but makes an audible click on actuation

PHYSICAL SWITCH DIFFERENCES

Far and away, the most common physical type of switch is 'Cherry MX' as well as the now numerous Cherry MX clones. Historically, due to patents, the manufacturer, Cherry was the only brand able to make switches with their mount system. Now their patent has expired, there are a number of other manufacturers offering comparable and compatible switches for less.

Nowadays, it isn't necessary to get hung up on getting a board with genuine Cherry brand switches. I'd argue that there are brands being far more progressive and innovative in switch development these days. Kailh is a Chinese brand that not just makes comparable switches for MX mounts with color designations (such as 'Blue', 'Green', 'Red', and so on) to approximate the equivalent Cherry switch (we'll cover color designations for switches in a moment), but they also produce 'box' switches which are IP56 dust and water-resistant, as well as 'speed' switches aimed at gamers. These have shorter travel resulting in quicker switch actuation. Hence, the 'Speed' moniker. There are also many other fine key switch types that bear no relation to Cherry — Topre being a personal favorite. Topre switches are designed and built in Japan and give a marvelous tactile feel that some swear by. However, they are expensive and subsequently less common.

Key switches — especially Cherry MX and variants — are typically labeled by color; for example, 'Blue' or 'Brown'. Different colors are attributed to different switch types; most typically, a switch that is either linear, tactile, or clicky.

For each switch type, there are differing key switch 'weights'; that is, how much force is required to make the switch do its thing. Key switch actuation force is often measured in cN units (centinewton). Again, colors are arbitrarily assigned. So, for instance, a Kailh Box Red is a soft linear switch whilst a Kailh Box Black is also a linear but heavier. There's no real sense to the color designations, simply that Cherry made them originally and now others follow suit.

So, in the interests of trying to keep you with me, the TL;DR of keyboard switch types is this: If you are looking for a mechanical keyboard (perhaps your first one), opt for a board with Cherry MX, or Cherry MX compatible switches such as those made by Kailh. Choose a switch type which, at least on paper, sounds appealing. Buy it, and see how you get on.

To offer just a little more broad guidance:

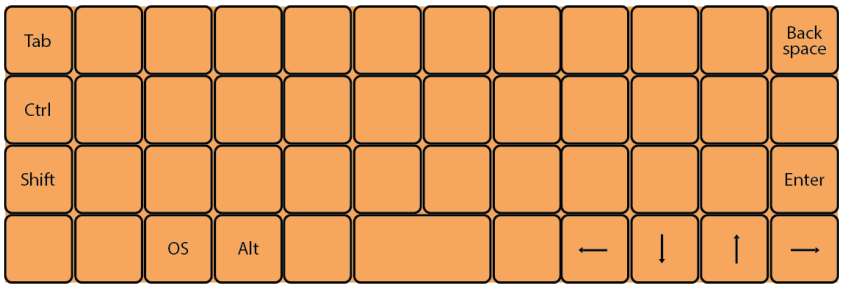
- ***Like the idea of linear switches?*** Go for Cherry MX or compatible red switches.
- ***If a tactile switch seems like it would be your bag***, opt for MX brown or compatible switches. If you can find a good offer on a Topre-based board a Happy Hacking or Realforce, that would be a solid choice, too.
- ***Does a clicky switch appeal?*** MX Blue or compatible switches for you.

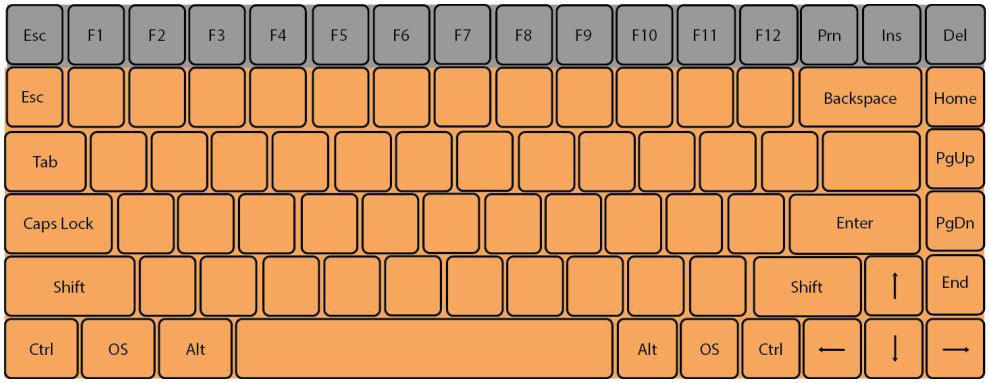
I'm making such broad recommendations because ultimately it's all preference anyway. However, if you do go for switches with an MX mounting stem, then you give yourself the greatest number of options when it comes to keycaps.

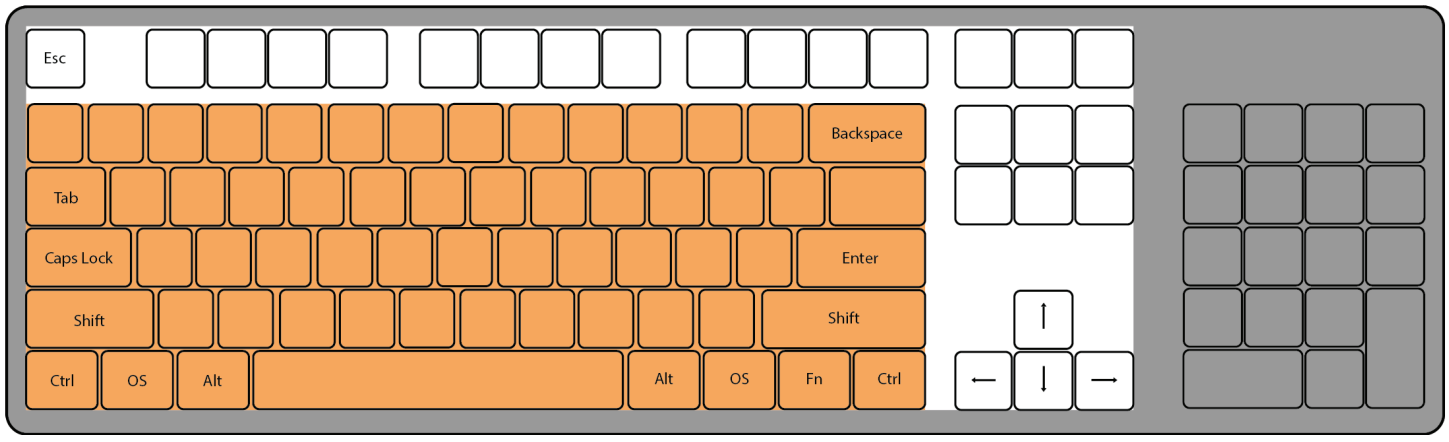
Despite telling you it is all preference, we thought it might be useful to try and describe the differences in the mechanical keyboards switches from first-hand experience.

KEYBOARD SIZES

With the touchy-feely issue of switches dealt with, let's move on to the next wall of acronyms and abbreviations. These deal with the keyboard layout, going from smallest to largest.







“40%”

Diminutive layout where many keys are doubled up, requiring an additional key to be pressed alongside the desired one. Unless you have a specific reason to have one, I couldn’t recommend this layout for practical purposes;

“65%”

Compact like a 60% but usually incorporating at least an arrow cluster;

“75%”

Usually brings in a distinct function row at the top;

These are often popular choices for those who want a more compact feel and look for their desk.

“60%”

Typically a normal key layout minus a dedicated arrow key cluster, home/end/page up and page down or function keys

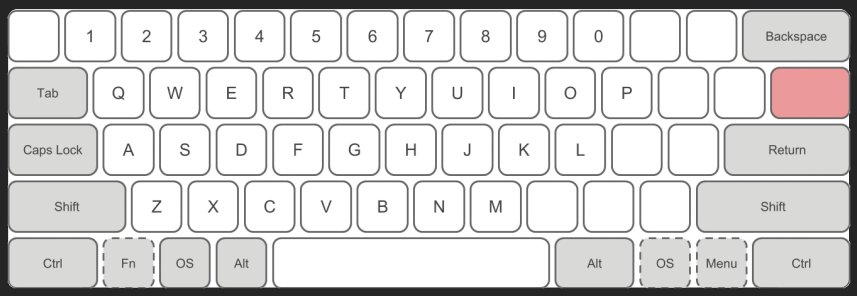
“TKL” /“80%”

The ‘Ten Key-Less’ is a more conventional layout, think of a ‘normal’ keyboard minus the number pad section;

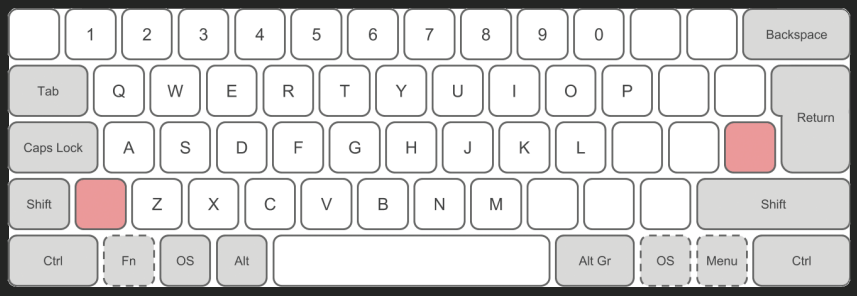
FULL SIZE;

The typical keyboard layout complete with function keys, number pad, and arrow cluster.

ANSI OR ISO?



ANSI



ISO

There is also the consideration of regional peculiarities; for users in the Western world this boils down to ANSI (American National Standards Institute), with the straight enter key one row high, or ISO (International Organization for Standardization), typified with the angular enter key taking up two rows of height. Whilst these might be the most distinct visual differences, they are not the only ones.

However, for simplicity, unless you have a reason not to, it makes the most sense to stick with the ANSI/ISO layout you use currently. Although, it is worth pointing out there are considerably more choices for keycaps and board layouts when it comes to ANSI.

CASE CONSTRUCTION & CONNECTIVITY

The majority of mechanical keyboards are wired. Whether that is USB-C, or Mini-USB, there is a wire going from board to computer.

However, if you switch devices frequently, or travel a lot, messing around with cables is something you don't have to put up with. Many of the well-known mechanical keyboard brands such as Filco, Matias, Corsair, Ducky, Atom and HHKB all have wireless variants.

When it comes to case construction, the two common materials are aluminium or plastic. Like most choices, there isn't a right or wrong, just a preference. Although wireless boards tend to be plastic to save weight and improve signal from the Bluetooth controllers.

Things that are genuinely useful to consider though are boards that make some accommodation for cable location. For example, if your nearest USB port is on the left of your computer, it might be a pain if the keyboard's port is on it's right side. Some keyboards have multiple ports. Some, such as the WASD mentioned at the outset have channels built into the case so you can route the cable however you like. That's a feature I don't see often enough from other brands but I certainly miss it when it isn't there.

Aesthetically, there is a wider choice of case colors in aluminium with even cerakoting and electrophoretical coating an option. But as you might imagine, with great beauty comes great expense.

An example of some DSA keycaps.

KEYCAPS

One of the biggest draws of a mechanical keyboard is that you can easily swap out the keycaps for a different set. As we discussed in the section on key switch types, the most popular switch type, when it comes to keycaps, is 'Cherry MX' compatible. Therefore, by far the most ubiquitous keycap mount is Cherry MX style.

However, within the realms of the MX mount connection type there are a great many options. There are choices in terms of materials used, key profiles, and legend marking method. Let's look at each of those.

SA

These are quite high keys and enjoy a sculpted shape down the rows (if you were looking at the keys side on).

A coiled USB-C cable covered in braided material.

DSA

DSA are a lower key and although they have a slightly curved top to each key like the SA, they do not have a sculpted shape down the rows.

If you are just starting with a mechanical keyboard, I'm not sure it's useful to worry too much about the key profile. However, it might be interesting to consider the kind of options available.

Signature Plastics, one of the largest and most popular producers of custom keycaps has a page dedicated to the different profiles they offer with PDF specifications to boot:

You might also see row numbers mentioned; this has most relevance if you are looking at a sculpted set of keys.

Row refers to the location of the keys on the keyboard and is most important when ordering a sculptured keycap family. On a standard QWERTY board, the "number" row is row 1; the "Q" row is row 2; the "A" row is row 3; the "Z" row and the space bar row are row 4; the upper "function key" row can be either row 5 style or row 1 style.

It is also important, if ordering an after-market set of keycaps, to consider how many of each size of key you are getting. Most keycaps are single unit, referred to as '1u'. Wider keys are designated in full and quarter increments. For example, the ALT, CMD and CTRL keys on the WASD keyboard I'm typing on as I write this are each 1.25u wide, the TAB key is 1.5u, and so on. Larger keys such as SHIFT and SPACE often have more than one mount underneath

PHOTO CREDIT (LEFT TO RIGHT): RICHARD MCNAMARA, KBDFANS, YUDHANTO RAKHMAT PRATOMO

and these connect onto the board with a stabilizer (or 'stab', as they are referred to in mechanical keyboard circles).

LEGEND MARKING

The three most common means of marking the legend onto each key (e.g. the E on the key for E) are double-shot, dye-sublimation and laser-etching.

Double-shot involves taking two different colors of plastic and putting one within the other; the contrasting colors creating the legend.

DYE-SUBLIMATION, or 'Dye-Sub', as it is more commonly termed is a process where the markings are dyed into the plastic. Think of it like a tattoo for keycaps!

Purists will argue that double-shot creates slightly crisper legends but with high quality dye-sublimation, from a reputable brand like Signature Plastics, I think the difference is academic.

Laser etching is just as it sounds, a laser etches the legend into the keycap. However, compared to dye-sublimation or double-shot, laser etched tends to wear away far sooner and are therefore far less popular.

KEYCAP MATERIALS

The overwhelming majority of keycaps are made of some sort of plastic. We won't cover more exotic materials for keycaps here.

ABS is the plastic typically used with 'double-shot' key-caps. It's a softer plastic, hence more pliable. You tend to get the widest variety of color options with double-shot but the downside is that the ABS plastic can go shiny over time. This manifests with keyboards with the most used keys visibly shiny compared to the others.

PBT plastic doesn't tend to get shiny over time as ABS does but dye-sublimation doesn't make as many color options possible. However, it does typically enjoy a slightly textured surface which some prefer.

I've been spending the last month switching between a keyboard with SA Lime which is a double-shot ABS plastic SA profile keycap set, and a keyboard with DSA Ferrous, a DSA profile PBT set. My personal preference is the PBT set as I enjoy the slight friction from the PBT but the ABS set is certainly no hardship!

Aside from regular keycaps, there is also a type called 'artisan' keycaps that feature all sorts of decorative parts made from resin or other materials.

SUMMARY

Let me try and distill everything we've been through here.

Firstly, mechanical keyboards offer a level of tactility in keyboards that is simply not achievable elsewhere. Furthermore, with many boards offering programmability, it means your keyboard no longer needs to adhere to the standard layout you are used to. Each key can do whatever you want it to!

You can get a layout that suits the way you use your keyboard; compact 60%, all-rounder TKL or full size with number pad plus everything in-between.

If you are someone who suffers from RSI or, simply feel your comfort might improve with a more ergonomic keyboard, mechanical keyboards like the ErgoDox EZ should be top of your list of hardware to investigate.

There is a gamut of keyboard switches available. Audible clicky switches, smoother tactile switches and fast linears are all available. If you can't find any to try first, consider buying a board with a hot-swappable PCB. This means you can try out other switch types at your convenience without needing to replace an entire keyboard. You don't need to go with genuine Cherry switches, manufacturers like Kaihl offer great alternatives.

Needing a portable keyboard does not mean sacrificing on quality! Keyboards like the Happy Hacking Professional Hybrid offer a premium switch feel with Bluetooth connectivity.

You can get keycaps of every conceivable colorway and profile. Take a look at Signature Plastics website for an idea of the breadth of choice available.

If you want a 'one-stop shop' take a look at WASD Keyboards. Not only do they offer ANSI and ISO layouts, you can also pick the color of the case, every single key color and the type of legend on the keycaps!

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Guide To
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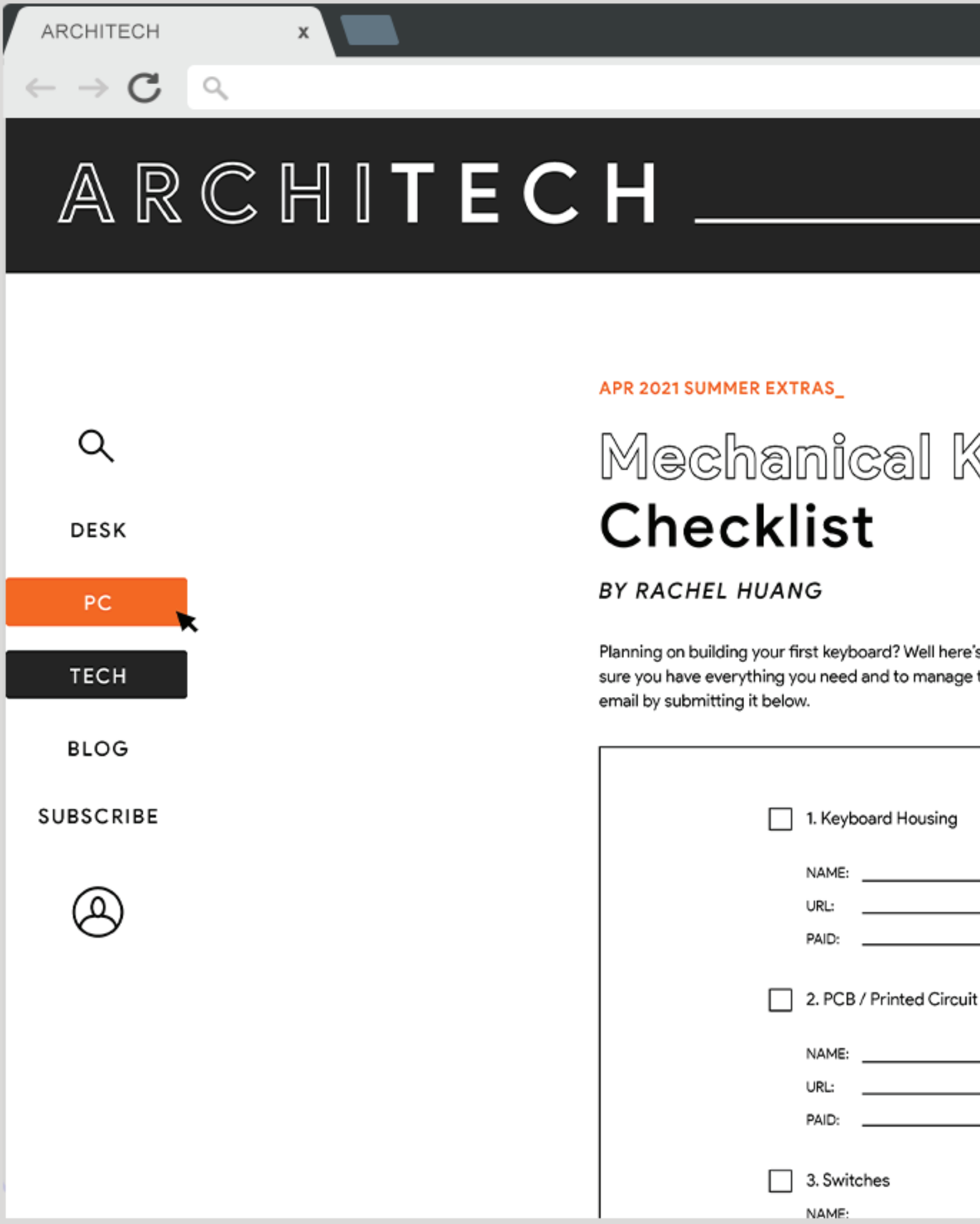
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Mechanical K
Checklist
BY RACHEL HUANG
Planning on building your first keyboard? Well here's
sure you have everything you need and to manage t
email by submitting it below.
1. Keyboard Housing
NAME:
URL:
PAID:
2. PCB / Printed Circuit
NAME:
URL:
PAID:
3. Switches
NAME:

Keyboard

s a useful interactive checklist for you to use to make
the costs! The completed form can be sent to your

Board

RATIONALE:

For my feature I decided to do an article on teaching readers on mechanical keyboards, the layout varies from text heavy to sections with diagrams to explain more important features of the keyboard (e.g. the different sizes). Having the second spread with more white space with large images allowed to give the reader a break from blocks of text, but also provide ample information for the section of the article. The two digital editorial adaptions mimic the looks it has in the physical magazine but also has a inner article navigation on the side which allows the reader to know where they are in the reading but also how much there is left to read.