General Information For Creating a Keyboard

**Topics to Cover**

* **How to Create the Mounting Plate**
  + What the mounting plate will be made of.

I’m looking to make the plate out of acrylic. I could 3D print this out of PLA, but I think the accuracy of the 3D printer wouldn’t be precise enough to reliably fit all the key switches.

I decided to go with a sandwich acrylic body for the keyboard. It will be comprised of 4 sheets of 5mm thick acrylic.

* + How thick the plate will be.

The maximum thickness I can cut at the ITLL is 3/8 of an inch, which should be more than enough to support the keys. McGuckins sells a decent selection of this, so I more likely need to just pick a thickness and go with it. It looks like the thickest people will go is 5mm (<https://www.reddit.com/r/MechanicalKeyboards/comments/2vj0ba/is_a_5mm_acrylic_plate_practical/>) which should be fine because people were using this thickness for larger keyboards, and the Planck layout is 40%.

The final design footprint comes out to be 486x182mm (To cut all pieces).

Each individual layer will be 243x91mm.

* + Shape of spaces for the key switches.

This can be found on the Cherry MX data sheet: <https://cdn.sparkfun.com/datasheets/Components/Switches/MX%20Series.pdf>.

To summarize the information from the data sheet, though, the holes are 0.551 inches square, with very slightly rounded corners (see the data sheet to understand this).

* + Distances between the key switch holes.

This information comes from the OLKB website (<https://olkb.com/reference/design/>). Essentially, there are 19mm in between the centers of each key switch hole (1u is 19mm). This is slightly different from other keyboards, but should work well enough.

* + Holes for mounting to the case.

The holes need to accommodate the M2.5 screws which will be going through them. The holes around the outside of the case are 2.05mm in diameter, which is recommended to tap the holes later to accept M2.5 screws (<http://www.custompartnet.com/tap-size-chart>). The screw holes in the middle of the case are larger, with a diameter of 3.15mm, to allow the M2.5 screws through to screw into 10mm tall female standoffs (<https://www.mouser.com/ProductDetail/Harwin/R25-1001002?qs=sGAEpiMZZMtrde5aJd3qw4L16p8RLiBxWo5MSsG4dBo%3d>), which will be used to support the center of the keyboard. (<https://spaenaur.com/pdf/sectionR/R11.pdf>), (.

The Teensy is 1.2in x 0.7in, so to make space for this on the bottom middle plate, I choose to cut out a 0.7in slot so the mini-USB port can be exposed.

* + Overall footprint of the plate.

Once again, I will be referencing OLKB for this. They list the total plate dimensions to be 233mm x 81mm. The Planck is 12u x 4u keys, so there will be a total of 47 keys (since I’m using the MIT layout, which has a 2u spacebar).

* **How to Model the Case**
  + What the case will be made of.

I was looking to 3D print the case out of PLA, which I currently have. After the design is complete, though, I need to make sure I have enough material to do the print, since the case will be pretty large, but more importantly, I was looking to make the case as dense as possible with my remaining material.

* + What size case to make.
  + Overall case height.
  + Where will the mounting points for the plate be.
  + How to mount the plate to the case.
  + Overall wall thickness.
  + Where to put the hole for the USB connector.
  + Will I use a damping rubber case for the case to decrease the echo within the case.
* **How to Wire the Keys**
  + What materials are needed to conduct the wiring.
  + How the wiring is done.
    - <http://blog.komar.be/how-to-make-a-keyboard-the-matrix/> This is a really useful resource for understanding how to wire a keyboard. It goes into the theory behind the matrix, and why it is done the way people normally do it.
  + What sort of microcontroller is required.
* **How to Flash the Firmware**
  + What microcontroller will I use.

The internet seems to like the Teensy 2.0, so I will be incorporating that into this build (<https://www.pjrc.com/store/teensy.html>).

* + What firmware will I use to flash the keyboard.
  + What will the layer’s layout be?
* **What Key switches/keycaps/rubber dampers do I want?**
  + I was looking to use Cherry MX clears because I’ve heard good things about their tactile bump, as well as the lack of a distinct audio click. They can be purchased here (<https://mechanicalkeyboards.com/shop/index.php?l=product_list&c=58>) or here (<http://www.wasdkeyboards.com/index.php/checkout/cart/>).
  + Or, alternatively to the MX clears, I could always just order a set of Zealios from ZealPC. They’re currently in stock (<https://zealpc.net/collections/switches/products/zealio>), and actually come out a bit cheaper than the MX clears.
  + In addition to the Zealios, I can order Lube for the switches, which makes them quieter and smoother. Not sure which variant to buy (<https://zealpc.net/collections/accessories/products/lube>) but it makes them sound like Topre (sound test: <https://www.youtube.com/watch?v=my6-6dhLwII>). Information on lubing switches: <https://geekhack.org/index.php?topic=34332.0>.
  + A set of nice PBT keycaps (<https://www.aliexpress.com/item/XDA-blank-keycaps-preonic-Keyset-Blank-Similar-to-DSA-For-MX-Mechanical-Keyboard-Ergo-Planck/32830703804.html?spm=2114.search0104.3.70.5c42285acRDj9O&ws_ab_test=searchweb0_0,searchweb201602_5_10152_10151_10065_10344_10068_10130_10324_10342_10547_10325_10343_10546_10340_10548_10341_10545_10084_10083_10618_10307_5722316_5711212_10313_10059_10534_100031_10629_10103_10626_10625_10624_10623_10622_10621_10620_10142,searchweb201603_36,ppcSwitch_5&algo_expid=a62372fb-beaf-4226-81a7-b2f662c4d5dc-9&algo_pvid=a62372fb-beaf-4226-81a7-b2f662c4d5dc&priceBeautifyAB=0>) This is for the Preonic, which means I can just use the white caps from the set.
  + A set of rubber O-rings for damping the sound of the keycaps <https://www.amazon.com/ThreeBulls-120Pcs-Dampeners-Keyboards-Dampers/dp/B01N75JL0F/ref=sr_1_2?ie=UTF8&qid=1518660242&sr=8-2&keywords=keycap+rubber+dampers>.
  + I opted to not use a stabilizer for the 2u spacebar. Jack doesn’t recommend one (as per this post: <https://www.reddit.com/r/olkb/comments/6va1hg/question_planck_spacebar_stabilizer/>) and it seems like the majority of people don’t use one anyway. That sounds good, because using stabilizers on overly thick plates can be complicated and require some stabilizer modifications (especially when it comes to the bars).