

MechWild Mercutio build log

Parts used:

- Mechwild Mercutio kit (All white pcb parts black and silver knob)
- 33uF@ 25V tantalum capacitor (replaces 10uF electrolytic in kit)
- 28 pin DIP machine pin socket (replaces 28pin socket included in kit)
- Durok Dark amber T1 switches (x15)
- Mode Signal switches (x28)
- C3 Equalz stabilizers (2u stabilizers x4)
- 2mm PE packing foam (used for plate foam)
- Silicone O rings ; 4mm OD, 1mm ID, 1.5mm cross section diameter (x26)

General impressions:

This is probably among the best budget oriented 40% boards you can buy. The support for standard keycap kit sizes, v/s the more unique 40% kit, makes locating keycaps that are acceptable easier. The build instructions are overall quite good. Out of the box VIA support is a huge plus for any beginner. The OLED and knob support provide some good options and information. While the construction process may take a while, the end result looks good, and is satisfying to use for most tasks.

Electronics Construction and instructions:

The instructions on the MechWild website do a good job helping you identify each part in your kit. This includes pictures of the components and hardware for easy identification. In some cases, I wish the part number was also included in this section. This especially applies to the zener diodes which do look a lot like the 1N4148 small signal diodes. Other items that probably need a part number added are the rotary encoder and the resettable fuse. It is still a good parts list and the added visuals help a builder identify parts with general ease. The only thing that would make this better is if components had information on sourcing replacements if needed such as a digi-key or mouser catalog number.

Installing the USB C connector is the most challenging part of the construction process. They stress that all components are installed on the top side of the PCB because some builders installed the USB C port on the wrong side of the PCB and the only option is to remove it and install it on the correct side.

The only concern about the approach shown when installing the USB C port is that the shield will get hot as you transfer heat to solder the component in place. An inexperienced solderer might want to be careful with this step. A decently sized piece of painters tape to provide some grip on the component and some insulation between the metal and your finger might be helpful. Beyond that, the approach is fine.

The instructions have you bend a lot of pins and this is okay. My preference is to give the leaded components the slightest bend possible. For parts that are not easy to bend, I will tack one or two legs in place and try to get the component as straight or flush as possible, then once all of the other solder points are done, I will touch up the lead that was initially holding the part in place. This doesn't always work out in some cases. For example, my OLED screen is tilted upwards more than it should be. I'm not sure what the solution is, but an easy way to at least get the OLED installed so that it is parallel to

the PCB would be nice. Something like a temporary spacer or washer to keep the angle reasonably straight during installation instead of trying to eyeball it.

The instructions have you install most of the components except for the 1N4148 diodes. This includes the microcontroller, rotary encoder and the OLED screen. When this step is done you are going to power the board up and test to see if the encoder works. The encoder does need a 1N4148 so you will install one early on. Power on the board and test the encoder. If that works, install the rest of the diodes. I did choose to make some substitutions in my build and they are mentioned in the parts list. The first is the substitution of a 33uF capacitor in place of the included 10uF capacitor. Tantalum capacitors have a couple of advantages over electrolytic in terms of durability, but they are more expensive and while I wanted a little more capacitance for the power rails (+5V), this was not needed, and the stock component is fine.

The other substitution was the socket for the microcontroller. The gold plated machine pin sockets tend to be a little more reliable, and have a very good grip on the pins of the IC. The big disadvantage is that pins need to be straight as these sockets are not very forgiving if a chip is seated incorrectly. This also was not needed and the stock component is just fine.

After installing all of the remaining diodes, the board is tested again to confirm that nothing obvious is wrong. It's a lot easier to troubleshoot the board without stabilizers and switches. At this point, everything checked out and stabilizers were installed.

Stabilizers:

I selected C3 Equalz brand stabilizers since I had enough of them in hand and enough 2u stabilizer wires to install in the build. Stabilizers were lubed with 205g0 on the stems and housings and dielectric grease was used for the wires. Since the planned layout was to use a split space bar, four stabilizer sets were needed. There are alternate layouts that split some of these keys and there is support for a 6.25u spacebar. The product page shows the combinations that are available.

Switches:

The Durok dark amber T1 switches were used for all of the modifier keys. These were lubed with Krytox 205g0 on the bottom housing rails and the back of the stem. The springs were lubed with Krytox GPL 105 using the container lube method.

The Mode Signal switches were lubed with Krytox 205g0 on the bottom housing rails and three sides of the stem. The springs were lubed with GPL105 by having lubricant brushed on. These switches are overlubed and were from an early batch of switches when I got into the hobby.

Neither of these switches are filmed and this was an attempt to use up some extra switch types that were used in other builds.

Plate foam:

A 2mm thick piece of PE packing foam was hand cut to go between the PCB and switch plate. This is not the same thing as the popular PE foam mod where switches rest on top of the foam. The foam goes around the switches instead. The cutting process used the included switch plate as a guide. Since this was done by hand, there are imperfections in how the material was cut. This material was

chosen because it was reasonably thick and was readily available packing material that came with another product. Ideally a 2.5mm-3mm thick sheet of foam should be used here. Once this was cut, the switch plate and switches were test fitted to make sure everything would work as expected.

Final assembly:

Once the test fit looked satisfactory, the switches were soldered in place and the PCB was tested one more time to confirm that the switches were functioning correctly.

From this point, the instructions were referenced. The conical back feet were installed on the bottom plate. All of the screws in the bottom plate had a 4mm silicone washer placed on either side of the bottom plate. The intent was to improve the bounciness of the typing experience, but It does not seem to have much impact overall, but the entire upper assembly should have some slight give to it that is otherwise not present.

The posts go through the PCB and mount to the switch plate, and the acrylic top is installed last. All that remains are the keycaps and the encoder knob.

The encoder knob is keyed, but just presses on and is held in place by friction. The key layout supports more standardized layouts and this is good because I had a much easier time finding a keycap set that looked good and fit the board.

My keycap selection was the PolyCaps ‘Octopus’ set sold by Kinetic Labs. These caps are doubleshot PBT in cherry profile and had a decent kit to support the layout.

Firmware Configuration:

This has been a bit of an iterative process. However, using VIA to configure the layout and also as a way to remember what layer certain keys are placed on is a nice bonus. I would like to one day add the ‘Bongo Cat’ animation to the OLED screen, but it’s not a high priority.

Conclusion:

One of the best budget 40% options out there. I have been using this as my daily use keyboard at work for at least a month at the time of this writing. The built keyboard looks and feels decent and was overall documented quite well. There is some room for tinkering and tweaking aspects of the build and I took some time to do just that.



Figure 1 : Glamour shot of Mercutio described above.