Rochester KLUG Keyboard Meetup

Tim Anderson

TODO Gather Raw Data for Presentation Prices Ali Express for Keycap Price Digikey for Hardware Cost Collect Info & Tutorial Sources for

Tim Anderson

Who am I?

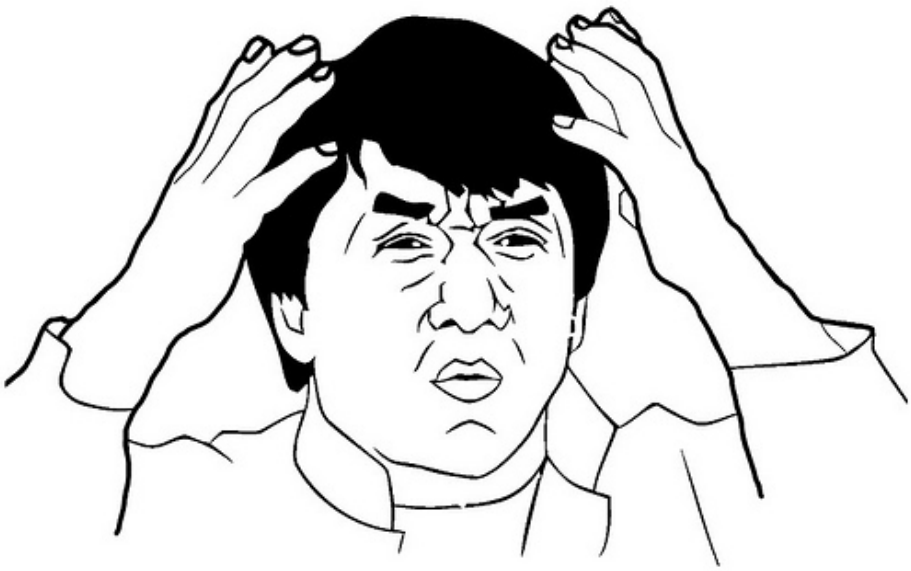
- https://github.com/mcdviii
- http://aberrant.online
- timothy.c.anderson@mykolab.com

I don't think there's much to tell about myself. I've worked 8 years in manufacturing for a local furniture manufacturer. About 6 of those years I've worked as a machine operator. I own a reasonably sized 3D printer; I tinker with electronics & free software on my free time. You can follow me through the following links. You won't find me on Facebook or Twitter, so don't bother looking for me there.

So, what is this Dactyl Keyboard thing?

Parameterized, Split-Hand, Concave, Columnar, Ergonomic Keyboard

- Written in Clojure



Those are a lot of fancy words. What does all of that mean? Well let's look at the project & see how it compares to a regular keyboard to answer that.

First I think we need to get a better understanding of why a regular keyboard is the way it is, so that we can understand what we're working with.

History & Background

yt:uk3A41U0iO4

- https://www.youtube.com/watch?v=uk3A41U0iO4
- Matt's Reasons for making the design
- Dactyl was Written in Clojure with the Help of OpenSCAD

Let's look at a regular keyboard

- History of Typwriter According to Matt Addereth
- Keyboard design may be a bit antiquated

Now, before we get into this, I should state that I am not a doctor. I do know how to use Google, so I might as well be one–but that being said–obviously, this is my understanding from my cursory research. None of it should be construed

as medical advice. Consult your doctor before making any changes to the ergonomics of your workstations or workflow. So with that out of the way, let's look at some things the internet tells you not to do.

- Compare bad hand posture to OEM keyboard
- RSI Injuries & How to Avoid Them https://www.rsiprevention.com/rsi_prevention.php
- Other relatable reasons (Programmers, emacs pinky)
- My personal reasons

Benefits of Ergo keyboards

I consider my hands to be my greatest physical asset, other than my brain. To be clear, I don't experience RSI issues, nor have I ever. But, over the past year I've just decided to make a concious effort to avoid them given my hobbies & future plans. I use a computer a lot, and I would like to continue using a computer a lot with as few negative affects as I can manage. I had the means to build my own badass keyboard, so I did.

Why Would You Want That?

While browsing around looking at these ergonomic keyboards I see a recurring question: "Why would you need/want that.", and I think that it's a fair question. It smacks of iPhone ownership or RGB lighting: Do you really need that? To the outside observer it might look like an expensive, showy & unnecessary gadget. But I think there are real health benefits to using a proper ergonomic keyboard, and in this talk I'd like to go over some of the things I've found while looking into the topic.

Notable Mentions

Kinesis Advantage2

- Advantages:
- Disadvanteges: $320.00 USD
- Open Source: No

As I

ErgoDox EZ

- Advantages:
- Disadvantages:
- Open Source:

One of the most popular ergo keyboards I've seen. It's garnered the attention &

a review from Linus Tech Tips, and has a long open source history.

Let's Split

- Advantages:
- Disadvantages:
- Open Source:

Atreus

- Advantages: Small, single-board form factor
- Disadvantages: Not a split design?
- Open Source: Yes

This is another keyboard I saw referenced a lot. It's a single board & not split, but it's small (the website shows it fitting in someone's jeans pocket). The single board design could be an advantage or disadvantage depending on what you're using it for. It's potentially less comfortable to use, but I see it being easy to grab & go if you're using it in a mobile set-up.

Signum 3 (Troy Fletcher)

- Advantages:
- Disadvantages:
- Open Source:

Notable differences between the Signum 3 & Atreus are the thumb clusters. Reference Youtube channel.

Other Dactyl Variations

Dactyl Ergodox

- Advantages:
- Disadvantages:
- Open Source:

This was a pull request by Joe Devivo (One of the writers of the earlier build guides). He was attempting to add some changes to fit the Ergodox keycaps, but the latest update to the pull was from 2017. /u/chrystalhand has apparently made more updates to the design and is trying to market it on Reddit and OhKeycaps.com. I don't know if he's made the source available.

Lightcycle Dactyl

- Advantages:
- Disadvantages:

- Open Source:

In the main repository you'll find this as an option along with the 'cherry' version. The LightCycle version of the Dactyl has fewer thumb cluster switch positions, and was designed to match with the Matias ALPS-inspired mechanical keyswitches. The 'cherry' one is the same design, but meant to fit with Cherry MX mechanical switches.

Dactyl Manuform

- Advantages:
- Disadvantages:
- Open Source:

I think probably the best designed of all of the options I've seen. The Manuform retains all of the features you would look for in the original, but lowers the thumb clusters so that you hands can remain in a more natural position. Notable hardware differences between this & the original are the use of DSA keycaps used and the use of 2 Pro Micros for the microcontroller. I'll probably build & switch to this in the future.

Reasons for Choosing Dactyl

- Open Source

- Kinesis Advantage form factor
- Looked like the most comfortable design
- Also looked hella cool

My Reasons for Building by Hand Instead of Purchasing

- At the time there were none being manufactured
- Sense of self-satisfaction
- I already own a 3D printer
- Screw paying someone else >$300, I'll just build my own!
- One year later joke

Build Overview

Shell/Case & Hardware

- Time
- Apologize for lack of media
- Print process involved trial & error. Segway into 3D print & support material.
- Hardware dimensions & heating countersunk screws. Make point of heat-shrink on standoffs.

Switches & Keycaps

- Fits Cherry MX switches, explain what they are
- Go over keycap profiles
- Keycap material, count & price

Etching

- 1:1 ratio of 3% Hydrogen Peroxide & Acid Magic (muriatic acid)

PCB & Wiring

- The circuit design in the repo is inaccurate. I had to flip around some of the designs because they were backwards. I didn't find this out until after my first attempt at etching. Luckily I had another sheet of Pyralux that I bought in case I encountered those kinds of problems.

PSA: TRRS *not* TRS!

- Include comparison.

Firmware

How Does it Work?

- Explain matrix positions

Challenges

- Hardware, clearance & dimensions
- Choosing LED Resistors
- PCB design
- PCB etching (I probably went the most expensive route.)
- Which way to wire the diodes
- Wiring the Teensy
- How the keyboard is controlled by the MC (key matrix)

Where To Buy

- Drop.com (formerly MassDrop)

Crowd sourced, limited manufacturing.

- OhKeycaps.com

Working with members of the reddit mechanical keyboard community to commercialize different Dactyl variations.

- Let's Split PCBs

`I have no affiliation or experience with the following. YMMV!`

Hardware & Accessories

- https://kbdfans.com
- https://aliexpress.com
- https://pimpmykeyboard.com/
- https://mechanicalkeyboards.com/shop/index.php?l=product_list&c=9

References

Das Blog.com