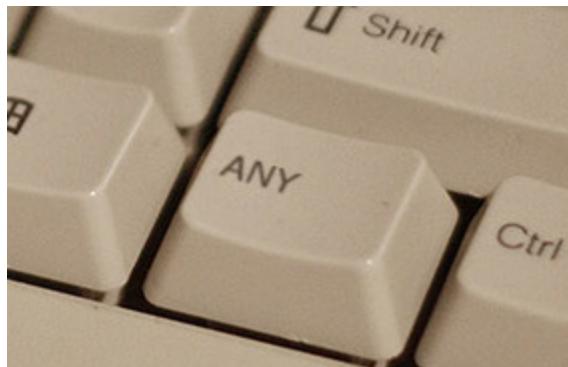


# **Building your own keyboard**

Pedro Ferreira

# Why?

**You can have that key you always dreamed of**



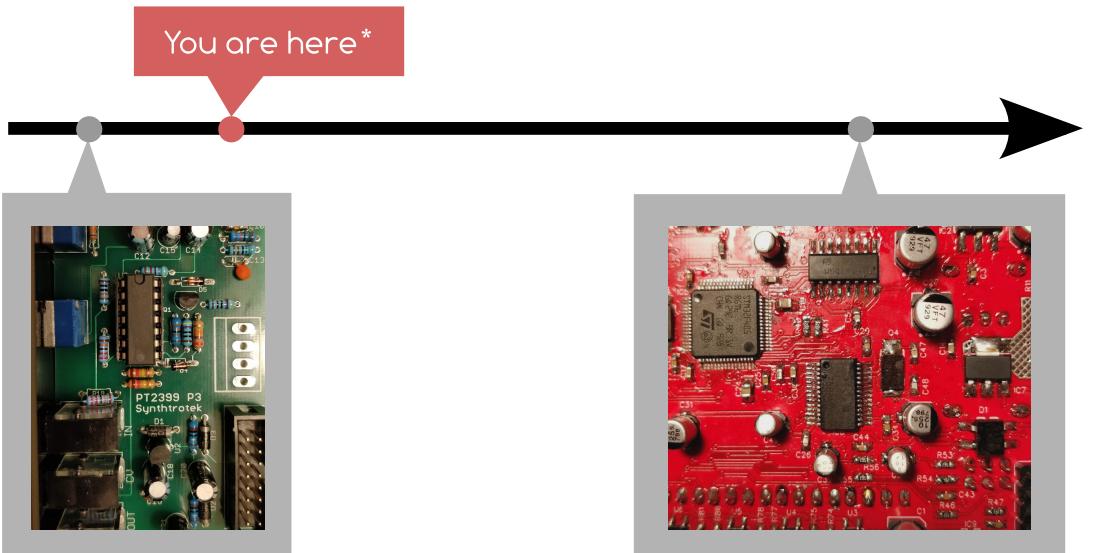
You can have the layout  
you  
always dreamed of



**It's the ultimate hacker  
fashion accessory**



# It's (relatively) easy



"Anyone can do this."

"Pray this won't explode when  
I switch it on..."

**It's fun!**



# Let's get started!

*In a record slides/min*



Planck

Dactyl

## Step 1

Pick a design

[BenRoe/awesome-mechanical-keyboard](#)



Corne

Ergodox



Lily58

# Dactyl

(Matthew Adereth)



<https://www.youtube.com/watch?v=uk3A41U0iO4>



# Variations



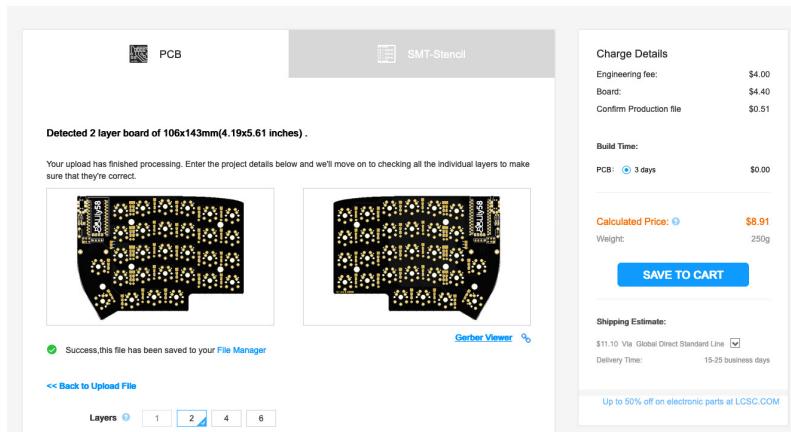
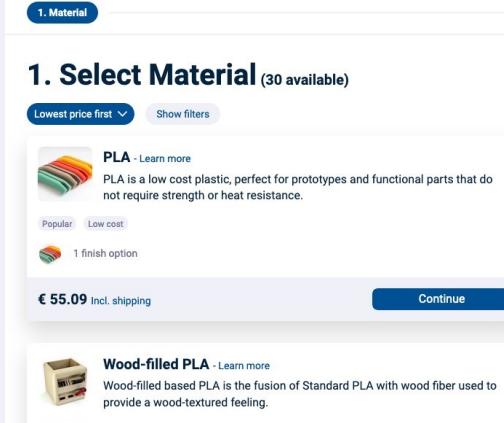
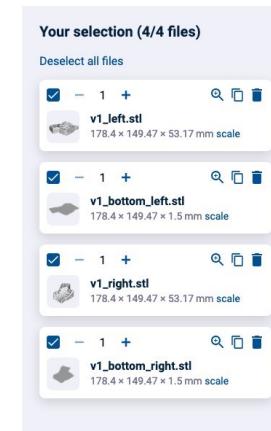
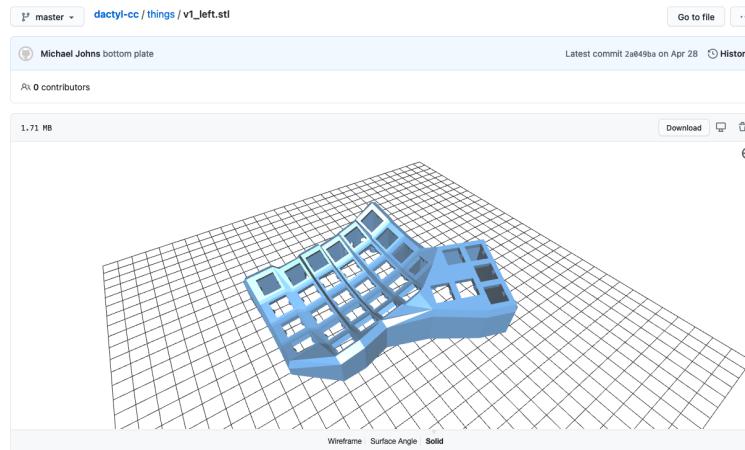
# Winner!

The dactyl-cc keyboard takes a different approach to the structure of the code (and language) as well as being more similar in feel to the Kinesis Advantage 2.

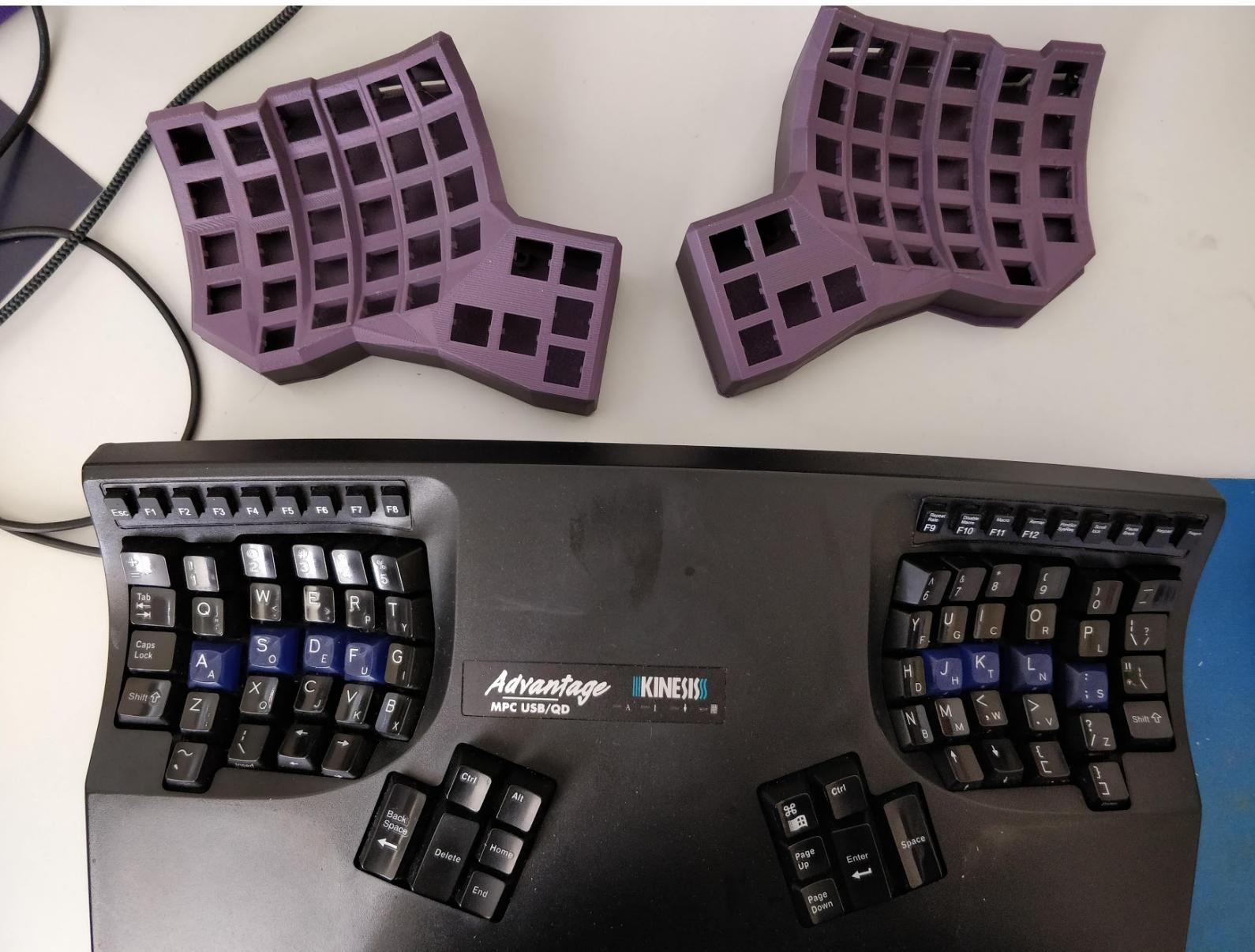
<https://github.com/mjohns/dactyl-cc>



# Step 2: The chassis







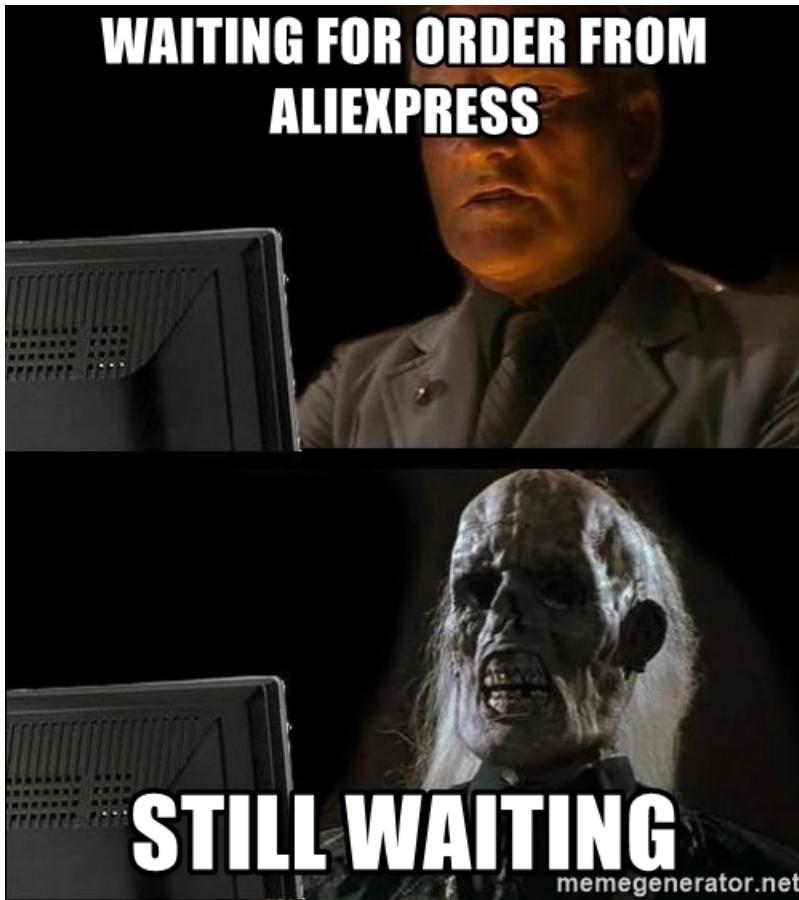
## „BOM“

Have	Ordered	Amount	Component	URL	Price + shipping (CHF)
	✓	70	Switches (brown)	<a href="https://www.aliexpress.com/item/4001111706889.html">https://www.aliexpress.com/item/4001111706889.html</a> <a href="https://www.aliexpress.com/item/4000810151652.html?">https://www.aliexpress.com/item/4000810151652.html?</a> (lot of 88)	36
		70	Keycaps		
	★	1	Teensy	<a href="https://www.aliexpress.com/item/4000182692435.html">https://www.aliexpress.com/item/4000182692435.html</a>	6.5
	★	1	MCP23018	<a href="https://www.aliexpress.com/item/4000014850326.html">https://www.aliexpress.com/item/4000014850326.html</a>	1 + 0.8
	★	70	1N4148	<a href="https://www.aliexpress.com/item/33035453991.html">https://www.aliexpress.com/item/33035453991.html</a> (lot of 100)	0.65 + 0.8
✓		1	28-pin DIP socket	<a href="https://www.aliexpress.com/item/32800776444.html">https://www.aliexpress.com/item/32800776444.html</a> (lot of 20)	1.2 + 1.3
✓		2	2.2K Resistor	<a href="https://www.aliexpress.com/item/4001166775224.html">https://www.aliexpress.com/item/4001166775224.html</a> (lot of 100)	0.47 + 1.21
	★	2	TRRS Jack (female)	<a href="https://www.aliexpress.com/item/33029465106.html">https://www.aliexpress.com/item/33029465106.html</a> (lot of 10)	0.73 + 1.77
	★	1	Spool of colored wire	<a href="https://www.aliexpress.com/item/32853594695.html">https://www.aliexpress.com/item/32853594695.html</a>	6.37
	★	1	MiniUSB cable	<a href="https://www.aliexpress.com/item/32918461237.html">https://www.aliexpress.com/item/32918461237.html</a> (3m)	4 + 0.4
		2	TRRS Jack (male)	<a href="https://www.aliexpress.com/item/4000850170022.html">https://www.aliexpress.com/item/4000850170022.html</a>	0.4 + 1.4
		1	4 wire audio cable	<a href="https://www.aliexpress.com/item/4000262397782.html">https://www.aliexpress.com/item/4000262397782.html</a> (4 core, 5m)	3 + 1

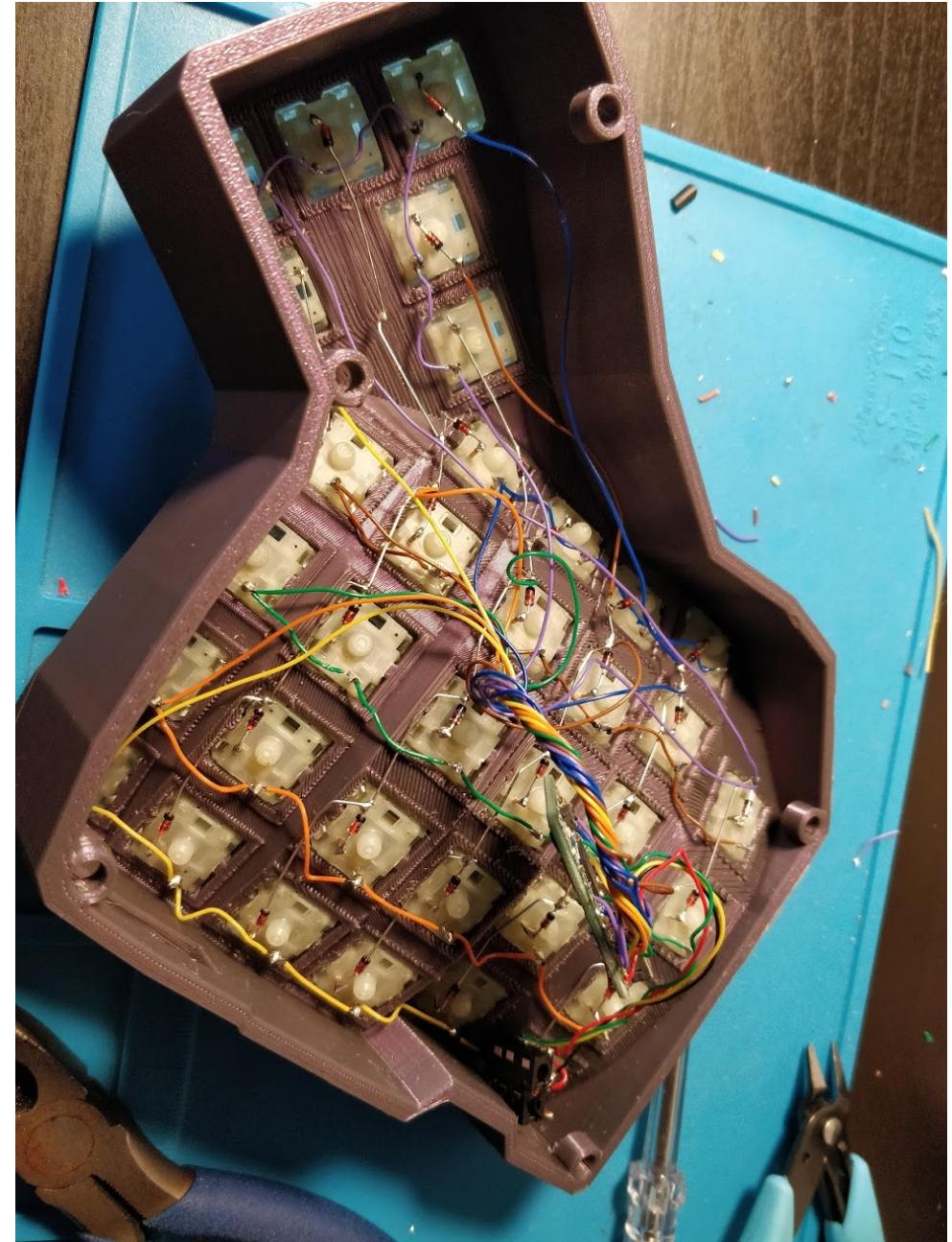
## Step 3: The parts



**WAITING FOR ORDER FROM  
ALIEXPRESS**

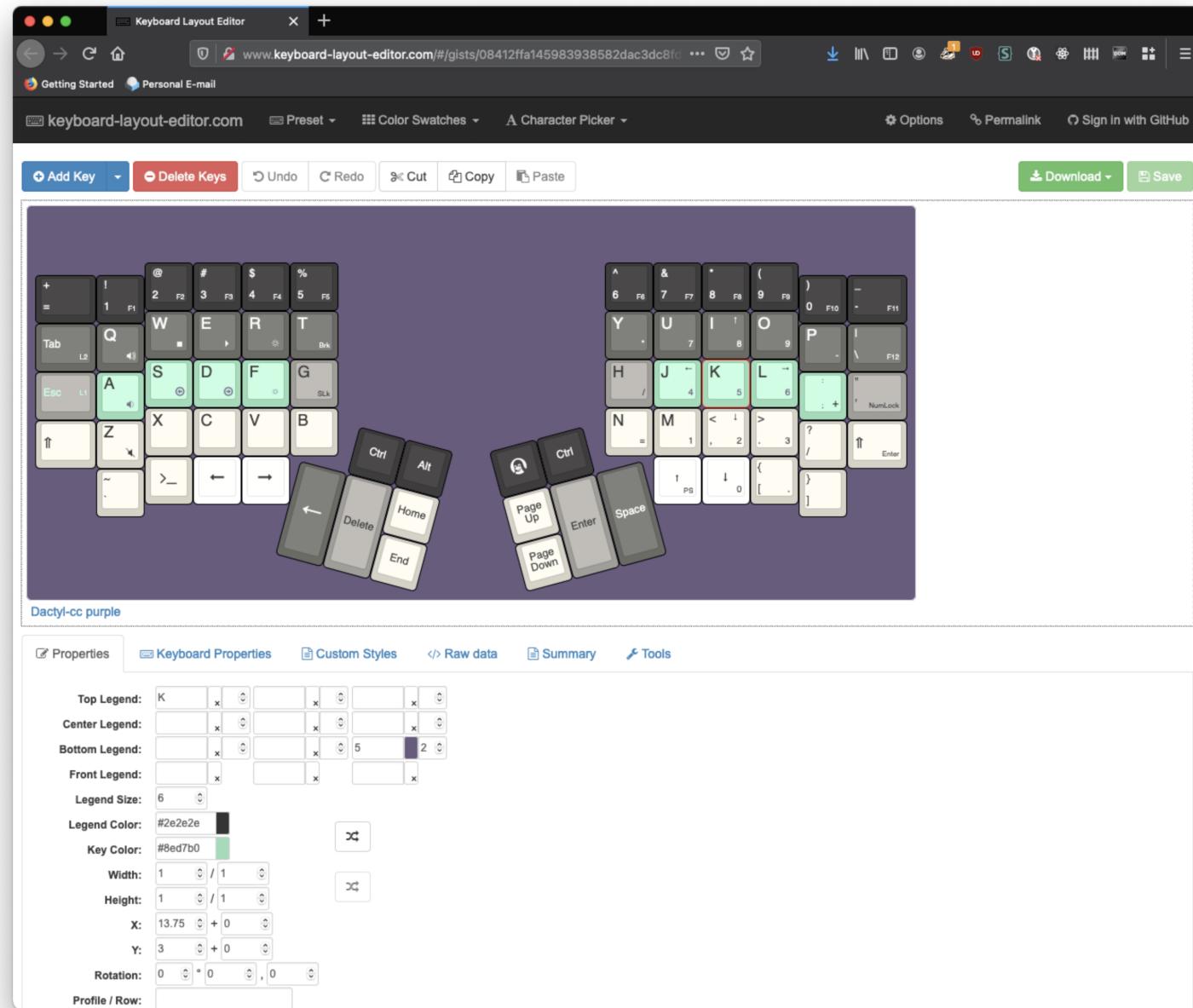


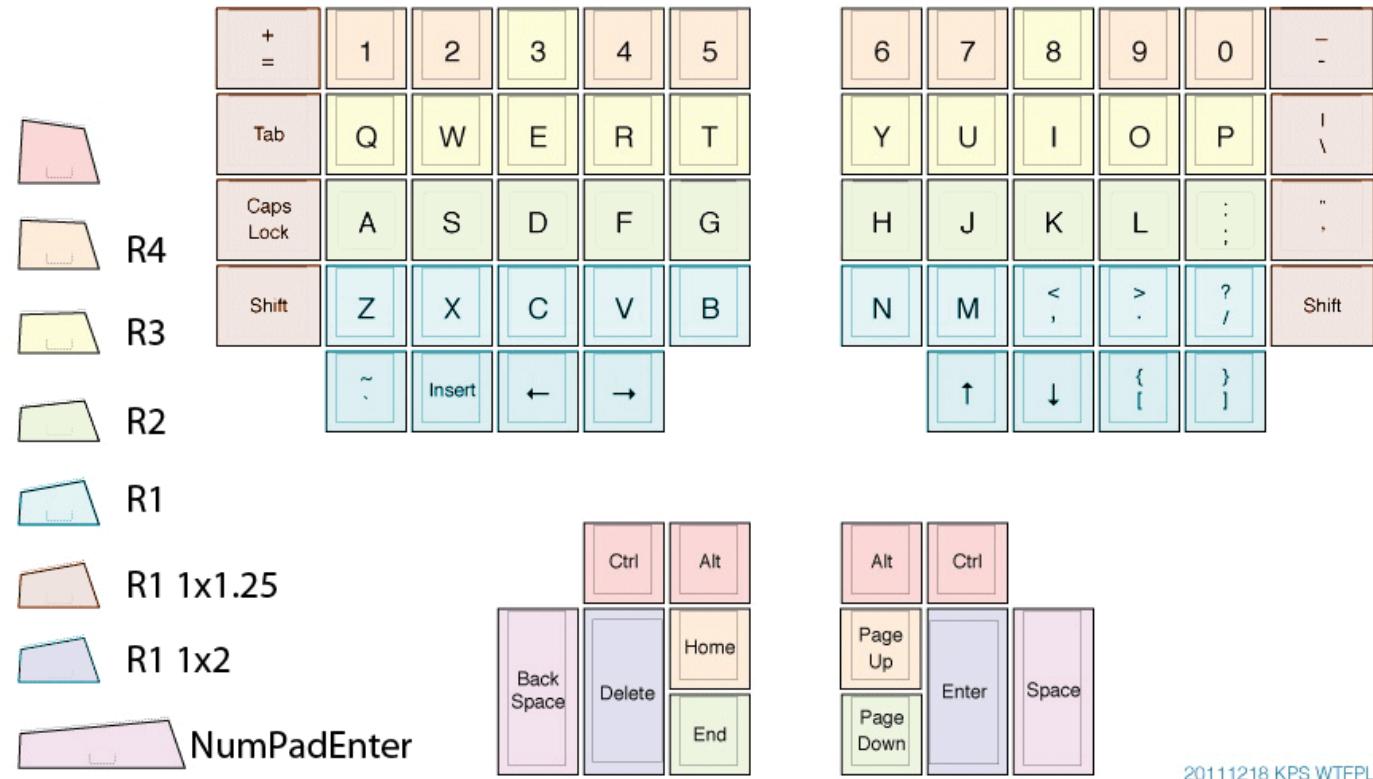
## Step 4: Let's solder!





## **Step 5: Keycaps**



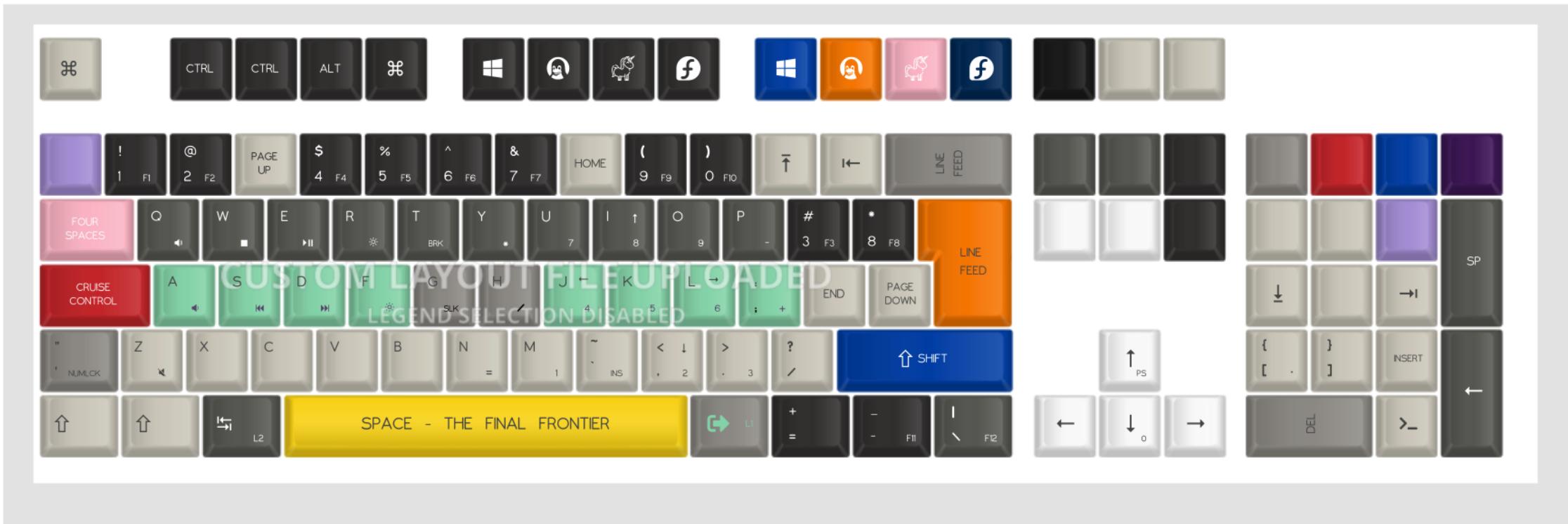


20111218 KPS WTFPL

[https://deskthority.net/wiki/Kinesis\\_Contoured#Keycaps](https://deskthority.net/wiki/Kinesis_Contoured#Keycaps)

## WASD Keyboards 105/88-Key Design Template

v5.0 - 6.11.2020





# Step 6: Firmware



<https://qmk.fm>

<https://git.io/JILZk>

*Am I running late by now? It will be a miracle if I'm not.*

```
qmkl_firmware on ↵ ubiks-config
$ qmk flash
Ψ Compiling keymap with make handwired/dactyl:pferreir:flash

QMK Firmware 0.10.22
Making handwired/dactyl with keymap pferreir and target flash

avr-gcc (Homebrew AVR GCC 8.4.0) 8.4.0
Copyright (C) 2018 Free Software Foundation, Inc.
This is free software; see the source for copying conditions. There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

Size before:
    text      data      bss      dec      hex filename
        0     21650          0     21650      5492 .build/handwired_dactyl_pferreir.hex

Compiling: tmk_core/common/command.c [OK]
Linking: .build/handwired_dactyl_pferreir.elf [OK]
Creating load file for flashing: .build/handwired_dactyl_pferreir.hex [OK]
Copying handwired_dactyl_pferreir.hex to qmk_firmware folder [OK]
Checking file size of handwired_dactyl_pferreir.hex [OK]
* The firmware size is fine - 21650/32256 (67%, 10606 bytes free)
Teensy Loader, Command Line, Version 2.1
Read ".build/handwired_dactyl_pferreir.hex": 21650 bytes, 67.1% usage
Waiting for Teensy device...
(hint: press the reset button)
```

# Main takeaways

*I most certainly will be out of time by now. Just read them during the Q&A!*

- Building your own keyboard is **not that hard™**;
- It's also not that expensive (~200 CHF)
- Chassis: use professional printing when possible;
- Next time: use STM32 instead of Teensy? (cheaper, better)
- Keycaps are expensive and hard to get in small amounts (blanks?);
- Details matter - e.g. nuts, rubber feet...
- **Learn from the mistakes of others!**
- <https://codimd.web.cern.ch/QGS2Mj8hRCSxOcjICrbbFw#>

# Thanks!

*Look ma, no time!*

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- "Hackerman - Copyright ©2014, Kung Fury;
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