

34 keys is all you need

An ergonomic mechanical keyboard journey

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Who am I?

- Master degree in EE
- Work as SWE @ Eurotech
- Mechanical keyboard enthusiast and maker
- Designed the *Redox Keyboard* and the *Yampad*

What is this talk about?

- Sub 40%
- Ergonomic
- Low profile
- Open source
- Mechanical
- Keyboards

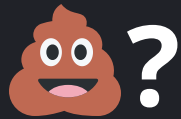
Talk outline

1. *Hardware*
2. *Software*
3. *Layout*
4. *Miryoku*

1. Hardware

- Top: Corona Model 4 1920 ca.
- Bottom: Macbook Air 2020 ca.

Why are we still stuck with this



Let's try and fix that

Split halves

“Your wrist are not built to bend like that. Split the keyboard to have a more natural posture.”

”

Thumb cluster

“Why is your strongest finger used to press only a key?”

Columnar stagger

“The row staggered layout is a heritage from the old typewriters that needed such an arrangement to prevent the percussors to get stuck.”

Minimalism

“We are moving our keys to the fingers, we're not moving our fingers to the keys”

Key wells and tenting

“A moderate elevation of the thumb side of the hand dramatically reduces the pressure on the forearm muscles.”

“The concave key wells ensure the keys are reachable and mimic the curve drawn by our fingers.”

2. Software

Keyboard Firmwares

“ **QMK** (Quantum Mechanical Keyboard) Firmware is an open source (GPL-2.0) community centered around developing computer input devices. The community encompasses all sorts of input devices, such as keyboards, mice, and MIDI devices.”

“ **ZMK** (Zephyr™ Mechanical Keyboard) Firmware is an open source (MIT) keyboard firmware built on the Zephyr™ Project Real Time Operating System (RTOS). ZMK's goal is to provide a modern, wireless, and powerful firmware free of licensing issues.”

Keyboard Firmwares

Features

Layers

“ ... this amounts to a function key that allows for different keys, much like what you would see on a laptop or tablet keyboard. ”

- QMK https://docs.qmk.fm/#/feature_layers
- ZMK <https://zmk.dev/docs/behaviors/layers>

Hold-Tap

“ The hold-tap key will output the 'hold' behavior if it's held for a while, and output the 'tap' behavior when it's tapped quickly ”

- QMK https://docs.qmk.fm/#/tap_hold
- ZMK <https://zmk.dev/docs/behaviors/hold-tap>

Mod-Tap

“ The Mod-Tap behavior either acts as a held modifier, or as a tapped keycode. ”

- QMK https://docs.qmk.fm/#/mod_tap
- ZMK <https://zmk.dev/docs/behaviors/mod-tap>

Home row mods

“ In simple terms, home row mods are the main modifier keys (namely Ctrl, Option/Alt, Command and Shift) on the home row of the keyboard set as Mod-taps. ”

- Great article: <https://precondition.github.io/home-row-mods>

Layer-tap

“ The "layer-tap" behavior enables a layer when a key is held, and outputs a keypress when the key is only tapped for a short time. ”

- QMK https://docs.qmk.fm/#/feature_layers?id=switching-and-toggling-layers
- ZMK <https://zmk.dev/docs/behaviors/layers#layer-tap>

Combos

“ Combo keys are a way to combine multiple keypresses to output a different key. For example, you can hit the Q and W keys on your keyboard to output escape. ”

- QMK https://github.com/qmk/qmk_firmware/blob/master/d
- ZMK <https://zmk.dev/docs/features/combos>

More advanced features

- Leader key
- Conditional layers
- Tap dance
- Caps word
- and so on...

3. Layout

What's wrong with QWERTY?

"On the Prehistory of QWERTY"

Can we do better?

Dvorak layout

Can we do better?

“ We have seen that the DVORAK layout does produce better typing speed performance than the QWERTY keyboard, **but that this difference is just 4 or 5%**. When we look at the history of the typewriter we can assume that people are not willing to switch to this superior design: **the gain is too small compared to the costs of retraining.** ”

“ The major feature of Dvorak's DSK, however, is its optimised key placement. The DSK is designed for touch typing and **significantly reduces finger movement and thus typists' fatigue**. Though this ergonomic feature has been pointed out in many different studies –and in fact is quite evident– this has not convinced the general public that they are better off with the DVORAK layout. ”

"Comparing Different Keyboard Layouts: Aspects of QWERTY, DVORAK and alphabetical keyboards"

Colemak layout

“ Coleman states that he designed Colemak to be easy to learn, explaining that Dvorak is hard for QWERTY typists to learn due to it being so different from the QWERTY layout. ”

4. Miryoku

**Let's put it all together
now**

Base layer

Base layer

Base layer


Base layer

Num layer

Fun layer

Nav layer

The Miryoku layout

 fit center

Docs: <https://github.com/manna-harbour/miryoku>

Personal experience

- It improved my typing habits
- The "limitations" of this keyboard made me discover new *improved* typing habits
- Shortcuts are *so much more comfortable to type*
- Improved symbols access
- I've yet to encounter a key combination that I cannot type
- It is **FUN**

Conclusions

- Minimal (sub 40 keys) ergonomic keyboards are *viable*, if not *preferable* to normal keyboards.
- The techniques developed for this keyboard to work might come useful for all keyboard users.
- Give them a try!