

# Broken by Design

Keyboards - Problems, Solutions, Example

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# Quiz

## Your Usage:

- Eagle
- 8.5 Fingers
- Touch Type

## Your keyboard:

- Default
- Laptop
- Mechanical
- Gamer
- Fancy

# High Performance Interface

**100s of keys strokes per minute**

Me: 180, best: 600

**6 bit per key**

Alphabet, Modifiers, numbers

**Maybe faster than speaking**

# Legacy

## History

Type Writer

Mechanical design

Computers

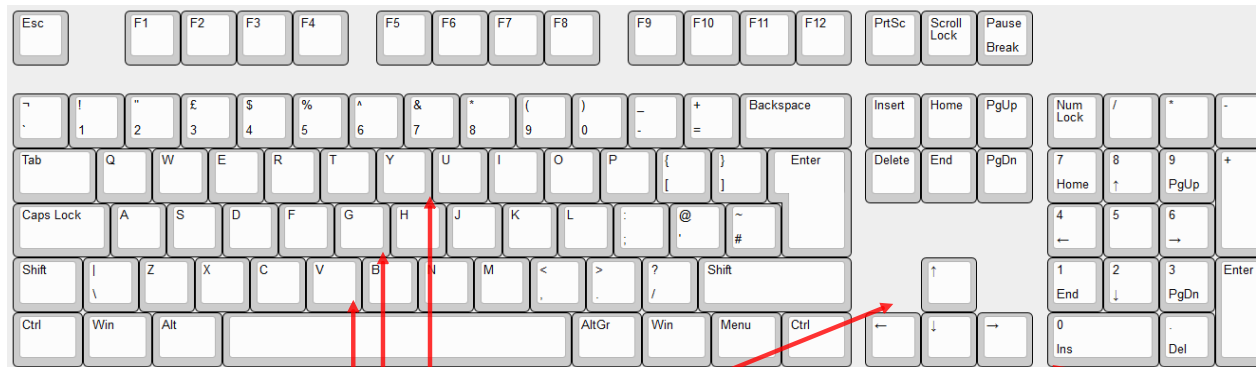
Adopted Interface

Different models

Unification in 80s

Windows Key 95

# Legacy Details

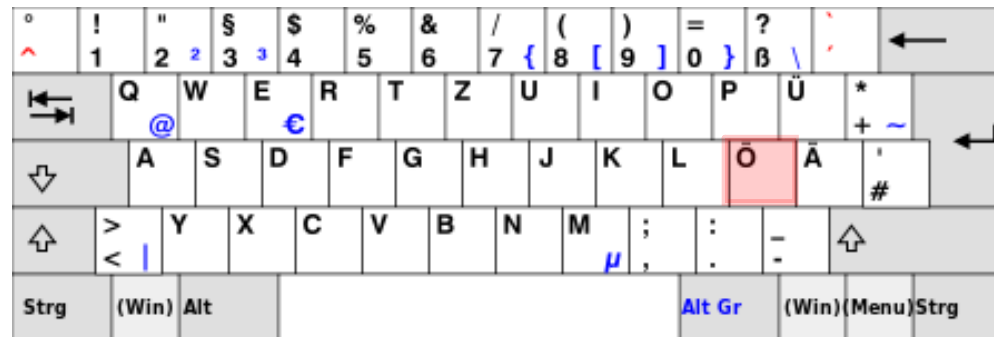


Source: <http://www.keyboard-layout-editor.com>

- 1 Shifted Rows
- 2 Caps Lock
- 3 Nav Block, Tenkeys

# Legacy

## Details



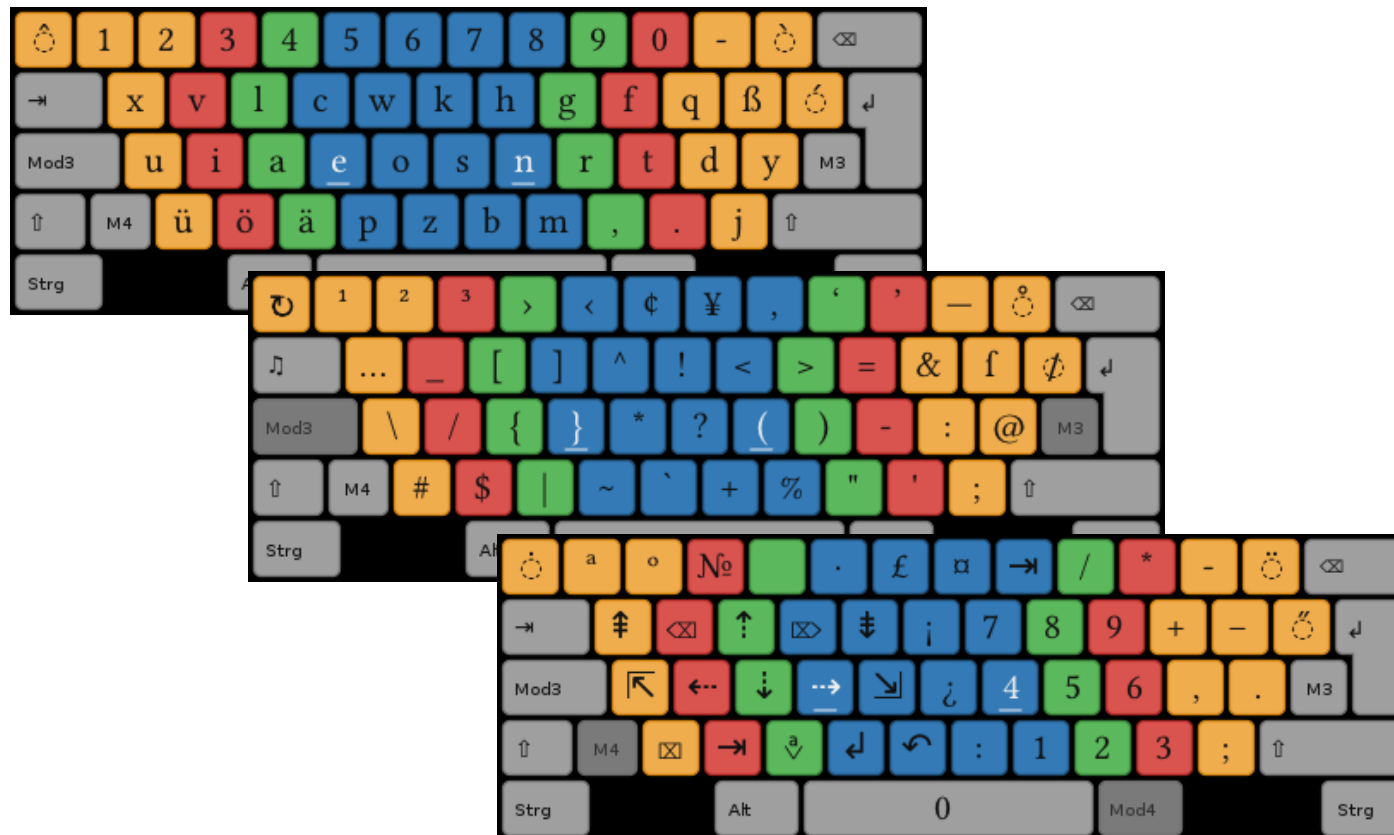
Source: Wikipedia KB\_German.png

German Layout

- 4 Alt Gr
- 5 Size
- 6 Layout

# Inspiration

Neo2 <https://www.neo-layout.org/>



# Inspiration

Ergodox

<https://www.ergodox.io/>



Looks probably not familiar... Don't panic!



# Inspiration

KeyMouse <http://www.keymouse.com/>



# Inspiration

Deskthority

<http://deskthority.net/>

Talk, knowledge and expertise regarding mechanical keyboards and other computer input devices.

View unanswered posts • View unread posts • View active topics Mark forums read

DISCUSSIONS	TOPICS	POSTS	LAST POST	BY
<b>Keyboards</b>	3596	61393	Today, 11:16	<b>mech greenhand</b>
<b>Mice &amp; other input devices</b>	223	3342	Yesterday, 19:31	<b>RickCHodgin</b>
<b>News &amp; reviews</b>	507	11483	22 minutes ago	<b>macboarder</b>

KNOWLEDGE BASE & MEDIA	TOPICS	POSTS	LAST POST	BY
<b>Deskthority wiki</b>	1485	37600	Yesterday, 23:26	<b>Daniel Beardsmore</b>
<b>Deskthority wiki talk</b>	173	2981	Yesterday, 00:35	<b>Daniel Beardsmore</b>
<b>Photos &amp; videos</b>	1451	30054	Today, 07:13	<b>Madhias</b>
<b>Workshop</b>	1053	32415	Today, 08:31	<b>Sythe</b>

OTHER	TOPICS	POSTS	LAST POST	BY
<b>Marketplace</b>	6180	157666	43 minutes ago	<b>DarkKou</b>
<b>Try before you buy</b>	37	3229	22 Apr 2017, 22:59	<b>hook</b>
<b>Other languages (de, fr, pt)</b>	495	12214	Today, 01:22	<b>lolpes</b>
<b>Off-topic</b>	955	26061	Yesterday, 20:00	<b>codemankamika</b>

**Photos & videos**

- Why we need a ma...  
by Daniel Beardsm...
- IBM 5556 Variant  
by DeChief
- Fucking Beamsprin...  
by mike52787
- IBM 3277 - 78 Key ...  
by kuato
- [Wik] IBM 624744...  
by snuci

# Ergonomy

## Hand:

- > Tilt
- > Angle
- > Rotation
- > Elbow position

## Fingers:

- > Pinky Overload
- > Thumb Underload
- > Versatility of fingers
- > Range of fingers

## Reorientation:

- > Arrows
- > Tenkey
- > Mouse

## Position:

- > Modifiers
- > Control Keys (Enter, Bsp)

# Ergonomy

What it is not

**Just split a keyboard and add some marketing**

For example MS Natural Keyboard

- Only very limited improvement compared to possibilities
- Marketing does not replacce true Ergonomy



[https://deskthority.net/w/images/9/99/Microsoft\\_Natural\\_Elite\\_UK.jpg](https://deskthority.net/w/images/9/99/Microsoft_Natural_Elite_UK.jpg)

# Build your own

## Try new ideas yourself!

### Ingredients:

- Key switches (Cherry MX, Alps, etc.)
  - > Any will do for a start! Really
- Key Caps
  - > **Order First, hardest to get**
- Wiring
  - > Diodes
  - > Matrix
- Microcontroller with USB capability
- Software
  - > tmk in my case
- Layout
  - > [keyboard-layout-editor.com](http://keyboard-layout-editor.com)

# Build your own

## Iterate cheap and fast

Costs:100€

Too expensive for full rebuilds

To much work and cost to create PCB layout

My approach:

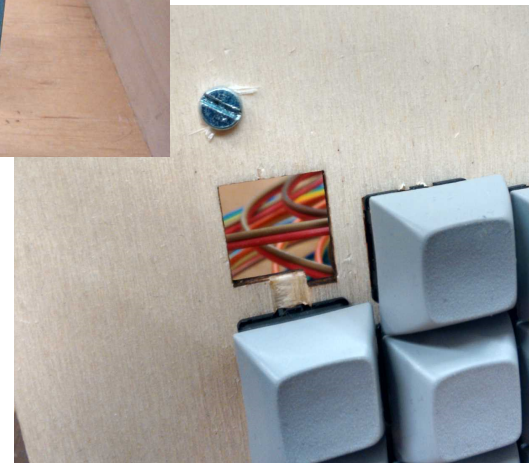
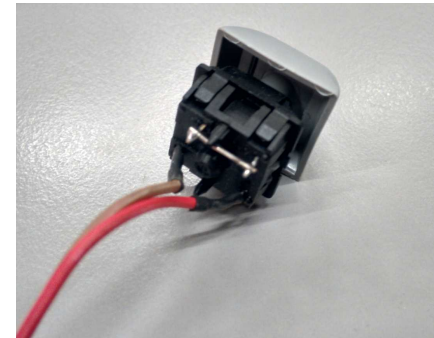
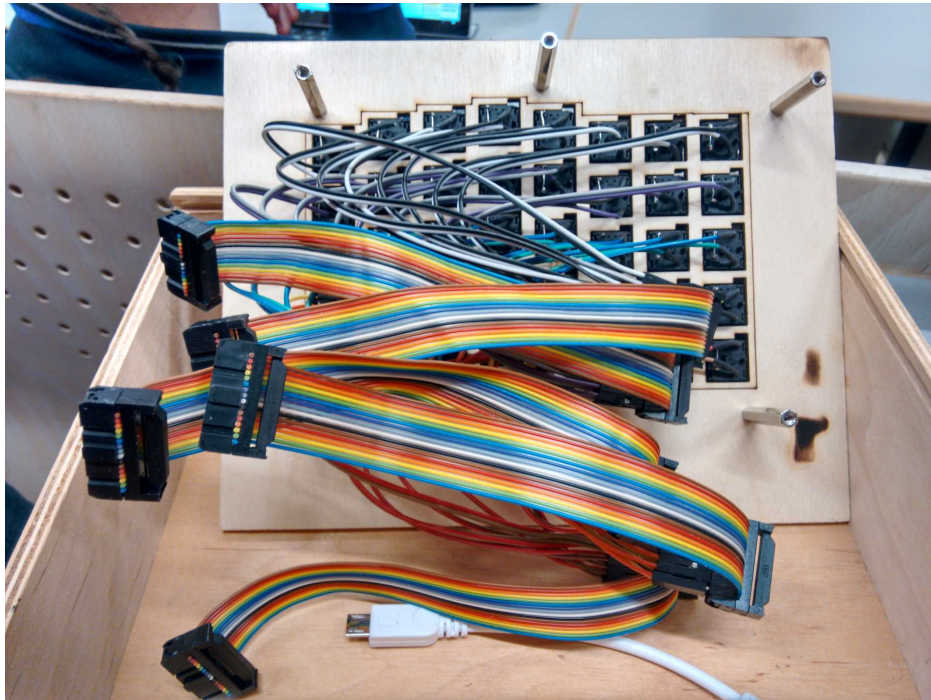
### Modularize

- > Cherry MX in lasered frame
- > Single wiring
- > Switching matrix
- > Microcontroller on Breadboard

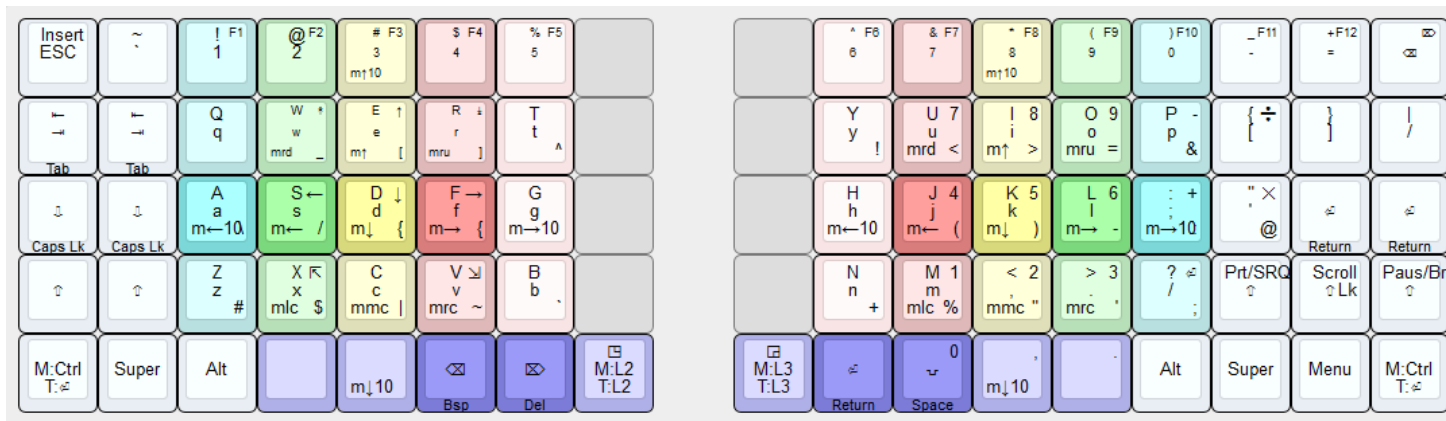
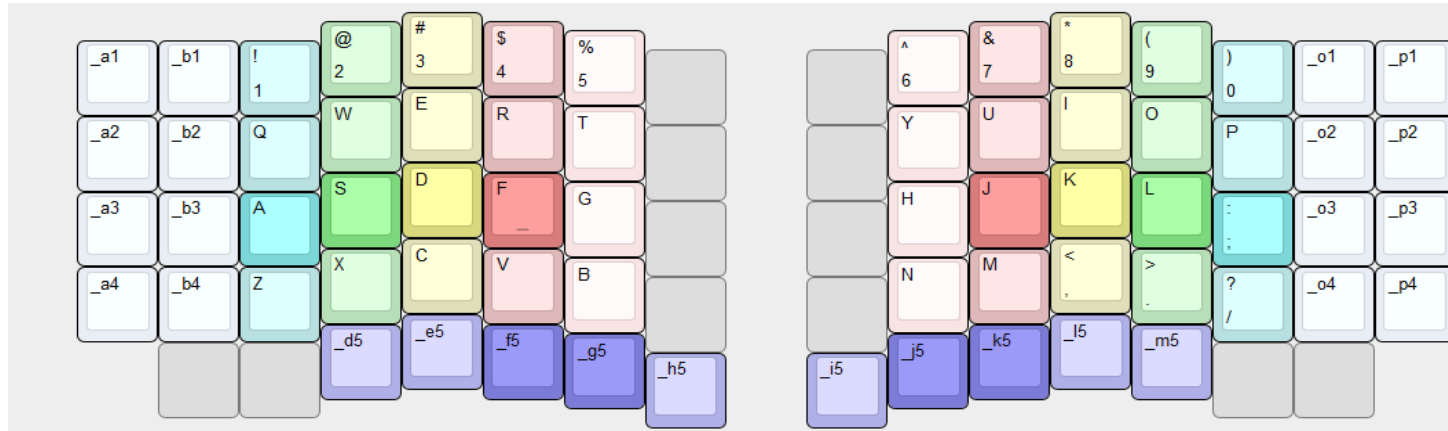
See <https://realraum.at/wiki/doku.php?id=trapicki:trapicki>

# Build your own

Iterate cheap and fast



# Build your own Patrick's first Layout



Pastrami traditional  
trapicki



# Beyond

No time to tell everthing

- USB protocol
- Keyboard Mapping
- Case building
- Lights
- Tactile Feedback
- Acoustic Feedback
- Morse/CW Output
- Morse/CW Input
- Display
- Macros
- Compose
- ....

**Think about it  
Build one.... maybe?**