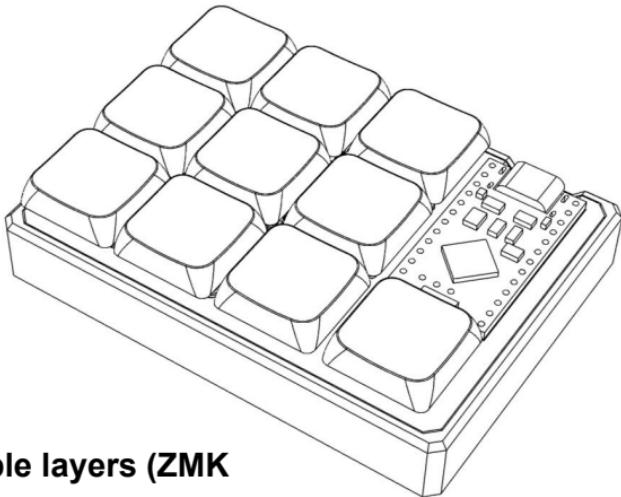


Iskra Handwired Numpad Overview & BOM

Description

Iskra is a DIY 10-key handwired macropad, designed for both wired and Bluetooth (ZMK) use.

It uses Kailh Choc low-profile switches and a Pro Micro nRF52840 (nice!nano v2 clone).



Key features:

- 3 programmable layers (ZMK firmware)
- Compact credit-card size layout
- Handwired matrix with 1N4148 diodes

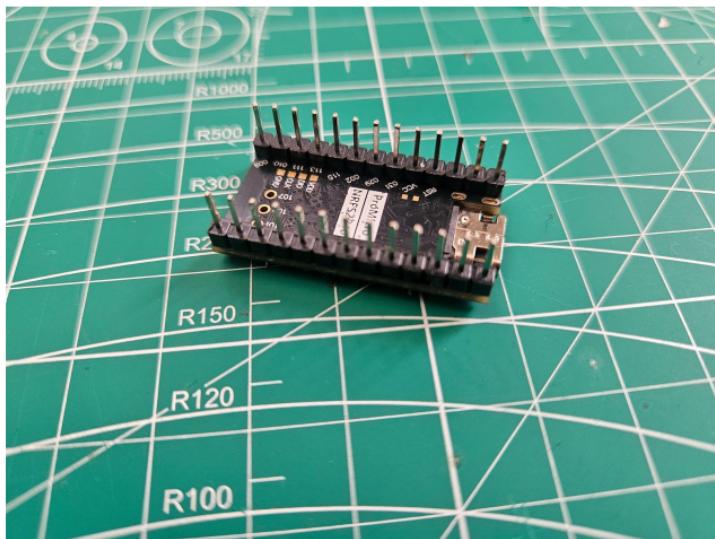
Bill of material with Links

Assuming you have soldering iron,solder, electronics tape and few wires

Part	Qty	Price (EUR)	Link
Kailh Choc switches	10	2.00	AliExpress
Pro Micro nRF52840 (nice!nano clone)	1	3.80	AliExpress
M3 brass standoff, 6 mm	2	0.20	AliExpress
M3 screw, 6 mm	4	0.10	AliExpress
1N4148 diodes	10	0.13	AliExpress
Copper wire	15 cm	0.05	AliExpress

Step 1: Solder pins to controller

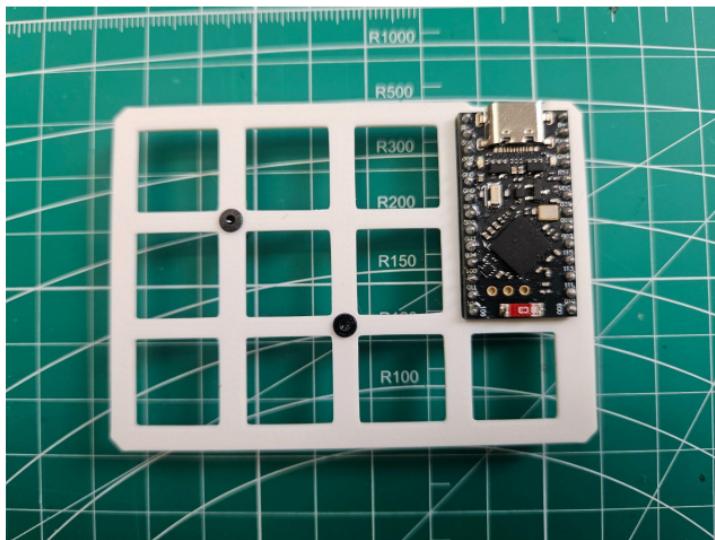
Solder the pins that came together with the controller



Step 2: Place controller onto plate

Place controller onto the plate as shown in picture, to secure it in place i added few drops of superglue from other side

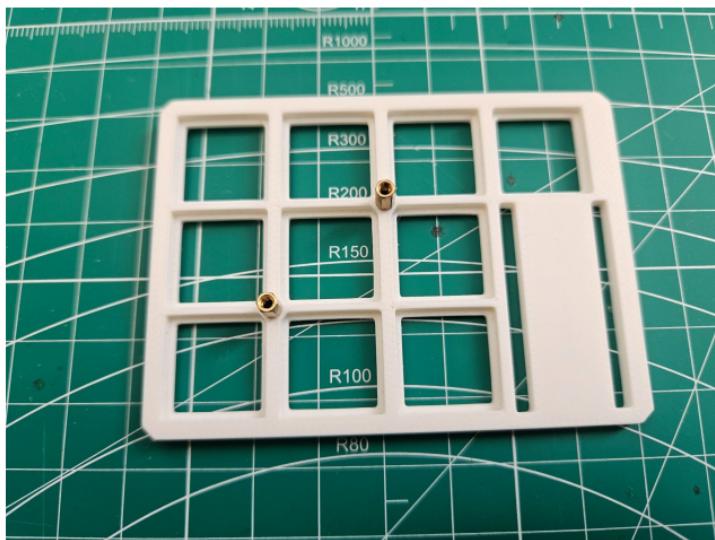
The right side of plate is the one that is completely flat on the surface with small indent for usb port



Step 3: Screw standoffs to the plate

Screw them on the side opposite where the controller is (on this side of the plate switch slot have small offset)

We are adding them now so we can account for them when we gonna wire the matrix



Step 4: Insert switches

Insert switches in the plate

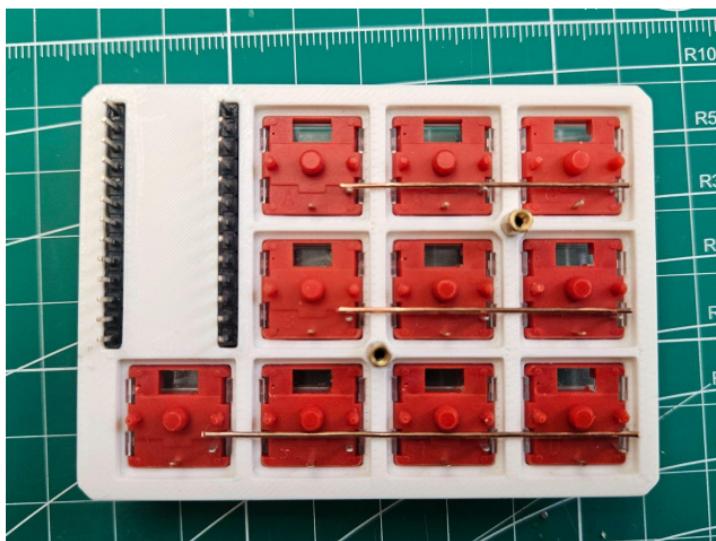
Make sure they are all oriented the same way, for ease of wiring in the future



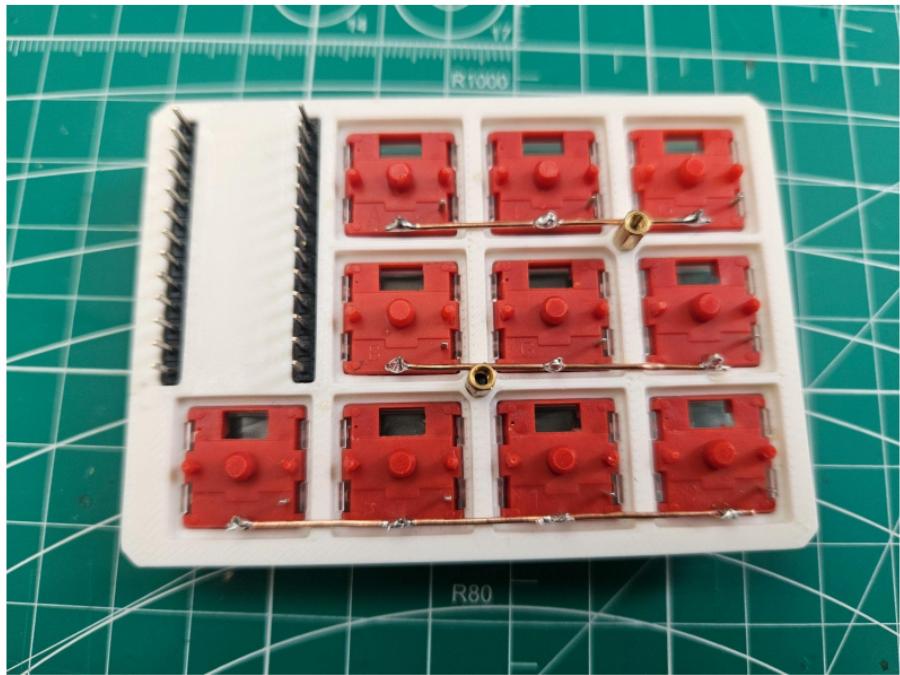
Step 5: Prepare copper wire for rows

Straighten the wire and cut it to the size of the row

All three rows are placed on the same switch contact



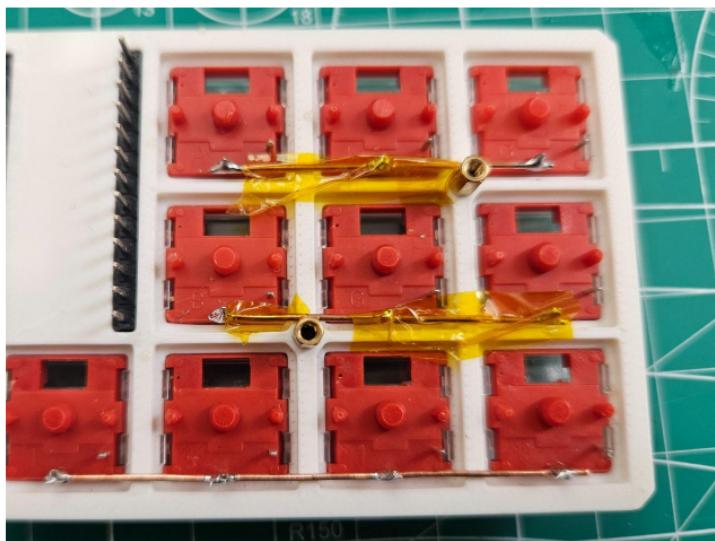
Step 6: Solder rows



Step 7: Mask the rows

In order for our columns to not short with rows, i masked the copper wire with some kapton tape, but you can use just normal electrical masking tape

Just make sure not to cover other contact of the switch

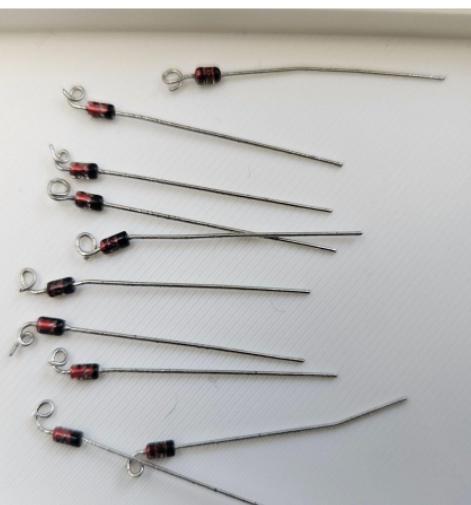


Step 8: Prepare diodes

Cut the diode leg that is opposite to the black marking

Then coil the short leg of the diode, it made to get better mechanical connection, you can wire them without coiling but this is just more secure and easy

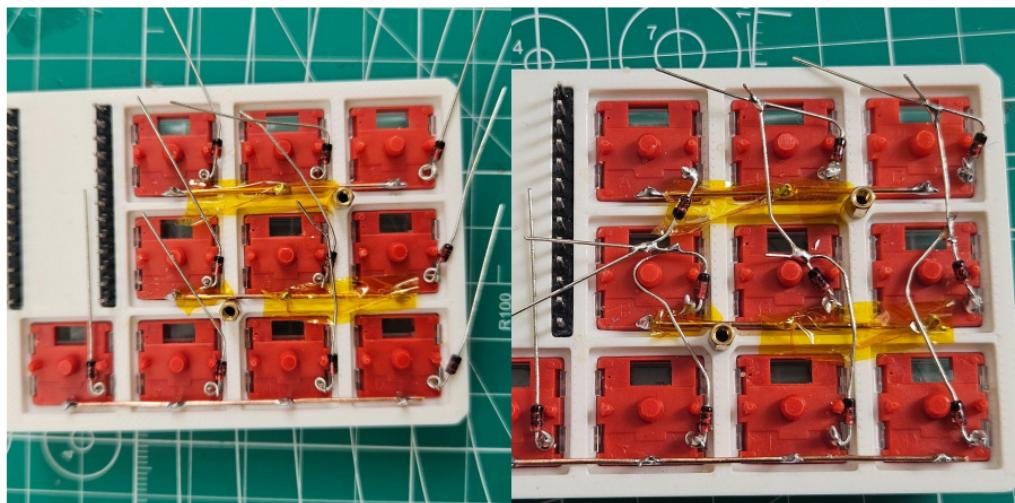
To coil them i just used round tip pliers



Step 9: Place and solder diodes

Place the coiled part on the empty switch contact and solder it

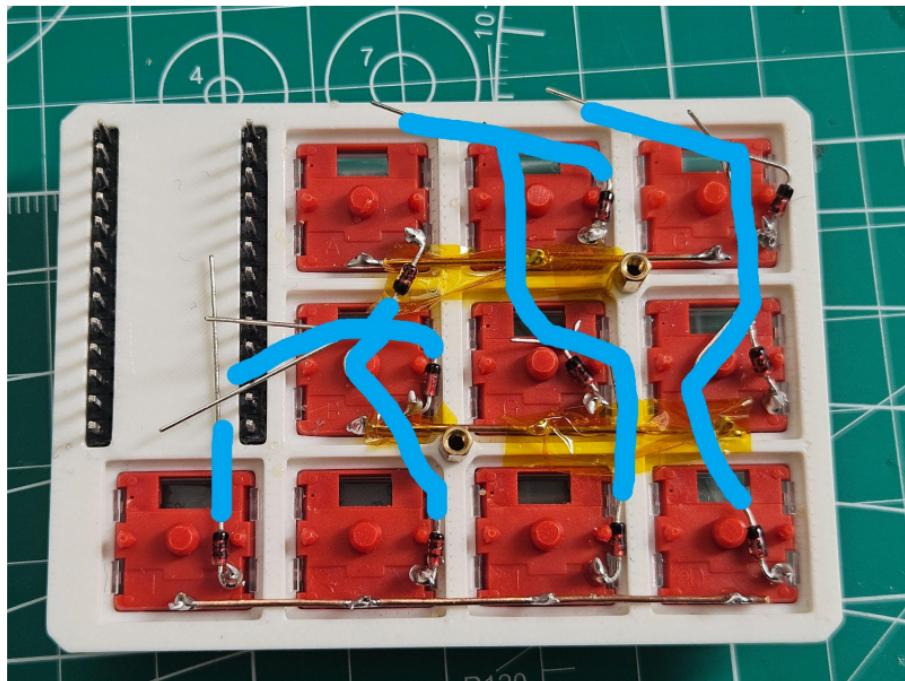
In the second image i moved the other diode leg in order to create columns



Note regarding Columns wiring

When wiring the legs of diodes to create columns, the only thing you need to pay attention to is this:

- Each diode leg need to be connected above other diode
- They cant short other columns or row



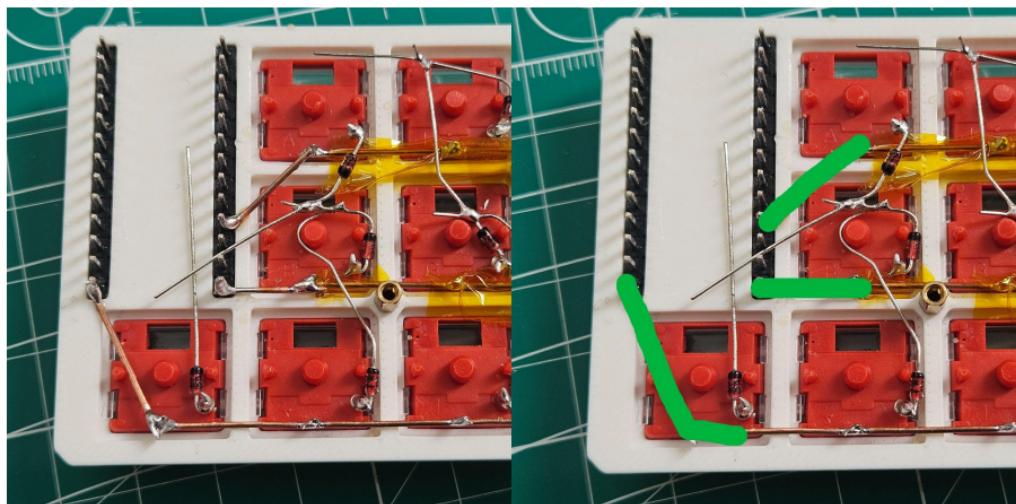
Step 10: Solder rows to pins on MCU

Solder each row to the pins, here i used small piece of copper wire

Top row goes to pin 100

Middle row goes to pin 106

Bottom row (With 4 switches) goes to pin 009



Step 11: Solder columns to pins on MCU

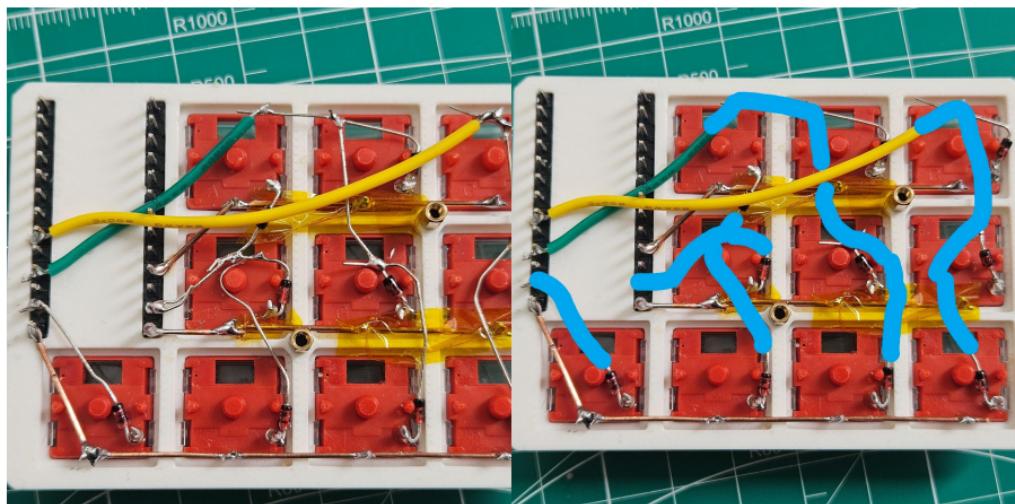
Solder each column to the pins, here i used long diode legs and few wires (It doesn't need to connect to the end of the column, anywhere above diode will work)

First column (single key) goes to pin 010

Second column goes to pin 104

Third column goes to pin 113

Fourth column goes to pin 002



Step 12: Final assembly

Screw the case, add keycaps and flash the firmware and you Iskra Numpad is ready to Use!

How to Flash firmware?

1. Connect Numpad to the pc
2. Short GND and RST pins two times (like you are double clicking)
3. MCU will appear as removable drive (D:/ NICE NANO)
4. Drop the Iskra.uf2 (from github) in the drive
5. It will restart and you numpad is flashed with new firmware

Note: The premade firmware will work only if you are using same controller and if you soldered to the pins specified in this guide