Ergo S-1 OE – Assembly Instructions

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1. What You'll Need

   - Left and Right Cases   https://github.com/wizarddata/Ergo-S-1

   - (Optional) Left and Right Ramp   https://github.com/wizarddata/Ergo-S-1

   - 12x M4 Heat Set Inserts   https://www.mcmaster.com/94180A351

   - 12x M4 Bolts   https://www.mcmaster.com/92010A222/

   - 10x Silicone Adhesive Feet   https://www.mcmaster.com/95495K57/

   - 68x Cherry / Gateron Switches

   - Cherry/OEM/DCS 104-Key Keycap Set

   - 68x Diodes   1N4148

   - Insulated Wire   Stranded 30ga silicone insulation

   - 2x Wireless Microcontrollers   https://zmk.dev/docs/hardware/

   - 2x Panel Mount USB-C   https://www.adafruit.com/product/4218

   - 2x Panel Mount Reset Switch   https://www.adafruit.com/product/1505

   - 2x Battery   https://www.sparkfun.com/products/13855

   - Soldering Iron

   - Hot Glue Gun

   - Double Sided Tape

   Cases, Ramps, Heat Set Inserts, Bolts and Silicone Feet are available in my Etsy store:
   https://www.etsy.com/shop/WizardKeyboards

2. Compatibility

   2.1. Switch / Keycap Compatibility

   This layout was designed to be compatible with standard Cherry/OEM 104-key keycap sets. DCS is also compatible, but DSA or SA will not work on all keys due to the keywell shape.

   The case is compatible with Cherry Mx and Gateron switches. The switches are held in place by the recess in the sides, so alternate designs like Kailh or Otemu will not fit.

   2.2. Insulated Wire

   For this guide, stranded 30ga silicone insulated wire was used. Some people prefer enameled magnet wire.

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3. Heat Set Inserts

The inserts included in the hardware kit go in narrow side down (pictured)

Figure 1 - Insert Orientation

Heat your iron to its lowest setting and gently press down on the insert. Stop when the top of the insert is flush with the case. Pictured is an iron tip designed for heat set inserts, but a standard tip can achieve the same result.

Figure 2 - Insert Tool

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Figure 3 - Insert Installation Example

There are four (4) inserts in each keywell and two (2) inserts in each base. The two (2) inserts on the base are inserted from the bottom (Figure 4). These are used to mount the optional ramps to adjust palm rest height.

Figure 4 - Base Inserts

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Figure 5 - Ramp Installed

4. Switches

Each switch is inserted with the LED slot facing down towards the palm. If you prefer, you can install the switches reversed instead. Once installed, the switches will be difficult to remove.

Figure 6 - Switch Orientation Front

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Figure 7 - Switch Orientation Rear

5. Switch Matrix Wiring

Attach your diodes in the orientation pictured below. Note that the black line on the diode is facing AWAY from the switch.
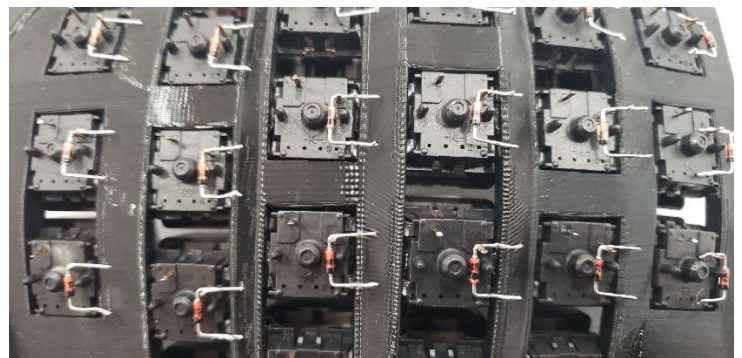

Figure 9 - Diode Orientation Close Up

Figure 8 - Diode Orientation

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Next connect the diode legs into rows, and the remaining switch legs into columns, as pictured. The wiring is mirrored between the left (Figure 10) and right (Figure 11) halves. Make sure to leave plenty of length to simplify the assembly process. See Section 8 - Battery (Figure 15 – Battery Location) for length reference image.
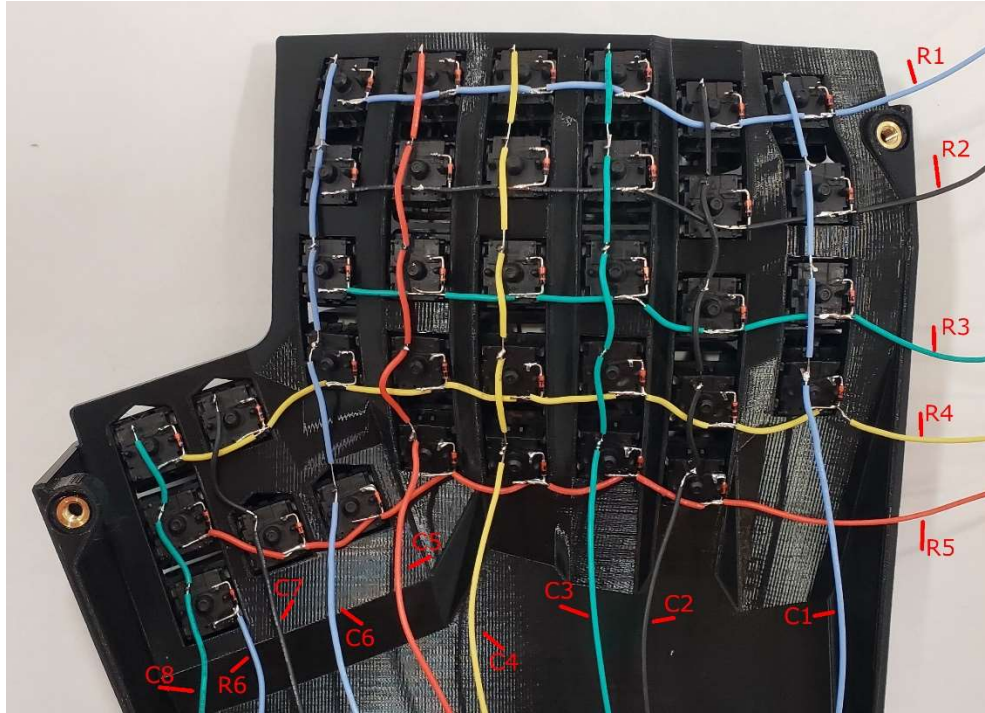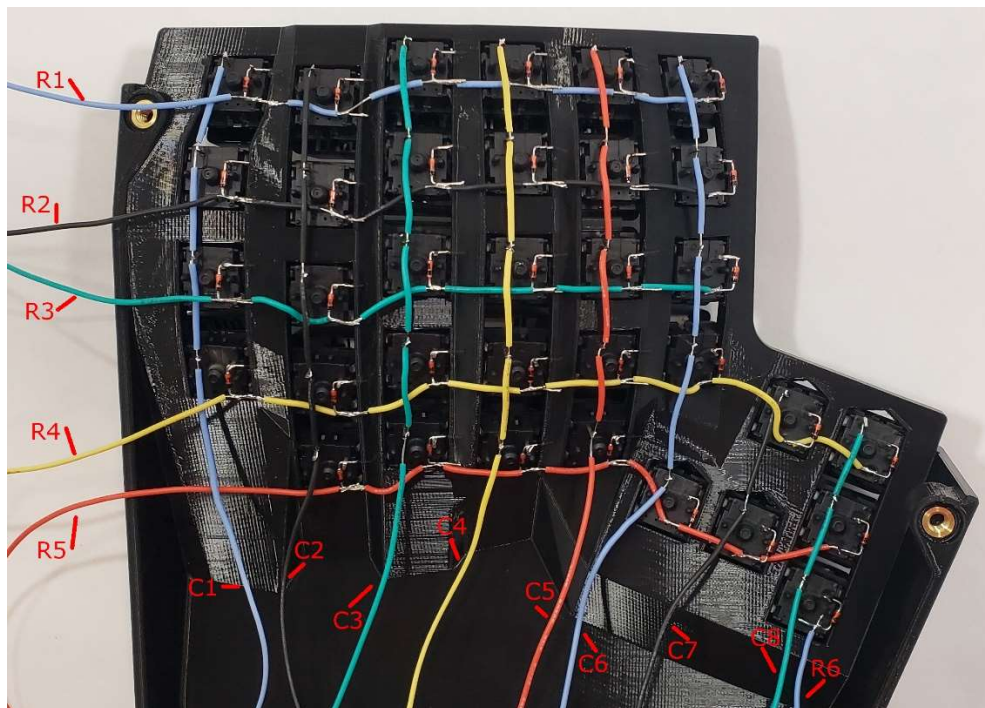

Figure 10 - Left Case Switch Matrix

Figure 11 - Right Case Switch Matrix

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6.   Reset Switch

Connect each leg of the reset switch to a wire as shown below. One will connect to your microcontroller's RESET pin, the other will connect to GND.

Figure 12 - Reset Switch

7.   Microcontroller

For this guide, a nice!nano microcontroller was used. Other good options are the nRFMicro or BlueMicro840. For any alternatives, you'll need to update your firmware configuration as each model has a different pinout.

For a complete list of ZMK's supported hardware: https://zmk.dev/docs/hardware

Hot glue the male end of the panel mount USB connector to this area of the case. Do not glue the micro controller down, you'll need to be able to remove it to connect the switch matrix wiring and possibly for future diagnostics.
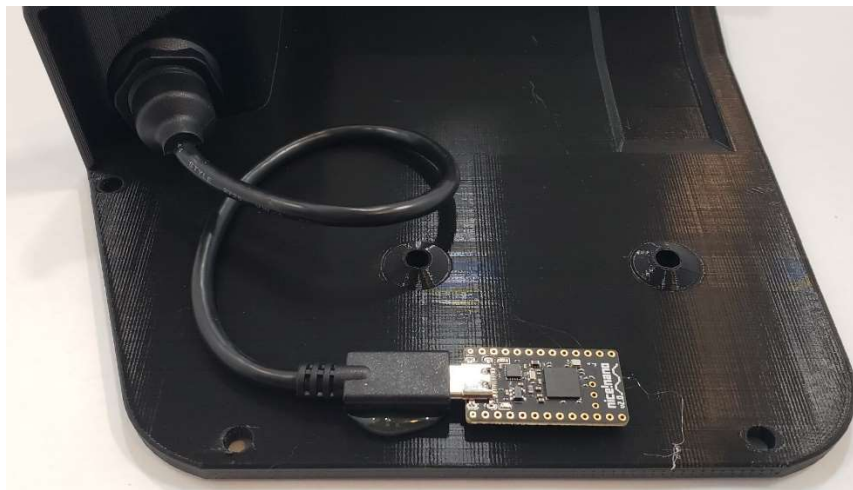

Figure 13 - Microcontroller Location

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7.1.   Microcontroller Wiring

Wire in the switch matrix to your micro controller according to the diagram below. Also shown, for reference, is a table correlating matrix rows/columns to nice!nano pin labels.

Table 1 - Matrix Positions / Pin Labels

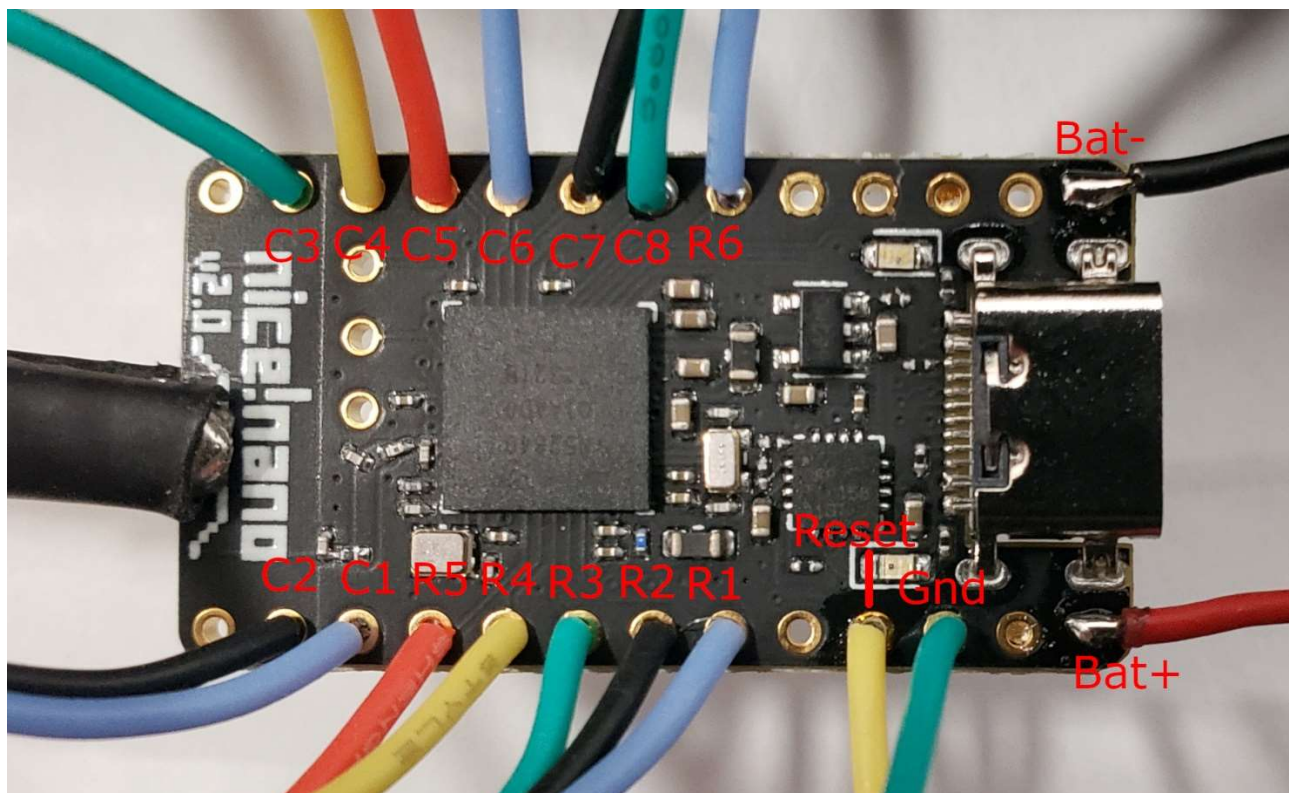| Matrix Position	Pin Label
R1	031
R2	029
R3	002
R4	115
R5	113
R6	017
C1	111
C2	010
C3	104
C4	011
C5	100
C6	024
C7	022
C8	020

Figure 14 - Nice!Nano Wiring

8. Battery

    Attach the battery in this area of the case. Double sided tape is recommended.

Figure 15 - Battery Location
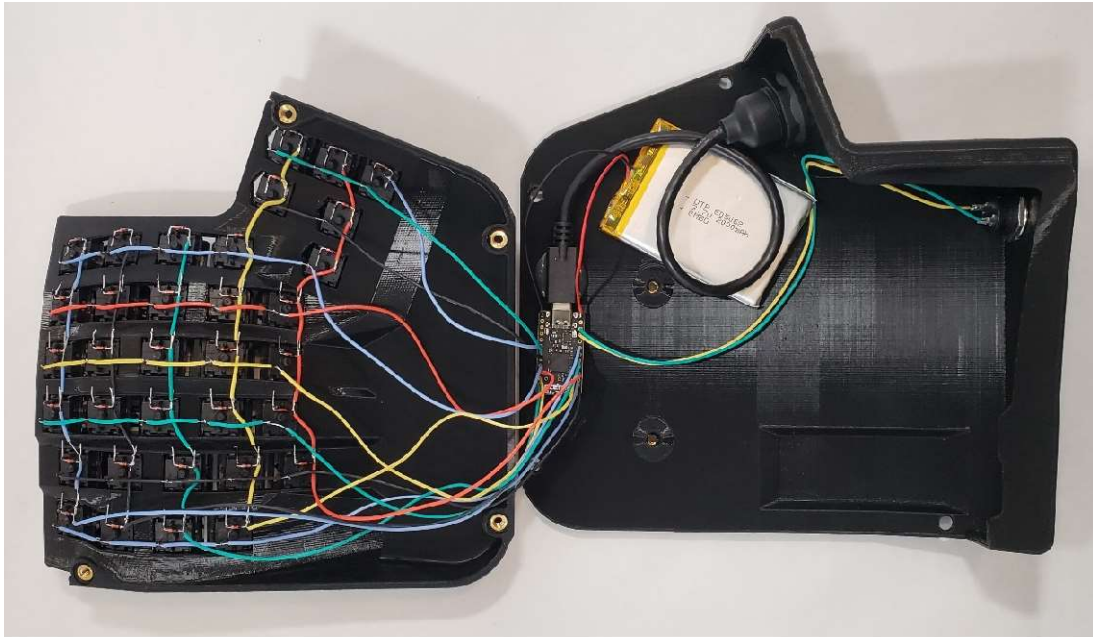
9. Firmware

    Pre-compiled firmware is available here: https://github.com/wizarddata/Ergo-S-1

    Refer to nice!nano documentation for flashing procedure.

    https://nicekeyboards.com/docs/nice-nano/getting-started/

    Refer to ZMK documentation for making layout changes.

    https://zmk.dev/docs