1 Cozy Pad

A cozy and wholesome macro pad for design folk

Made by Sam Daitzman and Dieter Brehm

1.1 Goals

Our goal is to create and program a tiny keyboard to make frequent tasks or shortcuts easier to access on a computer. It will have eight keys in a 4 column, 2 row grid, and will connect over usb to a computer. The computer will dictate the key-binding through it's operating system, but the keypad firmware will bridge the gap between the key switches and the computer's USB keyboard spec.

1.2 Minimum Interesting Results

- A physical keypad that connects over usb and allows the user to press buttons to type characters on a computer.
- Should work on windows, mac, and linux

1.3 Maximum Interesting Results

- Fancy case or rotary encoders on the macro pad
- Multiple control layers with a switch that activates them
- Robust ability to support different physical mechanism grid sizes (i.e. number of keys)
- WiFi or Bluetooth pairing ability

1.4 Learning Goals

1.4.1 Sam

I want to learn more about USB communications and how embedded C interacts with peripherals. I'm particularly interested in understanding the connections between the C code scanning for keypresses, and how to optimize the hardware (in this case, probably a diode-switch matrix) to work well with the software (which will probably need to scan the matrix very quickly). I'm excited to think intentionally about how to write C that performs as well as possible with the hardware we're working with.

1.4.2 Dieter

I want to learn more about C and C++ programming in embedded systems, and about how to handle inter-peripheral communication and inter-computer communication.

1.5 What's first

- Construct and wire up mvp macropad (1st week of project)
- Identify microcontroller of choice and locate documentation
- Sketch out an architecture for what control layers and functionality we want
- Research usb-keyboard protocols and communication
- Get a single button to write a single letter character on the computer