Béton3 // Build Guide

Soldering Guide

Welcome to the third Build Guide for Béton3. This Build Guide outlines a basic overview of the soldering and wiring you'll need to do in order to assemble Béton3.
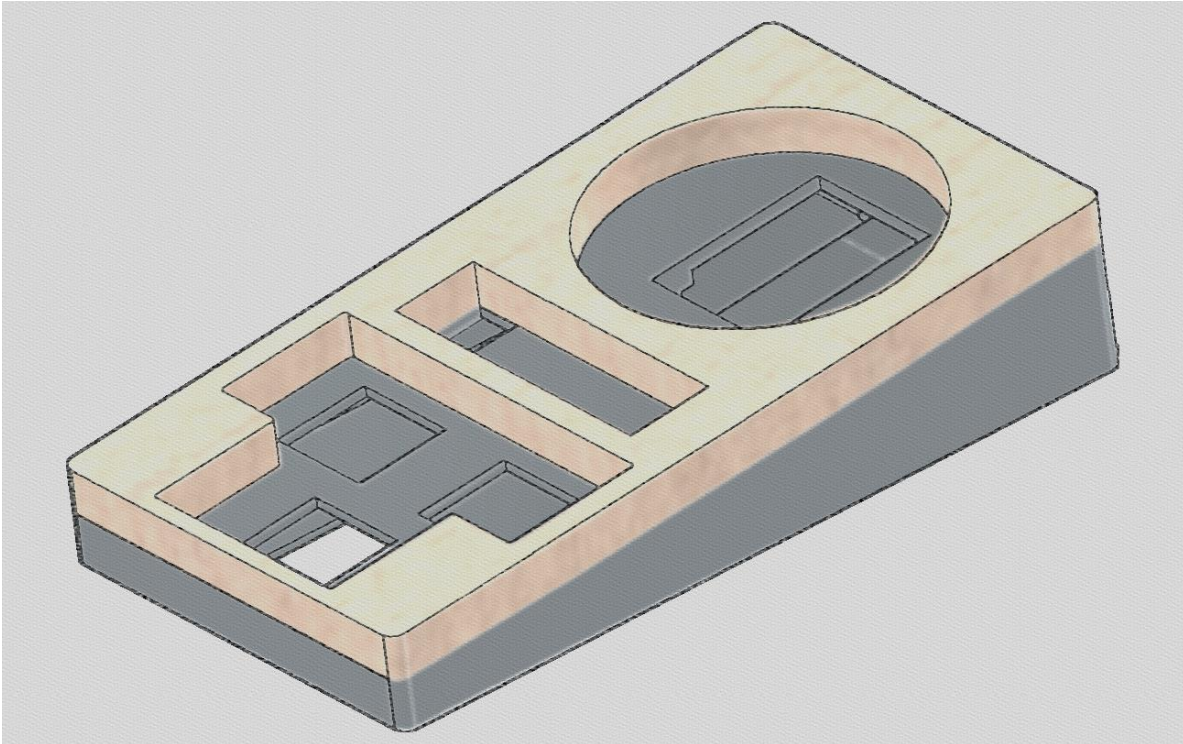

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Overview

Before starting with soldering assembly, gather some supplies:

- Dupont Wire
- Regular Wire
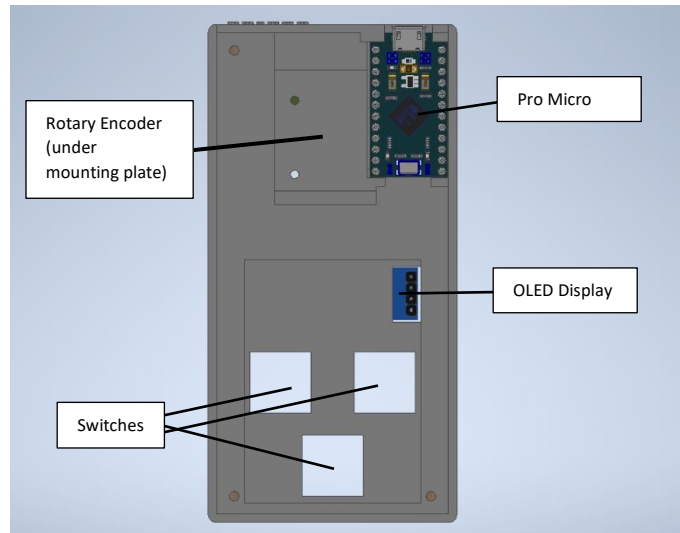- Soldering Iron
- Electrical Tape
- Wire Cutters

Figure 1 – The layout of components underneath

Layout

Looking at the chassis from underneath, the Pro Micro gets nestled in the top right, the rotary encoder gets inserted from the other side into a mounting "bracket" designed into the case, with its pins facing towards the back of the unit. The OLED display will get mounted to the top of the chassis, with its pins poking through the small hole for wiring. Finally, the switches are mounted in regular fashion into their respective mounting holes and wired accordingly.

Keep this layout in mind when you solder wires to the Pro Micro. I would highly recommend having the chassis part physically near you while you solder, so that you can essentially perform "test fits" after completing a few wires and see whether or not the length is good.

Dupont Wire Modification

Building Béton3, I used Dupont wires to connect the Pro Micro to components that have existing pins soldered on (rotary encoder, OLED display).

This step is theoretically optional, depending on how comfortable you are with desoldering pins or using an alternate method of attachment.

Figure 2 - An example of the modification required for the Dupont wires.

The commonly available type of Dupont wires have the connector seen in the figure to the right. A small modification is required to make them fit in the chassis' tight fitting case – using a small wire cutter, you'll want to trim the black plastic from around the wire at the wire-facing end. This modification doesn't affect functionality and gives the wire a bit more flexibility to bend and conform to tight spaces.

You'll want to do this modification to any Dupont wires used throughout this guide.
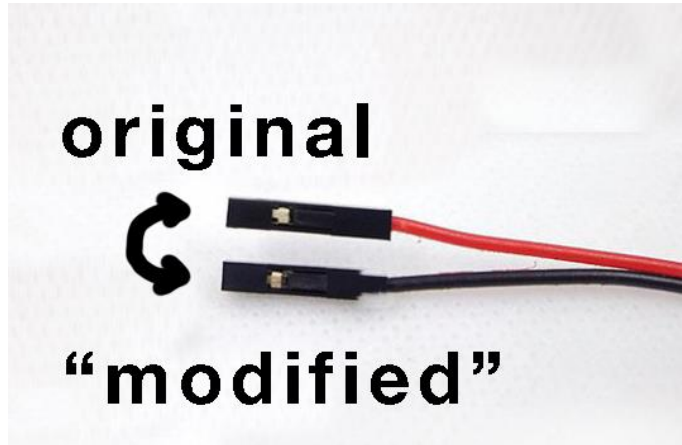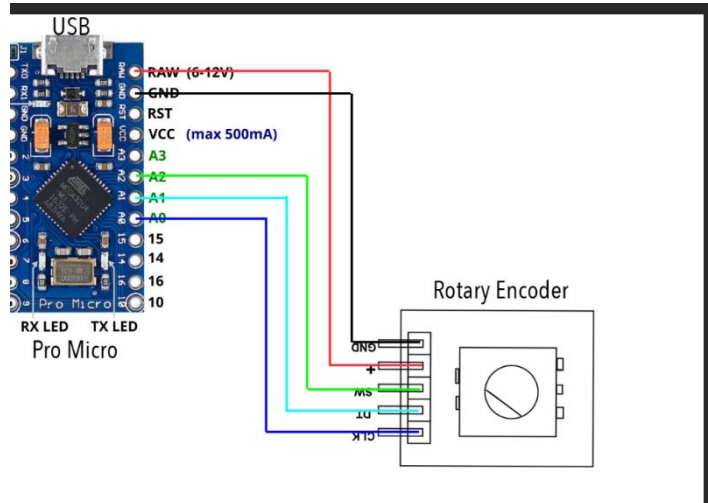
Rotary Encoder Wires

Gather the following:

- 5 Dupont Wires (female end)

Wiring description:

Figure 3 – A simple line representation of the wiring for the Rotary Encoder

- Pin RAW on Pro Micro → + on Rotary Encoder
- Pin GND on Pro Micro → GND on Rotary Encoder
- Pin A2 on Pro Micro → SW on Rotary Encoder
- Pin A1 on Pro Micro → DT on Rotary Encoder
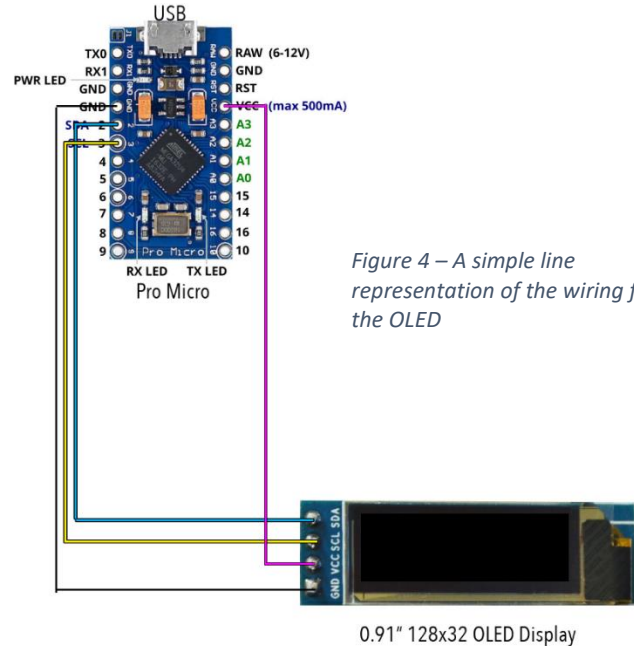- Pin A0 on Pro Micro → CLK on Rotary Encoder

Procedure

Starting with the Rotary Encoder wiring, you'll want to get 5 Dupont wires with female ends (these ends will connect to the rotary encoder) and cut them to size. You'll notice that the rotary encoder and Pro Micro are tightly packed next to each other in the chassis, so you'll want to cut the wires to be long enough to thread through to the other side and connect to the rotary encoder, but also short enough to fit in that small space in between the two.

In final assembly, the excess of these wires should tuck neatly in the space underneath the Pro Micro (looking at it from the bottom).

OLED Display Wires

Gather the following:

- 4 Dupont Wires (female end)

Figure 4 – A simple line representation of the wiring for the OLED

Wiring description:

- Pin VCC on Pro Micro → VCC on OLED
- Pin GND on Pro Micro → GND on OLED
- Pin SDA (pin 2) on Pro Micro → SDA on OLED
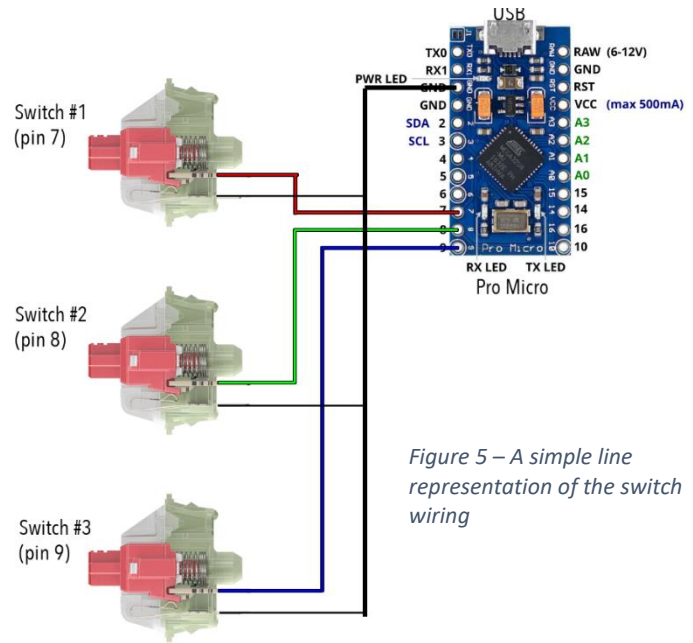- Pin SCL (pin 3) on Pro Micro → SCL/SCK on Rotary Encoder

Procedure

For the OLED wiring, you'll want to get 4 Dupont wires with female ends (these ends will connect to the rotary encoder) and cut them to size. You'll want to cut the wires to be long enough to reach the OLED pins poking through the chassis underneath the Pro Micro, but short enough to avoid bunching up and taking up space that will be needed for switch wiring.

Make sure you check that the Dupont wires have enough length to swivel and make contact with the OLED pins, I made a mistake on my first try and made the wires long enough to "reach" but too short to actually connect with the display.

Switch Wiring

Gather the following:

- 7 Regular Wires
- Electrical tape

Switch #1 (pin 7)

Switch #2 (pin 8)

Switch #3 (pin 9)

Figure 5 – A simple line representation of the switch wiring

Wiring description:

- One pin on each switch → GND on Pro Micro
- Other pin on Switch #1 → Pin 7 on Pro Micro
- Other pin on Switch #2 → Pin 8 on Pro Micro
- Other pin on Switch #3 → Pin 9 on Pro Micro

Procedure

To wire up the switches, the most important thing to keep an eye on is wire length. You'll want to carefully measure out wire lengths that more or less directly reach each switch.

The wiring looks more complex than it is – basically, one pin of each switch needs to connect to ground, and the other pin connects to a pin on the Pro Micro.

For the ground wires, I cheated a little bit and soldered one wire to a pin on the Pro Micro, which then spliced into three "branches", one for each switch. I used some electrical tape to insulate the joint where I spliced wires.

Make sure you check which pin is connected to which switch. If you're using the stock firmware, (looking from the top), the bottom switch (play/pause) will be switch #1, the leftmost switch (rewind) will be switch #2, and the rightmost switch (fast-forward) will be switch #3. If you mess this up, you can reassign the switch pins in the firmware before you flash it.

Full Wiring Diagram

A full, PDF version of this diagram is available at the GitHub repostitory:

https://github.com/adamlechowicz/Beton3/tree/master/Wiring%20Diagram