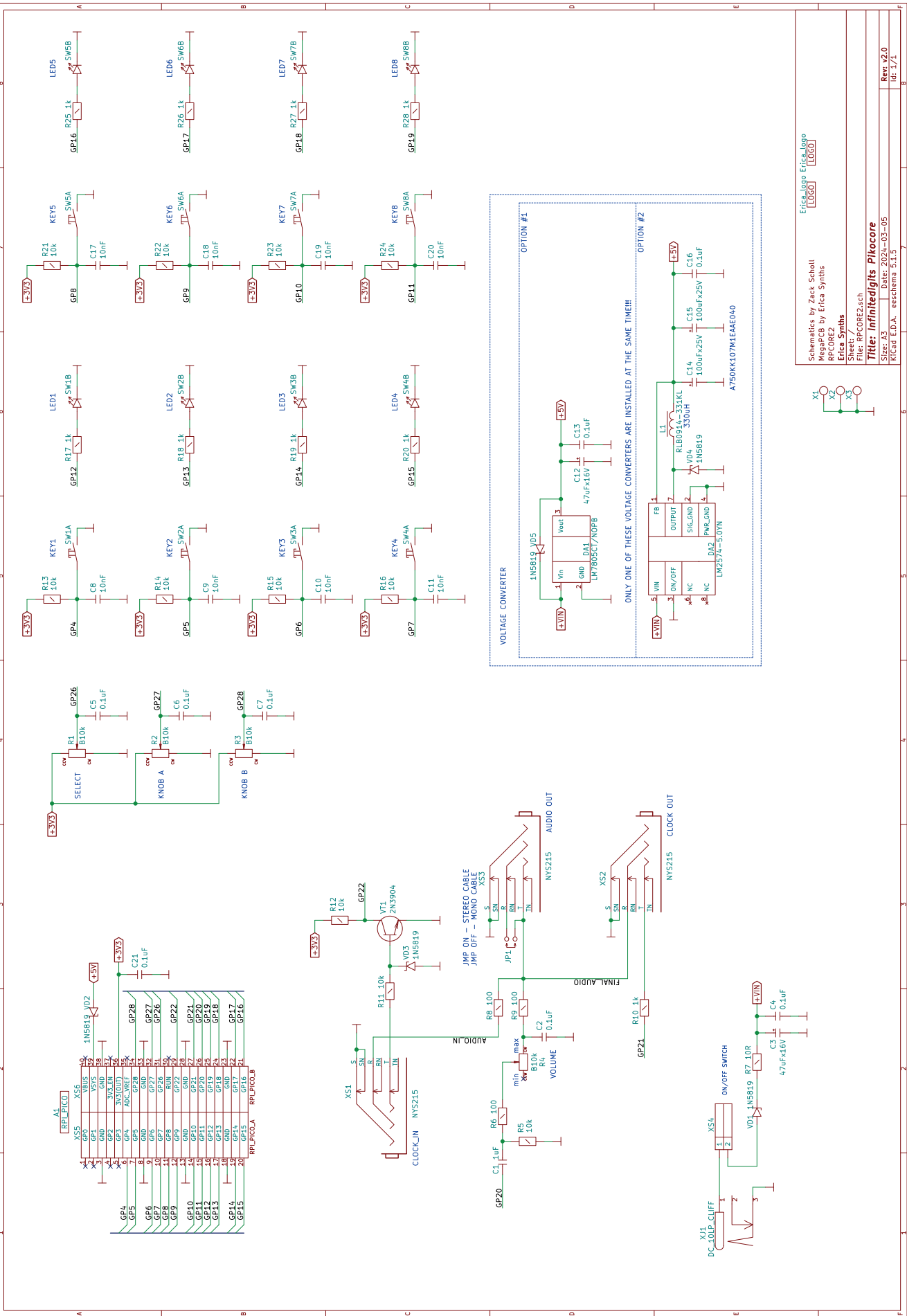


PIKOCORE ASSEMBLY MANUAL

Thank you for purchasing **Infinite Digits Pikocore XL DIY kit by Erica Synths!**

The Pikocore is a lo-fi music mangler based on the Raspberry Pi, developed by Zack Scholl: <https://infinitedigits.co/wares/pikocore/>. The original DIY kit comes in a miniature pocket calculator form factor, and we at Erica Synths wanted to make it more playable, so we reached out to Zack and agreed to develop an XL version of the Pikocore that has identical functionality, but comes with a signature Erica Synths hands-on user interface and proper aluminium enclosure. The Infinite Digits Pikocore XL by Erica Synths is a full DIY kit that includes all required components to build an instrument and put into action straight away. The RP board in the kit is pre-programmed and ready to use.

Before you start soldering, we highly recommend printing out the schematics and part placement diagram with designators and values and to follow the step-by step instructions below. This will help you to avoid mistakes during the build process. There are two options for +5V regulators on the PCB – a switching regulator and a linear voltage regulator (LDO). Because the power consumption of the instrument is comparably small, the kit contains components for a linear voltage regulator. When building the kit, **do not populate** DA2, C14, C15, C16, L1 and VD4.



Erica Synths Erica Synths
MegaPCB by Erica Synths
RPCORE2
Erica Synths

Schematics by Zack Scholl
MegaPCB by Erica Synths
RPCORE2
Erica Synths

Sheet:
File: RPCORE2.sch

Title: Infinitdigits PicoCore
Size: A3
Date: 2024-03-05
KiCad E.D.A. - eschema 5.1.5

Rev: v2.0
Id: 1/1

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

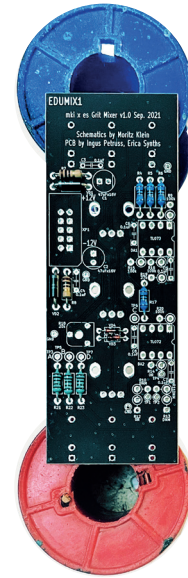
4

3

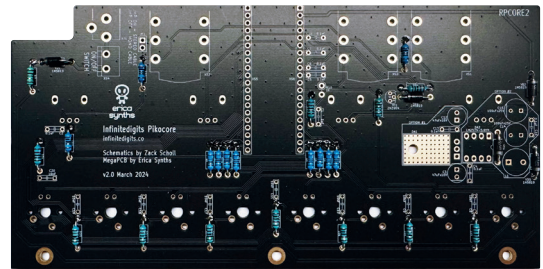
2

1

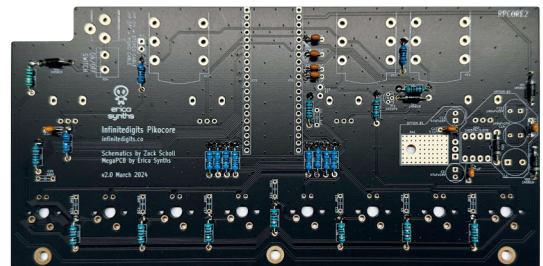
Place the Pikocore PCB in a PCB holder for soldering or simply on top of some spacers (I use two empty solder wire coils here).



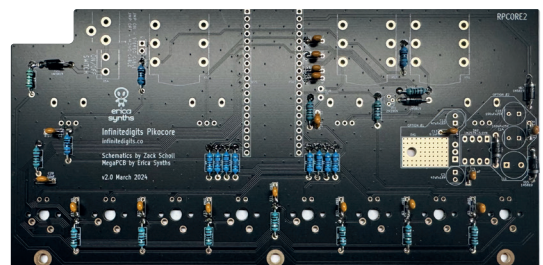
I usually start populating PCBs with lower, horizontally placed components. In this case, these are resistors and diodes. Bend the resistor leads and insert them into the relevant places according to the part placement diagram above. There is one vertically placed resistor – we'll install it later. Now, proceed with the diodes. Remember – when inserting the diodes, orientation is critical! A thick white stripe on the PCB indicates the cathode of a diode – match it with the stripe on the component. Flip the PCB over and solder all components. Then, use pliers to cut off the excess leads.



Now, we recommend sorting the ceramic capacitors. There are 100nF, 10nF and 1uF ceramic capacitors in the kit. 100nF have 104, 10nF have 103, and 1uF has 105 printed on the capacitor. Start by populating the 100nF capacitors.



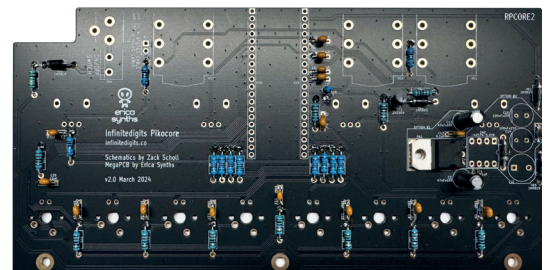
Then proceed with the other ceramic capacitors.



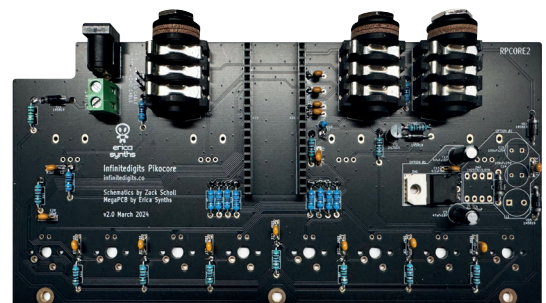
Now, insert & solder the electrolytic capacitors. Electrolytic capacitors are bipolar and you need to mind their orientation. The positive lead of each electrolytic capacitor is longer and there is a minus stripe on the side of the capacitor's body to indicate the negative lead. On our PCBs, the positive pad for the capacitor has a square shape and the negative lead should go into the pad next to the notch on the silkscreen.



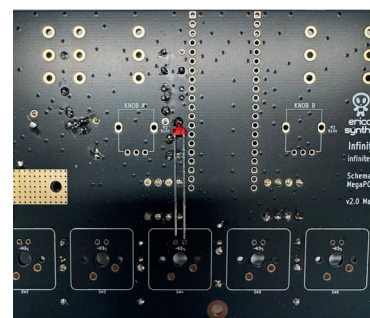
Also, install the voltage regulator (LDO) – bend the leads and solder it in place. The LDO will disperse all of the heat generated in the process of lowering the voltage. Before soldering, make sure that the LDO touches the heatsink on the PCB (no big deal, if it doesn't because not that much heat is generated). Also install and solder the remaining 1k vertically placed resistor. When completed, your PCB should look like this:



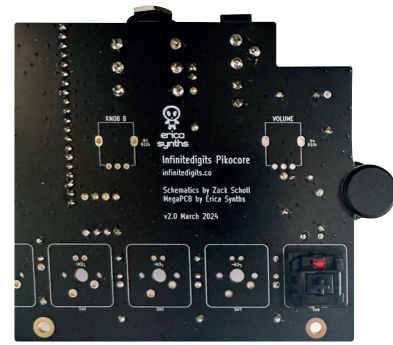
Now, solder all jack sockets and connectors. Make sure all components are properly pushed in the relevant places and the connectors are aligned with the silkscreen and vertical. We recommend soldering one pin of the component and double-checking the alignment. Also, solder the two-pin male connector for the jumper next to the XS3 jack socket. If you will use a mono jack for the audio output, do not install the jumper. At this stage your PCB should look like this:



Now turn the PCB around and inspect your solder joints. Make sure all components are soldered properly and there are no cold solder joints or accidental shorts. Clean the PCB to remove extra flux if necessary. Now let's proceed with the cherry keys! Each key has an LED inside, and the orientation of the LED is critical. The longer lead is the anode and all LEDs have to be aligned with the PCB as shown below.



Place the cherry key in the relevant position, insert the LED and hold both components in place and solder just one pin of the cherry key. Now, make sure that the cherry key is centred in its place and aligned with the silkscreen, then solder the second pin and the LED.



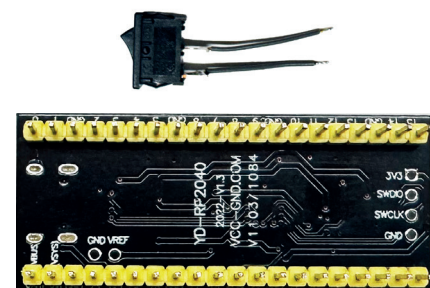
Proceed with the remaining 7 cherry keys and LEDs.



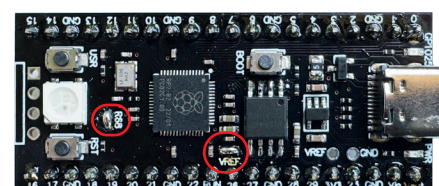
Now, install and solder all 4 potentiometers.



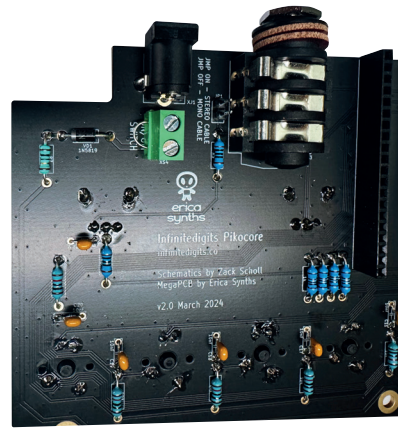
Cut the wire in the kit into two pieces and solder it to the power switch. Also, solder the male connectors to the RP board. Start with one pin, make sure the connector is aligned with the silkscreen and is positioned vertically. Do not install these components yet.



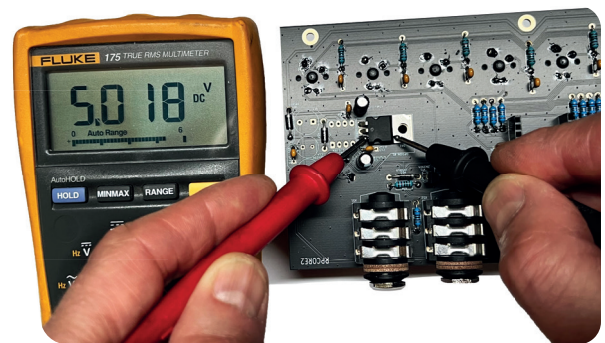
In order to ensure correct operation of the instrument you need to solder two "jumpers" on the RP board. Just put the solder blob on the smt polygons indicated in the picture.



At this point it's a good idea to test if the voltage regulator works. Use one excess lead of a resistor to emulate a closed switch and connect the power supply.



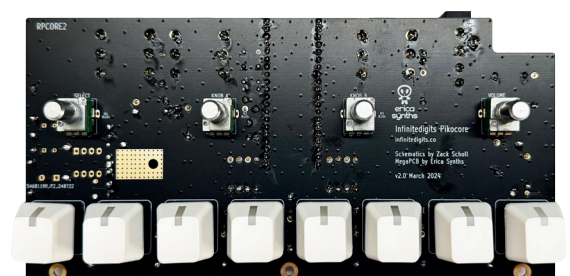
Measure voltage between pins 2 and 3 of the LDO.



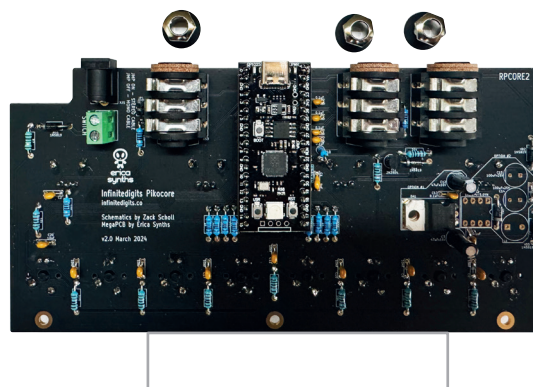
If the voltage reads somewhere around 5 volts, you are good to install the RP board. Disconnect the power supply and install the RP board. Once it is installed, power the unit on and make sure that the LEDs on the cherry keys light up sequentially and the LEDs on the RP board are on.



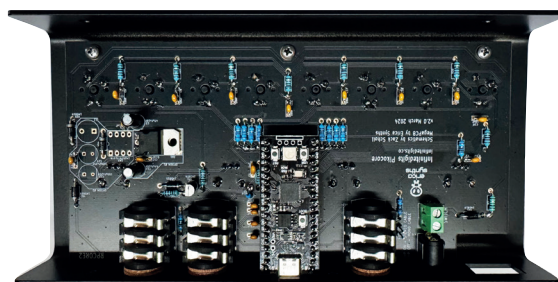
Push on the **cherry key caps**.



Remove the nuts from the jack sockets, but leave both washers on.



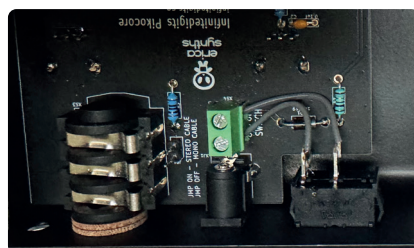
Now you can insert the PCB into the enclosure. Make sure the DC connector clicks into the relevant opening and that the washers of the jack sockets touch the rear panel. Tighten the jack socket hex nuts and then fix the PCB with 3 screws into the cherry key area.



Then place **washers on the potentiometers** and **fix** them in place with the hex nuts.



Next, **push in the switch** and connect the wires to the green connector.



Attach anti-slip pads to the bottom part of the enclosure.



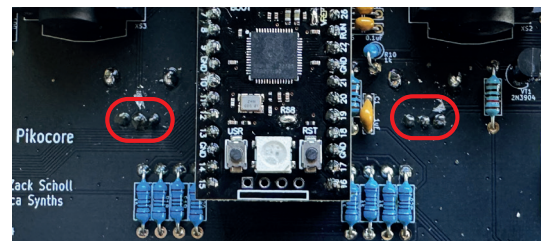
The last step is to install **knobs** onto the potentiometers.



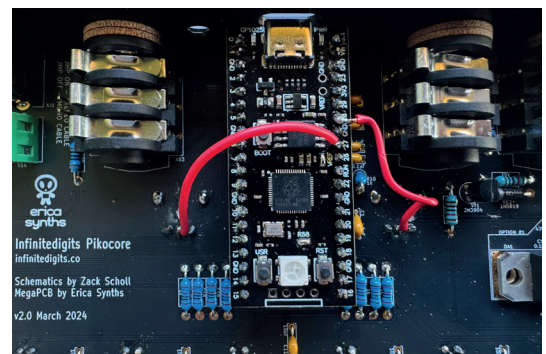
ERRATA: SWAPPED POTENTIOMETER FIX

We discovered that Function A and Function B potentiometers are swapped on the PCB V2. If you wish to align them with a silkscreen, describing functions on the enclosure, you'll need to do some PCB surgery in two easy steps.

1. Cut the traces that connect to the center pin of two potentiometers.



2. Solder a wire from the center pins of potentiometers to the pin 27 and pin 28 of the RP board as shown on the picture.

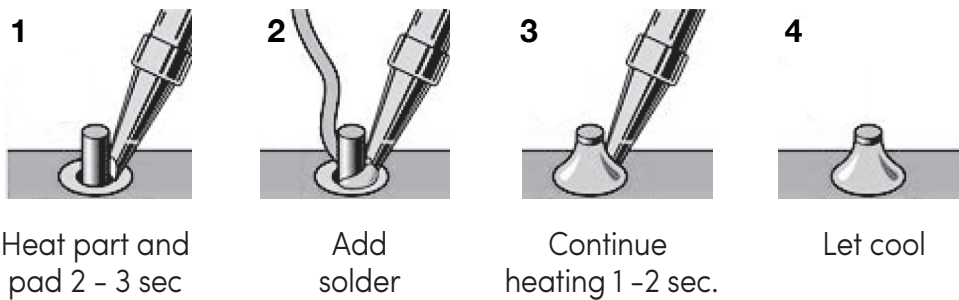


Congratulations! **You have completed the assembly of the Infinite Digits Pikocore XL DIY kit by Erica Synths!** Connect it to the power supply and make some noise! The unit will work straight away and does not need any calibration.
Enjoy!

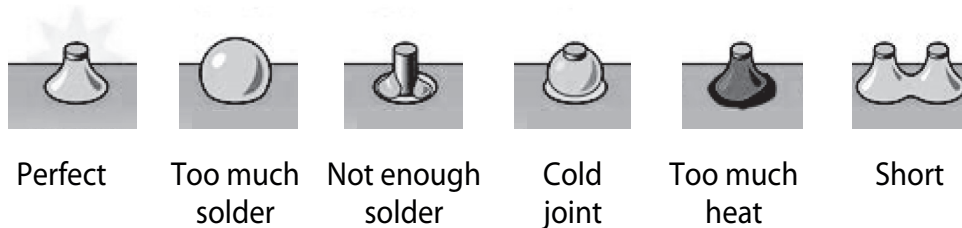
SOLDERING APPENDIX

If you've never soldered before – or if your skills have become rusty – it's probably wise to check out some **THT** (through-hole technology) **soldering tutorials on YouTube**. The main thing you have to remember while soldering is that melted solder will flow towards higher temperature areas. So you need to make sure you apply equal heat to the component you are soldering and the solder pad on the PCB. The pad will typically absorb more heat (especially ground-connected pads which have more thermal mass), so keep your soldering iron closer to the pad on the PCB. It's critically important to dial in the right temperature on your soldering station. I found that about 320 °C is the optimal temperature for most of parts, while for larger elements like potentiometers and sockets, you may want to increase that temperature to **370 °C**.

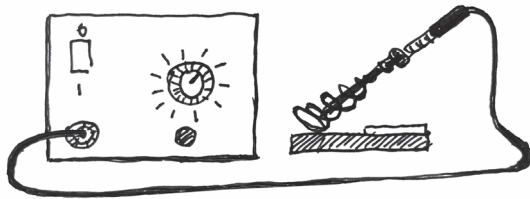
Here's the recommended soldering sequence:



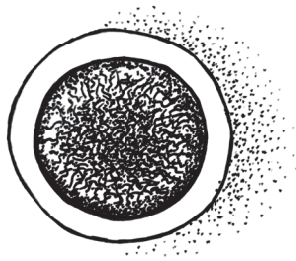
After you have completed soldering, inspect the solder joint:



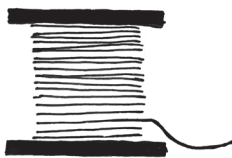
DIY electronics is a great (and quite addictive) hobby, therefore we highly recommend you invest in good tools. In order to really enjoy soldering, you'll need:



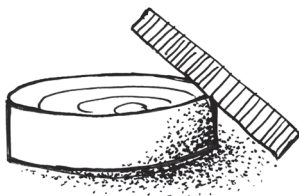
A decent soldering station. Top-of-the-line soldering stations (brands like Weller) will cost 200€ and above, but cheaper alternatives around 50€ are often good enough. Make sure your soldering station of choice comes with multiple differently-sized soldering iron tips. The most useful ones for DIY electronics are flat, 2mm wide tips.



When heated up, the tips of soldering irons tend to oxidize. As a result, solder won't stick to them, so you'll need to clean your tip frequently. Most soldering stations come with a **damp sponge for cleaning the iron tips** – but there are also professional solder tip cleaners with golden curls (not really gold, so not as expensive as it sounds). These work much better because they do not cool down the iron.



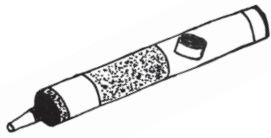
Solder wire with flux. I find 0,7mm solder wire works best for DIY projects.



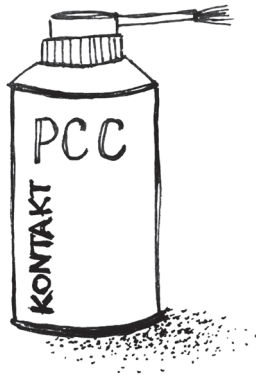
Some **soldering flux** paste or pen will be useful as well.



Cutting pliers. Use them to cut off excess component leads after soldering.



A solder suction pump. No matter how refined your soldering skills are, you will make mistakes. So when you'll inevitably need to de-solder components, you will also need to remove any remaining solder from the solder pads in order to insert new components.



Once you have finished soldering your PCB, it's recommended to remove excess flux from the solder joints. **A PCB cleaner** is the best way to go.

All of these tools can be found on major electronic components retailer websites, like Mouser, Farnell and at your local electronics shops. As you work your way towards more and more advanced projects, you'll need to expand your skillset and your tool belt – but the gratification will be much greater.