Solarpunk Synthesizer

Quantity	Designation	Description
3	RV1-RV3	Potentiometer $100\,\text{k}\Omega$
1	Solar panel	
3	C1-C3	Ceramic capacitor $1\,\mu\text{F}$ (105)
2	C6-C7	Ceramic capacitor $100\,\text{nF}$ (104)
1	74HC14	Schmitt trigger SN74HC14N
1	MCP6002	2-fold operational amplifier MCP 6002
1	Headphone connection	
2	C4-C5	Electrolytic capacitor $10\,\mu\text{F}$
1	R7	Resistor $22\,\text{k}\Omega$
2	R1,R6	Resistor $10\,\text{k}\Omega$
4	R2-R5	Resistor $1\,\text{M}\Omega$
2	Piezo buzzer $20\,\text{mm}$	
2	approx. $5\,\text{cm}$ stranded wire	
1	Solarpunk synth circuit board (PCB)	

Difficulty: ●●○○○   Build-Time: 60 – 90 Minutes

Safety Information

- ATTENTION: Not suitable for children under 3 years, choking hazard due to small parts that may be swallowed.

- We recommend: Supervision of the assembly and soldering process by an adult.

- Keep these operating instructions in a safe place for later use! It contains important information.

- If the battery is empty, replace it only with a new battery with the same values.

- When soldering, the soldering iron, the solder and also the components being soldered become very hot.

- Always wear safety glasses when soldering and assembling the kit.

- Always use a fire proof soldering pad when soldering! This prevents the components from slipping away.

- To keep the soldering iron safe during assembly, always use a suitable soldering stand.

- The kit is designed for battery operation only.

- CAUTION: Never connect the kit to 230 V mains voltage! There is an absolute danger to life!

- Please take the device to appropriately certified disposal companies at the end of its service life. This is good for the environment and ensures correct disposal.

- Subject to changes and errors.

Disposal

This appliance is labelled in accordance with the European Directive 2012/19/EU on waste electrical and electronic equipment (WEEE). The directive provides the legal framework for the take-back and recycling of waste equipment throughout the EU.

- **packaging**: The packaging is made of environmentally friendly materials and is therefore recyclable. Dispose of packaging materials that are no longer needed accordingly.

- **waste equipment**: Old appliances often still contain valuable materials. Therefore, hand in your old appliance to your retailer or a recycling centre for reuse. Please ask your retailer or your local authority for the current disposal routes.

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Step 1

a) Check your components for completeness.

b) Sometimes a small part is hidden in the bag. Look carefully here

c) The colors or the number of rings on the resistors may differ. We use different manufacturers.

d) Tip: These are almost exclusively THT (through-hole) components. You push the components through the board from the top and solder them from the other side. You can bend the legs slightly on the back when you push them through, so that the parts hold and can be soldered more easily.
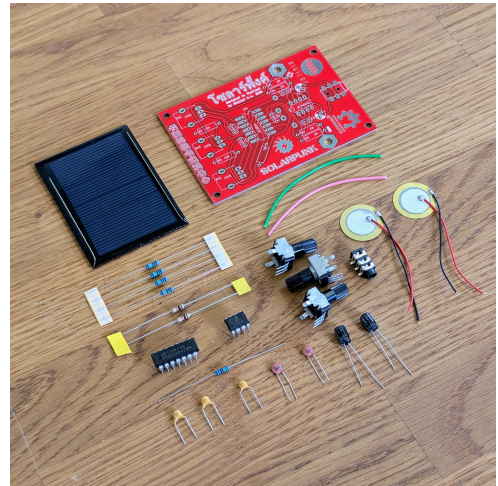

Step 2

a) First solder on the resistors R1 to R7. The color scale shows you the resistor values. Alternatively, you can measure the resistance values with a multimeter.

b) Tip: R1 is a $10\,\mathrm{k\Omega}$ resistor.

c) Cut off the protruding pieces of wire on the back

d) Caution: When cutting, the legs like to fly around and can jump into the eye. Wear safety goggles!
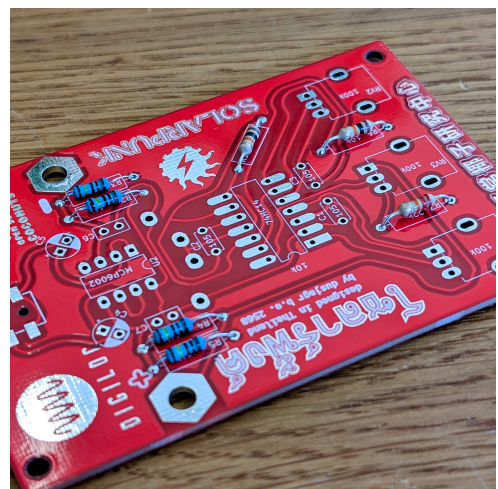

Step 3

a) Now solder on the ceramic capacitors C6, C7 (104) and C1-C3 (105). Ceramic capacitors have no direction. You can simply plug them through like resistors and solder them from the back.

b) After soldering, cut off the protruding wires on the back.

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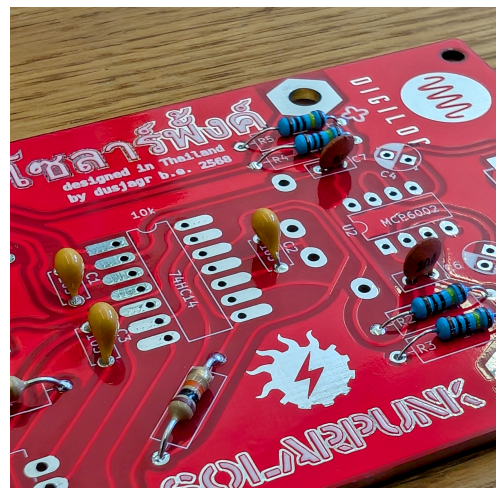
Step 4

a) Solder on the headphone connection.

b) The headphone connection (i.e. the hole) should point outwards (away from the circuit board). There are two holes in the circuit board. The headphone connection fits in there perfectly.

c) then solder all 6 legs. This time you have to solder from the top side.
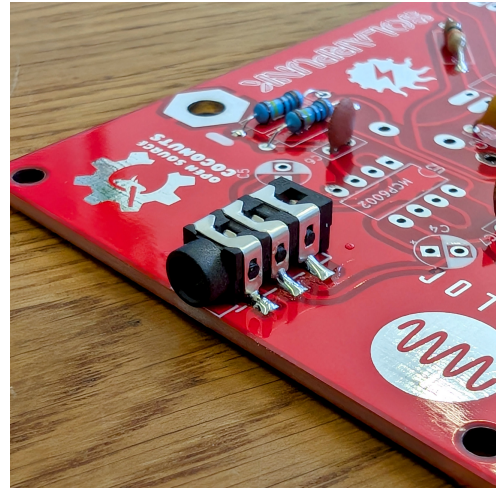
Step 5

a) Now we solder in the 74HC14 and MCP6002 chips. Both chips have a small indentation (also known as a nose) on one of the short sides. This nose is also marked on the board as a border. It is important that the nose and the notch in the border are on the same side.

b) Tip: If the board is in front of you and you can read the 'Solarpunk', the 74HC14 has the nose on top and the MCP6002 has the nose on the left.

c) Insert the chips and solder from the back. Make sure that there are no solder bridges.
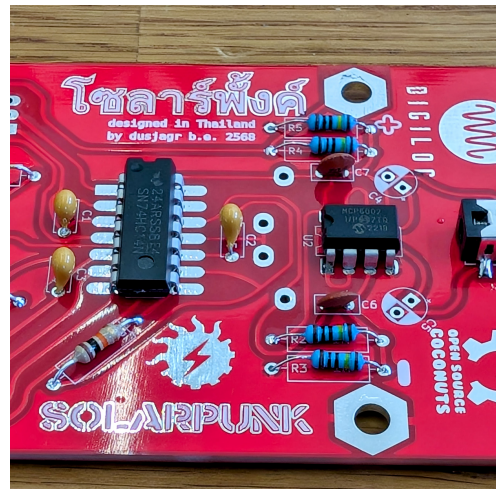

Step 6

a) Now solder the electrolytic capacitors C4 and C5.

b) Attention: These have one direction. The long leg is the '+' side. A hole on the board is also marked with a plus. Insert the long leg through the hole marked with a + on the circuit board.

c) After soldering, cut off the protruding wires on the back.
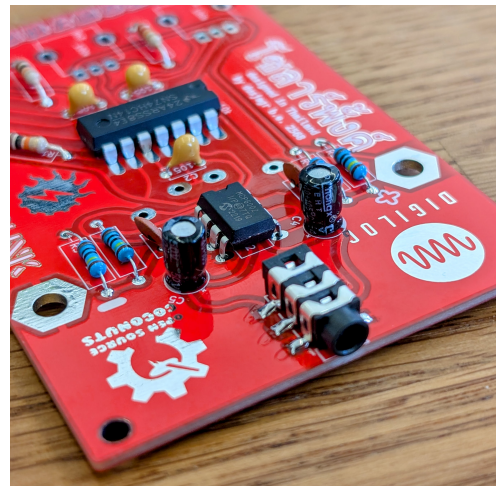
Step 7

a) Now take the potentiometers RV1 to RV3 and insert them into the circuit board. You may have to bend individual legs slightly to insert them into the circuit board.

b) after the potentiometers are properly inserted into the circuit board. Solder 5 connections each from the back. Again, make sure that there are no solder bridges. Attention: If you want to cut off the protruding legs, you must use very good side cutters. Otherwise you will damage your side cutter.
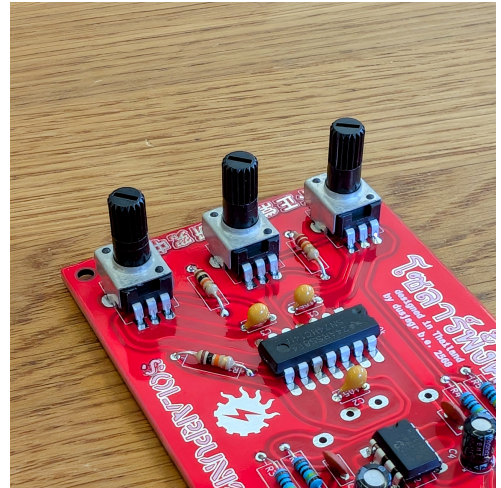
Step 8

a) Now solder the two piezo buzzers. The black cables go into the two holes above C2. The two red cables go into the holes at C7 and C6 respectively.

b) Then glue the buzzers in place with a drop of hot glue above the two hexagonal holes.
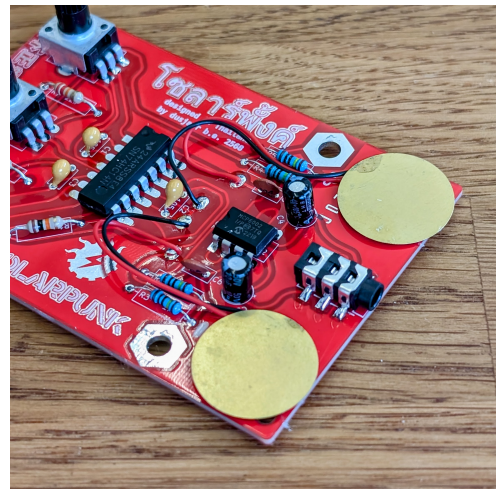
Step 9

a) Now take the two cables and remove about 5mm of insulation from all four ends.

b) Then tin the ends with solder. Then solder one cable each to the positive and negative pole of the solar panel.

c) Solder the other end of the cable from the positive pole to the hexagonal hole on the edge of the plantine, marked with plus (+).

d) Then solder the negative cable to the hexagonal hole marked with minus (-).

e) Tip: It is sufficient if you solder the solar panel to the edge. The hole is larger and designed for additional solar connections.
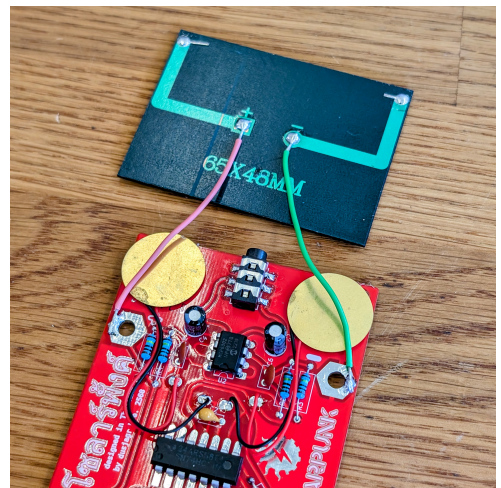
Step 10

a) You're done! You can now connect your synthesizer to a playback device and go out into the sun with it.

b) Try out all the sounds you can get from the simple Schmitt trigger.

c) You can find out exactly what happens technically at wiki.blinky-parts.com.