DIY Particle Detector

Parts Overview - Electron-detector version with 4 diodes

Resistor values in Ohm:

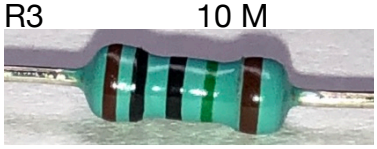
R1 4k7 (4.7 k)

yellow purple black brown (brown)

R2 15 k

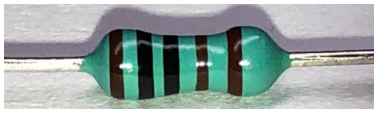
brown green black red (brown)

R3 10 M



brown black black green (brown)

R4 1 k



brown black black brown (brown)

R5 100 k

brown black black orange (brown)

R6, R7 10 k

brown black black red (brown)

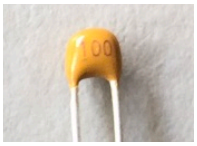
R8 must be shorted with a wire
(0 Ohm)

R9 2k2 (2.2 k)

red red black brown (brown)

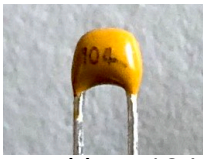
Capacitor values in Farad:

C1, C2, C6 10 p



marking: 100

C3, C4, C5, C7, C10 100 n



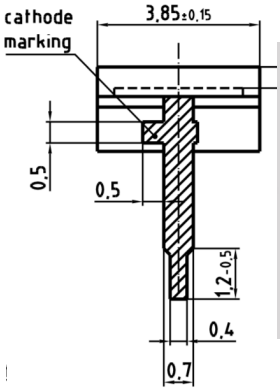
marking: 104

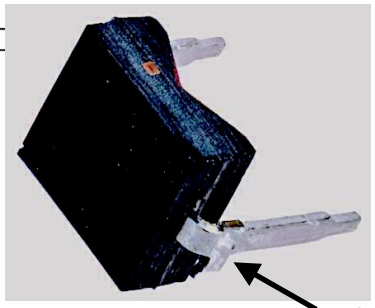
C8 47 u

polarity: short pin = minus, long pin = plus

C9 is not needed in this variant
(leave empty and do not populate)

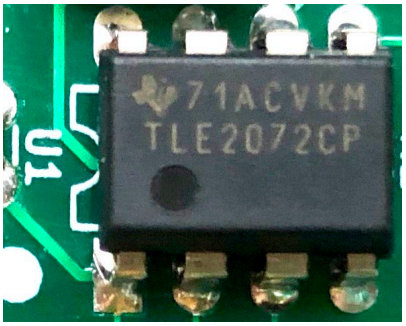
D1 - D4 Silicon PIN Diode BPW34 F





polarity: pin with notch = cathode

U1 Dual operational amplifier TLE2072



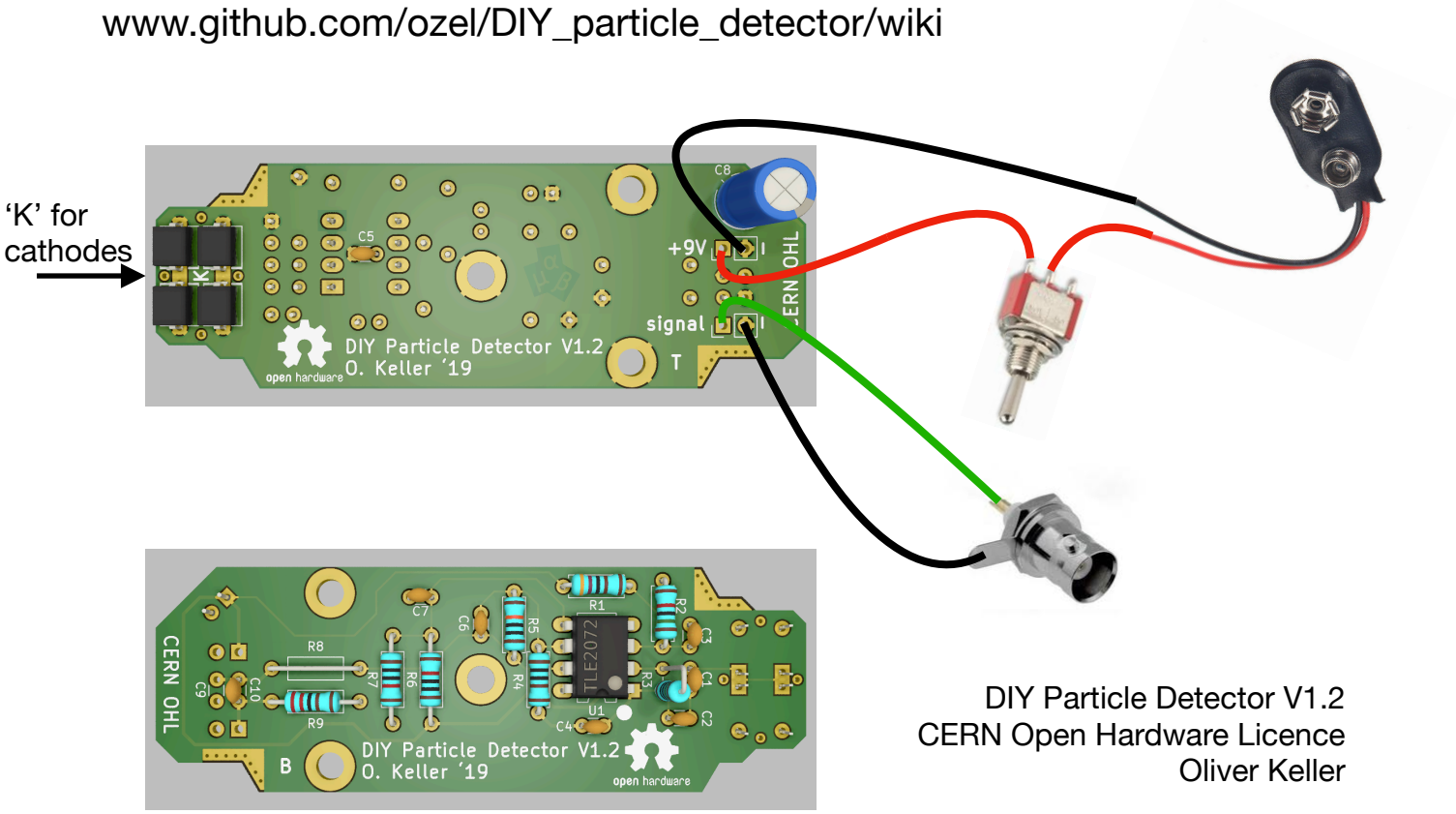
pin1 on board & chip marked with a circle

Assembly Instructions

Start with the smallest parts and place the largest ones at last.

1. Solder all resistors in the correct place by checking their color bands.
   - R3 must be soldered upright, the others stay flat and parallel to the board
   - R8 shall be just bridged with a short piece of wire
   - cut all resistor leads afterwards as short as possible
2. Solder the small capacitors C1 to C7 and C10.
   - C9 shall be skipped, the large C8 comes later
   - cut all capacitor leads afterwards as short as possible
3. Solder the 4 BPW34 diodes in place.
   - check the diode polarity according to the pictures on the previous page and below
   - the cathode pin with the notch must face towards the ‘K’ symbol on the board center
   - cut all diode pins afterwards as short as possible
4. Solder the black amplifier chip U1 in place.
   - carefully check the chip polarity according to the picture on the previous page
5. Solder the large capacitor C8 and check on which side of the board it fits best
   - choose the side of the board that has enough space available once installed in a case
   - carefully check the polarity according to the picture on the previous page
   - cut the capacitor leads afterwards as short as possible
6. If you have a multimeter: check the resistance of the battery connector (+9V and -).
   - if the resistance is lower than 9-10 kilo Ohm, there is a problem that must be found
7. Solder the battery connector to the board and the switch as shown below.
   - solder a separate short piece of wire between the switch and the board
8. Mount the board with one or two screws inside the metal enclosure.
9. Mount the switch and the signal connector in holes of the metal case.
10. Solder 2 more wires from the signal & ground (-) connections to the BNC connector.
11. Attach a 9 Volt battery, but in inside the case and close the lid well.
    - no light must reach inside, try covering the case with a dark piece of cloth if unsure

Detailed assembly instructions and **troubleshooting** tips are in the project Wiki:
www.github.com/ozel/DIY_particle_detector/wiki



DIY Particle Detector V1.2
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Oliver Keller