

**Roger 10-4**

**HOW-TO**

Steps:

- 1) Microphone
- 2) Amplifier
- 3) Connecting
- 4) Listening



## 1) Microphone

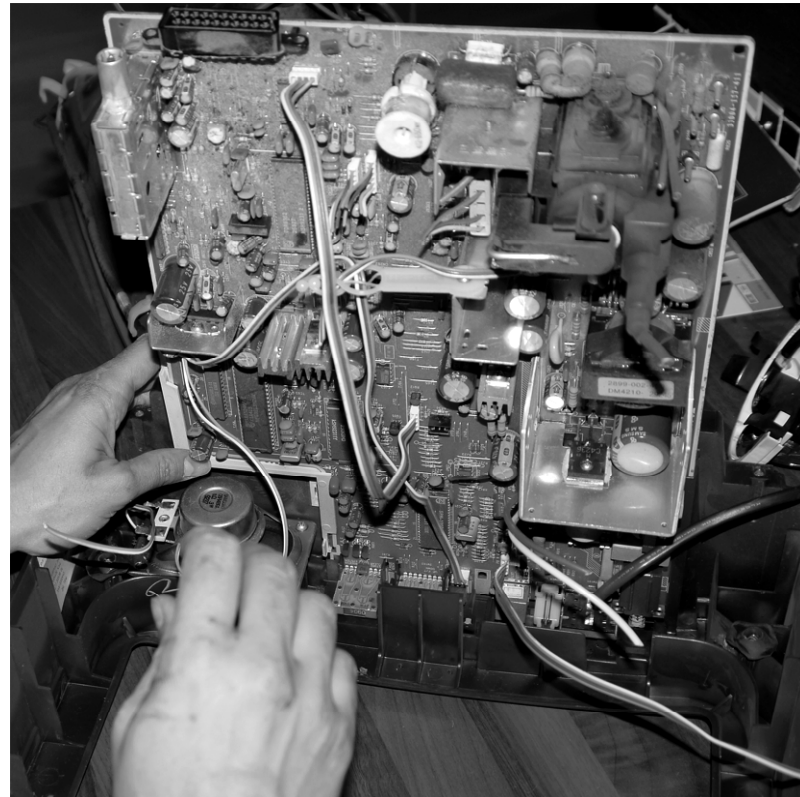
\*Break apart an old appliance.

[Tip: Older objects have a better chance of having components that can be re-used. Tv's, radios and motherboards all have coils in/on them]

\*Finding coil

Wikipedia: "An electromagnetic coil (or simply a "coil") is formed when a conductor (usually an insulated solid copper wire) is wound around a core or form to create an inductor or electromagnet."  
-<http://en.wikipedia.org/wiki/Coil>

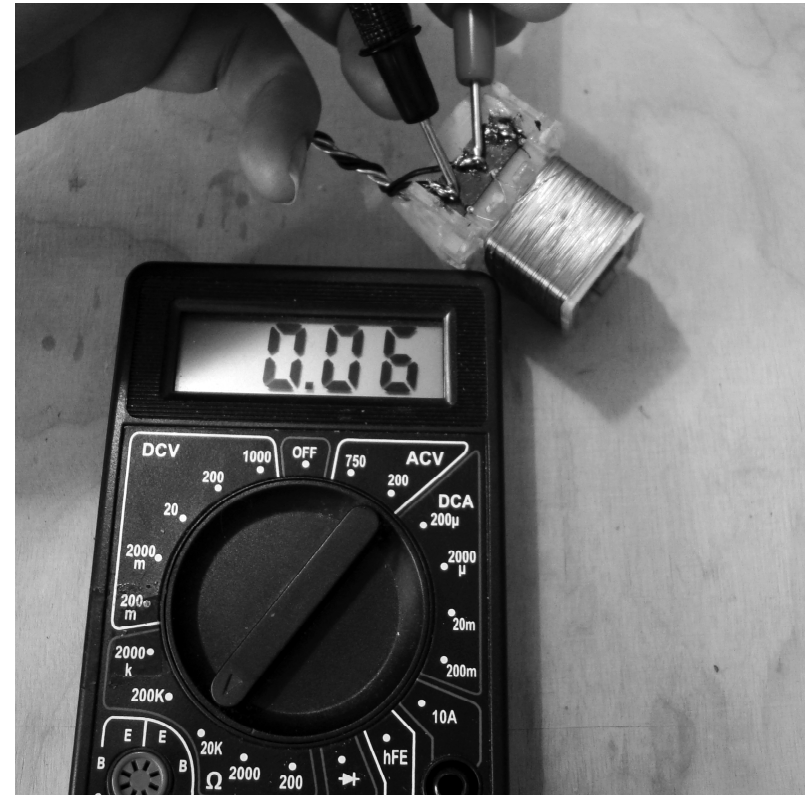
They can look like this:



### \*Testing coil

First test all the possible combinations of 2 legs with a multimeter. The combination that gives the highest resistance should be the one you use as I/O. (see photo on the right)

Test this combination with crocodile cables hooked up to an amplifier and speakers. Drag the coil in front of your computer screen, you should hear lots of noise (if it works).



## 2) Design

### Questions:

- Where will the microphone be on your body?
- Where will the amplifier be?
- What is the relationship between the placement of those two objects?
- How the placement of those objects affect your movement?

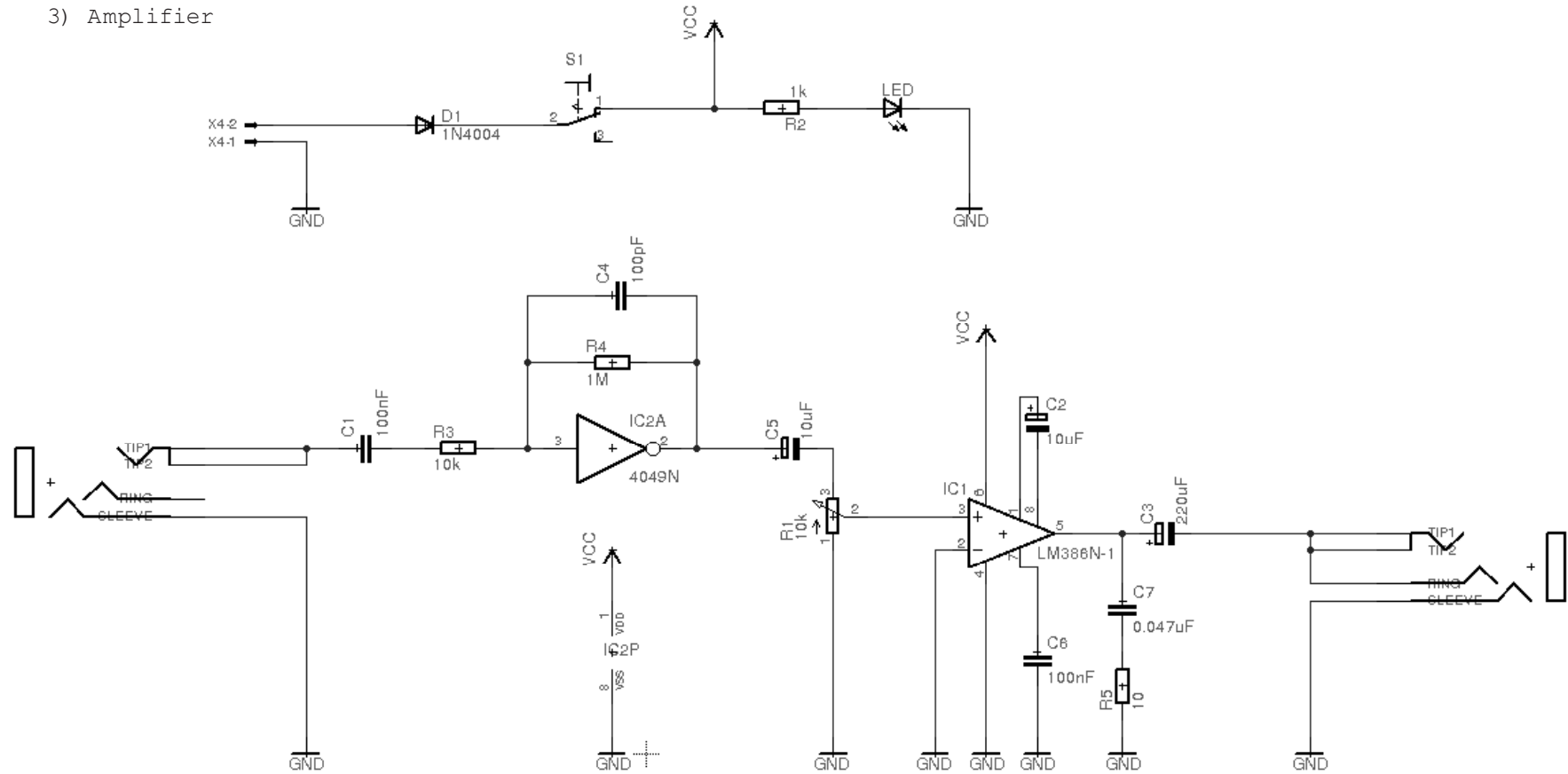
\*Once you have thought of all these aspects and you have laid out how much cable you need (from mic to amplifier), solder it all together (see image on the right).

\*Test it again!





### 3) Amplifier



Begin by the smallest 'flatest' components to make soldering easier.

Begin by placing all the resitors (except the vari-  
able resistor) in the board and soldering them.

R1: 10K (R1 is a variable resistor, it is a blue  
'volume knob', solder it at the end as it is big  
and bulky).

R2: 1K

R3: 10K

R4: 1M

R5: 10R

\*Place all the capacitors and solder them.

C1: 100nF (0,1uF)

C2: 10uF place long leg on the plus side)

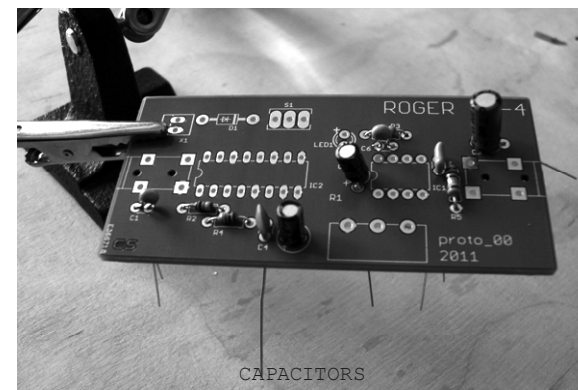
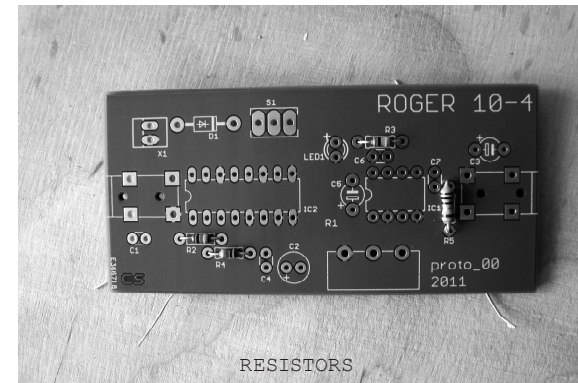
C3: 220uF (place long leg on the plus side)

C4: 100pF

C5: 10uF (place long leg on the plus side)

C6: 100nF (0,1uF)

C7: 0,047uF



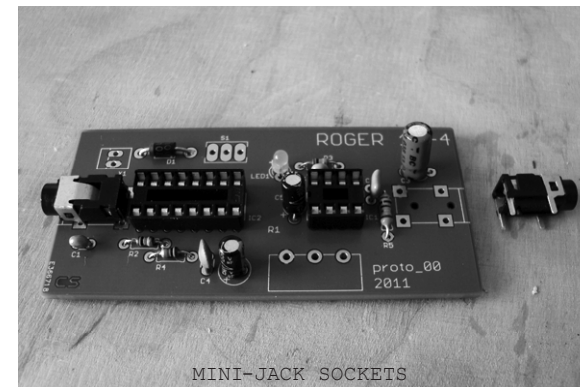
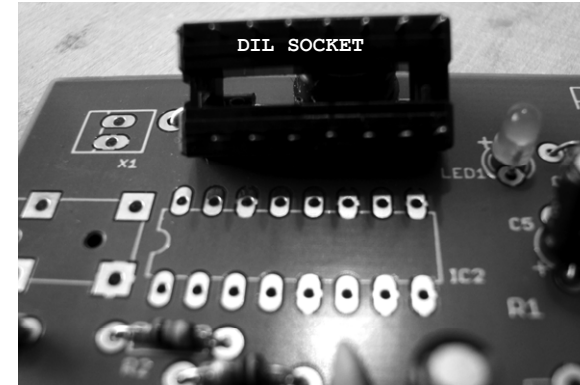
\*Place and solder the diode (D1). The diode also has a direction (as its function is to stop current from flowing in the wrong direction). Place the white line on the diode in line with the white line on the PCB (Printed Circuit Board).

\*Place the LED on the board (LED), mind the direction! (place long leg on the plus side).

\*Place the dil sockets (the chip holders) on the board (IC1, IC2). These also have a direction. It resembles a half circle cut-out on one side of the socket. That half circle should be on the same side as the one on the board. DO NOT PLACE THE CHIPS IN THE HOLDERS UNTIL THE VERY END - after all soldering is finished (chips are very sensitive to heat).

\*Place the female mini-jack sockets onto the board and solder them.

\*Place the switch onto the board and solder it (S1).



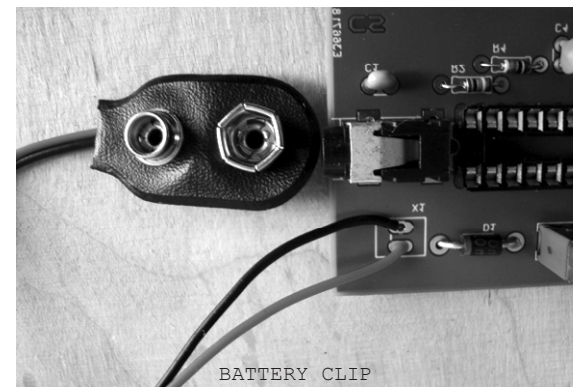
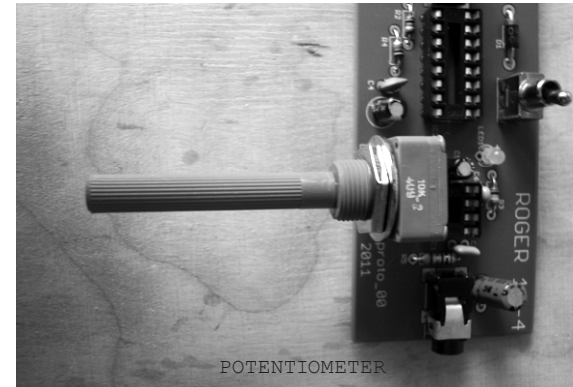
\*Place the potentiometer onto the board and solder it (R1).

\*Solder the battery clip (X1).

Now the chips can be placed into the dil sockets (BEFORE you connect it to the battery). Check all the components (are they in the right direction, etc), are the solder joints sound, etc.). Once you are sure you can test your amplifier. Place the battery, turn the switch on.

Und los gehts!

*(It doesnt work? Does the LED turn on? Now comes troubleshooting...).*



#### 4) Listening

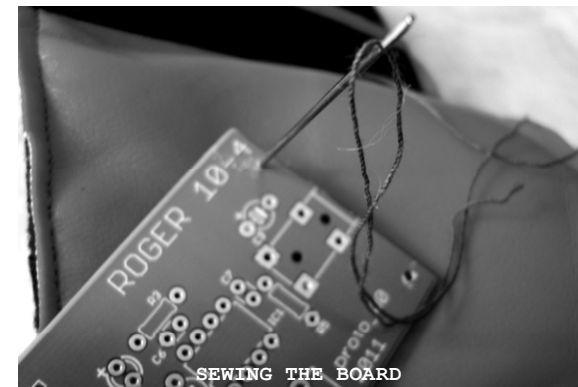
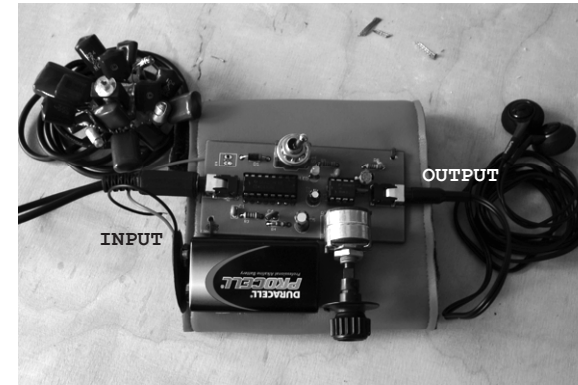
\*Connect everything together:

-The microphone goes into the input side of the amplifier (the side with the large chip). The headphones go into the output side of the amplifier (the side of the small chip) (see picture).

-Test your setup. Place the microphone close to a computer screen for example, you should hear noise that varies as you move the microphone along the screen or towards the keyboard. A nice test can also be listening to the computer as a DVD is inserted - very cool sound - classic Nic Collins example).

-If all this works its time to attach the board to your body, by sewing it into a piece of clothing for example. Drill holes in the board to be able to sew it (see picture). Use double sided tape to attach the battery.

**-Go into the city!** Walk around, see what you hear.





## **ROGER 10-4**

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More info including links and inspiration (and people who inspired and helped us) here:

<http://roger10-4.hotglue.me/>