

When done, please return these instructions for the next person to use. Thank you.

18E: Atom Earring Sept 2022 V0.9

This *Blinkie* is made with a circuit board, three light emitting diodes (LEDs), a battery and battery holder, a switch, and an earring hook. You will make it yourself by soldering the parts onto the circuit board.

We hope you have fun building this Blinkie, learning soldering, or improving your soldering skills.

Start with a bag of these parts:



Finish with a Blinkie earring you can wear!



First, open up the kit and review the contents below, comparing to the parts picture above:

- An earring hook with silicone back stopper
- A power switch
- The Atom earring circuit board
- Three flashing or fading LEDs
- A CR1220 battery
- A CR1220 battery holder

Are you ready to start? Do you have all the parts? If not, give us a shout.

“How to solder” will be covered briefly in “Assembly”, but a detailed description may be found on the **last page** of these instructions.

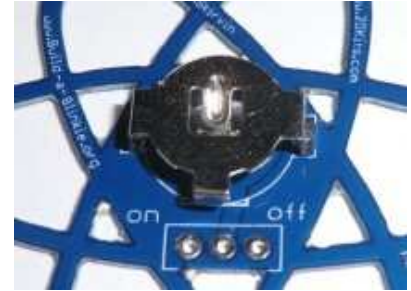
TERMS:

Solder	A metal alloy that melts easily, holds things together, and conducts electricity. You will have a “coil” of it on a sewing machine bobbin (spool). As a Verb: “to <i>solder</i> the LED pin”
Lead	Rhymes with “seed”. The wire that comes out of an LED that you solder to the circuit board
Pin	Like a lead, but on the battery holders or switch
Pad	Small shiny areas on the circuit board, usually circles or squares, that you'll be connecting LEDs and other components leads or pins to by soldering, IE. melting solder to hold them together and also usually, complete an electrical connection.

Assembly

SUMMARY: You're going to solder the battery holder, then the switch, then install the battery, then test and solder three LEDs, and finally install the earring hook.

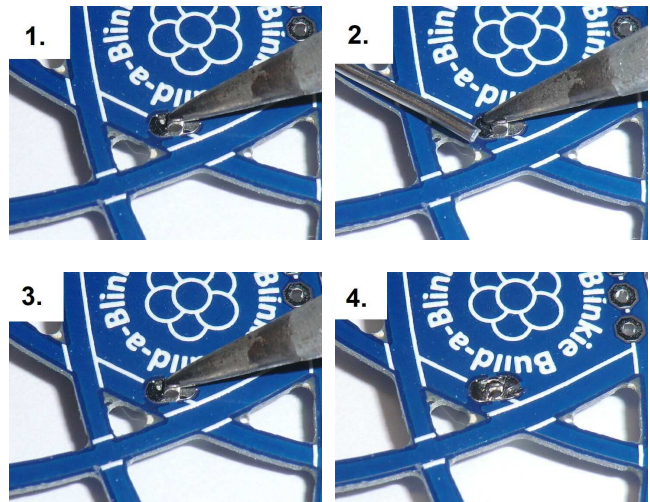
1. On the back side, **insert the battery holder** over the printed outline.
 - The battery holder is a little roundish piece of metal, with 2 “legs” that go through the board, and 1 that touches the board near the SWITCH – **See the tab next to the 3 switch holes?!!**
 - It should just drop in – do not push – Bend the legs so they go into the holes, again making sure the tab stands on the board next to the switch.



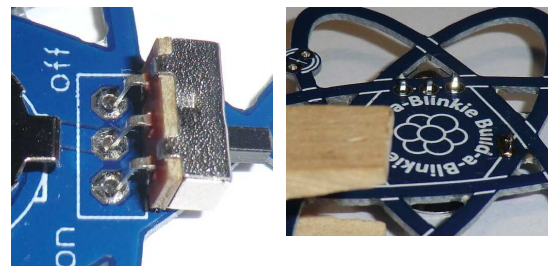
2. **Flip the board over** so it rests on the battery holder.
 - It won't sit flat / tight, so prop up the low side with a clothespin:
 - **Follow the next 4.1) through 4.4) steps for all soldering.**



3. Solder the pin. **Use these 4 soldering steps:**
 - 1) **Heat pin and pad:** the soldering iron tip must touch **both** for the solder to connect them.
 - 2) **Add solder into connection** – about 1/8”. Slide it along the board to be on the pad.
 - 3) Remove solder, but **keep heating the pin and pad to flow the solder around them.**
 - 4) **Remove iron and wait for the solder to cool** and harden so the entire round pad is covered by solder, going up on the pin just a little.



4. **Install the switch** to prepare for soldering
 - 1) On the back, **insert the switch pins into the 3 holes inside the rectangular outline.**
 - 2) **Hold the switch in**, and flip to the front side, and make sure the pins stand up from the board
 - 3) Use a clothespin to level the board
 - 4) **Solder the 3 switch pins**



5. Install the battery:

- The “+” faces up, but is pretty small to see, so just be sure the SHINY side is UP, not the “ripply” or textured side.
- If you can’t slide the battery in, have a Tech help you.
- **Turn the power switch on.**
- In the next few steps, **the LEDs will be tested before soldering**



6. Installing and testing the LEDs:

Orientation is important when inserting LEDs:

- The **long lead** of each LED goes into the hole with the **round pad**, and the **short lead** in the **square pad** hole.
- **TEST THE LED**
- The LED should light up as you wiggle the leads. If not it may be inserted the wrong way. If it doesn't light even when wiggled, flip the switch, and check that the battery pins and switch are well soldered.
- With the LED flat against the board, spread the leads on the other side into a SLIGHT “V” as shown, bottom right:



7. Continue with the other 2 LEDs:

- **Insert – Long Round**
- **Wiggle to TEST**
- **Spread leads into V**
Turn off the switch and flip to the back – it should look like the picture:
- **Solder the LEDs** on the back, making sure they are flat against the front. Solder 1 lead, check, then solder the 2nd lead



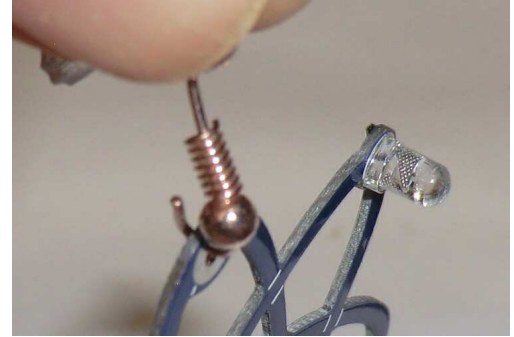
8. Preparing the earring hook:

- Slide the bead and spring back to show the loop:
NOTE Carefully:
- LIFT the free end “up” based upon this picture, not to the left (widening the gap)



9. Installing the earring hook:

- Insert the opened loop from the FRONT as shown – note where the LEDs are.
- Grab the loose end with a pliers and twist it to close it up against the other wire



That's it – you should have a working Blinkie earring now!

Troubleshooting

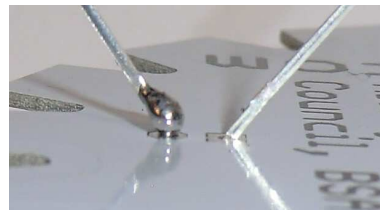
If the switch doesn't turn off, you may have shorted 2 pins together, or have a defective switch

- If each pin is individually soldered, and no solder “bridge” is between pins, have a tech replace the switch for you. Do NOT try to remove parts by yourself, it can ruin the circuit board

If the LEDs don't flash, then you'll need to do a little troubleshooting to finish your project. The following steps should isolate most problems. Be sure the power is off to save the battery.

If you've made a solder **bridge** (meaning the leads of an LED or switch pins are soldered together), it is easy to fix. You can often just re-melt the solder and pull the tip of the soldering iron through the bridge, breaking it, then shake any captured solder off the iron. Or, reheat all the solder and tap to the board on edge to shake off the excess while it is still melted. Ask a tech if you need help.

- **A common soldering problem** is to have solder on the pin or lead but NOT connecting it to the pad. Notice the pad UNDER the solder in the picture:
- Re-heat the connection, being sure to press DOWN on the pad with the soldering iron tip and wait for the solder to “puddle” around the pad and pin.



- Recheck your solder connections. 80% of all problems are traced to this. Cold solder connections (dull, not shiny) and broken connections will cause erratic performance or failure. Reheat any questionable solder connections until they flow and look shiny and secure.
- Check for bits of solder, lead ends, or other foreign matter which may be lodged in the wiring.
- LEDs reversed. You will need to remove the LED by having a tech desolder it, and then insert it the correct way and solder it. Trying to remove it yourself can BREAK the circuit board.
- The battery is incorrectly inserted. The “+” side of the battery should always be inserted facing up.
- The battery holder is inserted backwards – and if you tested the LEDs and they worked, so are they. This actually “works”, and is usually left alone.
- A bad part: it does happen. In thousands of boards assembled, we've seen two or three parts fail. If bought online, send us email, and we will send a replacement part.

Any Questions? Contact us – dwayne@2dkits.com or drsulak@2dkits.com

- A part got lost/melted/damaged/destroyed while building the kit. It happens – you’re not the first (or second, or fiftieth). If you are doing this at an event, just let a tech know. Otherwise, send us email, and we’ll see what we can do. We have no problem selling just the parts you need to get it working.

Caring for and using your Blinkie

Once built, the use of this Blinkie is fairly straightforward. Don’t get it wet. Don’t stick it in a pocket with a bunch of coins or metal where it might short out. Don’t set it on a metal table top or in a metal dish, etc. To prevent it shorting out, you may want to keep it in the bag it came in.

Soldering Hints

Soldering is not like gluing: Both the “pad” (shiny circle or square on the circuit board) and the component (lead coming up through the hole) must be hot enough so the solder flows around them, making an electrical connection.

For the purposes of learning how to solder, you do not need to be perfect. With a little bit of practice, your soldering skills will rapidly improve. The goal is to have fun while learning, and your skill will develop as you have fun. Happy soldering!

Here’s how to make a good solder connection:

- Prepare the connection. Bend the component lead slightly after it passes through the printed circuit board (this helps hold it in place while soldering). Ex: Bend LED leads into a “V”.
- Prepare the soldering iron. The soldering iron should be up to temperature. Clean the tip by plunging it into the stainless steel wool in the jar. Melt a little solder (a 2mm length) onto the tip so it’s shiny. This is called “tinning”. The solder coating helps conduct heat from the tip to the connection. If the iron doesn’t get shiny, contact a Tech who has special tip cleaner.
- Place the tip in contact with the component lead AND the printed circuit board pad.
- Place the solder against the connection directly opposite the tip. It should melt within 2 seconds, and flow around the connection. If it takes longer than that, you’re not getting enough heat into the connection. Use only a TINY bit of solder.
- Pull back the solder, but keep the soldering iron in place until the solder flows freely and completely covers the connection. If the heat is removed too soon, the solder will tend to “ball up” and not stick well to the conductors. The solder connection should look “wetted”, with concave shapes.
- Let the connection cool without movement at room temperature. This usually takes only a few seconds.
- If a connection is moved before it cools, it will take on a dull look that is characteristic of a cold solder connection. A cold solder connection is fragile and conducts poorly – reheat the connection until the solder flows freely, and hold it still until it cools.
- Keep the tip of the soldering iron clean. Jab it into the steel wool tip cleaner jar several times until it is shiny.

Directions by Ward Christensen, WardC@2dkits.com. Feedback welcome!