

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

Kit 71 - Marvin V1.0, November 2024

This **Blinkie** is made with a circuit board, a light emitting diode (LED), a battery in a battery holder, a switch, and a tie tack pin so you can wear it. You will make it yourself by soldering the parts onto the circuit board.

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

Start with a bag of parts:



End with a Blinkie you can wear!



Not Shown:

- Solder, usually wound on a sewing bobbin.
- A soldering iron
- A lamp
- A wire cutter and clothespin
- A container of steel or brass wool to clean the soldering iron tip. (Dirty! Don't play with it!)

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

- A Tie Tack, consisting of a **clasp** and **pin** – Squeeze the “wings” on the clasp to release the pin
- An LED (light emitting diode) Usually “rainbow” or “color fading” red-green-blue
- The “Marvin” printed circuit board
- A power switch
- A CR2032 battery holder. The bottom spring (picture at right) may have fallen out, Try putting it back, or ask for assistance.
- A CR2032 battery



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 at the end of these instructions.

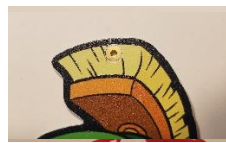
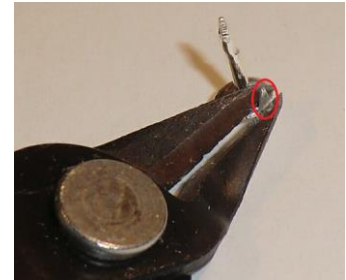
TERMS:

Solder	A metal alloy that melts easily, holds things together, and conducts electricity. You will have a “coil” of it.
Leads	(rhymes with “seeds”) Wires on the LED, that you solder to the circuit board
Pin	Like a lead, but comes out of the battery holders, tie tack pin or switch
Pad	Small shiny areas on the circuit board, usually circles or squares, that you'll be connecting the parts to, by soldering.

Assembly

We're going to solder the tie tack pin, then the switch, then the battery holder, and finally the LED.

1. Separate the pin from the clasp of the tie tack (pin and clasp). The pin has a small secondary post we need to remove before soldering.
2. **Use the cutters to remove the smaller post next to the big pin.** **Catch it so it doesn't fly off!**
If there is a little stub left you can flatten it against the round base of the pin with your pliers.
3. Inserting the tie tack pin:
 - Insert the pin on the front, top center.
 - Hold the pin, and flip the board onto its back for soldering. **If you are on a plastic table, put it on cardboard or the business card to protect the table from the soldering heat.**



Insert pin in the hole
Front, top center



Flip to the **Back** to
solder the pin

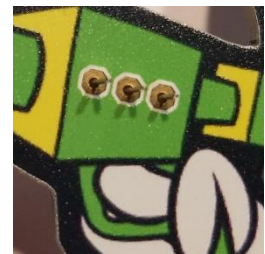
[Follow the next steps \(4.1 through 4.4\) for all soldering.](#)

4. 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) Melt solder into connection – about 1/8"
 - 3) Remove solder, but **keep heating the pin and pad to flow the solder around them.**
 - 4) Remove the iron. Wait 10 seconds to harden so the entire round pad is covered by solder, going up on the pin a little.



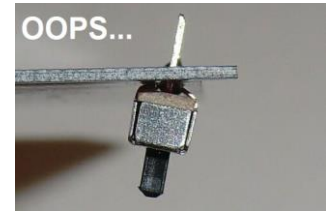
Now put the clasp on the pin so you don't lose it.

5. Installing the switch
 - 1) [Left Picture] Hold the switch by the pins, and insert it in the clothespin as shown.
 - 2) [Right Picture] Set the board on the clothespin holding the switch, as shown. Make sure the pins are standing straight up.



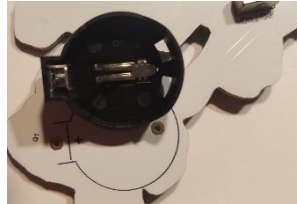
Any Questions? Contact us – dwayne@2dkits.com or drsulak@2dkits.com

6. **Solder ONLY ONE PIN** of the switch - then remove the clothespin and check...
- If the switch is crooked (left picture), then re-melt the solder and straighten it.



- 6.1 Then **solder the other two switch pins**.

7. On the back side, flip the battery holder over the printed outline, inserting the pins in the board.
- **Note** the squared off part on the holder and the outline on the board need to be lined up.
 - Keep it in place, and flip the board over
 - Solder the left pin, then solder the right pin.

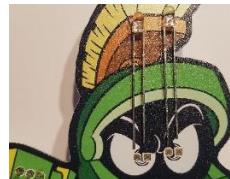


8. Install the battery
- Turn the switch off.
 - Hold the battery with the “+” sign facing up.
 - Angle it into the battery holder against the metal tab, and then squeeze down hard, so it snaps in place.
 - Turn the power switch on (up)
 - In the next few steps, **the LED will be tested before soldering**



9. Install and **test** the LED (BEFORE SOLDERING)

- Insert the LED from the front, **long lead in the round pad**, short in the square pad.
- The LED should blink as you wiggle the leads.
- If it doesn't blink even when wiggled, check that the battery and switch pins are soldered well.



10. Soldering the LED

- Flip the board onto the back, and with the LED coming out the front
- Solder **one** lead, make sure the LED is flat against the front of the board (Left picture), if not, re-melt the one lead's solder and push it flat.
- Trim the leads, **keeping them from flying off, as shown in the picture** (Right picture)



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

If it turns on but won't turn off, the switch is probably too close to the board, Ask a tech to melt the solder on the “ON” end pin while pulling the switch away from the board by putting a thumbnail under it.

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Soldering Tips

- Turn the iron on (switch is in the base) and wait for it to get hot – the LED should blink
- Clean the soldering iron tip ($\frac{1}{4}$ ") by plunging it into the container of metal wool several times.
 - Do this when you start. Do it again if the tip becomes dull.
- BOTH the pad on the circuit board AND the pin/lead coming through the hole, need to be hot, so hold the tip in contact with them for a few seconds, longer for the pin in the tie tack.
- Feed the solder into the pin/pad, by pushing it along the circuit board – this will ensure you don't put solder just on the wire, but also on the pad.

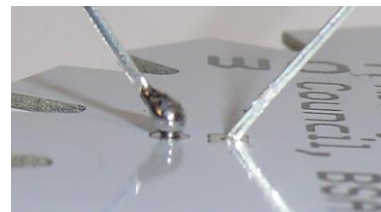
Troubleshooting

If the LED doesn'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**, as shown, 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.
- LED reversed. You will need to remove the LED by having a tech desolder it, and then solder it in the correct way. **Trying to remove a reversed LED 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 LED, so is it. This actually "works", and is usually left alone.
- 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.
- 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 a convention, seminar, or class, just let us 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.

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