Wee Blinky

Assembly Instructions

Written by Dale Wheat – 30 March 2009

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Thank you!

You have read at least this far into the assembly instructions; this tells me you are an exceptional person, above average with many qualities and more than likely able to successfully complete the building of this kit. The Wee Blinky is a simple product based on a very famous circuit that has been around for many years. Finding interesting applications for the Wee Blinky is now your task, once you get it assembled.

Assembly time should range from five to fifteen minutes, depending on your skill level. The Wee Blinky was designed to be a good starting project for learning about soldering and basic electronic circuits.

If you have any problems while building this kit, please contact me and I will do my best to help you with it. I really do want you to succeed as well as learn and have fun while doing it. Please let me know if you have any suggestions or questions about this kit.

Dale Wheat
30 March 2009 / updated 1 June 2022
https://www.dalewheat.com/product/wee-blinky/

Step 1: Parts check

First things first: Make sure you have all the parts that are supposed to come with the Wee Blinky kit. Please note that since the Wee Blinky kit is completely open source and available from many different vendors, your kit contents may not match exactly with this description. As long as you have the correct main components, you will be able to finish building the Wee Blinky kit in no time!
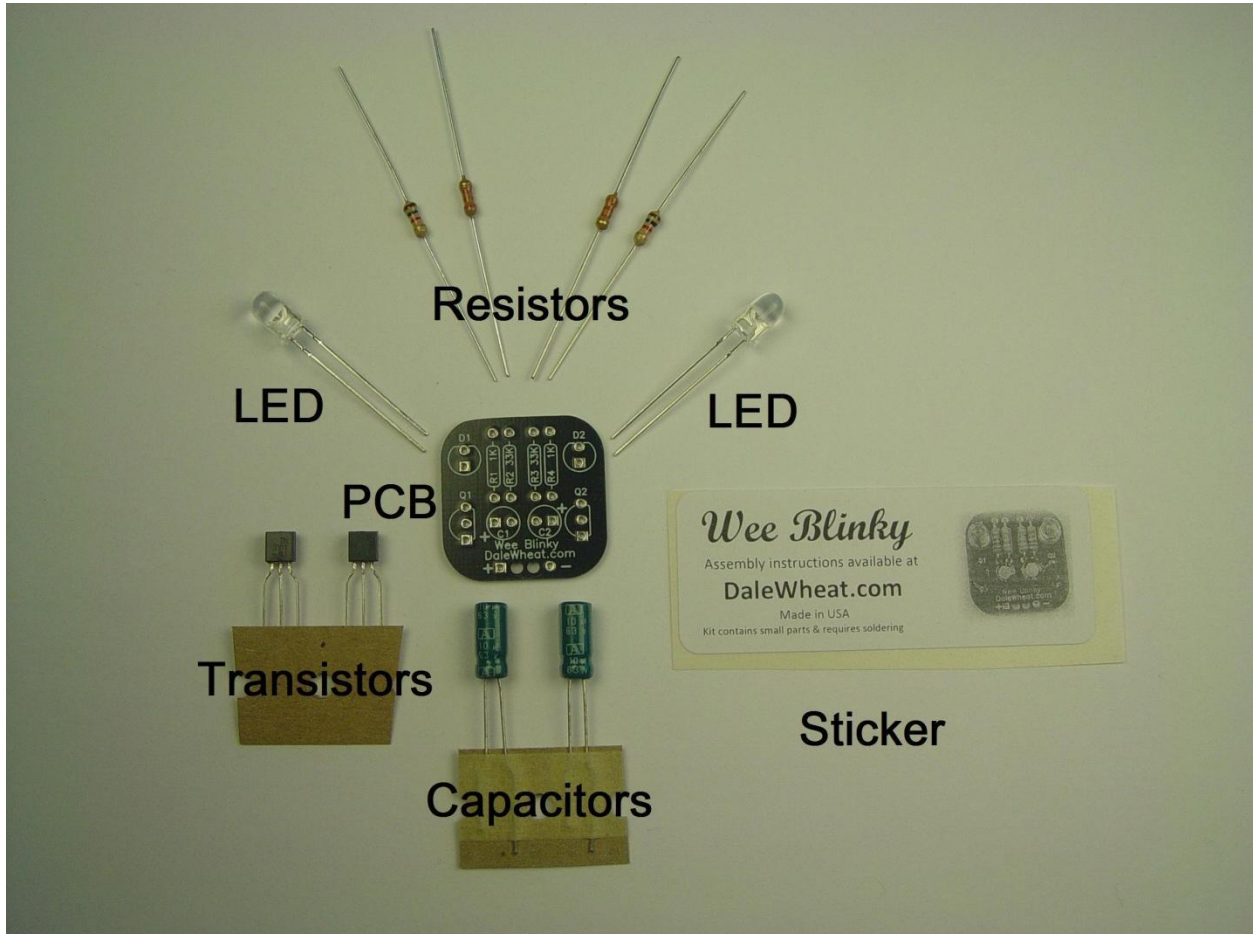

Photo 1. Wee Blinky kit contents. Make sure you have all your parts before assembly!

Item #	Quantity	Reference designator	Description
1	1		Printed circuit board (PCB)
2	2	R1, R4	1KΩ, ¼ Watt resistors (brown, black, red)
3	2	R2, R3	33KΩ, ¼ Watt resistors (orange, orange, orange)
4	2	D1, D2	5mm red LEDs
5	2	Q1, Q2	2N3904 or PN2222A transistors
6	2	C1, C2	10µF electrolytic capacitors
7	1		Wee Blinky sticker

Table 1. List of Wee Blinky kit contents.

Step 2: Tool check

Now that we have all the parts together, it's time to collect all the tools and supplies we need to build the Wee Blinky kit.

Soldering iron & solder

You will need a small soldering iron (and the skill to use it) to build the Wee Blinky kit. Anything with a "pistol grip" is probably too large. Try to use something in the 15-30 Watt range. You can use a higher powered soldering iron if it has a temperature control built in.

There are many quality soldering irons out there and you can often find good deals online or in the surplus channel. Like all tools, many people hold wide and varying opinions based on experience, hearsay and the phase of the moon.

Use a small gauge solder that contains flux. Almost anything will do. You can use lead-free solder if you want but I'm hearing rumors that there are long-term reliability problems with lead-free solder.

One day all electronic products will be "RoHS" (reduction of hazardous substances) compliant. This will reduce or eliminate many of the most poisonous and dangerous materials from the handy-dandy devices that we love so dearly. Initially, some of the components in the Wee Blinky kit are *not* ROHS compliant and may contain small amounts of lead. Do not eat your Wee Blinky kit. If swallowed, do not induce vomiting. Do not throw your Wee Blinky kit away in the trash. It should last forever, so put it in your will and let future generations enjoy its blinky goodness.

Side cutters

You could *almost* use scissors to trim the leads during the assembly of the 12 Volt Dimmer kit, but you will find that the right tool for the job is a pair of "side cutters" or "flush cutters". They allow you to get the cutting parts right up against edge of the solder joint and cut the majority of the excess lead off cleanly and safely. You really should wear safety glasses when soldering and especially when cutting leads. They have a bad habit of jumping up and flying this way and that.

Wires strippers

You don't need wire strippers to build the Wee Blinky kit. You will only need wire strippers if you are attaching the Wee Blinky to a power supply that doesn't already have stripped wires connected to it or if you are doing something fancy with the LEDs and wiring them off the board somewhere.

Step 3: Install the resistors

There are a total of four (4) resistors in the Wee Binky kit. Two (2) of them are 1KΩ (one thousand ohm) resistors and the other two (2) are 33KΩ (thirty three thousand ohm) resistors. The 1KΩ resistors (R1 & R4) have a brown stripe, a black stripe and a red stripe, in that order, painted all the way around their bodies. The 33KΩ resistors (R2 & R3) have three orange stripes. It should be easy to tell them apart if your vision is reasonably good. If not, try a magnifying glass or ask someone to help you tell them apart. They are not interchangeable. It won't hurt anything if you get them mixed up **but** your Wee Blinky is not going to blink the way you think it should.
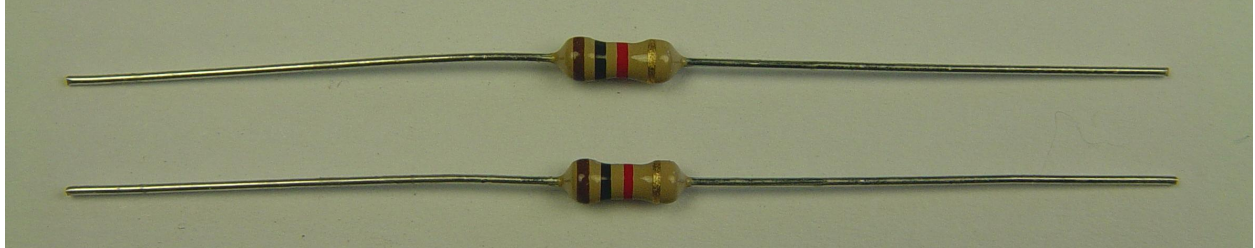
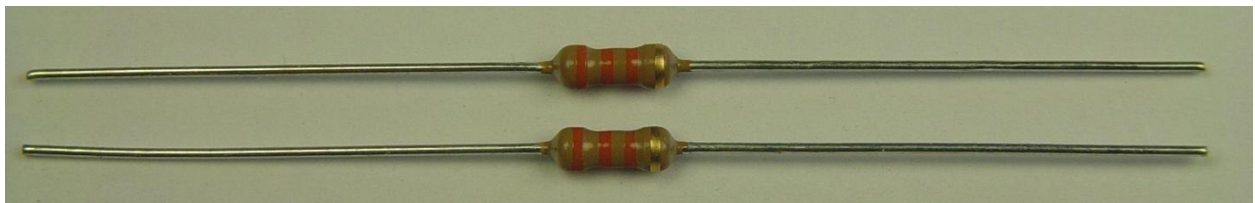Photo 2. Resistors R1 and R4 are 1KΩ (one thousand ohms), with brown, black and red stripes.

Photo 3. Resistors R2 and R3 are 33KΩ (thirty three thousand ohms), with three orange stripes.

Bend the leads of each of the four (4) resistors so that both leads point the same way.
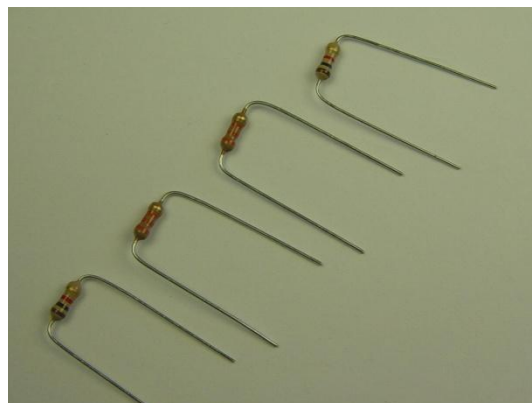

Photo 4. Form the leads of all the resistors like this.

Now insert the resistors through the holes in the PCB so that their bodies are lined up with the part outline that is printed on the top of the board.

Resistors can be installed either direction. They are not polarized so it doesn't make any difference to the circuit. Push them all the way down so that the bodies of the resistors lay flat against the PCB.

While holding all the resistors down with one finger, bend all the leads out so that the resistors don't fall out of the PCB when you turn it over.
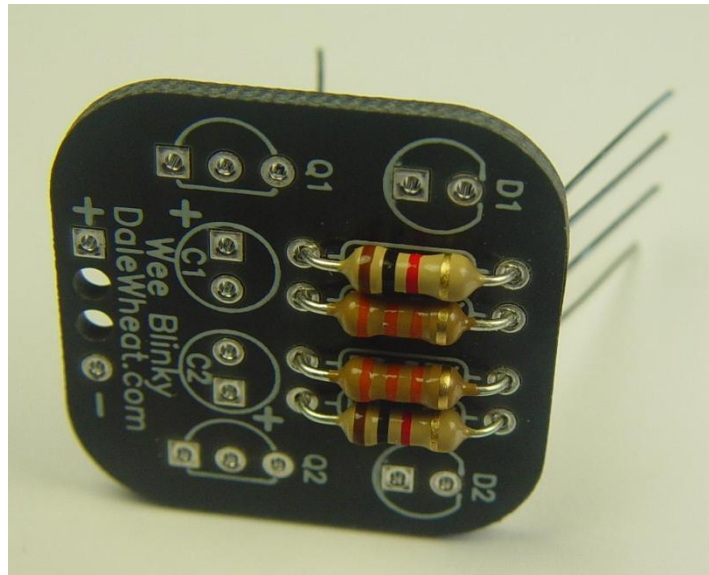

Photo 5. Insert the resistors into the PCB. Make sure you put the right resistor in the right place.

Solder the leads of the resistors to the PCB. Once the solder joints cool off, cut off the excess leads using the side cutters. Do not cut into the actual solder joint itself.
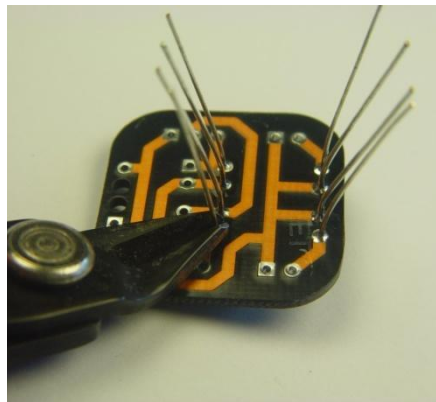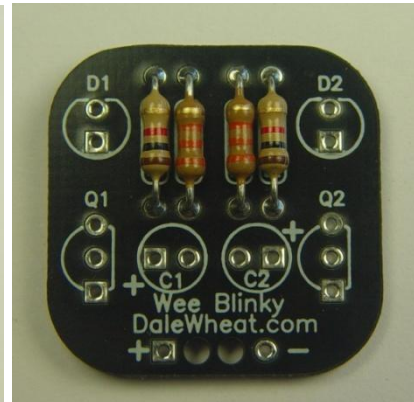

Photo 6. Trim the leads.   Photo 7. The correct way to install the resistors.

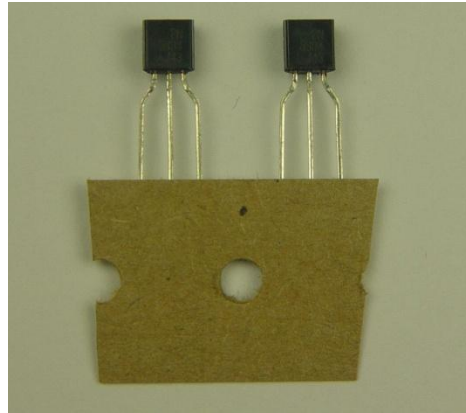## Step 4: Install the transistors

Photo 8. Transistors on tape.

Locate the transistors, Q1 and Q2. They will most likely be shipped together on tape. Do not try to remove the tape from the leads; this tends to leave tape adhesive residue in the leads which can contaminate the solder joint. Use your side cutters to clip the leads off right at the edge of the tape.
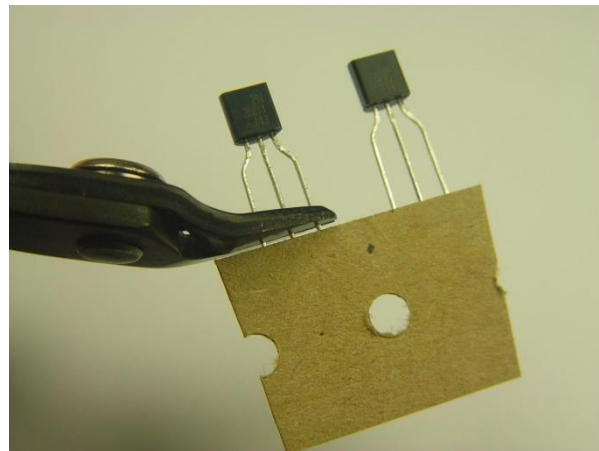

Photo 9. Cut the transistor leads near the edge of the tape. Don't try to remove the tape from the leads.

An important note: The transistors are *polarized* and must be inserted in the correct way for them to work properly in the circuit. Be sure to match the orientation of the transistor with the part outline printed on the PCB. Notice that the transistors have a flat side and a rounded side. This will match up with the outline printed on the PCB to show you which direction to install them.

The leads of the transistors should already be formed to fit exactly into the holes on the PCB. You will see the outline of the part printed on the PCB. Line up the flat side of the transistor body with the flat side of the part outline on the PCB. Insert the leads through the holes in the PCB. Make sure all three (3) leads go through and then bend the leads outward a little bit to retain the transistor on the PCB.
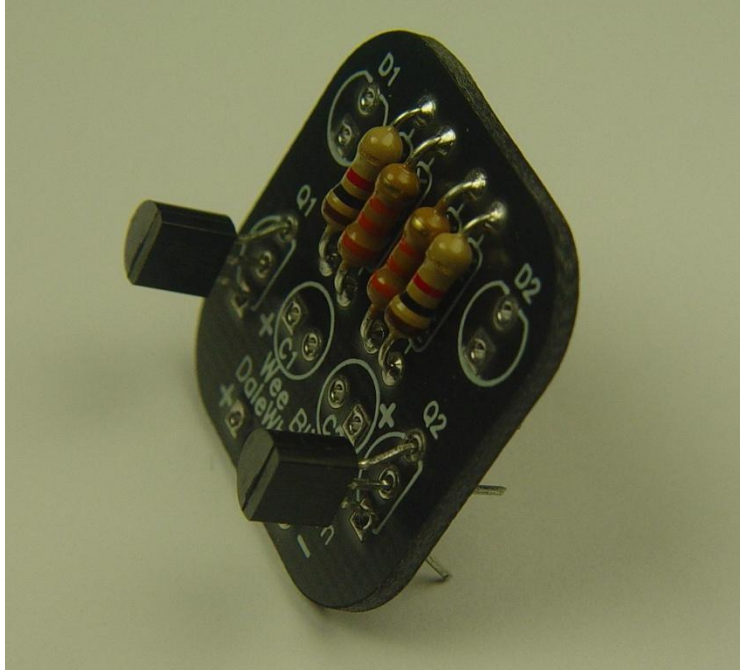
Photo 10. The correct way to insert the transistors.

Flip the PCB over and solder the leads to the PCB. After the solder joints cool, clip the excess leads without cutting into the solder joint itself.
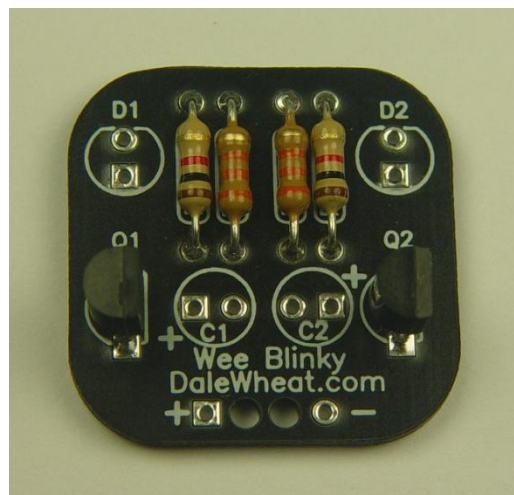

Photo 11. The transistors have been installed correctly.
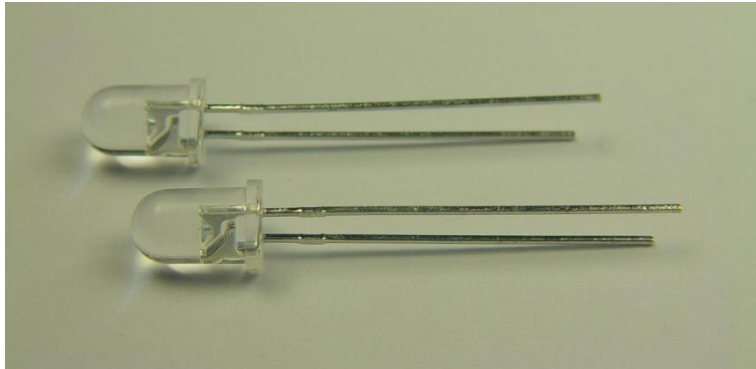
Step 5: Install the LEDs

Photo 12. The LEDs D1 and D2. The longer lead is the *anode*, or positive lead.

Now it is time to install the LEDs. These instructions will show you how to install the LEDs directly to the PCB. You can also mount the LEDs *off-board* by connecting wires to the holes where the LEDs go and then connecting the wires to the LEDs elsewhere. Be inventive. Go nuts.

Find D1 and D2, the LEDs. Notice that one of the two leads is slightly longer than the other one. The longer lead is called the *anode* and goes in the hole that has the square pad. The other, shorter lead is the cathode and goes in the other hole.
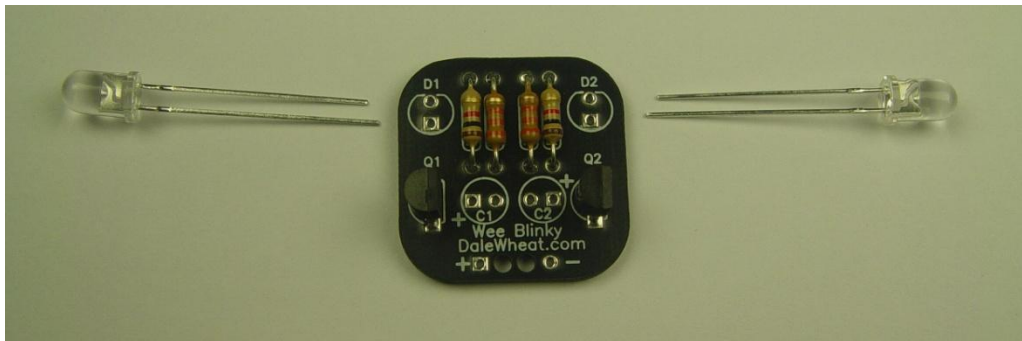

Photo 13. The long lead, or *anode*, goes in the hole with the square pad. It won't work the other way.

Another important note: LEDs are *polarized* and will not work properly in this circuit unless installed in the right direction. As mentioned previously, one lead, the *anode*, is slightly longer than the other lead. The other lead is called the *cathode*. Another way to check the polarization of the LEDs is to find the flat side on the base of the plastic body of the LED. The flat side indicates the *cathode*. There is also a flat section in the LED part outline printed on the PCB.

Insert the LEDs all the way into their holes until the body of the LED is flat against the PCB. Or don't. It's up to you. Use your imagination. Be thinking about what you're going to do with your Wee Blinky once it's built. Will you need to bend the LEDs around to fit into something?
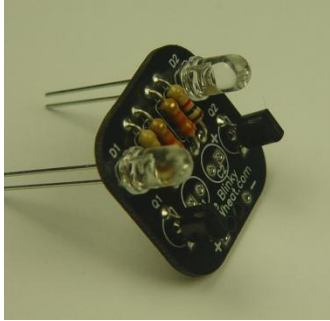
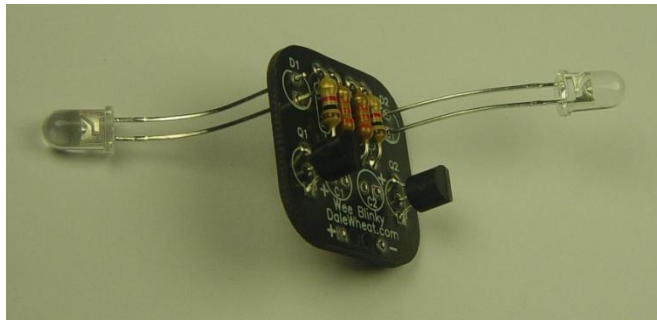Photo 14. LEDs inserted flush against PCB.   Photo 15. LEDs mounted in another fashion.

Bend the leads apart a little bit to keep the LEDs snug against the PCB while you flip it over. Solder the leads to the PCB. Once the solder joints cool down, clip off the extra part of the leads. Do not cut into the solder joint.

Photo 16. The LEDs are installed flush against the PCB.
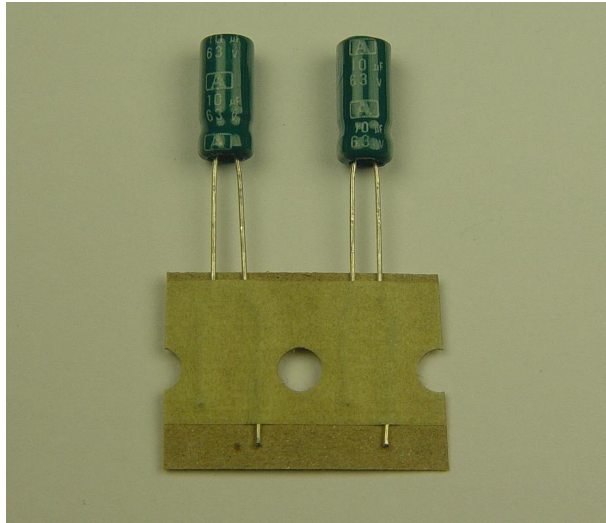
Step 6: Install the capacitors

Photo 17. Capacitors on tape.

C1 and C2 are the capacitors. They are the last components to be installed. You're almost done! If the capacitors arrive taped together, clip the leads right where they emerge from the tape. Don't try to unpeel the tape. It will just leave sticky goo on the leads.

Yet another important note: Like the transistors and the LEDs, these capacitors are *polarized* and must be installed in the correct orientation. Some kinds of capacitors are not polarized **but these are**, so pay attention. There is a stripe with minus signs ("—") printed on the sleeve that covers the body of the capacitors. This is the negative terminal, or *cathode*, of the capacitor.
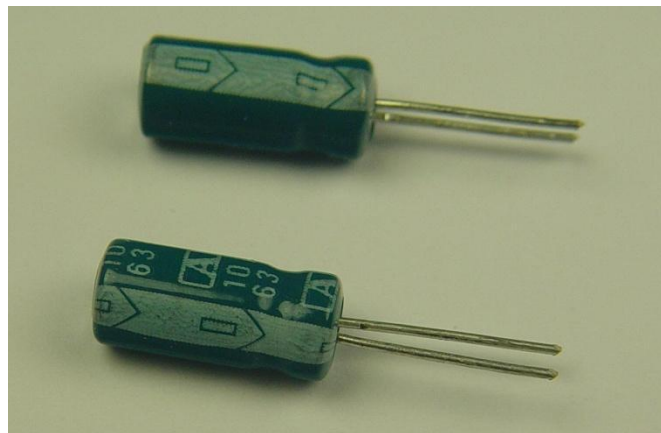

Photo 18. The cathode ("—") marking on the capacitors.

On the PCB, the positive lead, or *anode*, is labeled with plus signs ("+") printed on the PCB and the anode mounting hole has a square pad. Once installed, the two negative leads of the capacitors should be facing each other (closest together).
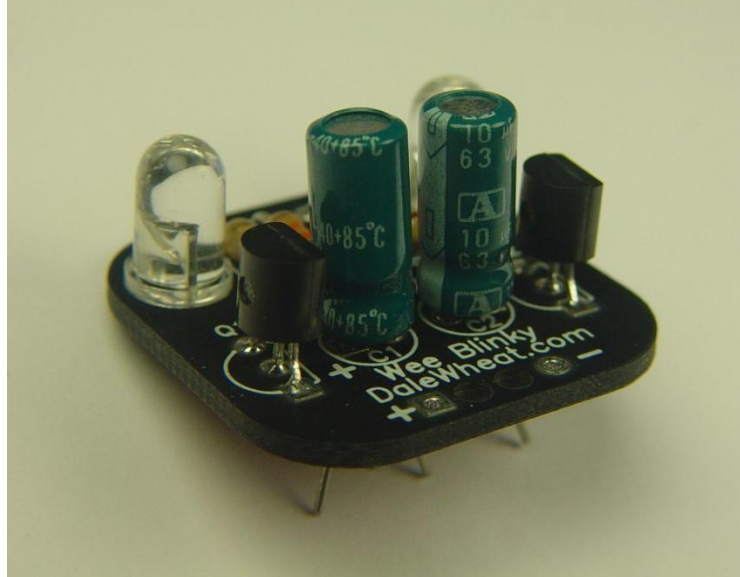
Photo 19. The capacitor cathode markings should be facing each other.

Insert the capacitors though the PCB, paying careful attention to the polarity. Bend the leads out a little bit and flip the PCB over. Solder the leads to the PCB and after the joints cool off, clip the excess leads off. Don't cut into the actual solder joint.

Photo 20. The right way to install the capacitors.

Step 7: Attach power

At this point your Wee Blinky is complete! All that remains is to attach it to a power source and watch it blink.

If you are using a battery holder or battery snap that already has wires, connect the positive wire (usually the red wire *but not always*) to the hole with the square pad that is marked with the plus sign ("+"). It's

a good idea to thread the wire up through the adjacent middle hole and then back down into the hole to make the solder connection. You don't have to do this, but it provides a bit of strain relief for the power wires and helps to keep them from breaking.

Leave big loops of wire before soldering. Then solder the wires to the PCB. After the solder joints cool, pull the extra wire back through the strain relief holes. Otherwise, the insulation tends to melt away from the tightly curled wire when it is heated by the soldering iron, making for un-pretty wires.
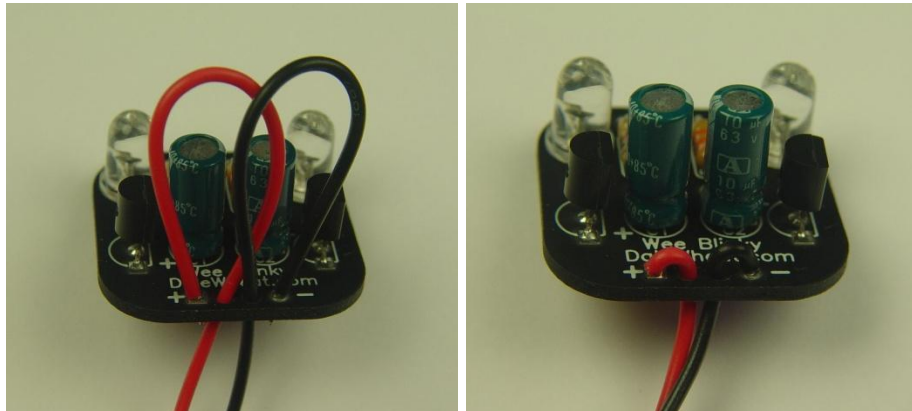

Photo 21. Lace the power wires for strain relief.

Next connect the negative wire (usually *but not always* the black wire) in the same manner, except this time to the negative power connection labeled with the minus sign ("—").

A note on power sources: The Wee Blinky will run on a variety of voltages, from as little as 3 volts to as much as 12 volts. It draws very little current, typically less than 10 mA. The Wee Blinky will run continuously as long as power is applied.

Once you've applied power, the Wee Blinky should start blinking the LEDs back and forth. If not, first check your power source, then the connection to the PCB, then make sure you've soldered all the parts in, then start looking for parts installed backwards. If you're still having problems, please contact me and I will help you get it working.