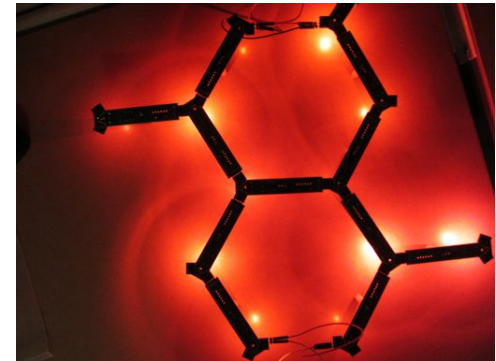
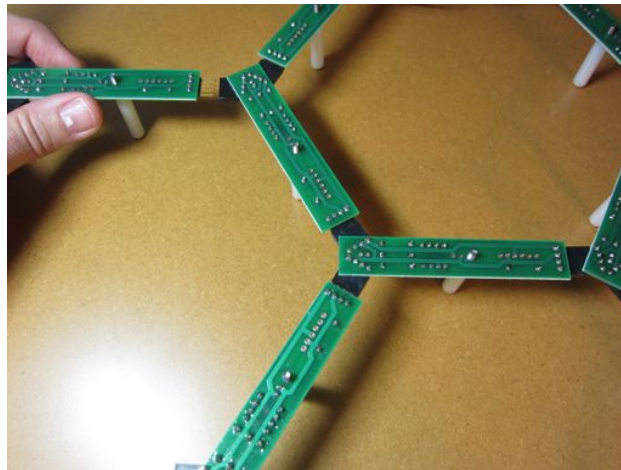
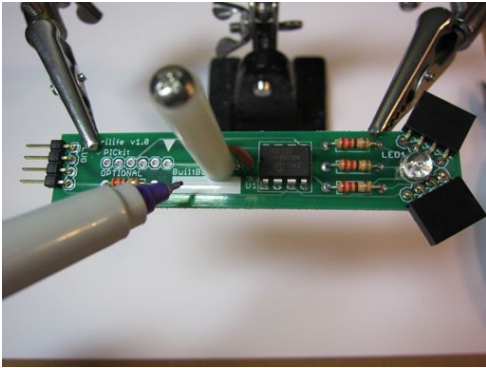


Building the TriLife Kit



What is TriLife?

Everyone builds a small identical board, then connects them together

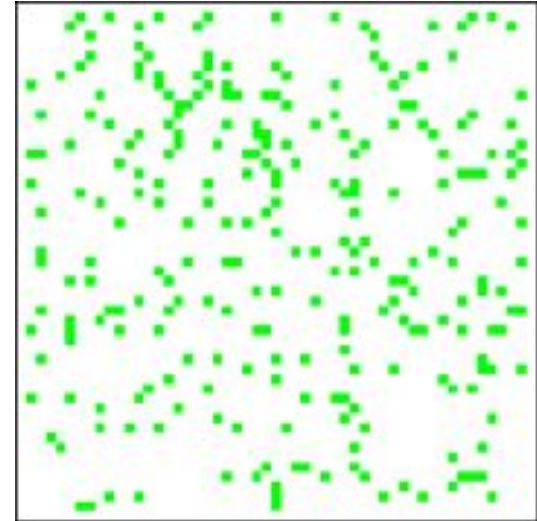
Your board's light level depends on its **3** neighbors (*Tri*)

Patterns emerge! (*Life*)

It's good for learning to solder

Cellular Automata

- Trilife is a kind of “cellular automaton.” Simple, local rules create interesting large patterns. There are lots of different grids and rules (right: a CA on a square grid)
- Trilife rules are pre-programmed into the microcontroller in the kit:
- There are 4 brightness levels
- Fade to the dimmest level and hang out there until one or more of your neighbors is at the brightest level.
- Then go to the brightest level and fade out again!



[http://en.wikipedia.org/wiki/
File:ExcitableCellularAutomaton.gif](http://en.wikipedia.org/wiki/File:ExcitableCellularAutomaton.gif)

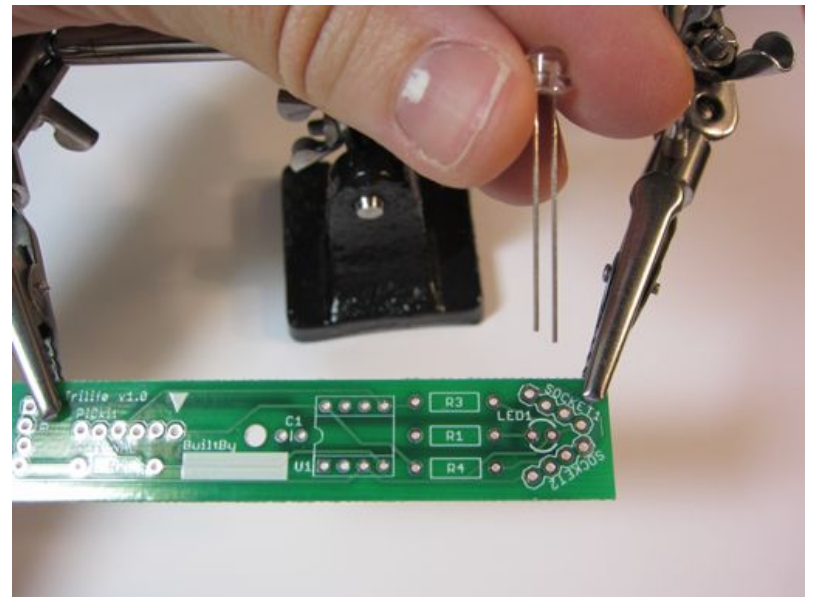


Start making a Trilife board

- Google “soldering is easy” for a helpful guide
- Need Helping Hands, cutters, solder and soldering iron
- We’ll start with some of the larger parts to get the hang of it

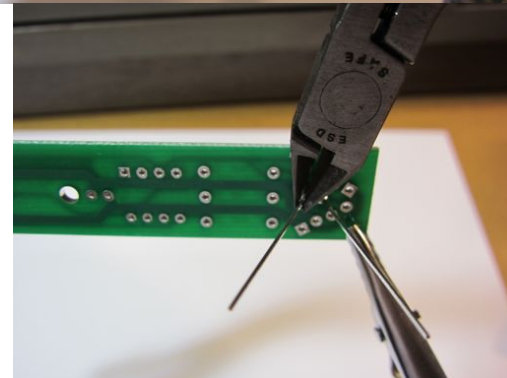
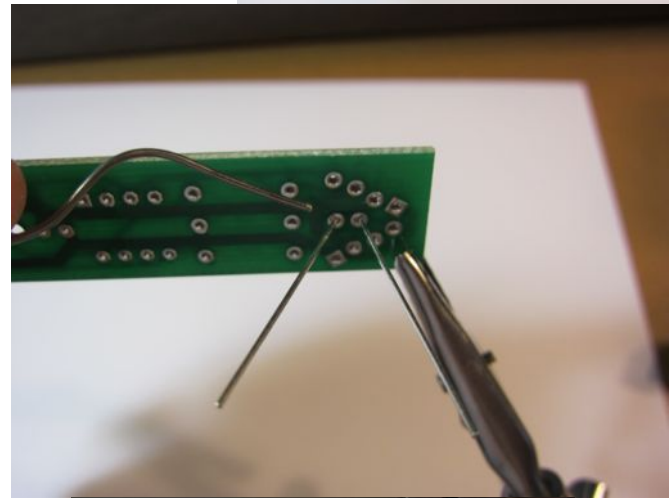
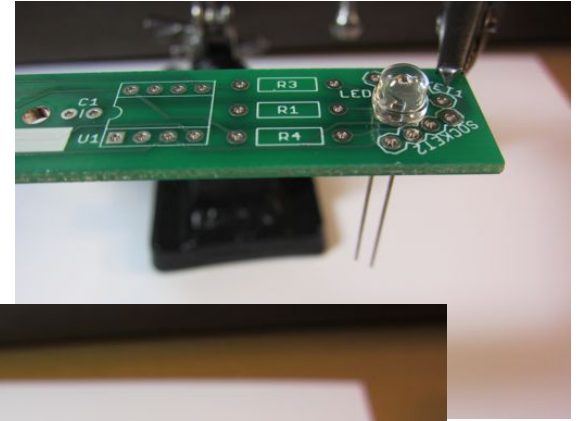
Put on the Light

- A LED (Light Emitting Diode) is the first component
- Watch where the long and short legs go—get it backwards and the light won't turn on (we will fix it)
- Install LED and all other parts from the side of the board that has writing



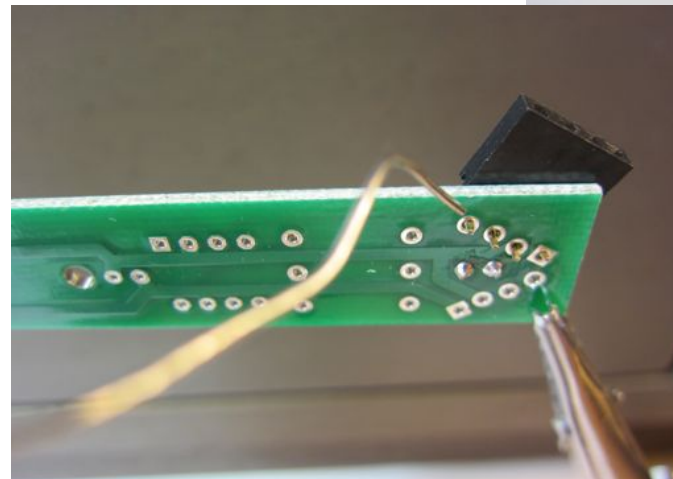
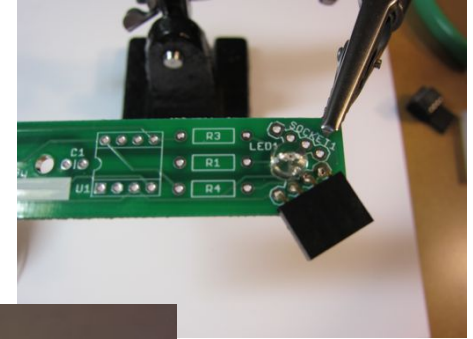
Solder the LED

- On the other side of the board, heat the joint between board and wire, and let solder flow onto it
- Cut the extra wires off
- Hold the end of the wire when cutting-- your neighbors will thank you



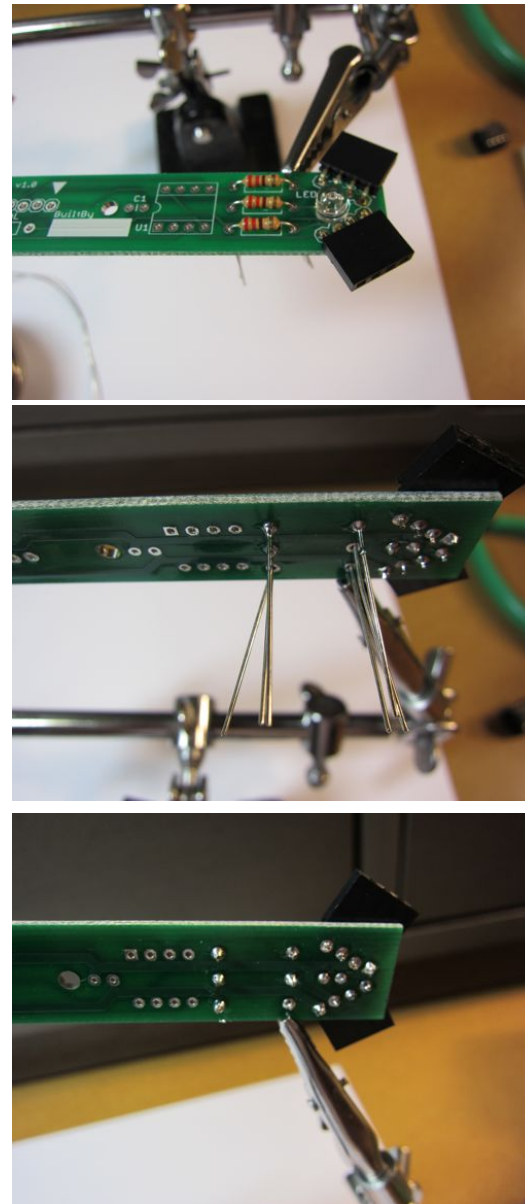
Then the sockets

- You can solder one pin on top of the board to hold it easier
- But make sure to do the final soldering on the back side
- Solder both sockets



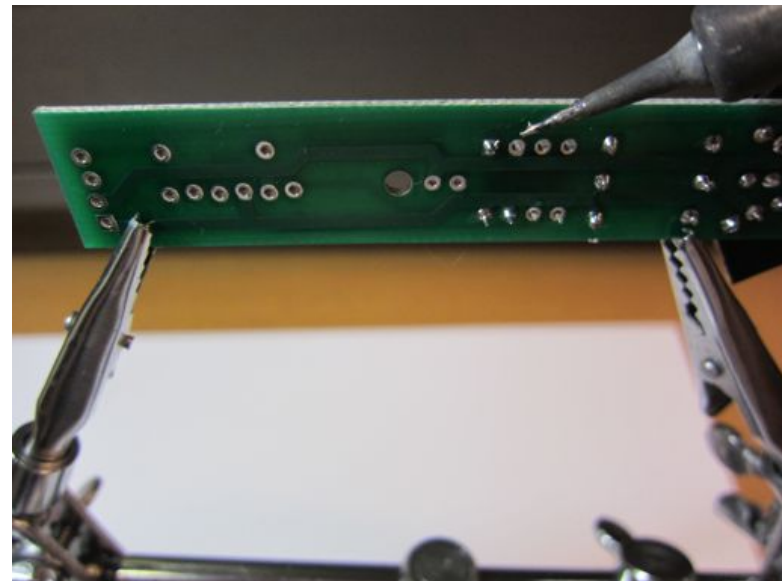
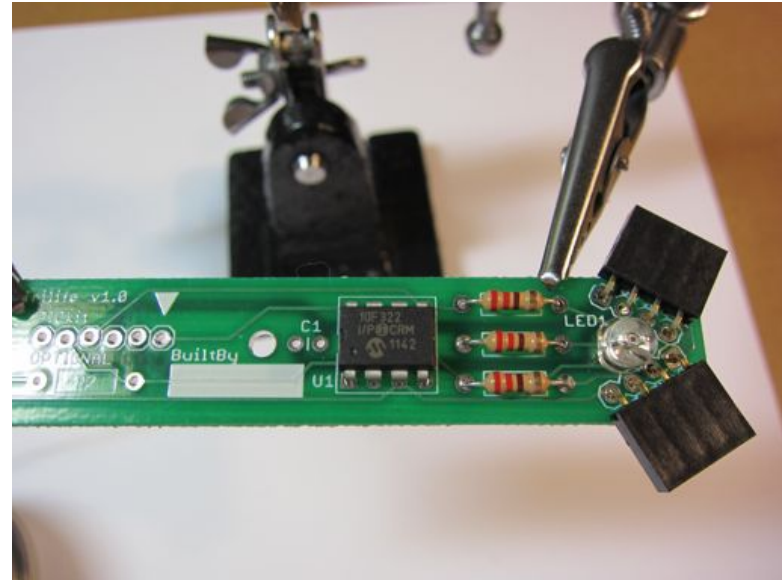
Add some resistors

- All 4 resistors on the board are the same 220 ohms
- Orientation doesn't matter (unlike the LED)
- Install 3 of them
- Solder on the underside, then cut



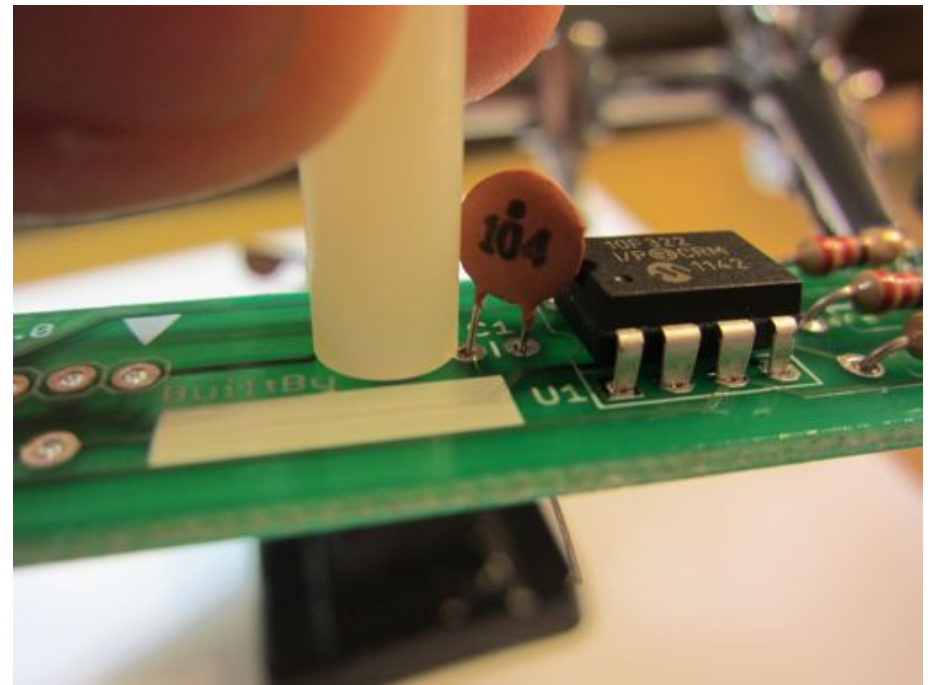
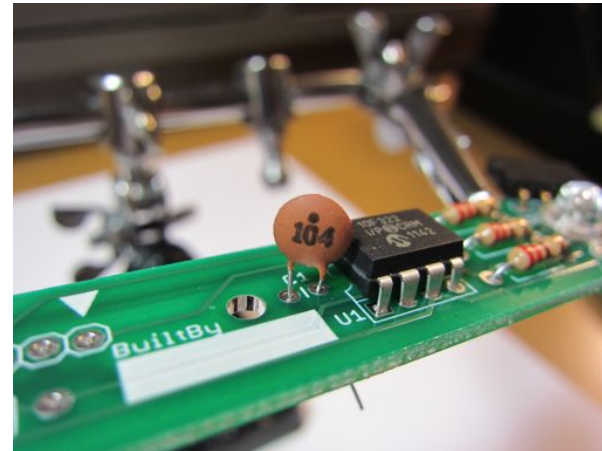
Install the microcontroller

- Put the dimple next to the “U1” label on the board
- It’s a pre-programmed PIC10F322
- Solder the 8 pins underneath



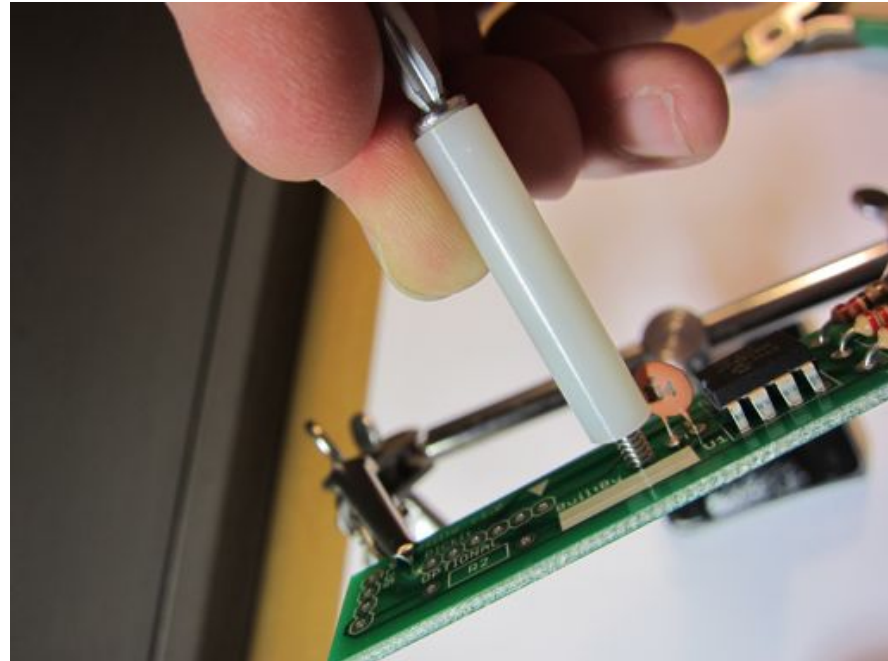
Add a capacitor

- It doesn't matter which way this capacitor goes
- It's a 0.1 microfarad ceramic capacitor marked "104"
- Let it stick up a bit from the board so it can twist to make room for the spacer
- Solder on the back and cut the extra wires as usual



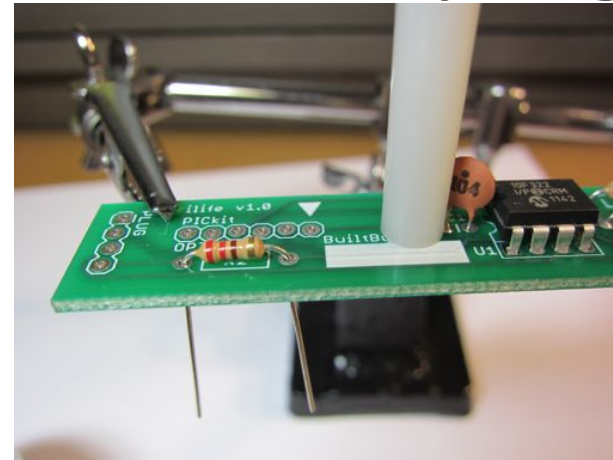
Add the foot

- A plastic spacer holds the board above a wall or table with the LED facing down
- Attach the spacer by screwing the #4 screw into the hole by the capacitor
- The board needs neighbors to stand up very long

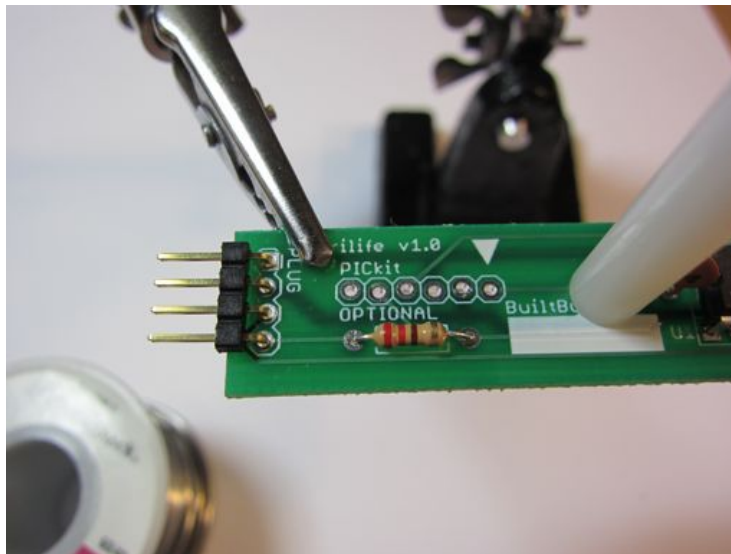


Add the last resistor and plug

- Install the remaining 220 ohm resistor and solder on back
- Install the 4-prong plug and solder it



- There's space for a 6 pin connector (not included, used to reprogram the board from PICKit3)
- You can just hold a 6 pin header on it and program OK
- Unplug it from any neighbors before programming



Current world record: 11 boards



- Wires cross over the signal when two sockets meet
- The “kicker” board at the top stayed fully “on” and triggered this pattern; it’s the same board with different software.
- Let’s build bigger and get videos of some large scale patterns!