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!

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
Sign it & plug it in

- There’s a space for your initials
- Assimilate it into the other Trilife boards
- Power the array: connect a prong with a square pad to ground, and the adjacent prong to 5V
- Each board draws a max of 20 mA at 5V
Here’s an array of 31 boards

• Lights shine up through a translucent panel
• Let’s build bigger and get videos of some large scale patterns!