GfxHax DrinkShield Tutorial

Overview

The GfxHax DrinkShields are easy to build and a great tool to learn and get better at soldering. The boards are silk screened so that every part is marked on the board to easily identify what part goes where. If you have built electronic kits before you shouldn't need a tutorial to assemble this kit.

Completion Time

Approximately 15-20 minutes or less.

Difficulty

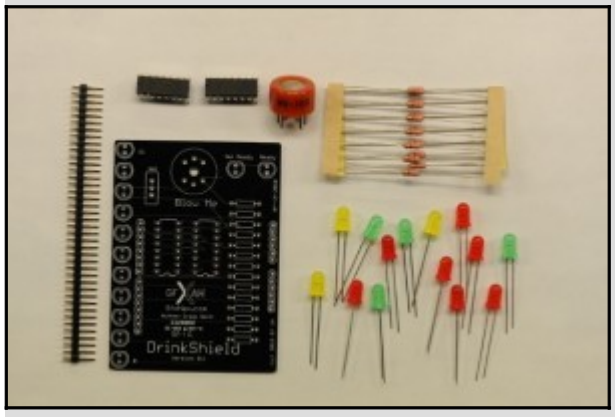
Beginner level board. This board is designed to be easy to solder even if this is the first kit you have ever used.

Tools

- Soldering Iron
- Solder ~.022 diameter
- Wire Cutters
- Razor

Step 1 – Review the kit

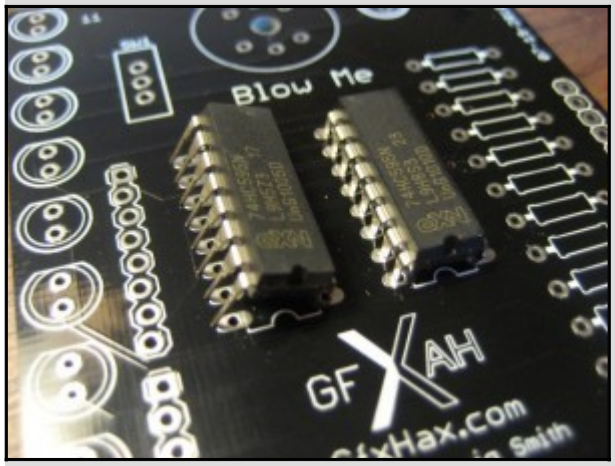
Look over the board and get familiar with all the layout. Look over the parts that come with the kit. If you have never soldered before I highly recommend reading the Soldering is Easy Cartoon.



Drink Shield Kit Parts

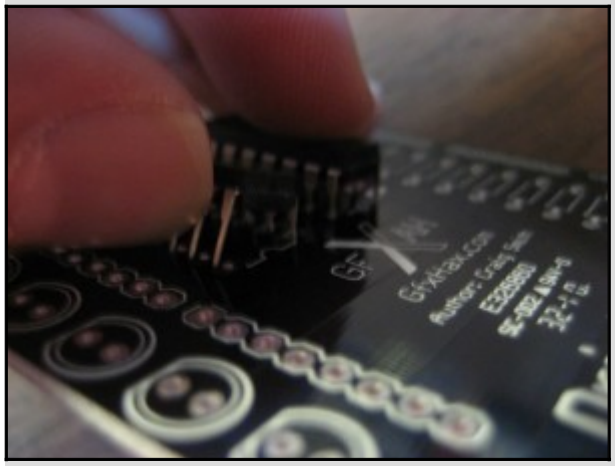
Step 2 – Solder the 74HC595N Shift Registers

Version 0.1 of the Drink Shield uses Shift Registers to control all the LEDs. This allows for a very small number of pins to be used on the micro controller (3) but allow for a large number of LEDs to be controlled (13). For a great tutorial on Shift Registers check out Protostack's Tutorial. There are 2 of these and they go in the middle of the board in the spot that looks like an integrated circuit (IC). You will notice there is a notch cut out of but the Shift Register and in the drawing, make sure those match.



Laying out the Shift Registers

After you slide one side of the Shift Registers into the slot you will notice the other side usually won't fit. You should use your thumb to apply a bit of pressure to the pins to bend them in slightly until they fit.

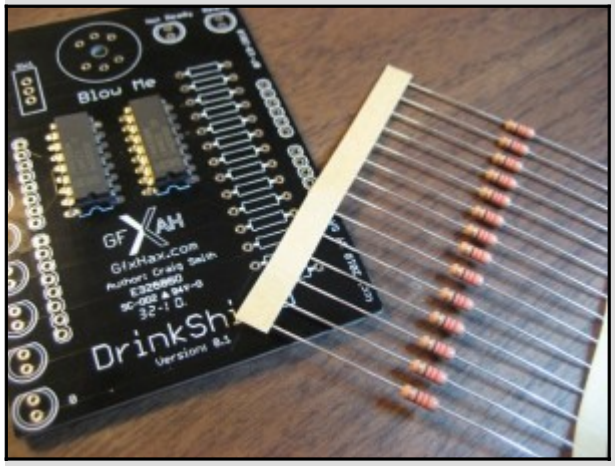


Gently bend in the pins on the other side

Once you get both sides in, press down so the shift registers fit snuggly in the board. Now flip the board over and solder down each of the pins. The shift registers should stay in place when you flip the board over.

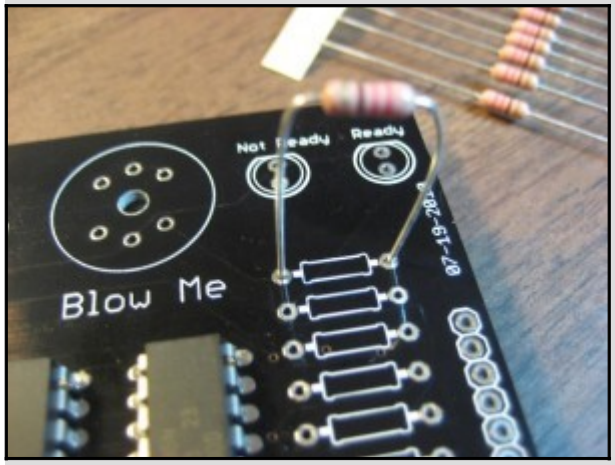
Step 3 – Solder the resistors

Now take your ribbon of resistors. These go down the right side of the board. You can pull the resistors out of the tape. They will bend when you do this and that's OK. Don't worry about it, we are going to bend them anyway.

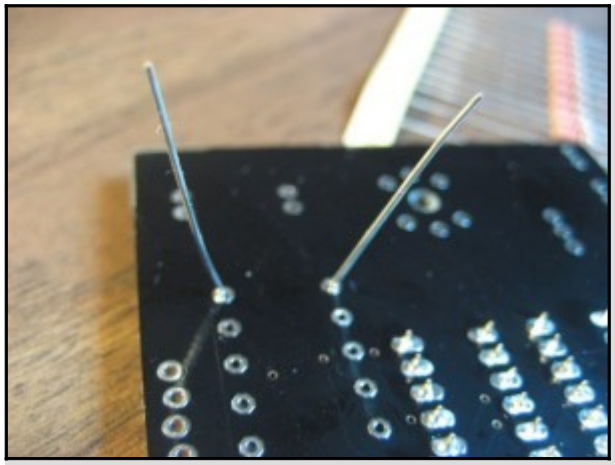


Resistors in their ribbon

All the resistors are the same (220 Ohm). It doesn't matter which direction you insert them into the board. I keep all mine the same direction so they look nicer. To fit the resistor in the board, grab the resistor and pull the leads downward so they fit into the holes. Push the resistor flush against the board and in the back bend the pins outward so the resistor will stay in place.

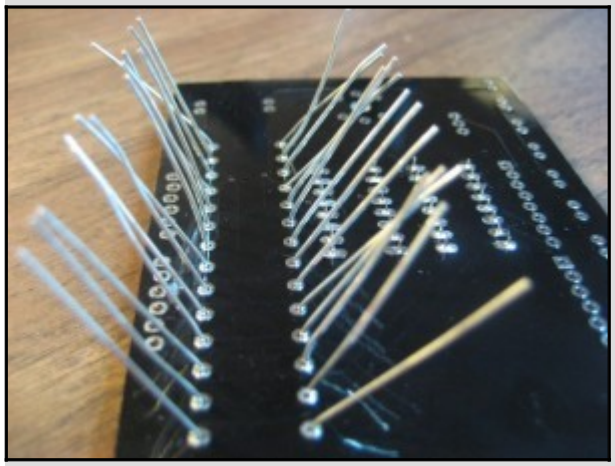


Bend and Insert the Resistor



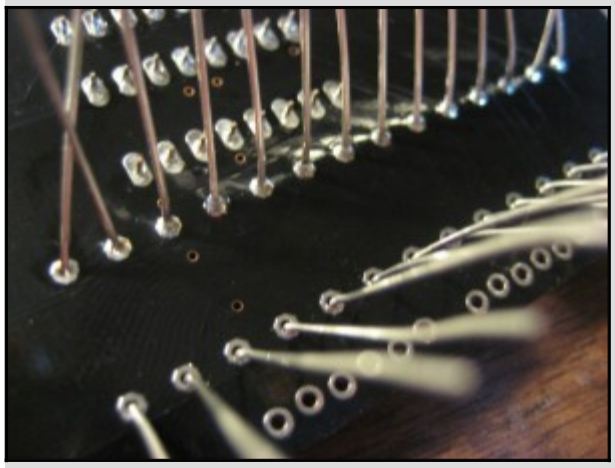
Bend the pins outward

Go ahead and insert all the resistors and bend their pins

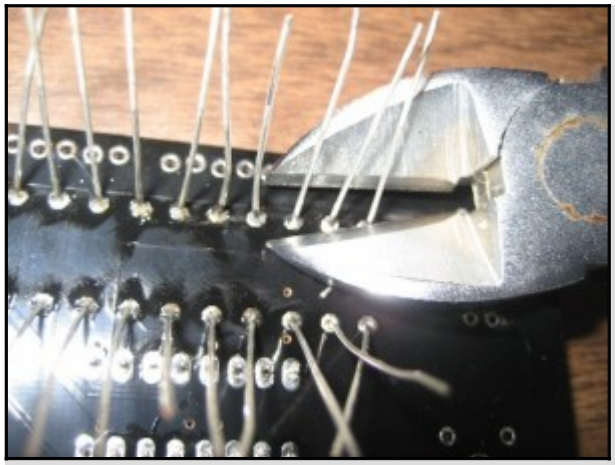


All resistors inserted

Solder all the resistors in place. I usually do one side at a time. After you are done trim the pins with a wire cutter.

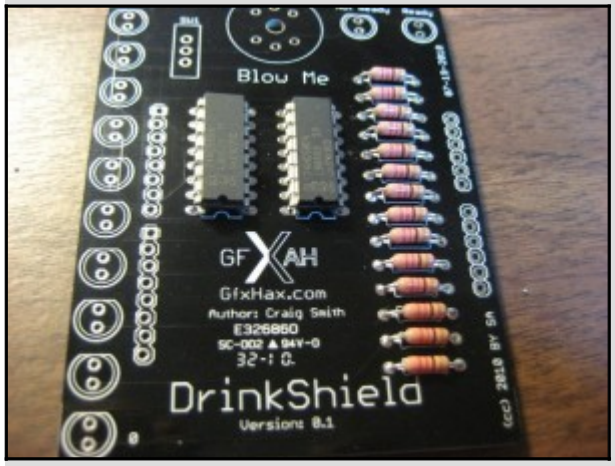


One side soldered



Use wire cutters to trim resistors

Trimmed Resistors

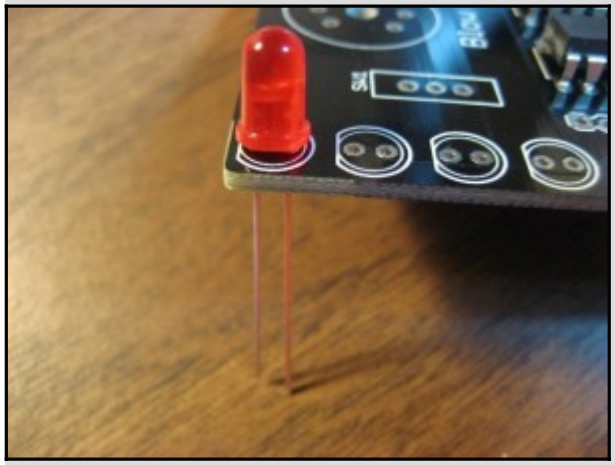


Finished with the resistors

Step 4 – Solder the LEDs

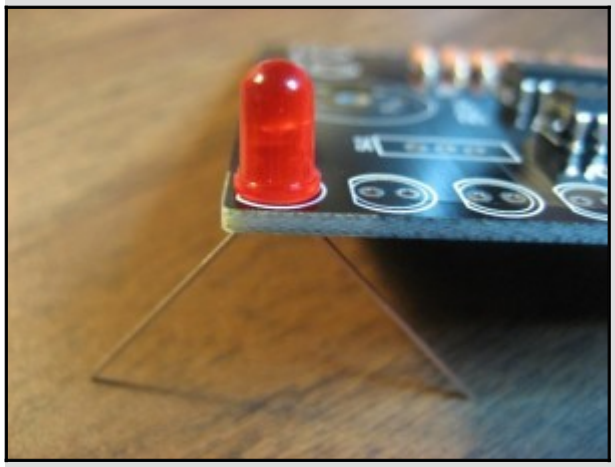
Next is the Light Emitting Diodes (LEDs) There are 5 red ones, 3 yellow and 3 green for the light bar. There is also an additional red and green LED for the player ready lights in the top right corner. The LEDs marking are circular and on the left of the

board. In this tutorial I start at the top of the board and work my way down. The top of the board is marked with an 11, this is because our light bar goes to 11. You will notice that the circular diode marking is flat on one end. If you look at an LED you will also notice that one pin on the LED is shorter than the other. The short pin goes into the hole next to the flattened part of the circle.

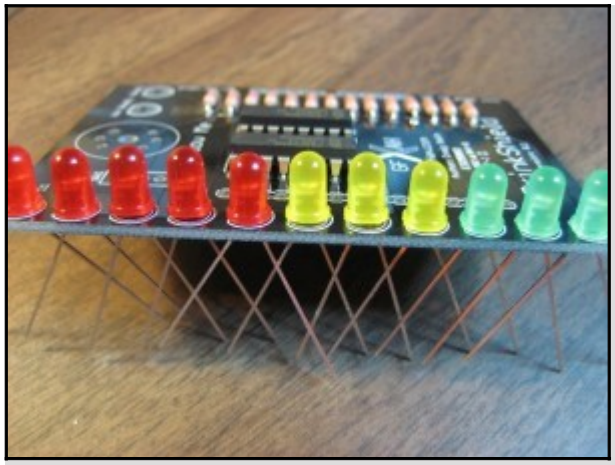


Short pin at the top near the flattened marking

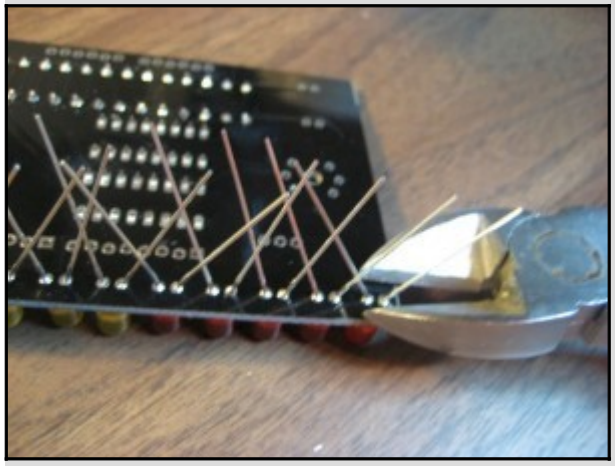
Next we are going to bend out the pins to hold the LED in place and insert the rest of the LEDs just like we did the resistors. This step is almost identical to the resistors except you must make sure the snort pin is always inserted at the top (the flattened part). Trim up the LEDs when finished.



Bend the pins outward



All LEDs inserted



Clip all the pins from the LEDs

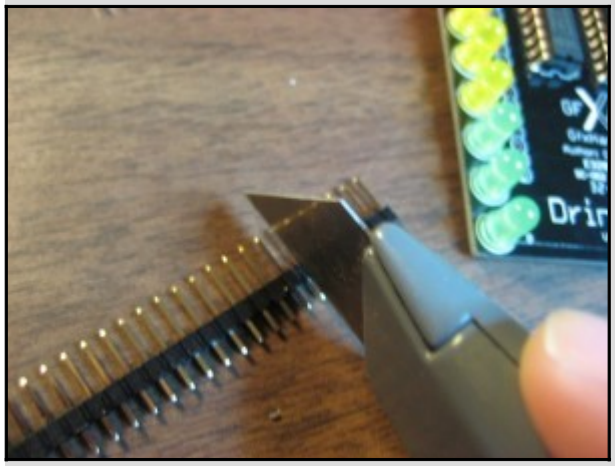
Step 5 – Solder the MQ-3 Sensor

The MQ-3 Sensor is the alcohol sensor that makes this kit a breathalyzer. There are 6 pins on the bottom of this orange device. It doesn't matter how you insert it. You can read the datasheet if you are curious as to why. This will simply slide in and it should hold in place when you flip the board over. The pads are a bit smaller on this device but in general it's still straight forward to solder.

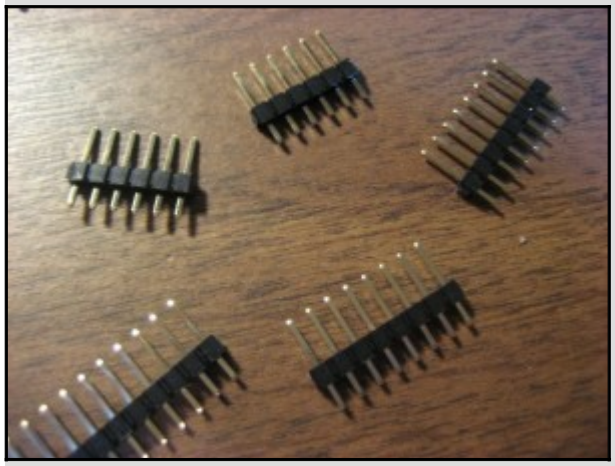
Insert the MQ-3 Sensor and solder it

Step 6 – Solder the headers

This is the last step. You need to take the breakaway headers and cut them to fit in the arduino. You will need four sections. Two sections of 6 pins and two sections of 8 pins. Using a razor blade count down six pins and press firmly in the notch, the header should cut without much difficulty. Repeat until you have 2 pairs of 6 and 8.

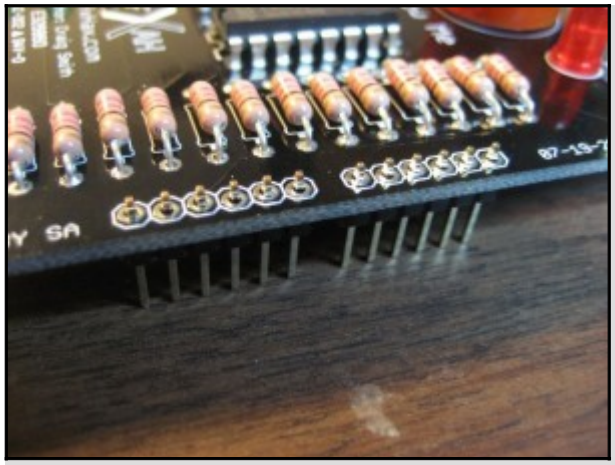


Cut the headers to fit the board



You will need 2 pairs of 6 and 8 pins

You will have some extra left over. That's OK, if you make a mistake hopefully you will have enough left to fix it Next insert them into the board, with the long pins protruding downward. The holes are the ones Sparkfun specifically designed to hold the pins in place while you solder (Sparkfun rocks!) Once you insert them they should stay for you. Just solder them in place.



Inserted headers

Done!

Finished Drink Shield

The Drink Shield should now fit snuggly onto an Arduino or Arduino clone. You will next want to download the arduino drinkshield library from the main page. Once uploaded all that is left is to get your drink on!

Enjoy!! Oh, and drink responsibly-ish.