

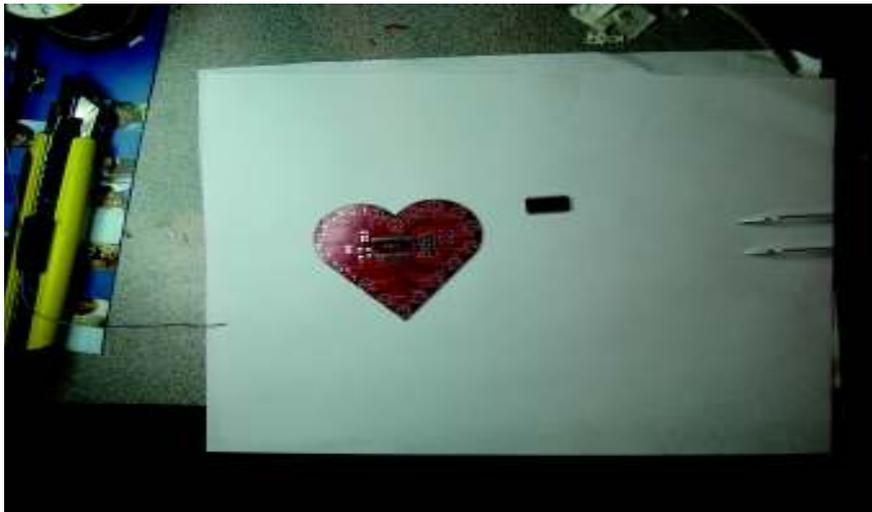
Heartboard Manual

Heartboard designed by: Mike Irvine
Manual Written by: Byron Sinclair

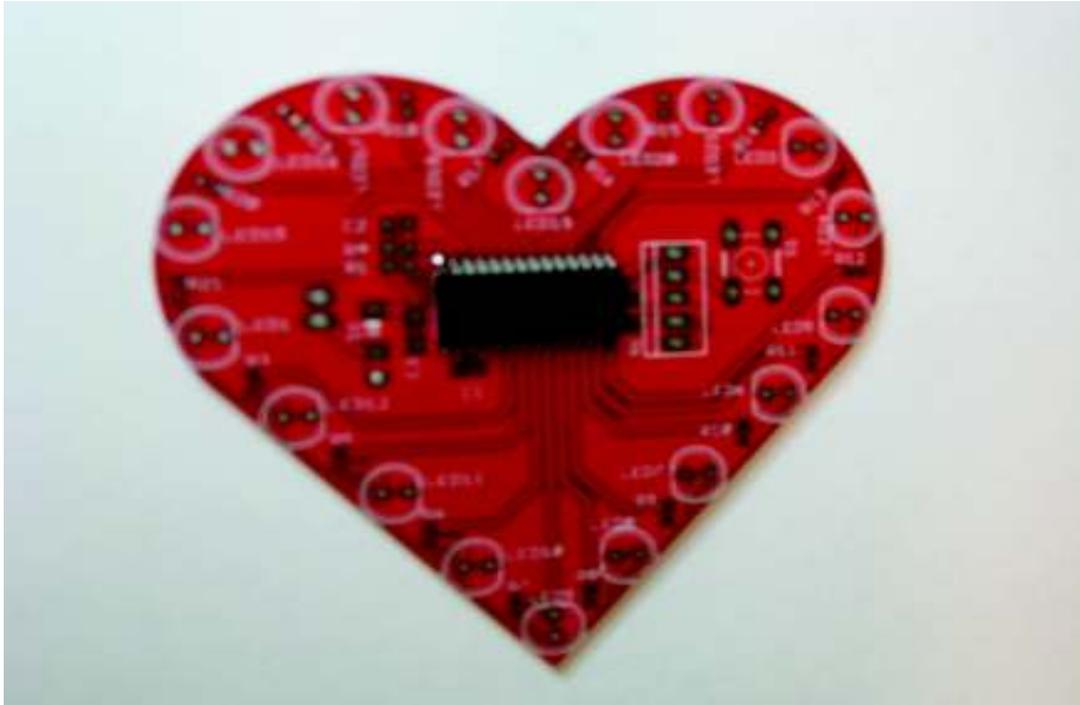
The kit:



The PIC



1. Placing the PIC on the board. Ensure the pins of the PIC correspond to the proper pads on the board, the PIC has a circle on the bottom left corner that corresponds to the circle on the bottom left corner of the circuit board.
2. Put solder on one of the bottom right corner of the pad for PIC on the board. Heat up the solder with the iron and place the chip on top with large tweezers to attach the chip to the board, making sure to align the pins of the PIC with the pads on the board.



3. Solder the pin on the opposite corner of the PIC to the board to ensure that the alignment is correct.
4. Solder the rest of the pins to their pads.



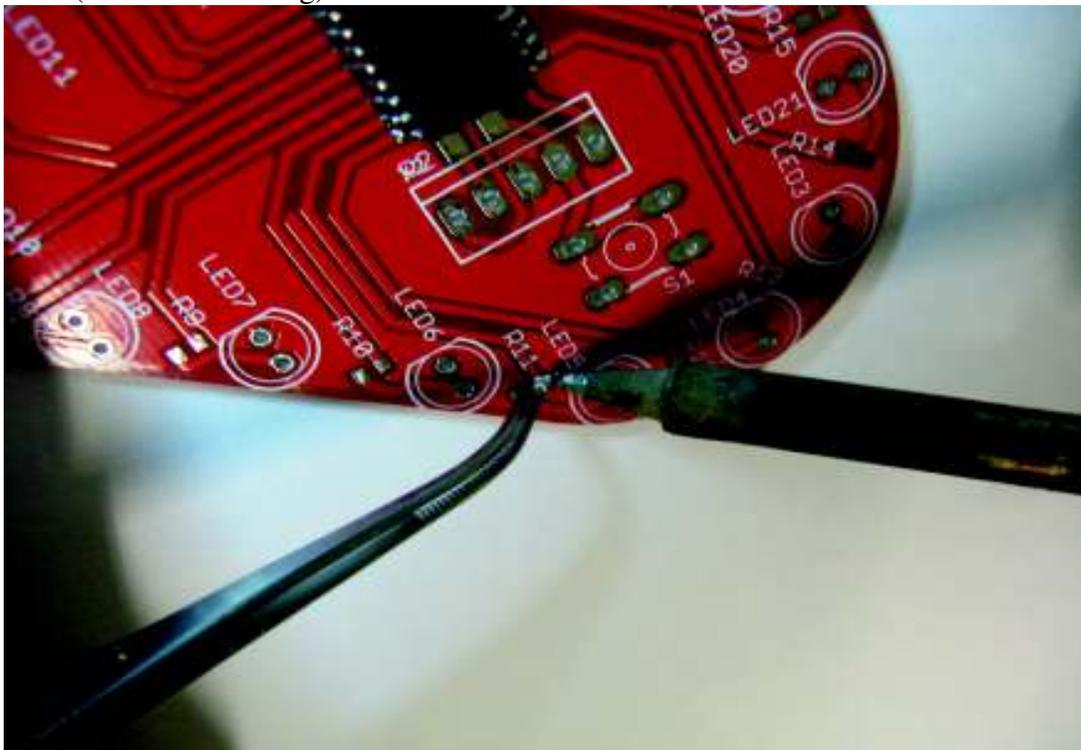
The LED Resistors

Tips: The 0603 resistors are very small! Do this step on a piece of paper to make them easier to see. A pair of tweezers are required to handle them properly. The resistors have writing on them. The first 2 numbers are the value and the third is 10 to the exponent of its value (eg. 10k is 103 10³).

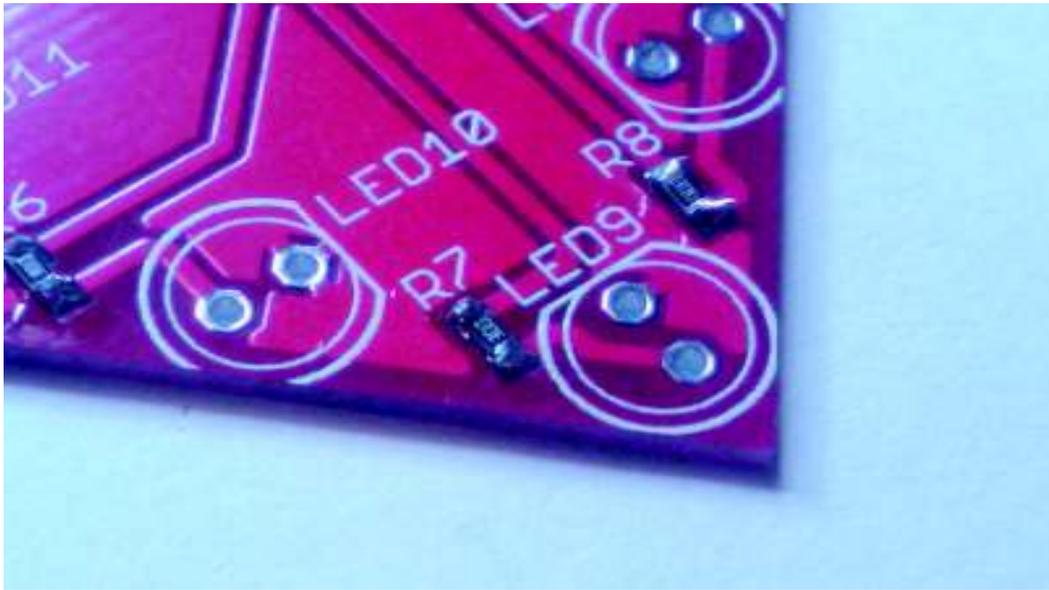
1. Place solder on one pad of the resistor.



2. Heat up the solder on the pad and place the resistor on top using the tweezers. Then remove the soldering iron while holding the resistor in place. Let go of the resistor once the solder has cooled (does not take long).



3. Heat the pad on the other side of the resistor as well as the resistor itself and add solder.
4. Repeat for all LED resistors.



R1 and R2 (10k)

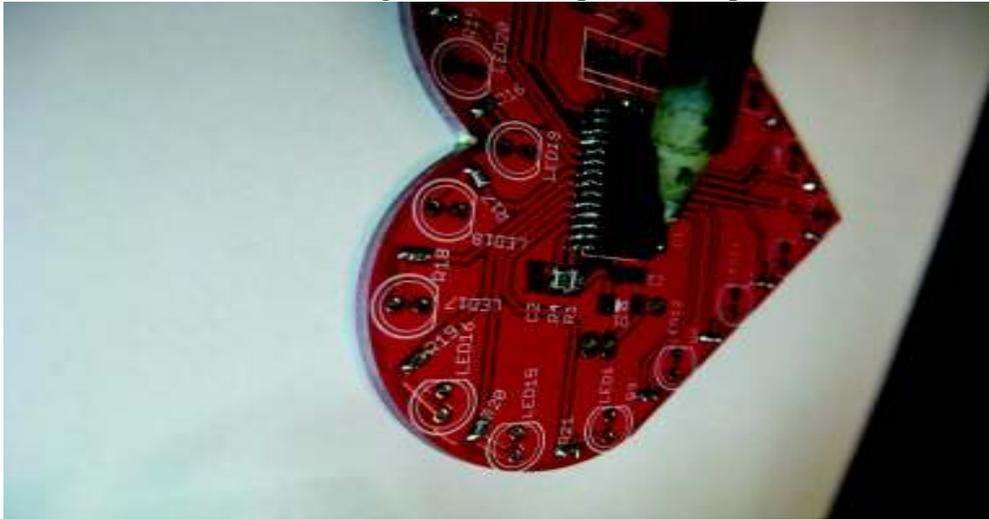
Tips: These resistors are larger, but pay extra care to the placement of R2 as it has a very small space between its pads. The R2 pad is hard to read, it is on its own on the right side of the chip.

1. Follow the steps outlined for the previous resistors.



R4 (47k)

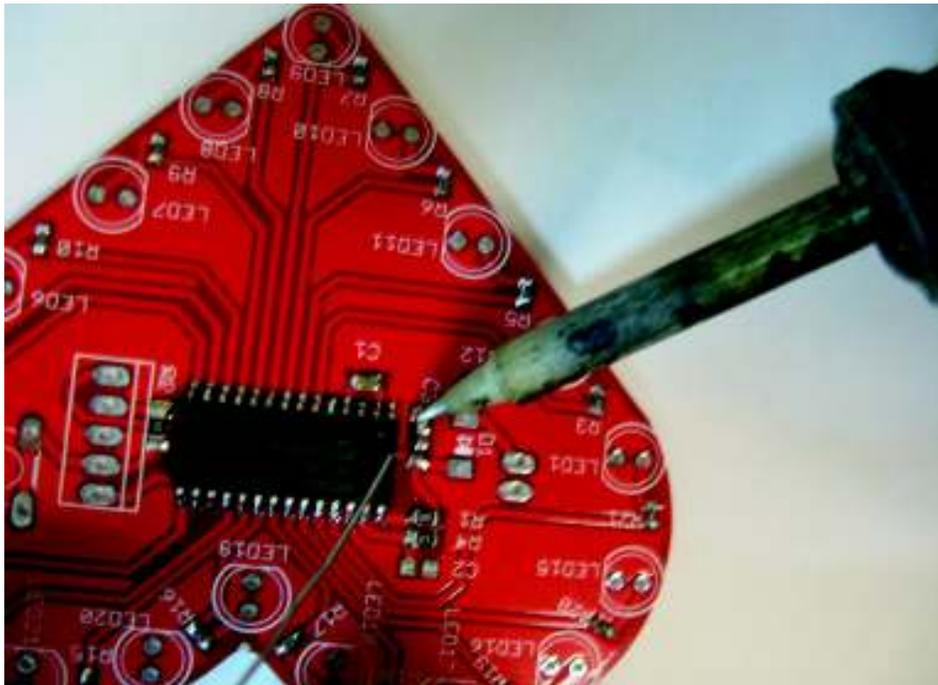
1. R4 is the oscillator resistor. Once again follow the previous steps for resistor soldering.



Capacitors

Tips: These capacitors do not have values written on them! They are labeled on the tape around them. The order is C1, then C3, and then C2.

1. Solder the capacitors the same as the resistors. These capacitors are non-polarized so they can be placed in either orientation.



The Diode

Tips: Diode is polarized! See picture for proper orientation before soldering.

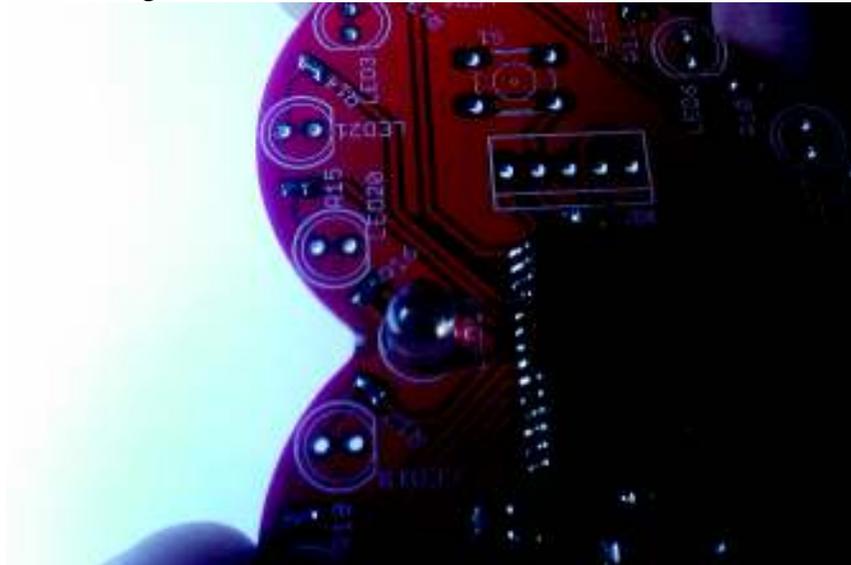
1. Once again soldering of the diode is done just like the resistors.

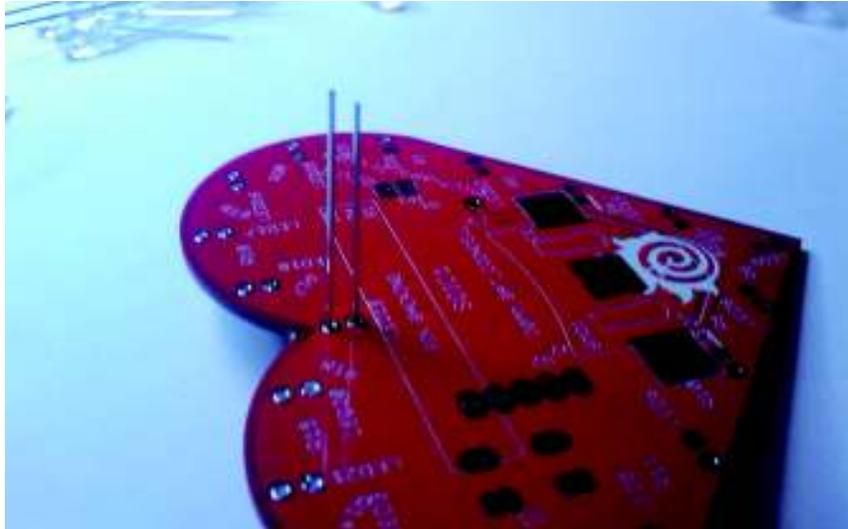


The LEDs

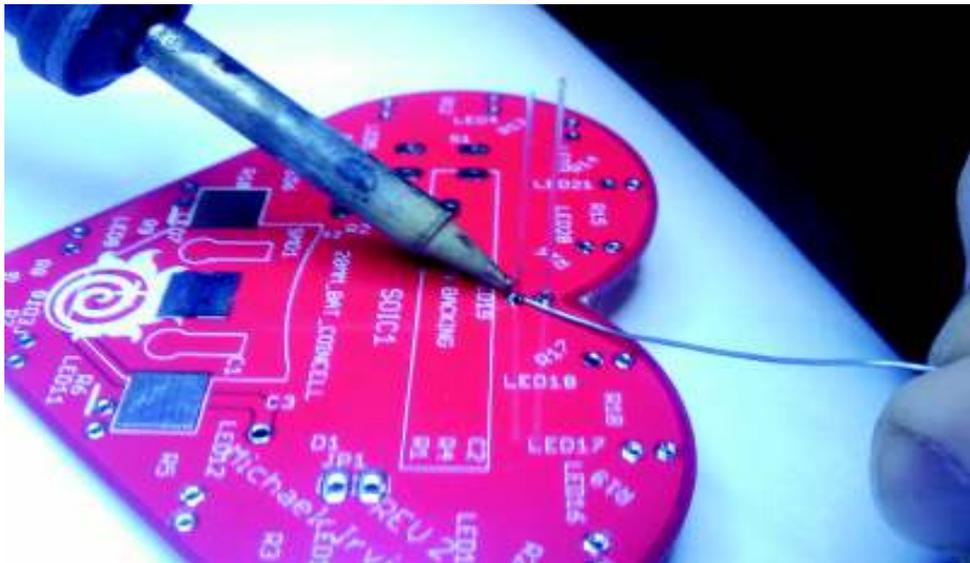
Tips: The LEDs have a flat side on them match them with the flat side labeled on the board to ensure proper orientation. Another way to look at it is that the long lead will always be on the outer side of the board.

1. Place the LEDs through the holes and turn the board over.

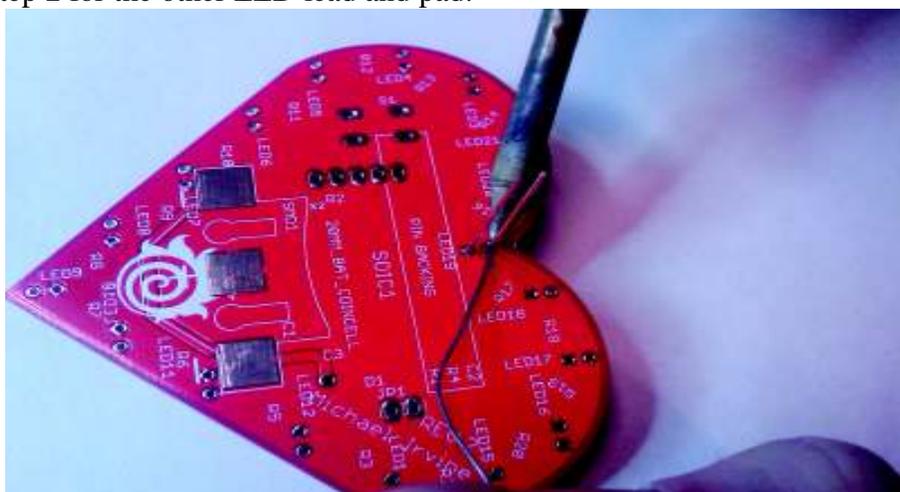




2. Resting the soldering iron on the pad on the board while also touching the LED lead, add solder to the pad. You can push the LED with your thumb while heating up the solder to straighten it out.



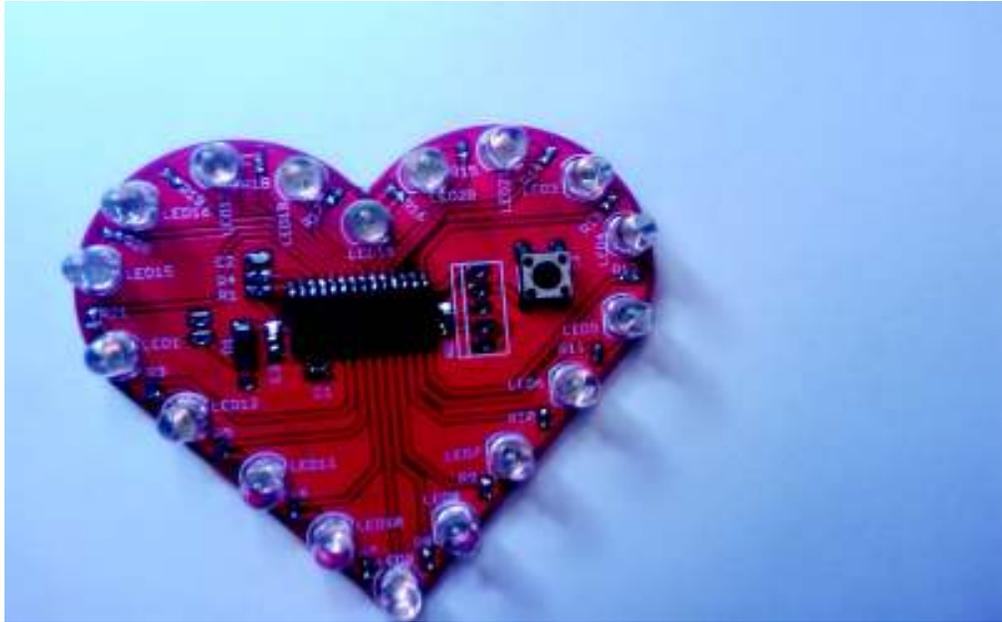
3. Repeat step 2 for the other LED lead and pad.



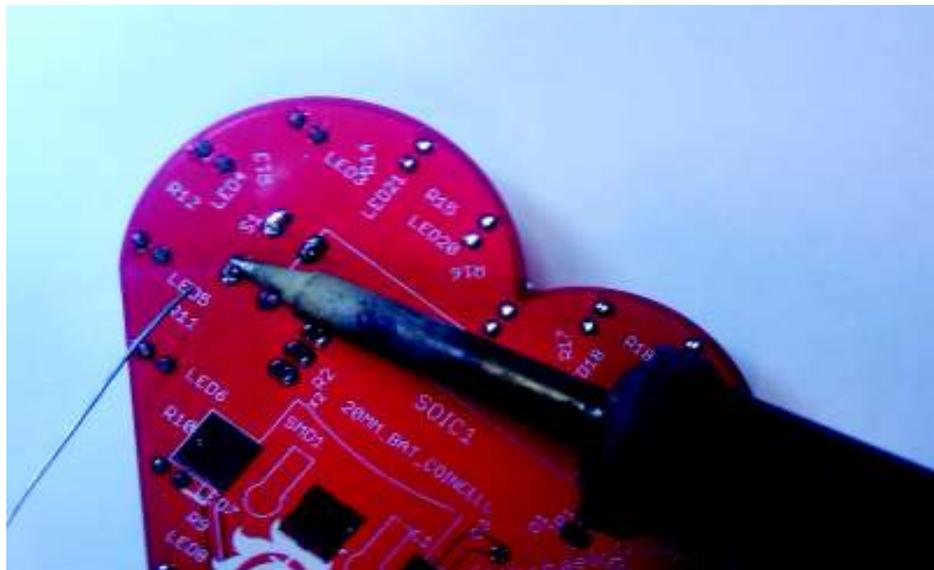
4. Use wire cutters to remove the excess lead from the LED. Make sure to cut these as short as possible!

The Switch

1. Place the switch through the holes on the board. If it fits the orientation is correct.

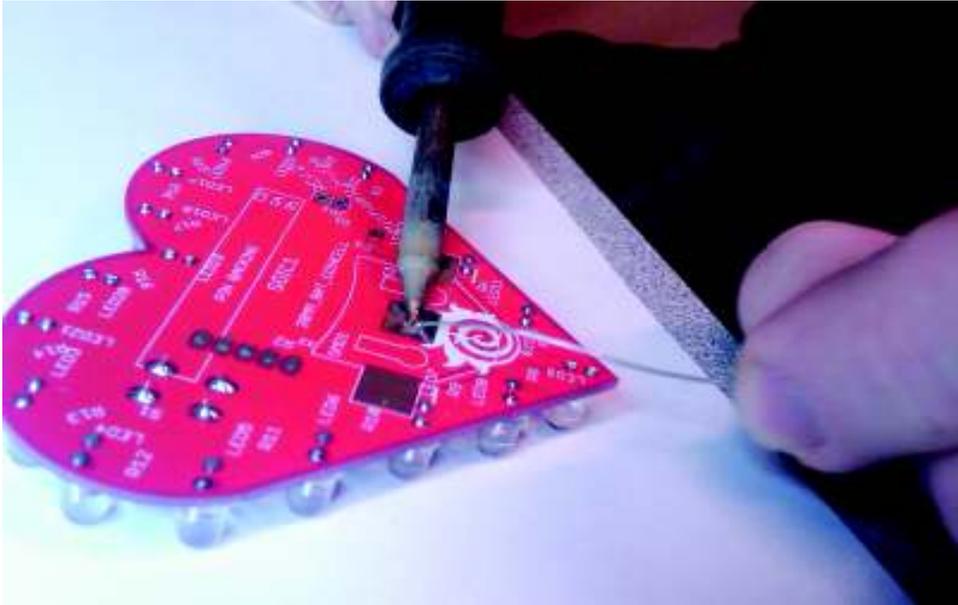


2. Solder the switch in place on the reverse side of the board using the same method as with the LEDs.

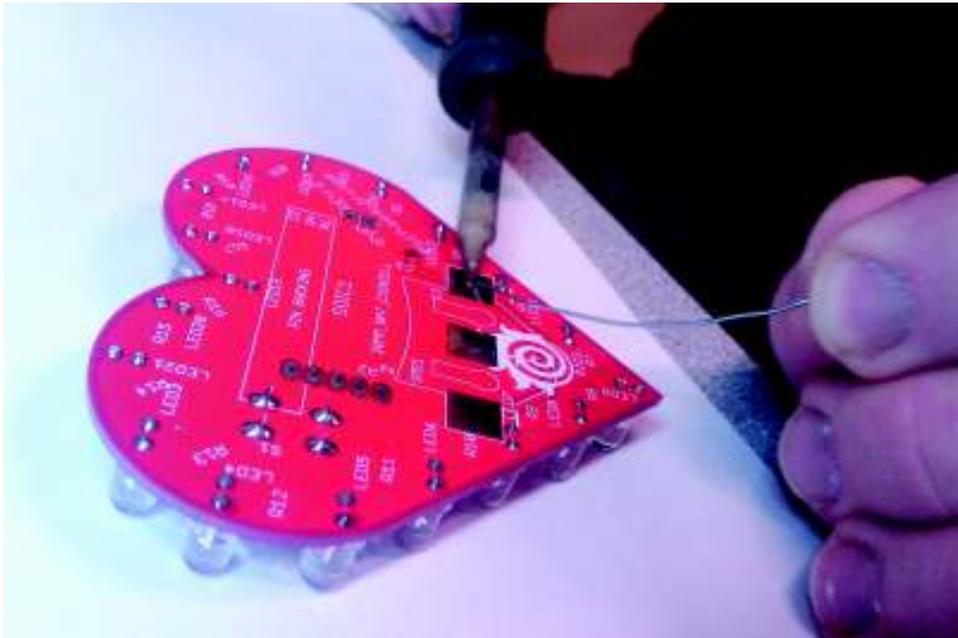


Battery holder

1. Important! The center pad is not high enough for the battery so add some solder to that pad to “dome” it.



2. Add solder to one of the side pads and place the battery holder with the open side facing upwards.



3. Heat up the upper side of the battery holder at the pad to attach it to the board.



4. Add solder to the other pad to attach the other side of the battery holder.



Important last check

1. Use a multimeter to check that ground and VDD are **NOT** connected.



Programming the Board

Your PIC is already programmed! However, if you would like to load your own program, you can do so as follows:

1. There will be a computer set up with MPLAB and the project in the IEEE SB Office (ITB 141).
2. Use the ICD 2 attached to the computer by placing the connector through the holes and applying a small amount of pressure sideways to ensure contact while programming.