



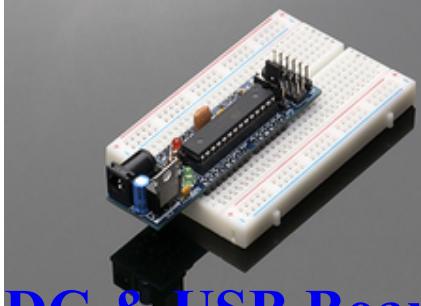
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## Featured in this Guide

DC Boarduino (Arduino compatible) Kit (w/ATmega328)

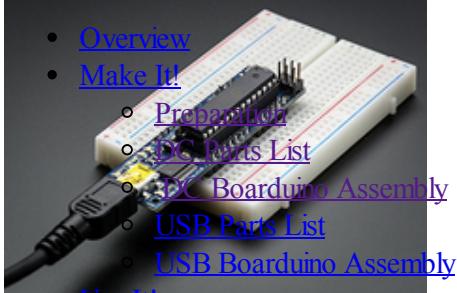


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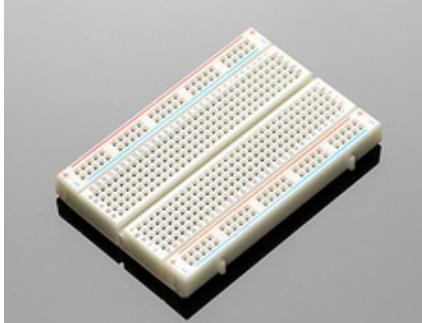
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Full sized breadboard

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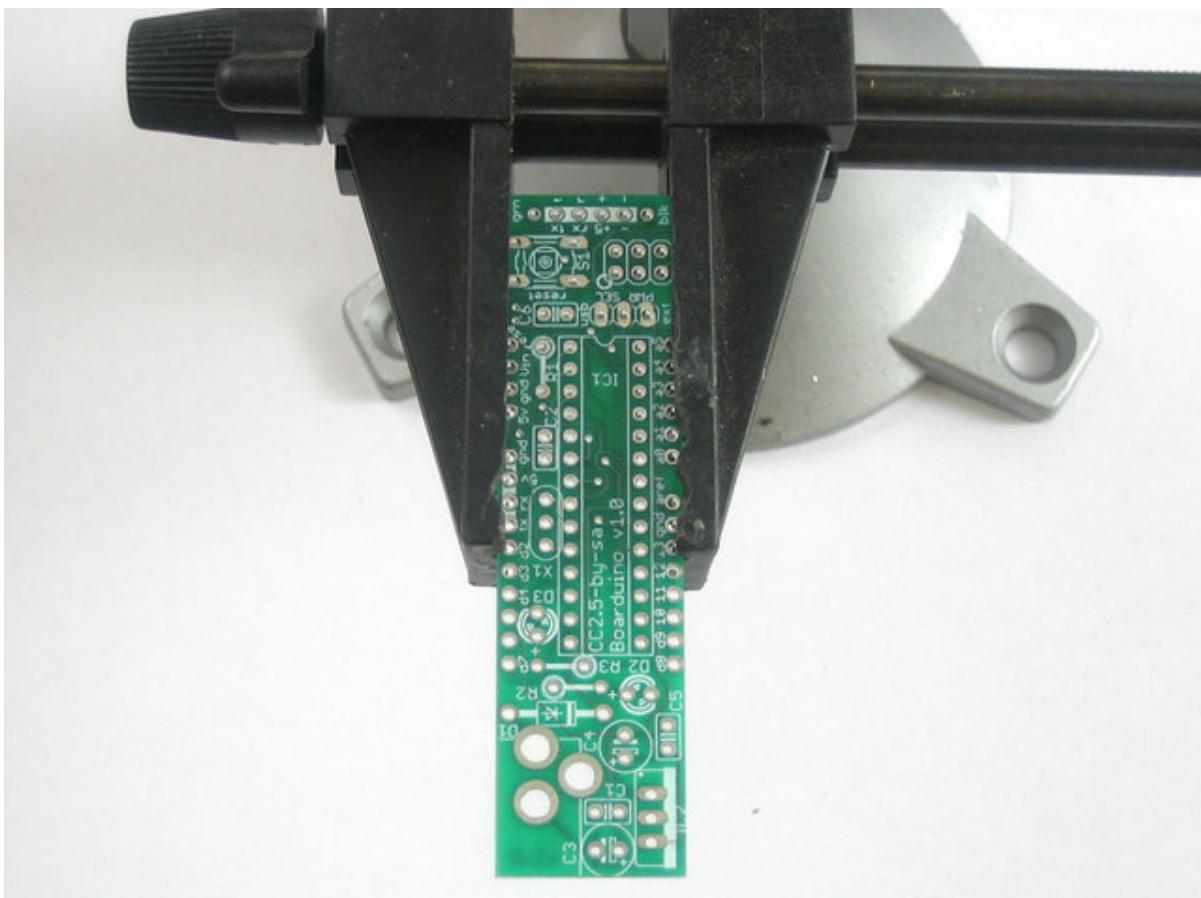
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## DC Boarduino Assembly Created by [Ladyada](#)

The first step is to solder the kit together. If you've never soldered before, [check the Preparation page for tutorials and more.](#)

**[If you have a USB boarduino check this page for instructions!](#)**

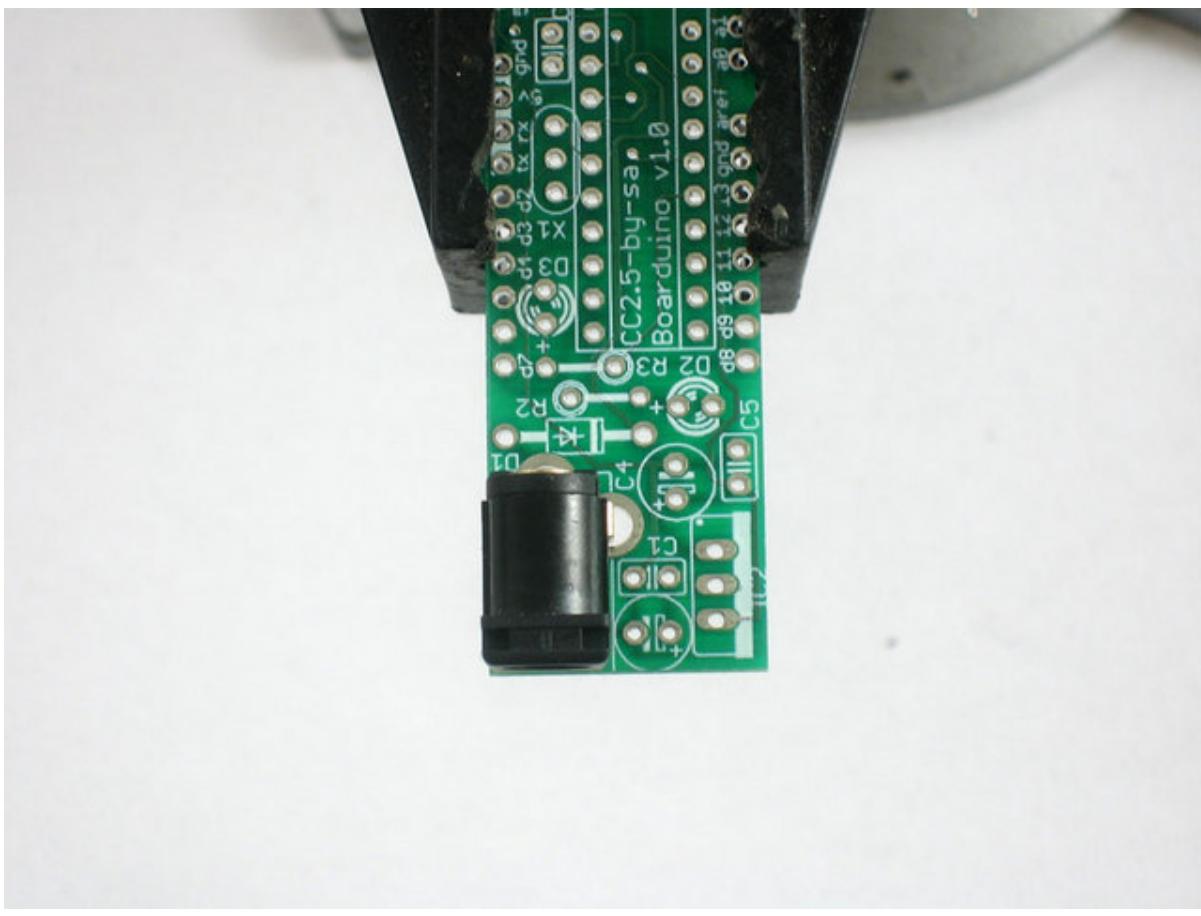
Check the kit to verify you have all the parts necessary, then get your tools ready! A board vise, soldering iron & solder , diagonal cutters, and a solder sucker (desoldering tool) if you have one.



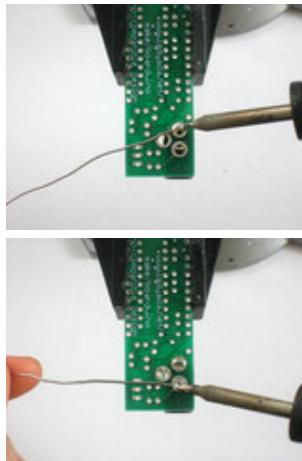
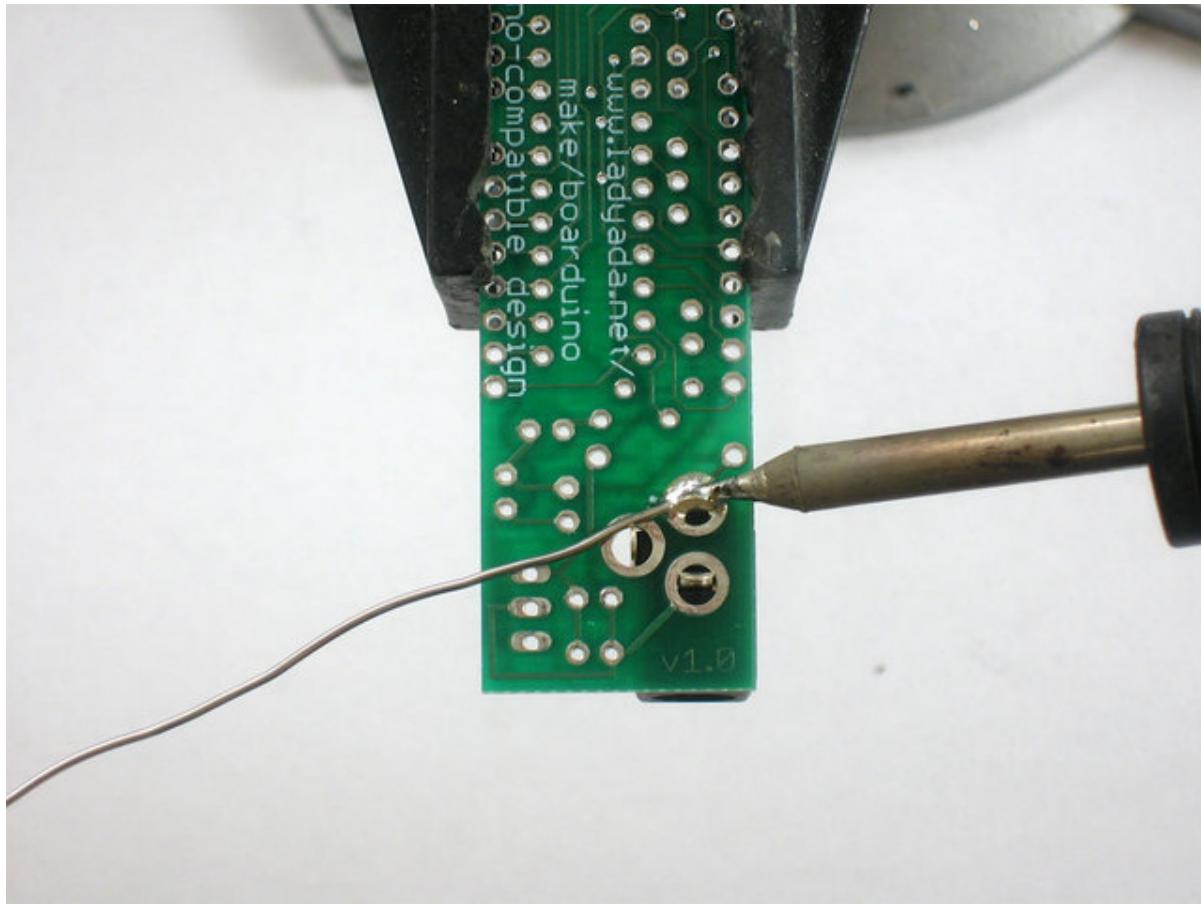
Place the PCB in a vise to make soldering easy!

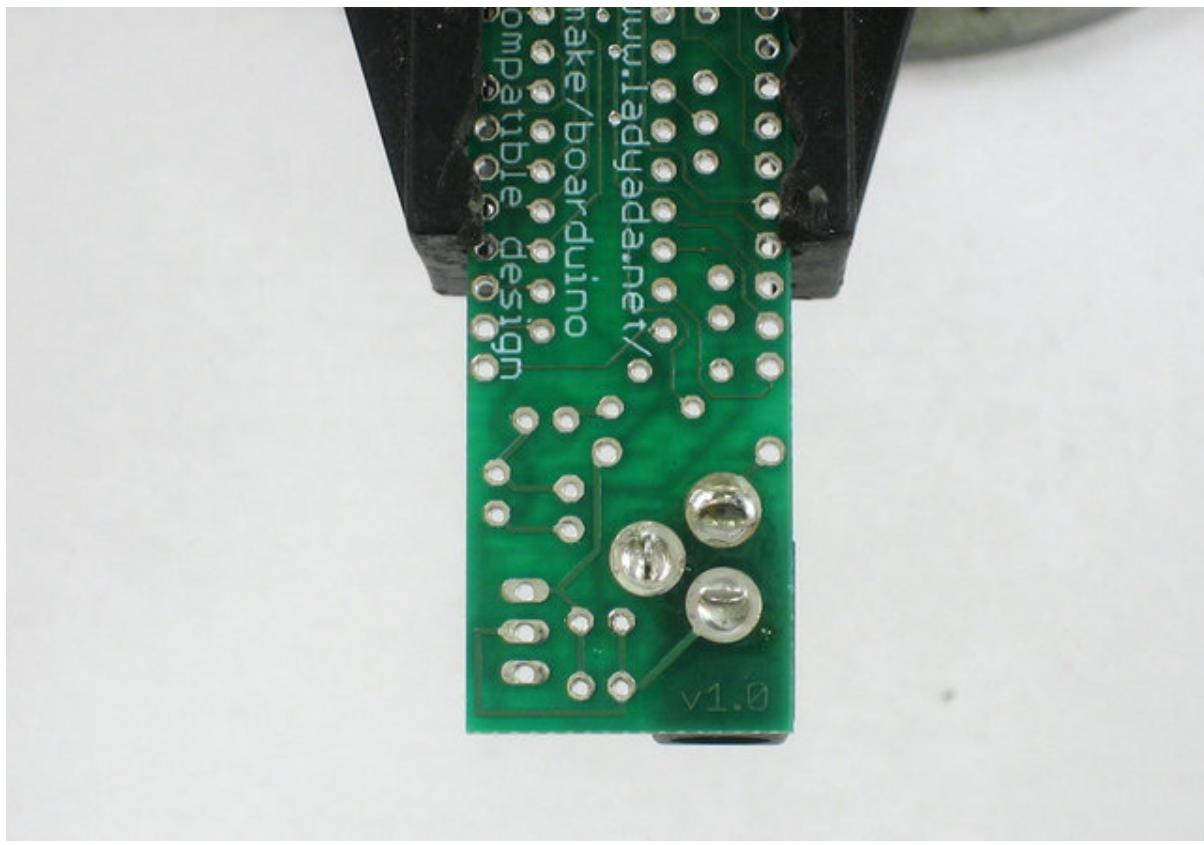
Heat up the soldering iron to 700 degrees, tin it if necessary.

Make sure the sponge is wetted.

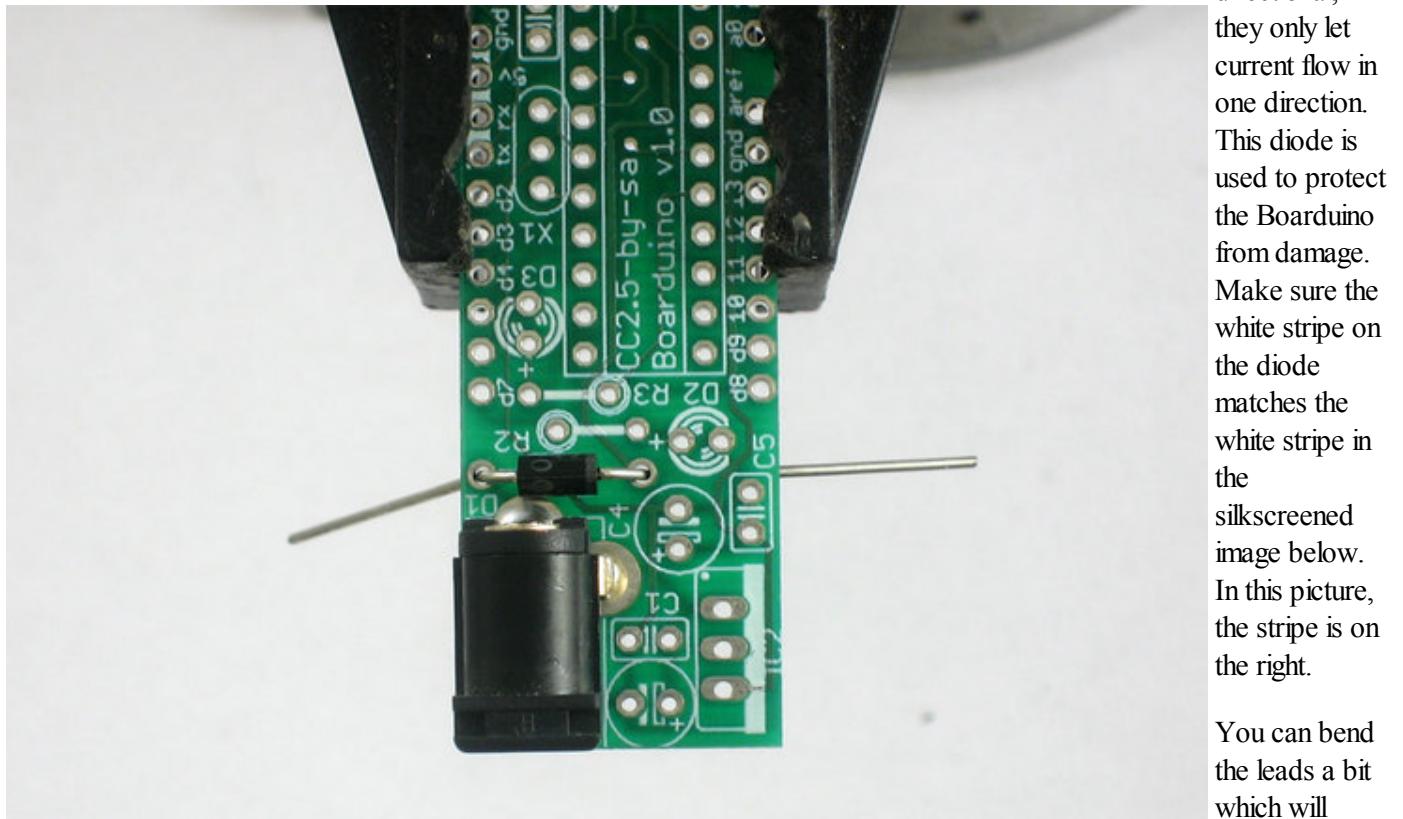


Place the 2.1mm DC jack as shown, it should fit in snugly. Make sure the part is on the top of the board, so that you can see the silkscreened images.



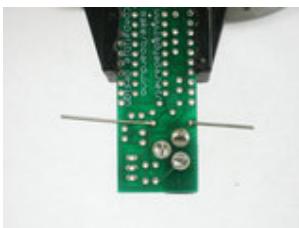
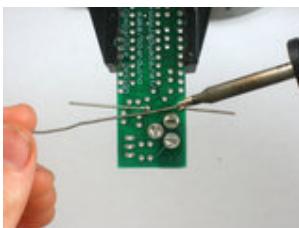
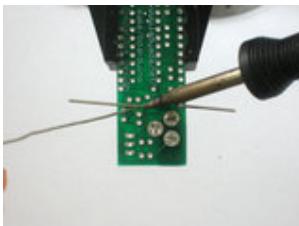
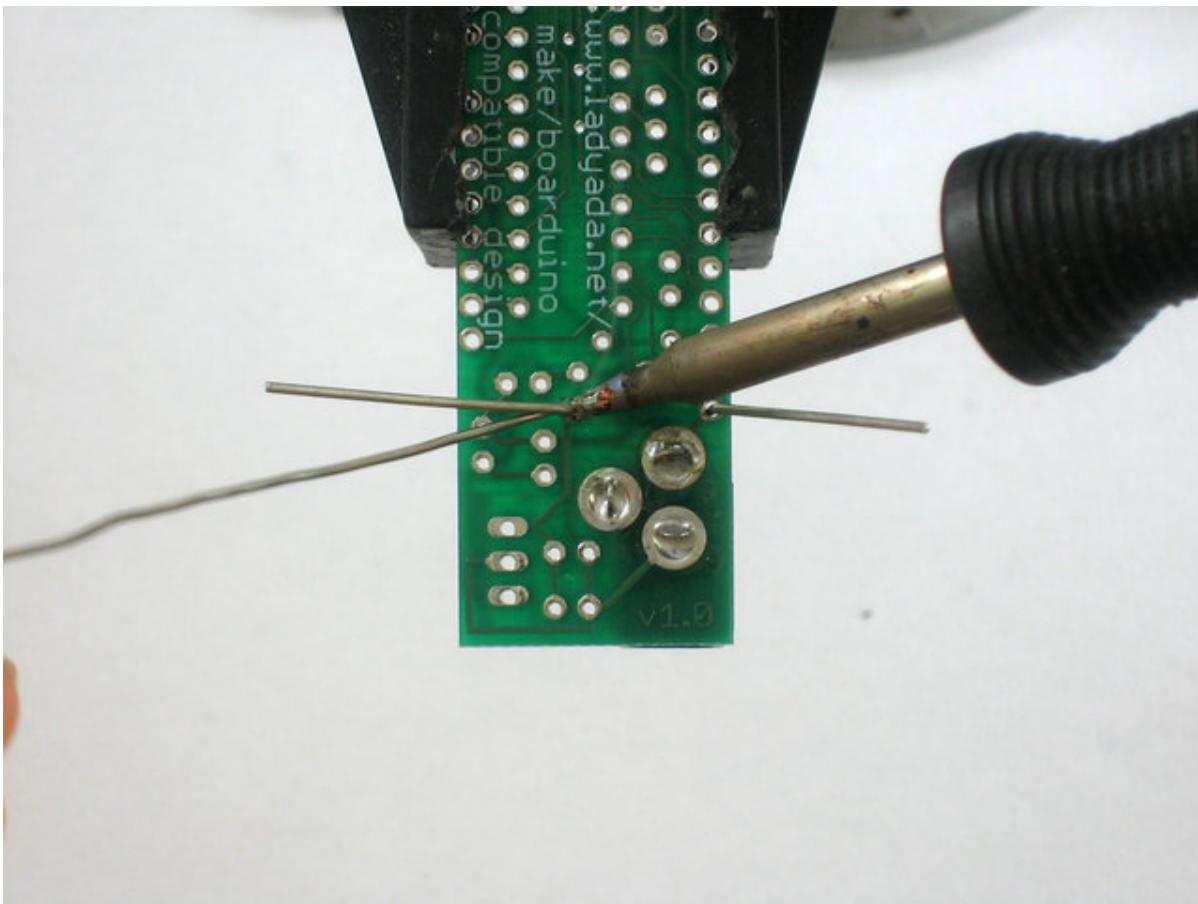


Make sure all three pads are soldered, with plenty of solder, the holes should be filled up. This gives the jack mechanical strength.

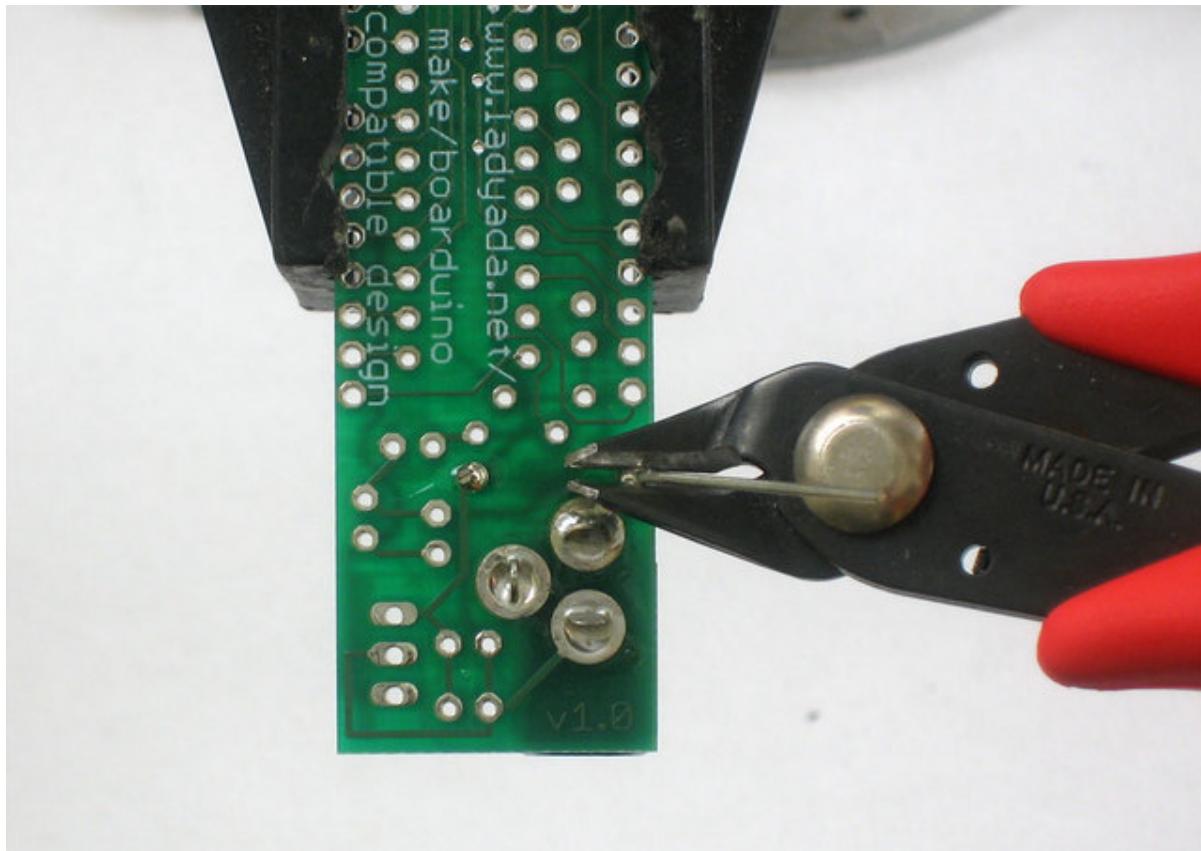


Next, place the 1N4001 diode **D1**. Diodes are directional, they only let current flow in one direction. This diode is used to protect the Boarduino from damage. Make sure the white stripe on the diode matches the white stripe in the silkscreened image below. In this picture, the stripe is on the right.

You can bend the leads a bit which will keep the part from falling out when you turn the board over.

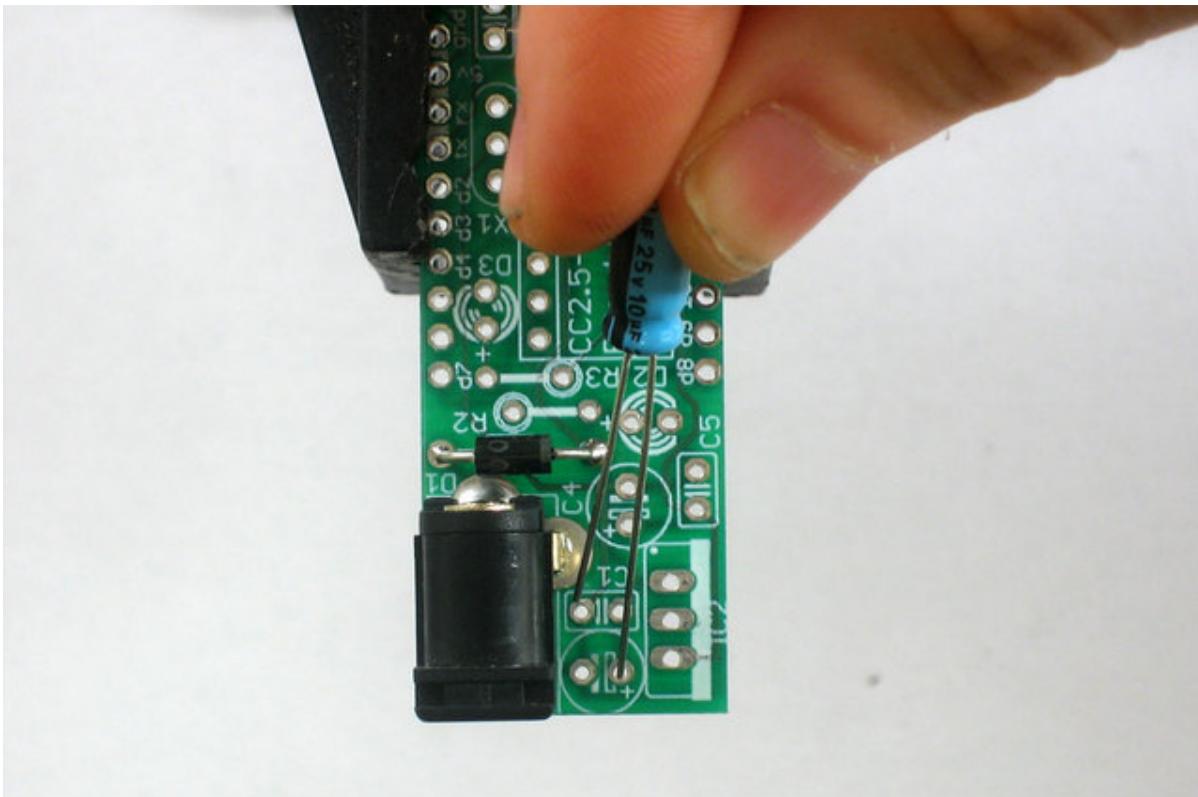
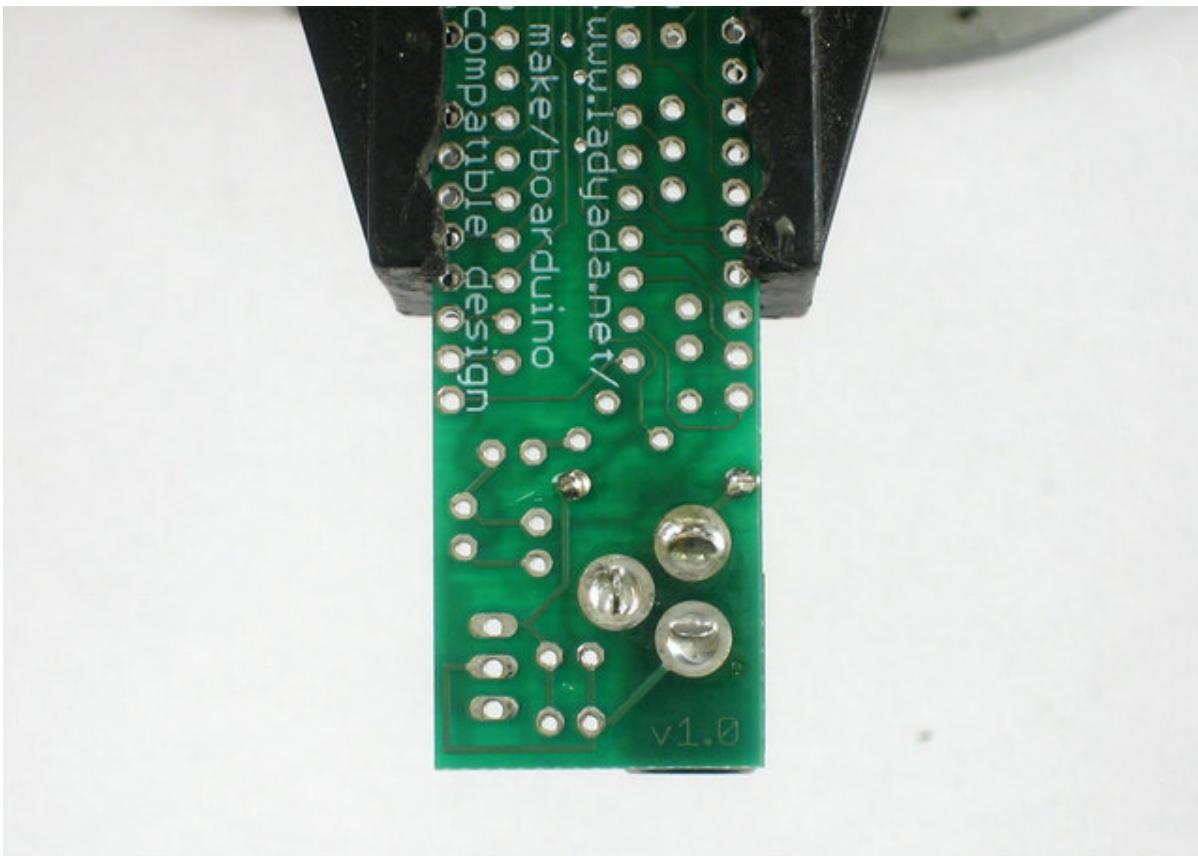


- Turn the PCB over and solder both legs so that you get a nice shiny solder joint.

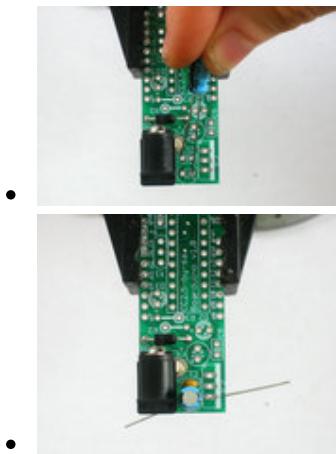


Use the  
diagonal  
cutters to clip  
off the long  
leads, leaving  
just a bump.

It should look  
like this.



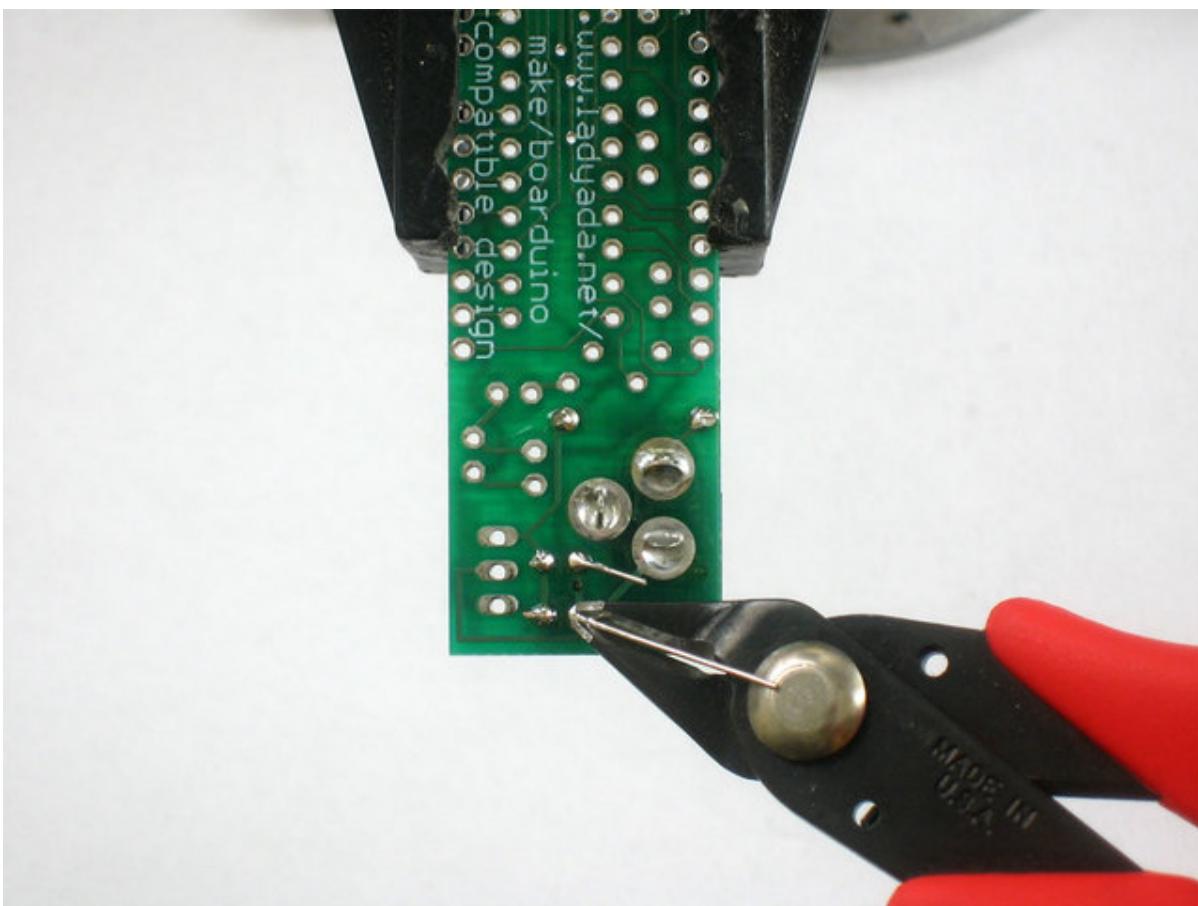
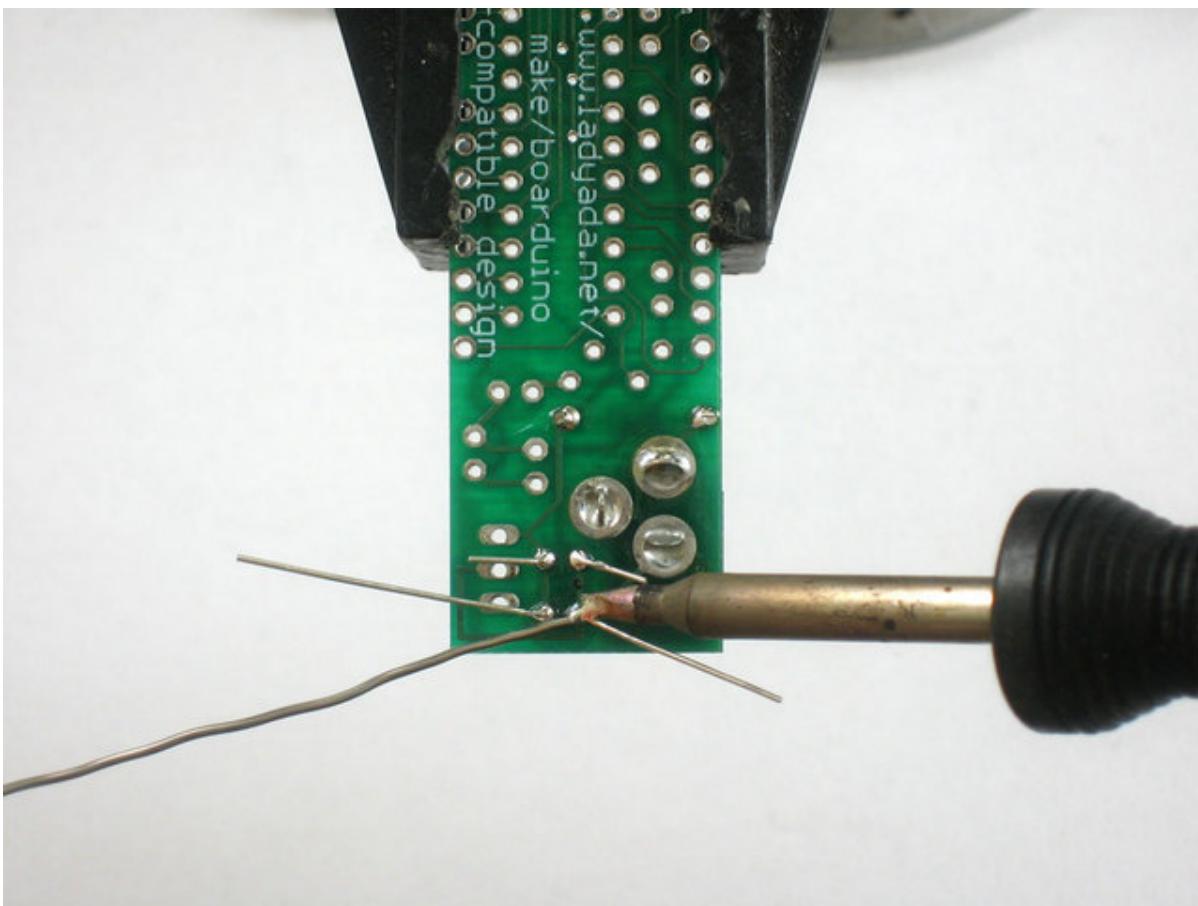
Next, it's time to place the 25V electrolytic capacitor **C3**. Electrolytic capacitors are *polarized* which means they only work well in one direction. Put it in backwards and they can explode! You can tell how to place it because the silkscreened image has a plus near one



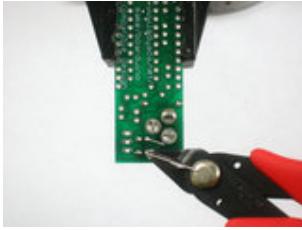
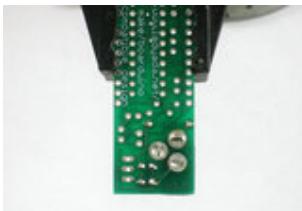
hole and the capacitor has one long lead. That lead is the positive lead. In this image, its the one on the right.

Also insert **C1** which is a ceramic capacitor. Ceramic capacitors are non-polarized so you don't have to worry about putting it backwards.

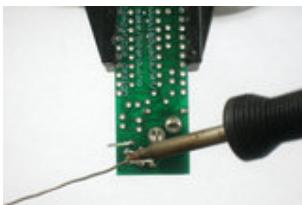
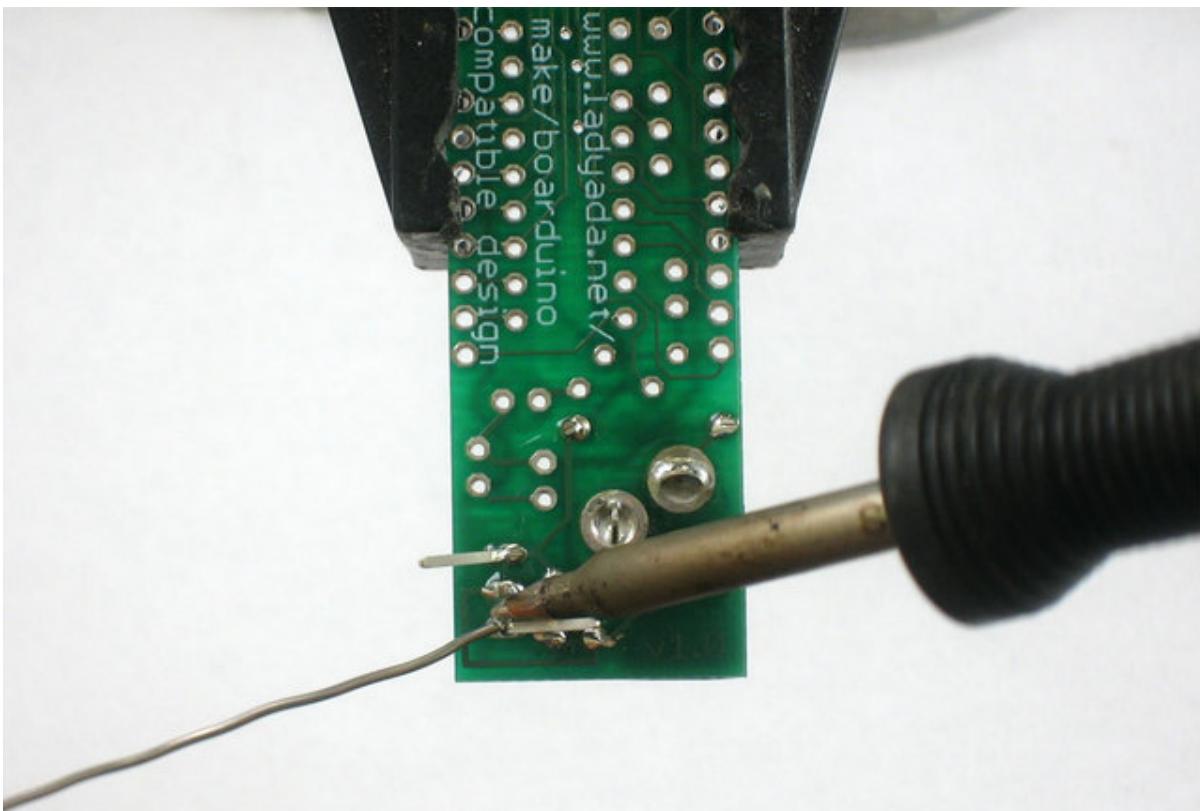
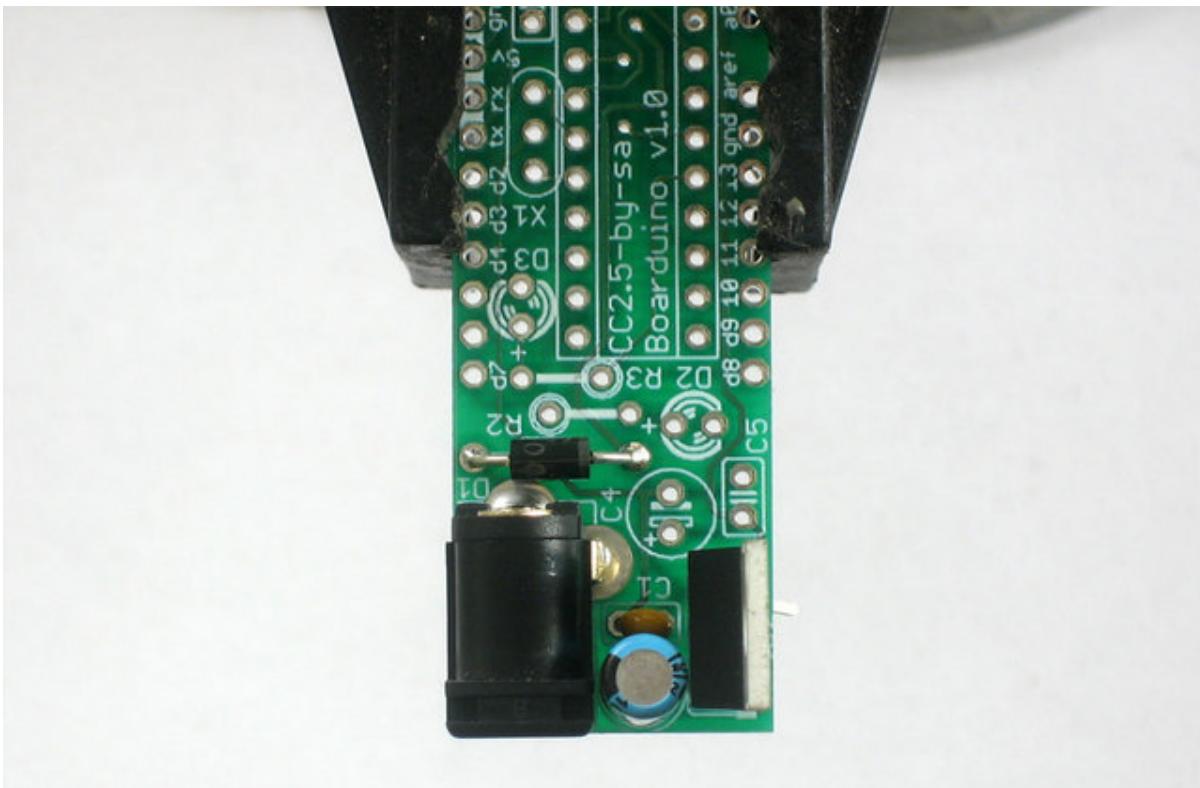
Solder all 4 leads.



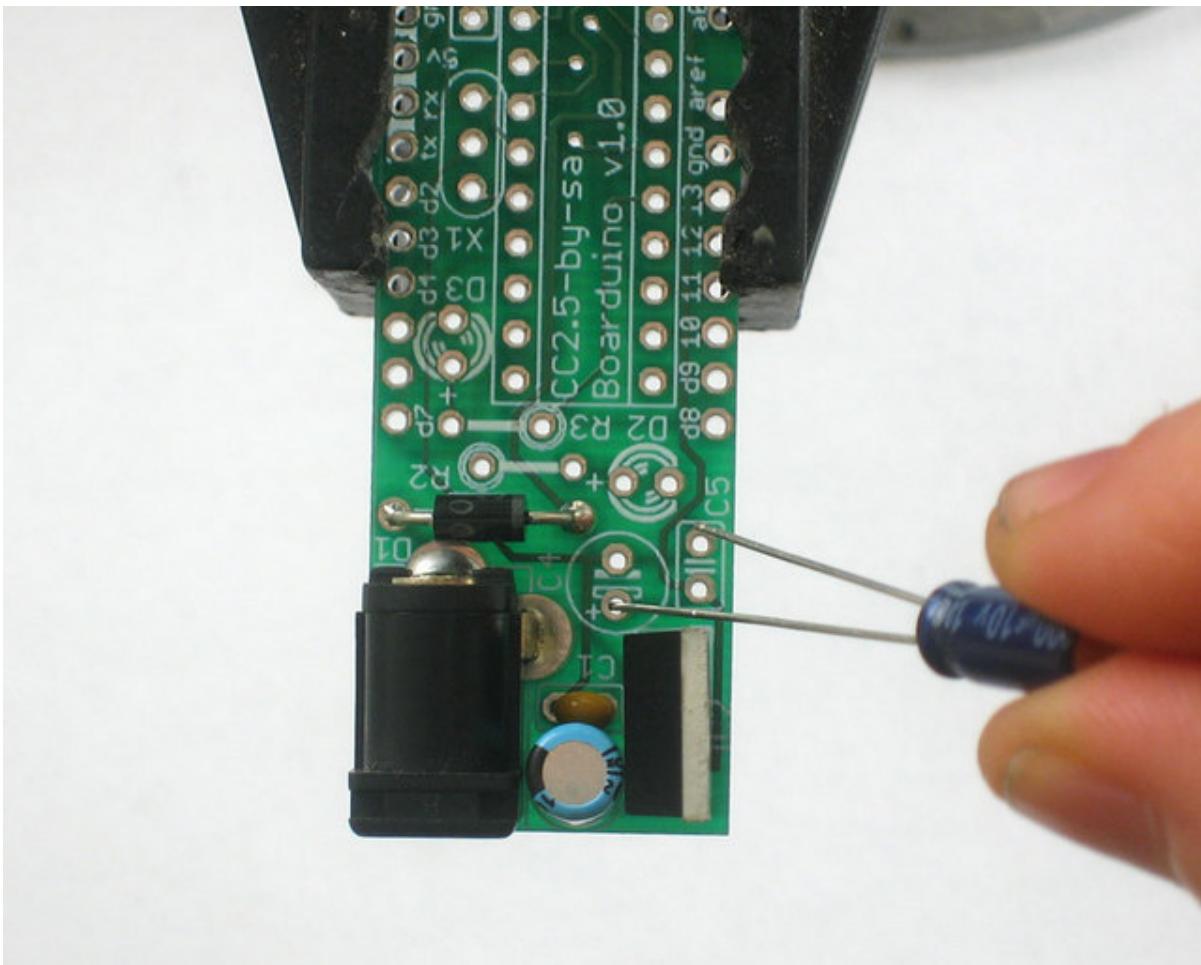
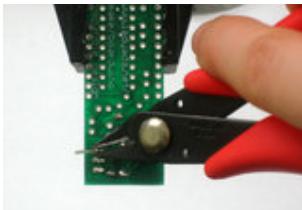
And clip them short with the cutters.

- 
- 

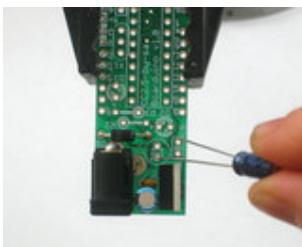
Next is the 5V regulator. This takes the power from the DC jack which may be something like a 9V battery, and brings it down to 5V, which is suitable for the microcontroller chip. This part must be placed as shown, with the metal heat sink tab on the right.



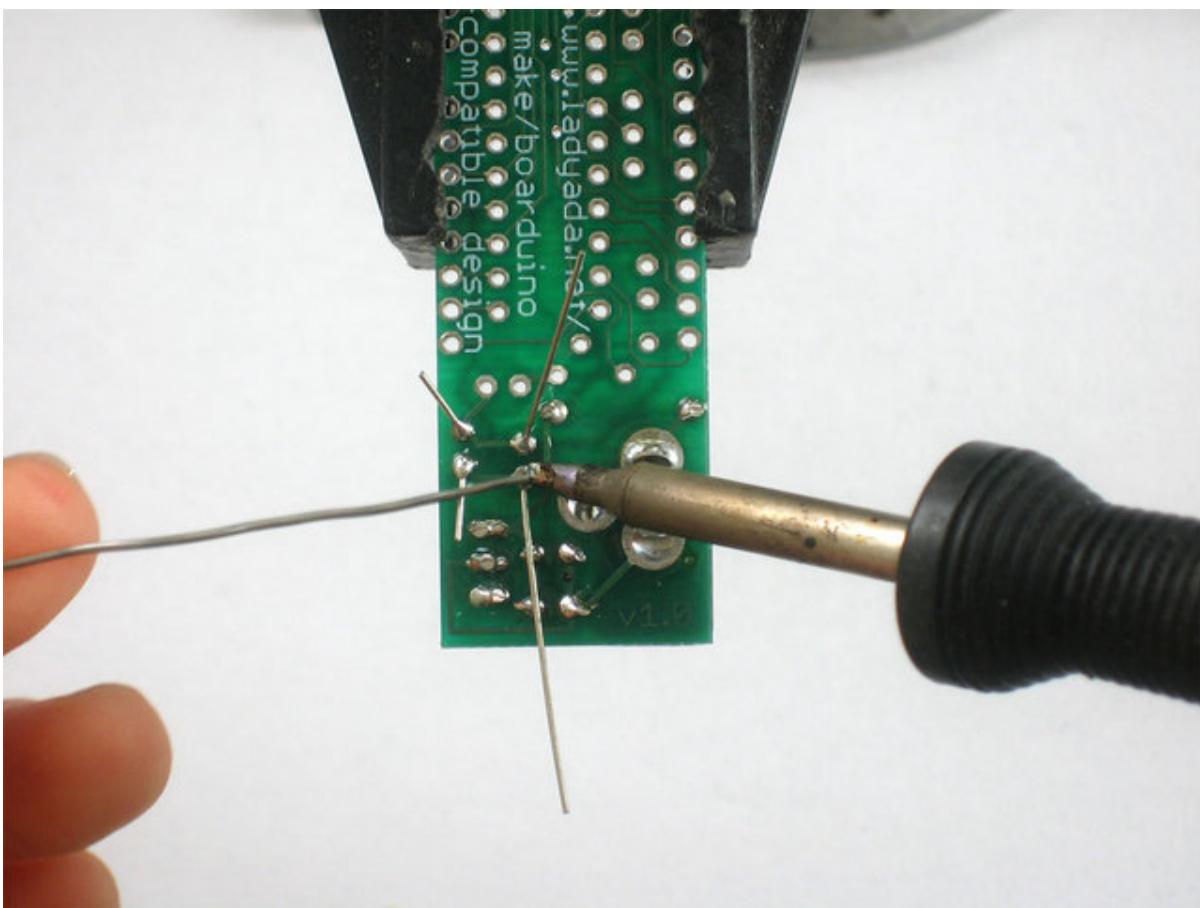
Turn over the board and solder all three pins, then clip them off.



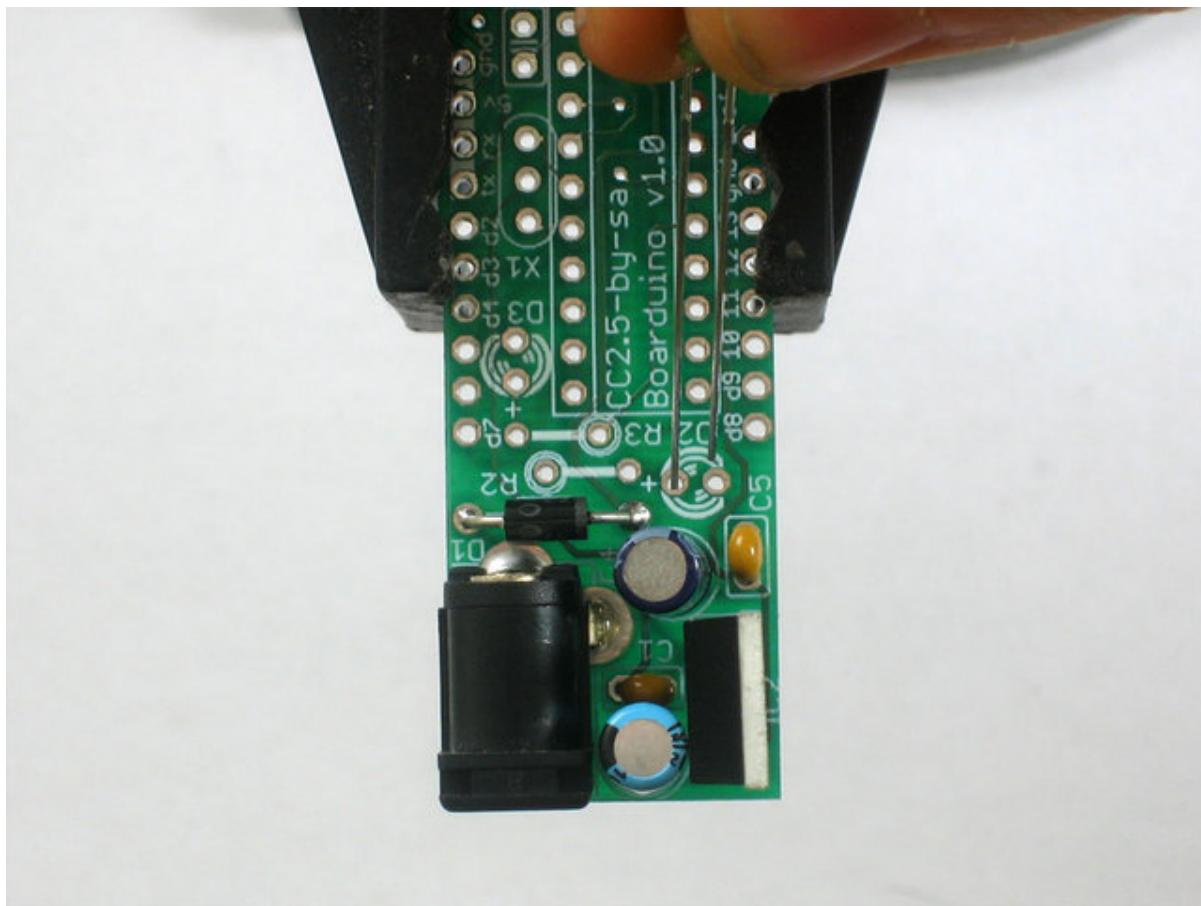
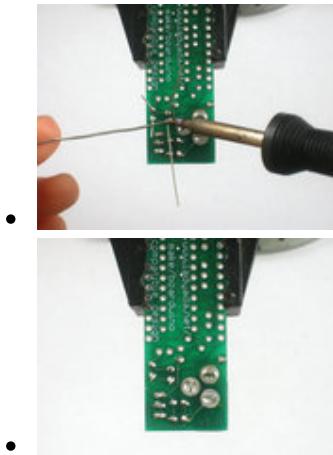
Now you should solder in the 6.3V electrolytic capacitor **C4** as shown. Remember its polarized so you must place the longer lead in the positive-marked hole.



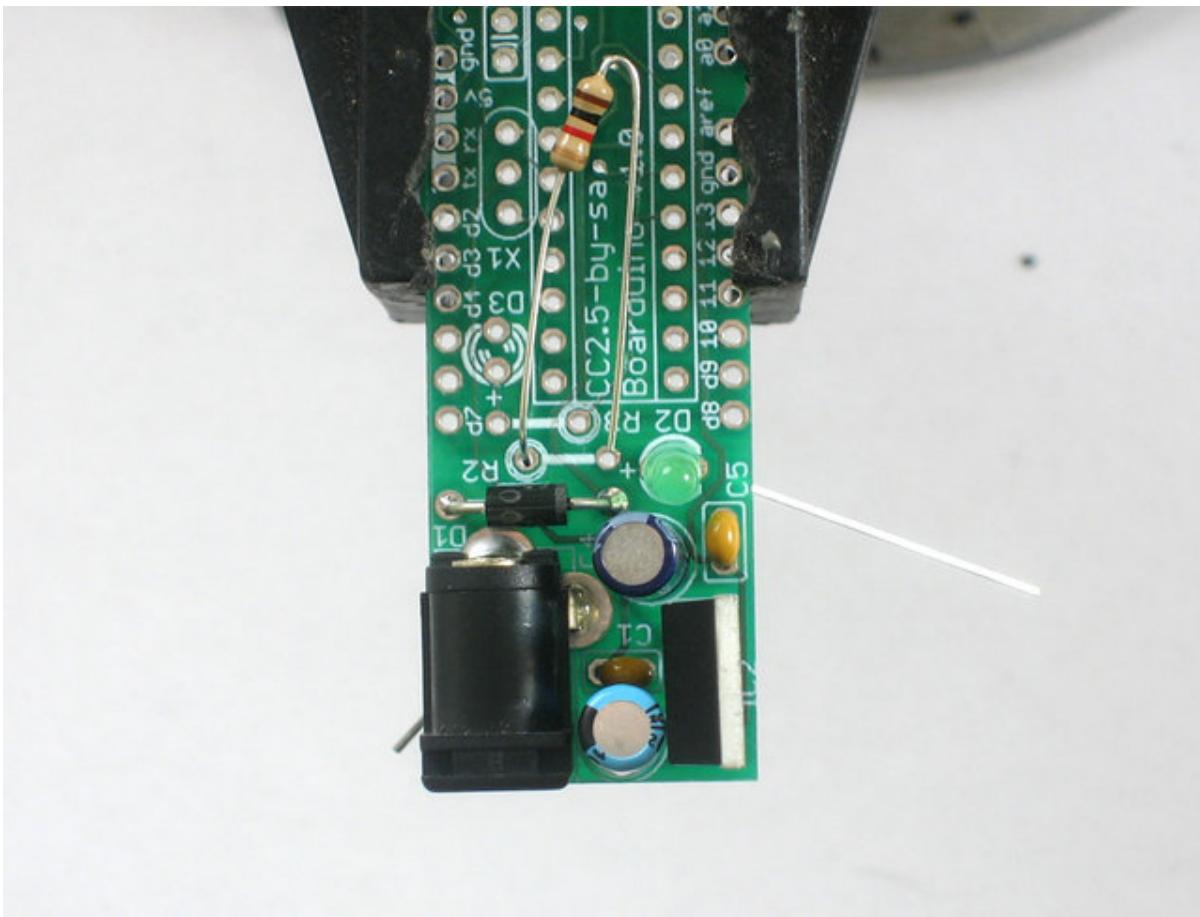
Then place the ceramic capacitor **C5**.



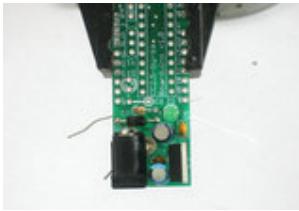
Solder in the capacitors and clip them.

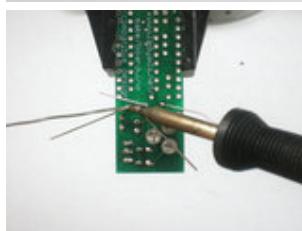
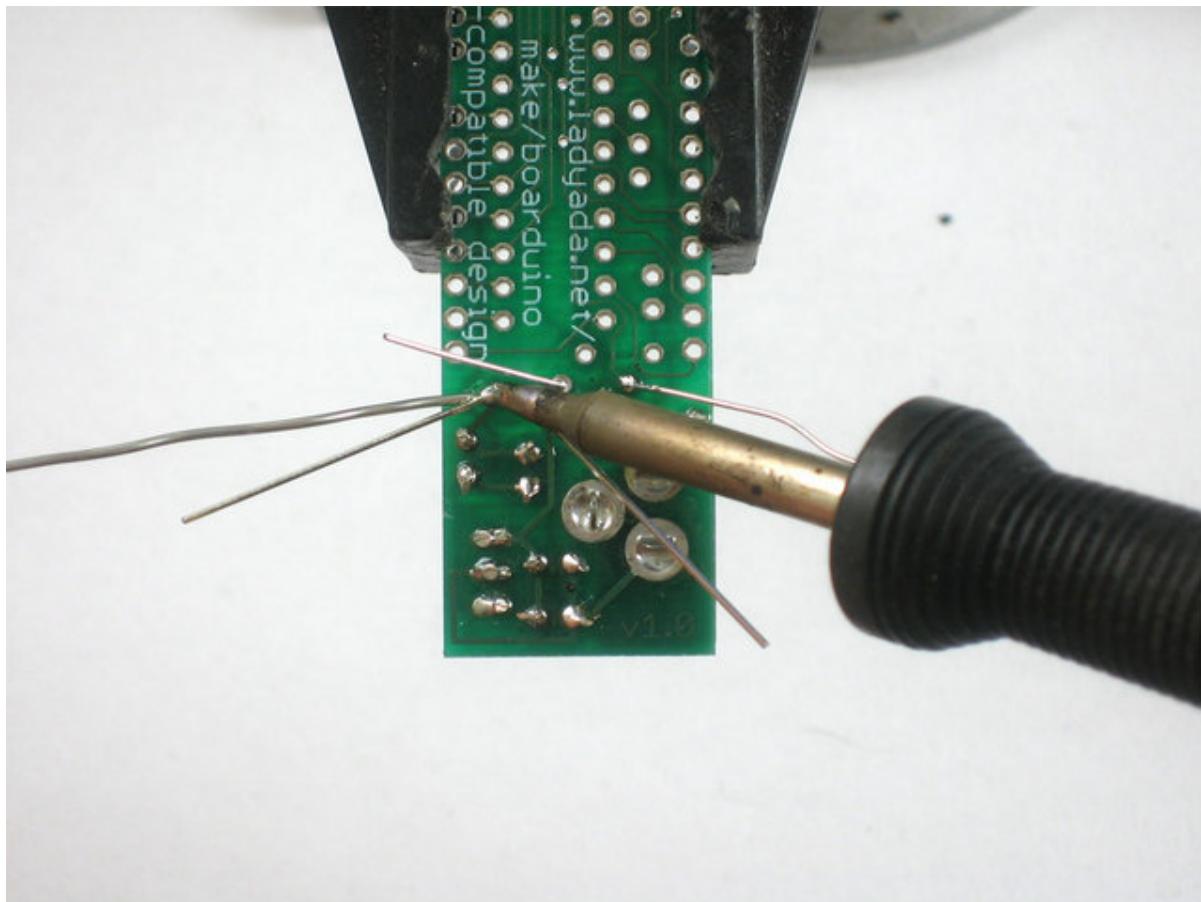


Next is the green 3mm LED **D2**. Like the electrolytic capacitors, LEDs have polarity and they won't work if soldered in backwards. The long lead is the positive lead, make sure it goes in the hole with a + next to it.



The 1K resistor **R2** goes in, its the LED's matching resistor. Bend it over as shown to place it.





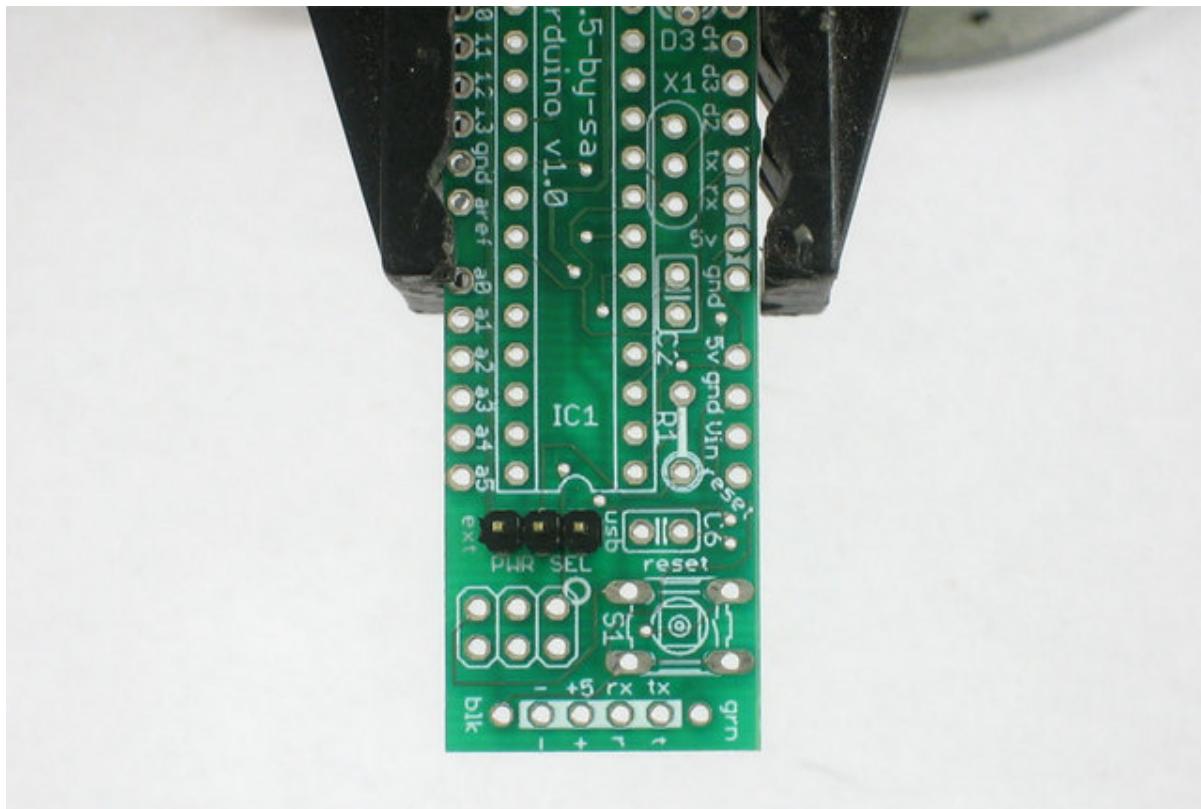
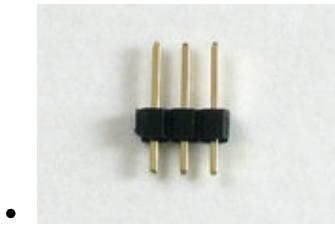
Solder in the resistor and LED and clip the leads.



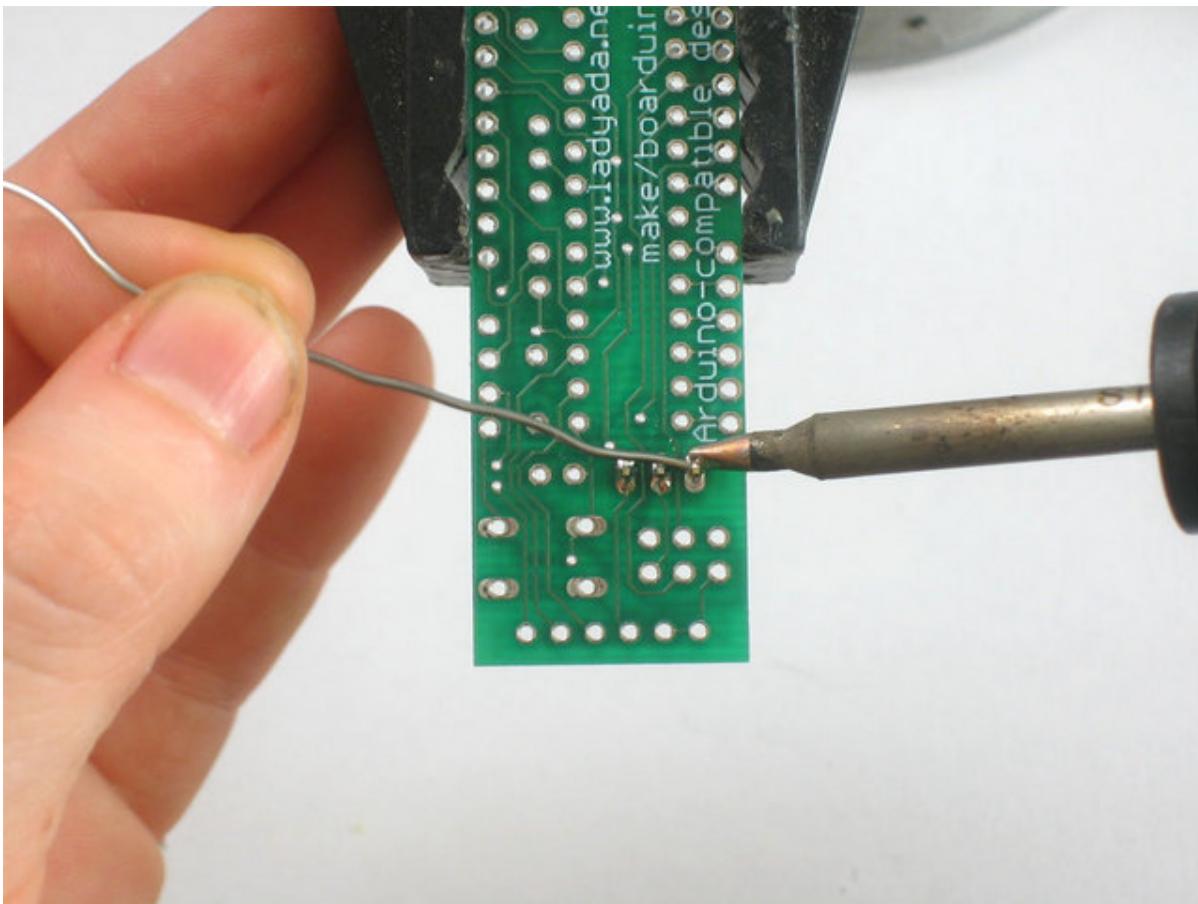
Next you have to make a 3-pin header.

Use the diagonal clippers or a pair of pliers to break apart the single row header.

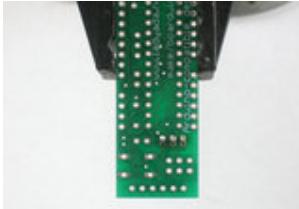
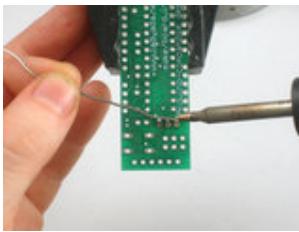




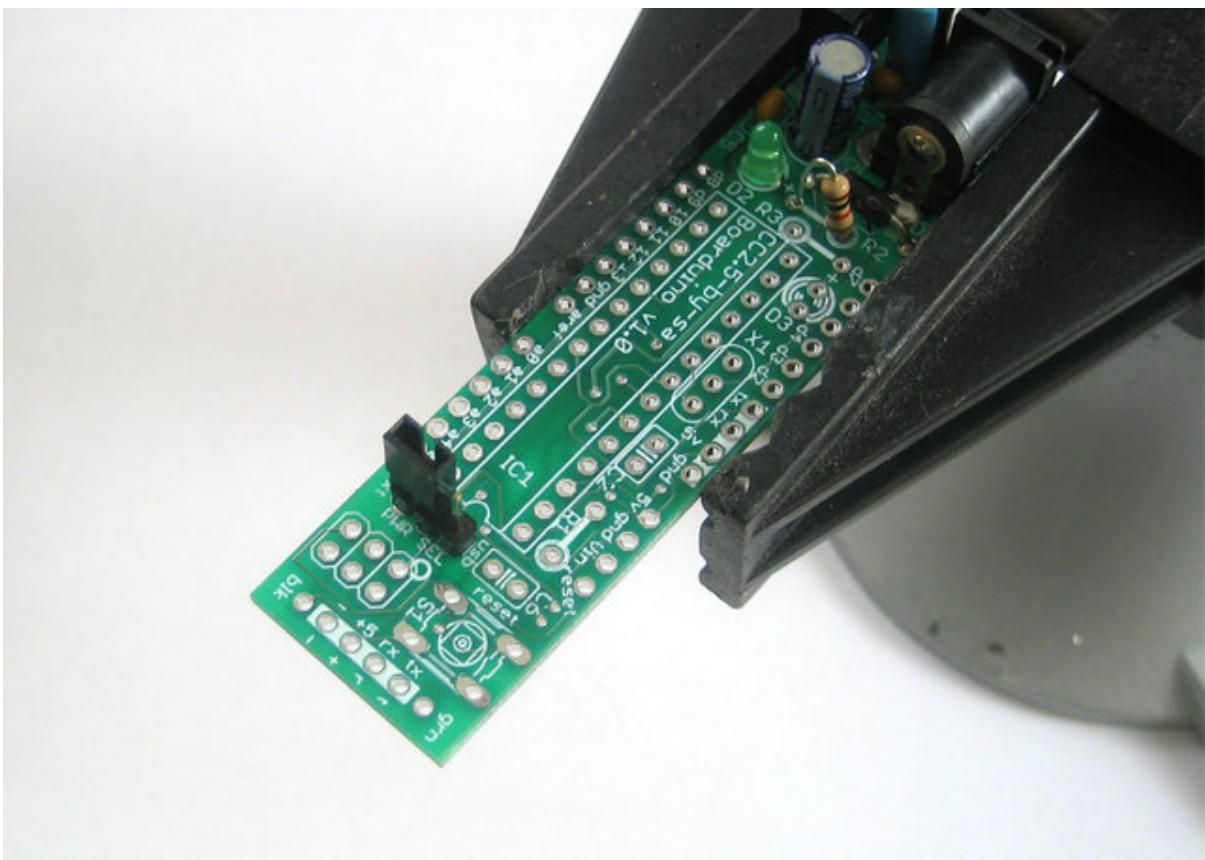
Place the 3 pin header at the other end of the board as shown. the short end goes into the PCB, and the long ends extend up.



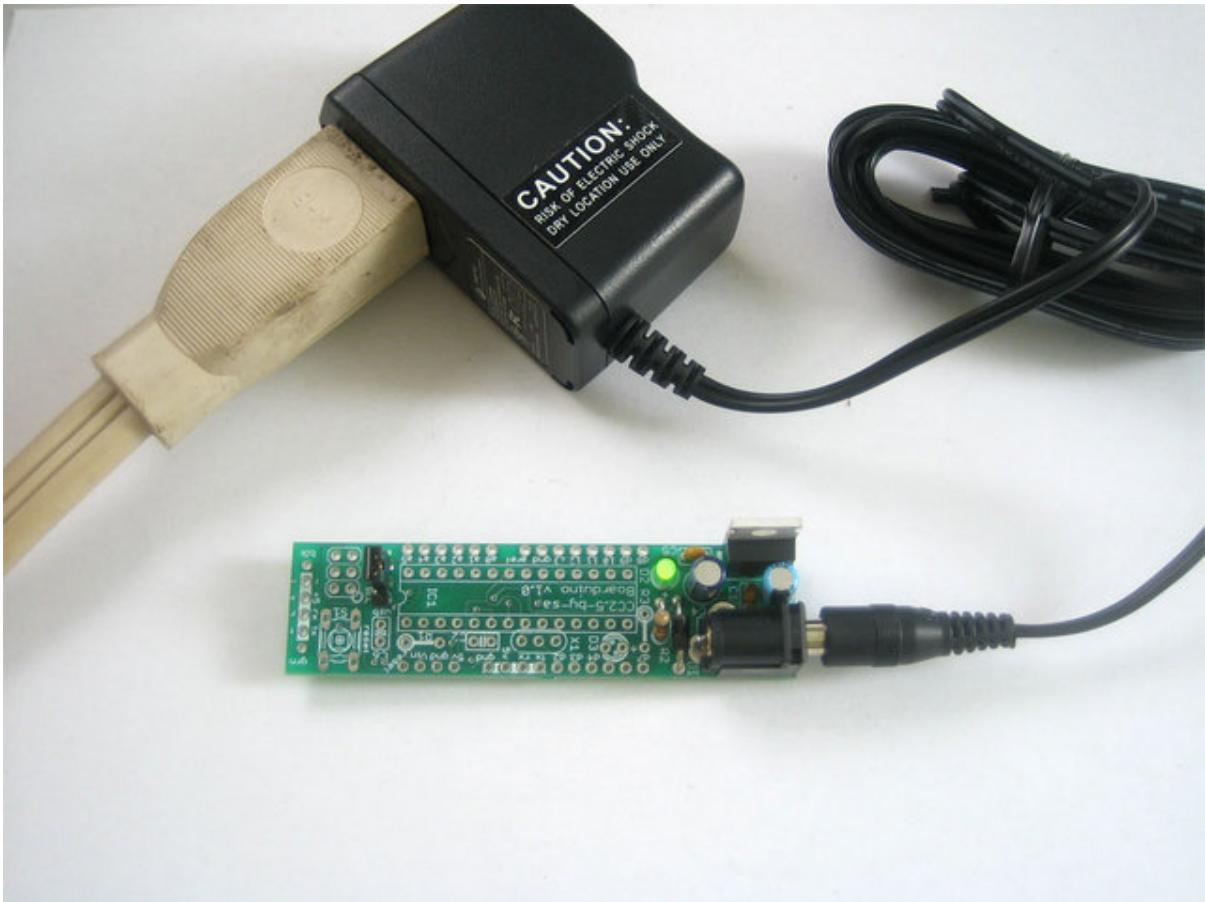
Solder the jumper header in place. You won't need to clip because the leads are short already!



Place the jumper/shunt as shown, so that its on the **EXT** pair of



pins.

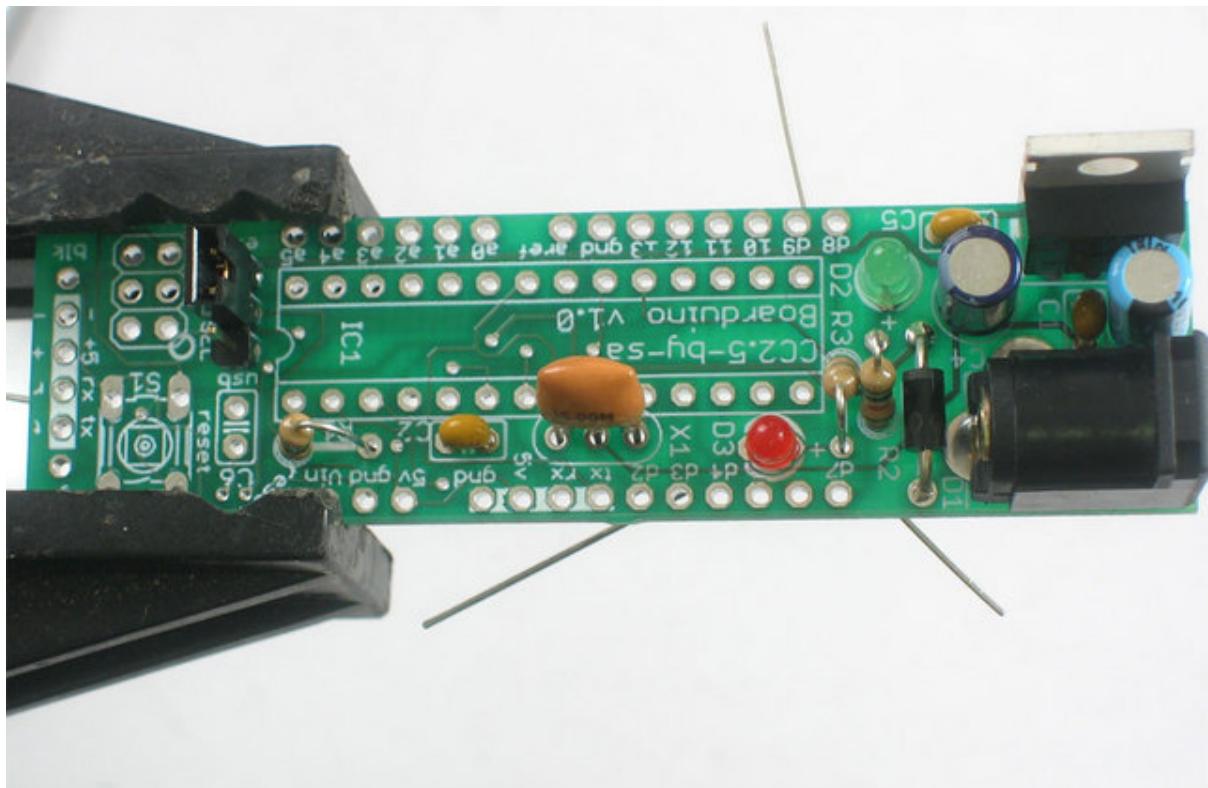


Take the board out of the vise and plug in a power source such as a 9V DC positive-tip wall adapter or a 9V battery with a 2.1mm barrel jack. You should see the green LED light up.

If no LED lights up check:  
Is the battery or wall adapter good?  
Is it positive tip?  
Is the diode in

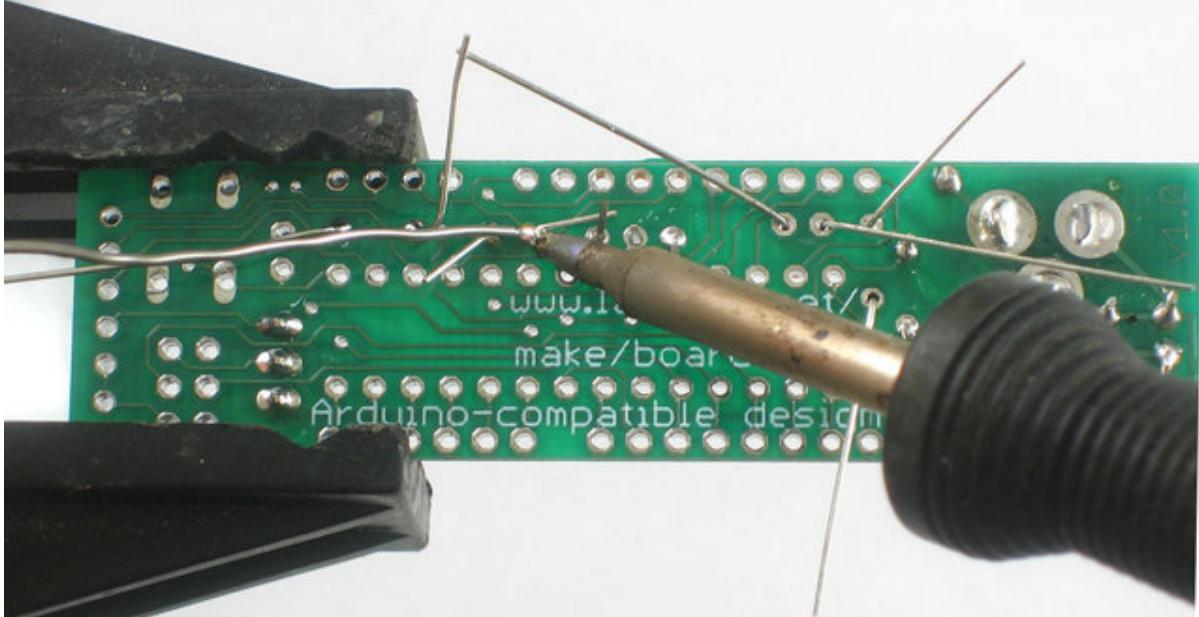
correctly?  
Is the LED in correctly?  
Are all the parts in place?

I don't suggest continuing if you can't get the green LED to light as it indicates a problem!

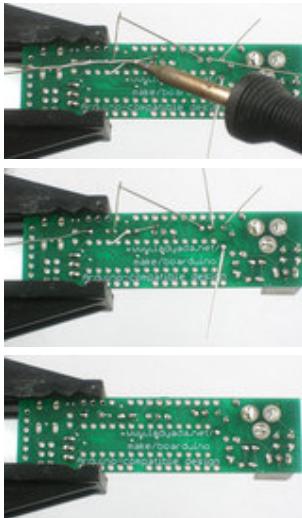


Place the red LED **D3**, taking care to make sure the long lead is in the positive-marked hole. Also place the matching 1K resistor **R3**

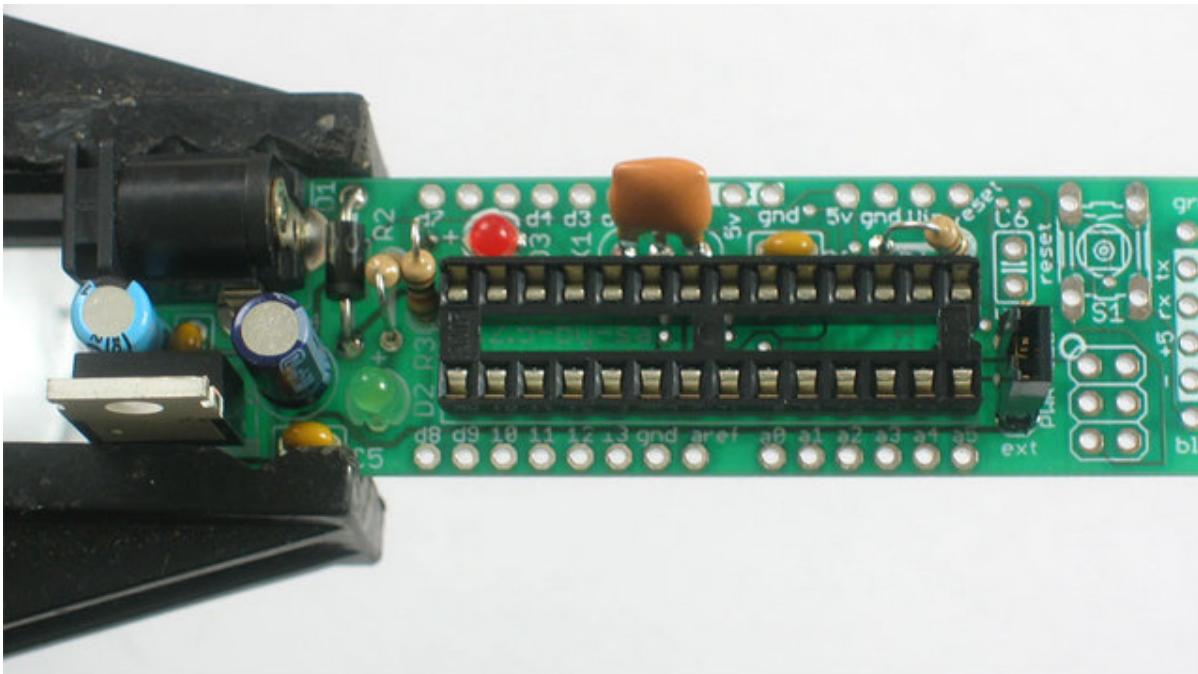
Also place the 16.00MHz ceramic oscillator **X1** (which is non-polarized) the third ceramic capacitor **C2** and the 10K resistor **R1**



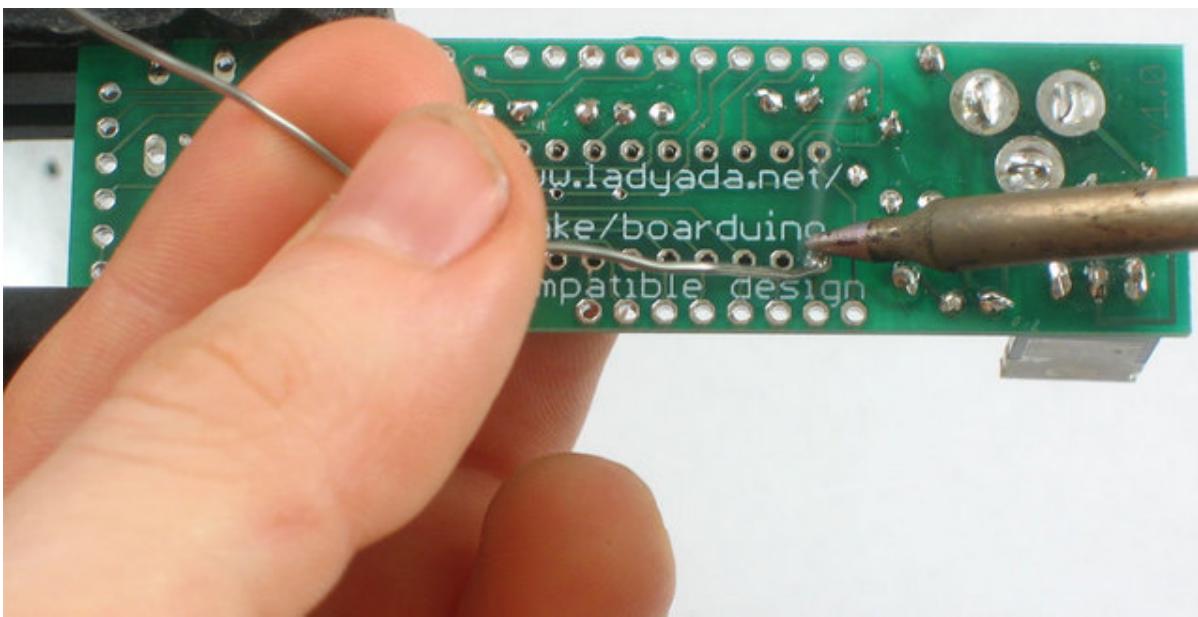
Solder and clip the leads.



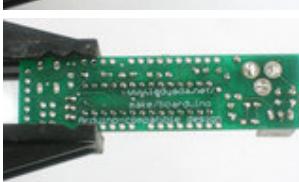
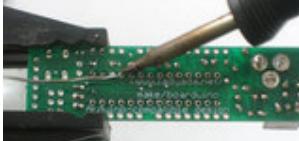
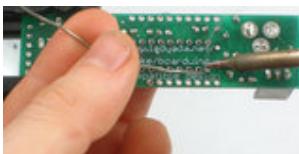
Place the 28 pin socket.  
This is to allow you to replace the microcontroller

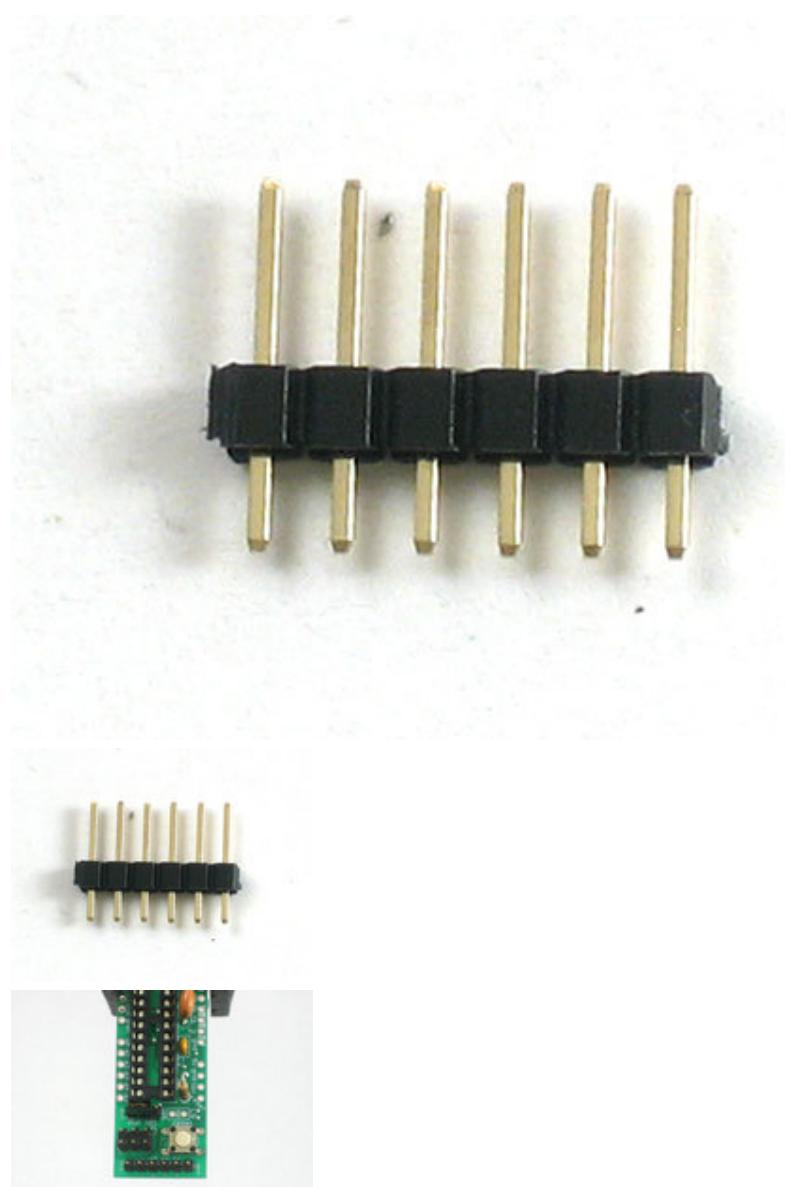


if necessary.  
Make sure the  
notch in the  
socket  
matches the  
notch in the  
silkscreened  
image. In this  
picture, its on  
the right.



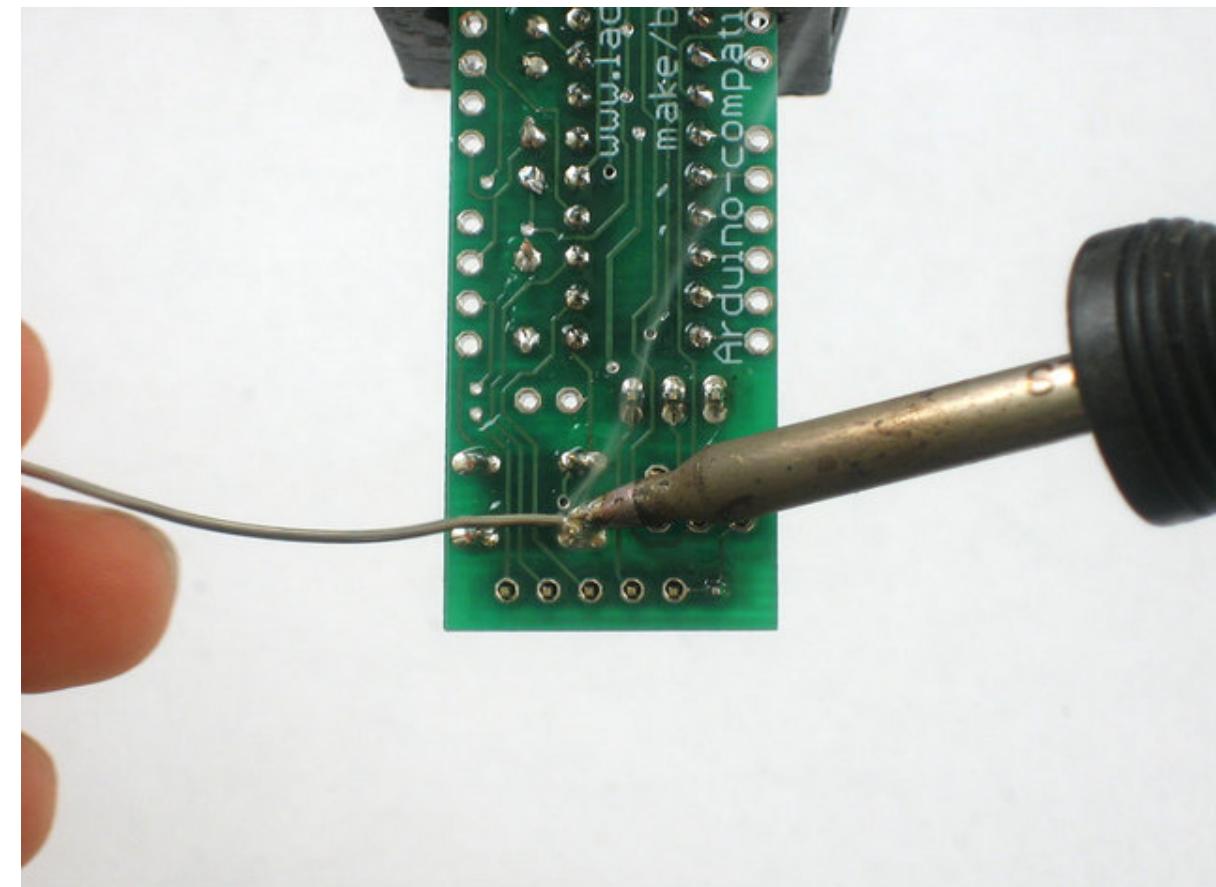
Solder in the  
socket by  
tacking two  
opposite  
corners and  
then soldering  
the rest of the  
pins. Press the  
socket into the  
board to make  
sure its flat up  
against it.



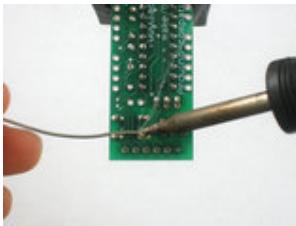


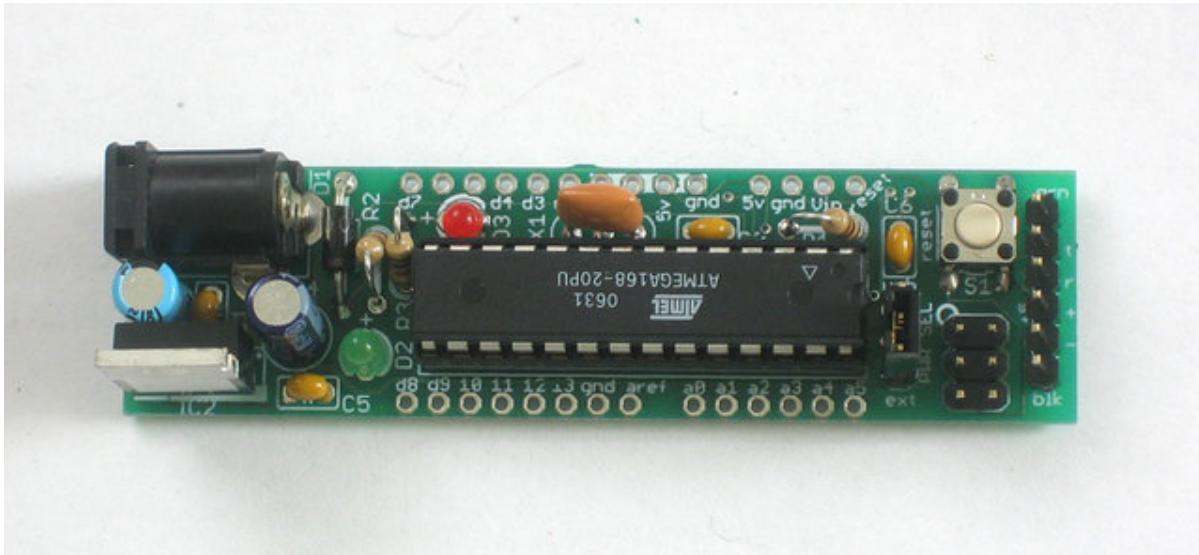
- Cut another header off, this time a 6-pin piece.

- Place the 6mm reset button, the 6-pin ICSP header and the 6-pin strip for using an FTDI USB cable.



Solder the parts in.

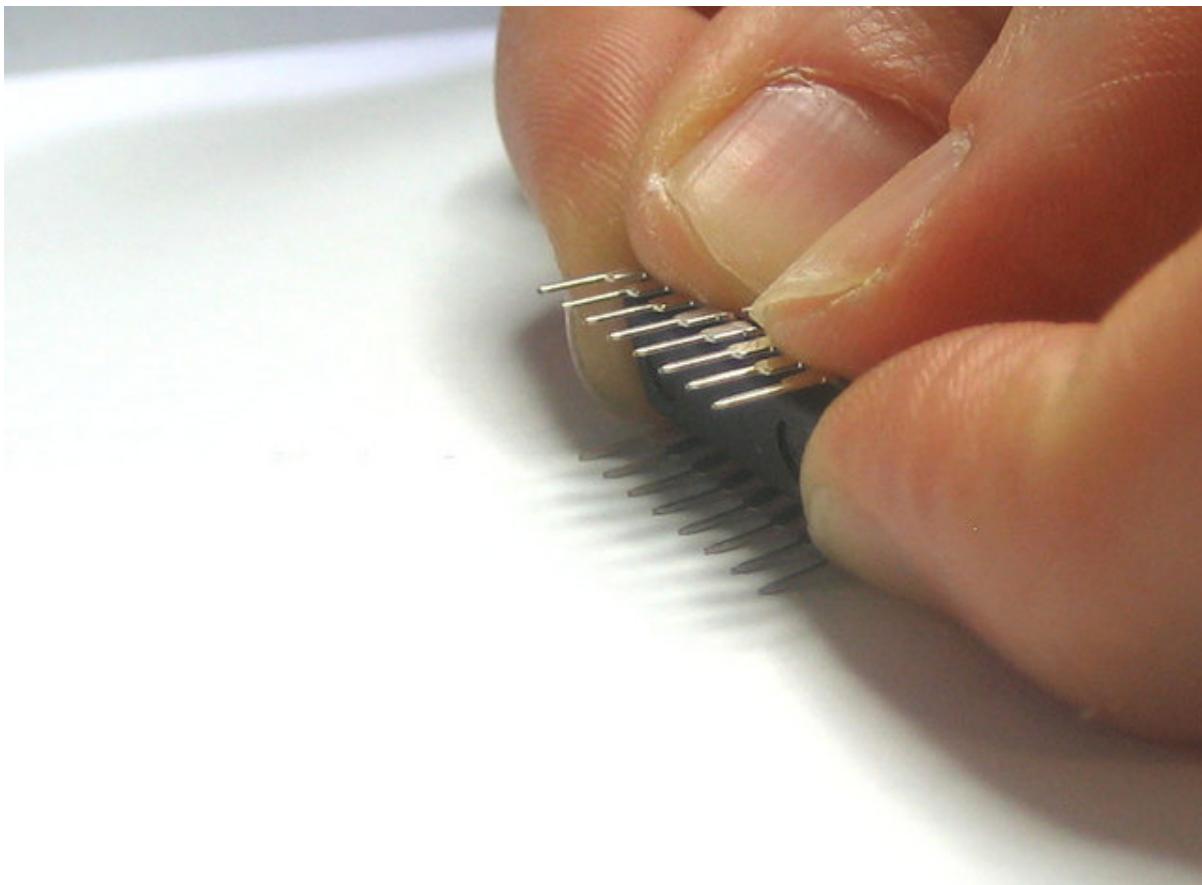
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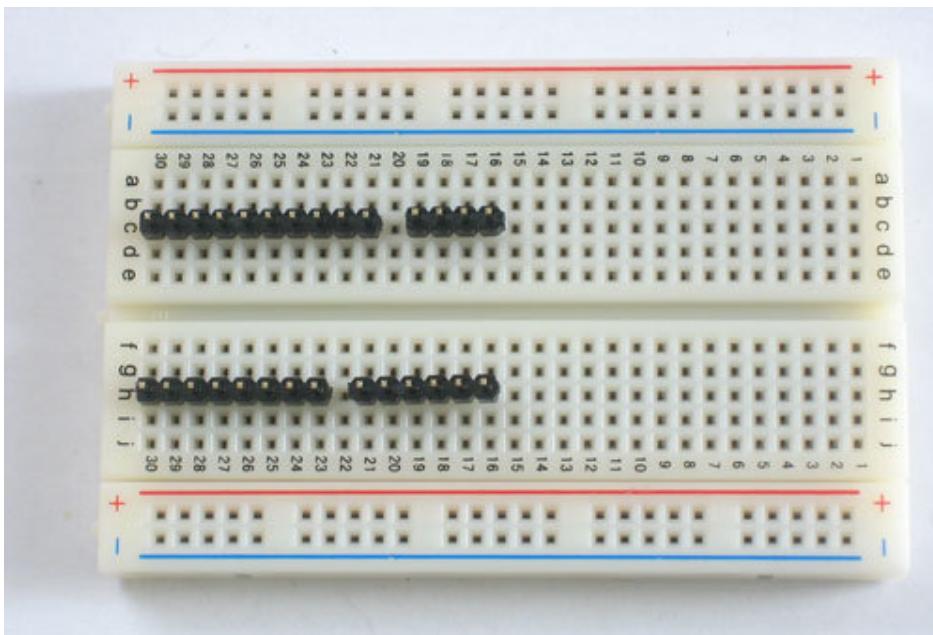
If you'd like to take advantage of the auto-reset capabilities added to the Arduino software, install ceramic capacitor **C6**.

Now is a good time to insert the IC.

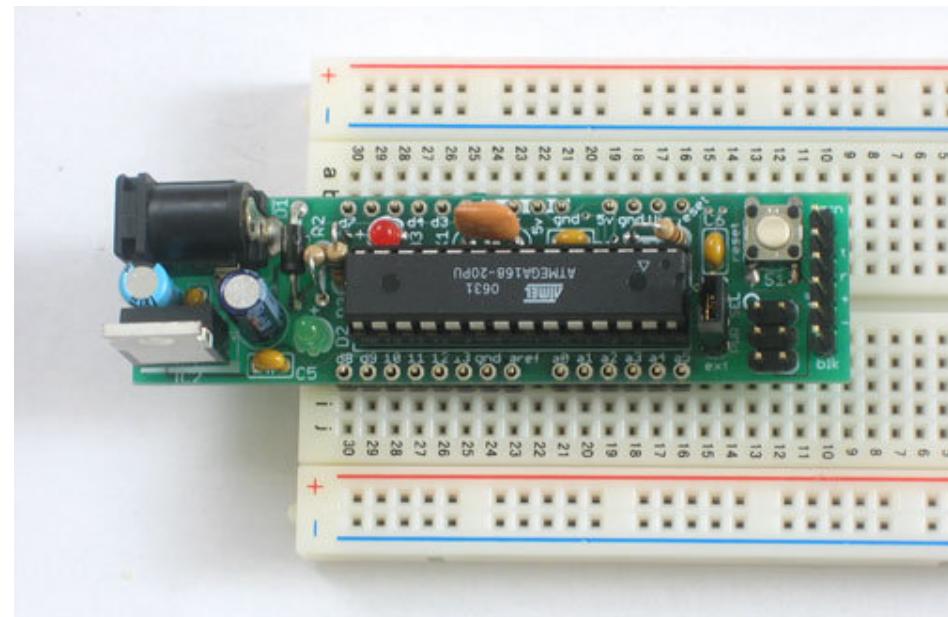
Bend the legs gently against a table and line up the notch in the chip with the notch in the socket.



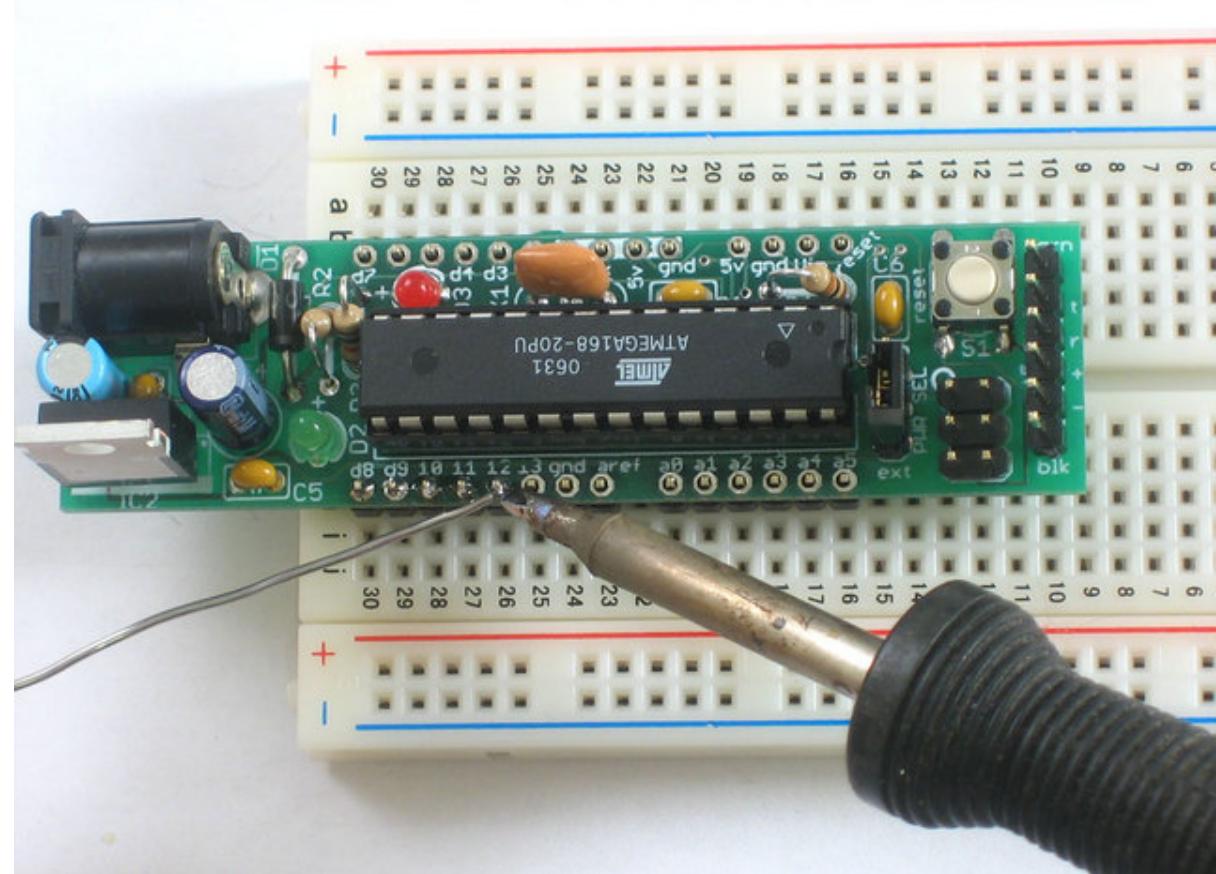
Carefully seat the chip, making sure all of the legs are lined up in the socket.



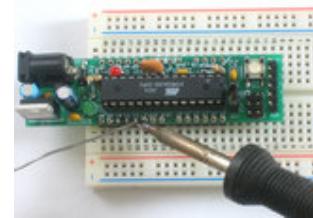
Cut 4 more pieces of header, a 10-pin, 8-pin, 6-pin and 4-pin. Insert them into a solderless breadboard as shown so that the long legs are in the solderless breadboard sockets.

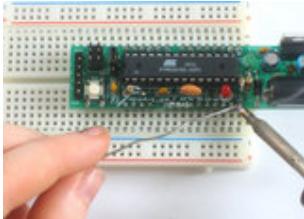


Place the Boarduino on top, so that the header matches up with the solder holes in the PCB.

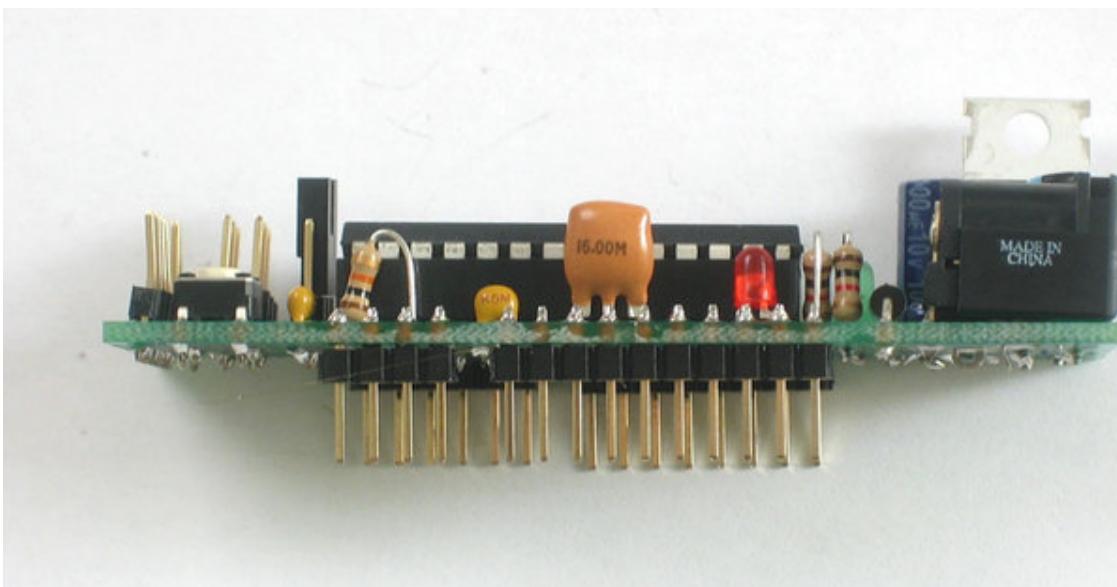


Solder all of the pins of the header, making sure that the board is sitting flat against the header.





Carefully remove the boarduino by slowly rocking it back and forth to release it from the solderless breadboard.

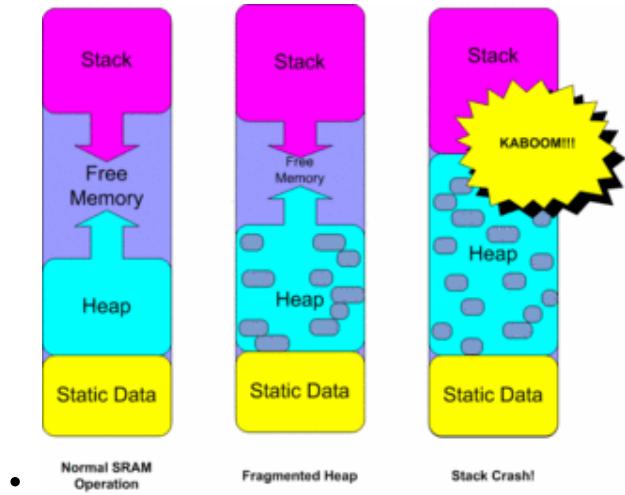


You should now try to power it up again, and you will see the green LED light. Press the reset button, the red LED should blink a few times. If you don't see the red light blink make sure the chip is in the right way.

[< DC Parts List](#) [USB Parts List >](#)

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