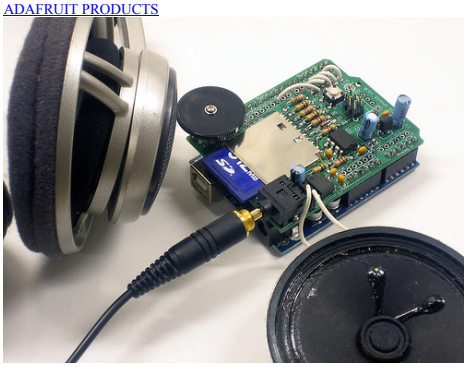


Wave Shield

Add music to your Arduino

Contributors

lady ada
Feedback? Corrections?

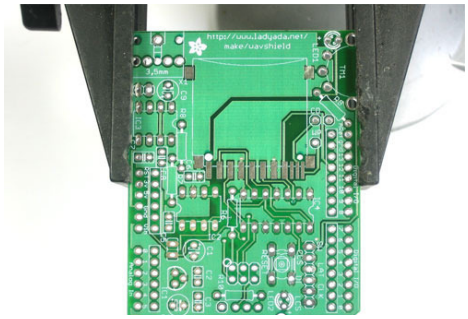
Solder

LADY ADA

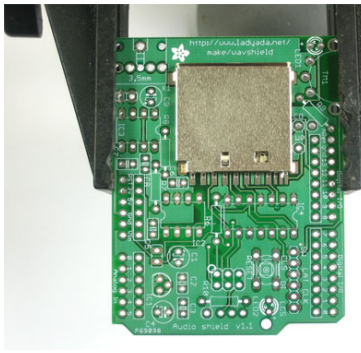
These are instructions for version 1.1 of the kit!

If you are confused because your kit doesn't have a 74HAC125 in it, you probably want to read the v1.0 instructions.

Make it

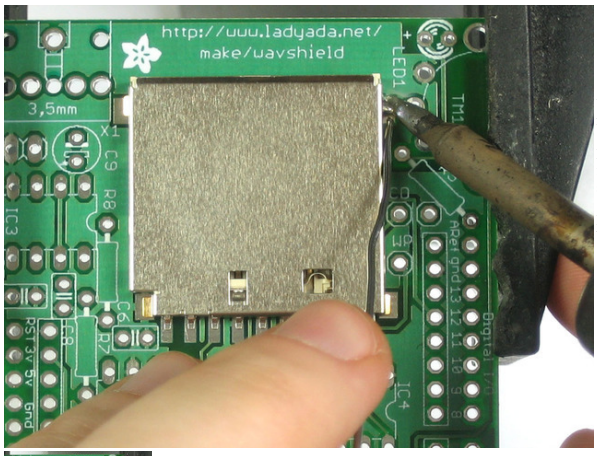


Get ready by placing the PCB in a vise.



We're going to the SD card first. While surface mount parts are a little tougher than thru-hole, this piece has pin spacing of 0.1" so it is quite easy. Doing it first also gives us lots of working room.

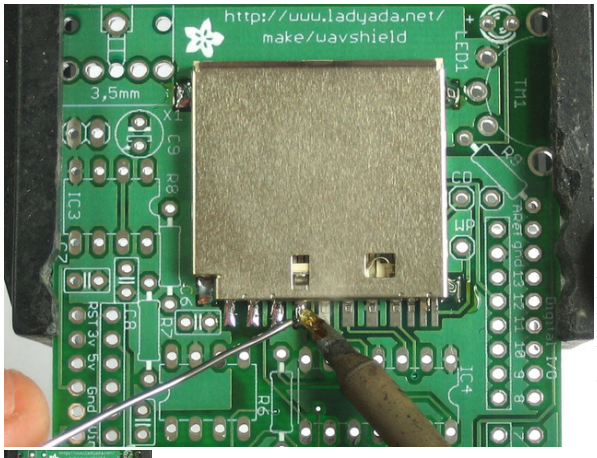
The holder should 'snap' perfectly into place thanks to two bumps on the bottom.



We'll start with the four side tabs that are used to mechanically secure the card holder in place.

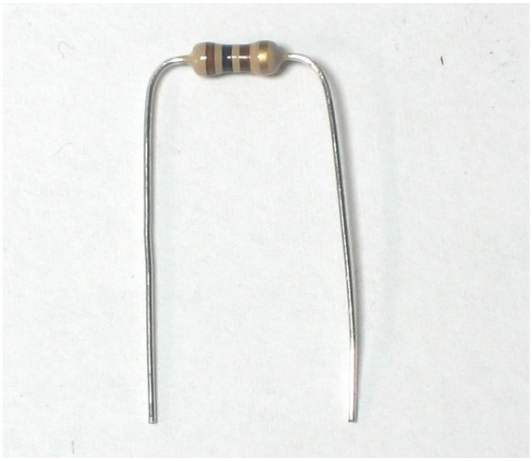
Heat up the metal tab and the pad (the silver square beneath it) for 3 seconds with a hot soldering iron, then poke just a bit of solder in.

Do this for all three corners. Once this is done you should not be able to lift the card holder



Now go thru and solder the 8 leftmost pins that stick out from the holder. The three rightmost pins are thinner and closer together so they are tougher to solder. Luckily they are not used and you simply skip them (although the photo shows them done).

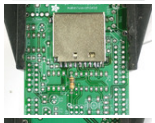
Check that you have no solder bridges - the pins should not be soldered to the metal body of the holder or to each other.

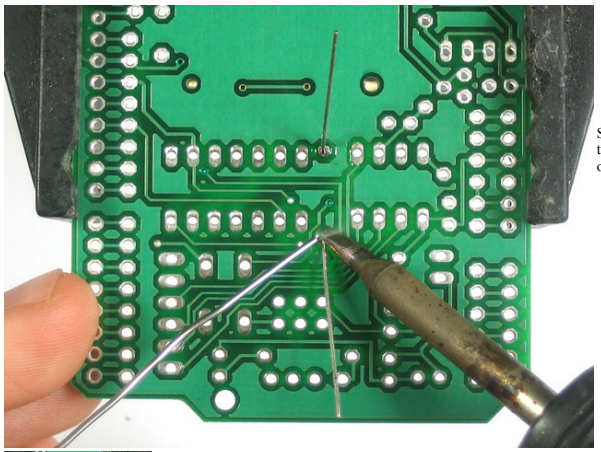


Next, we will solder all of the many resistors. The 10K resistor **R6** is first.

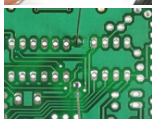
Form them into staples (as shown left with a 100 ohm resistor), then place them so they sit flat against the PCB, in the correct locations. Resistors don't have *polarity* so they can go in 'either way' and work fine!

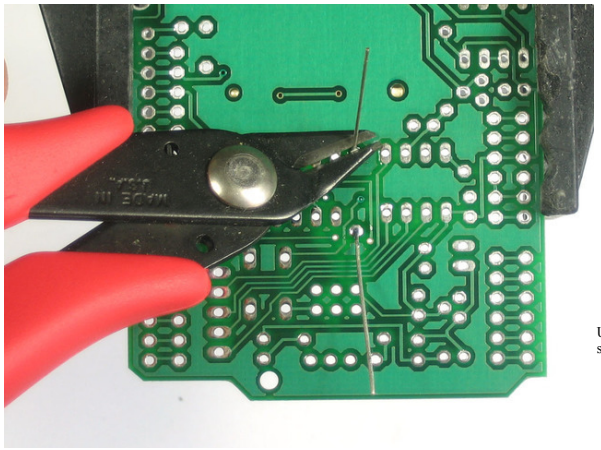
Once placed, bend the leads out so the resistors don't fall out.



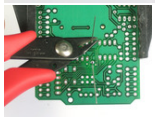


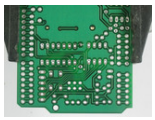
Solder the leads to the pads (metal ring) by heating both with the side-tip of the iron for 3 seconds and then poking in a bit of solder.

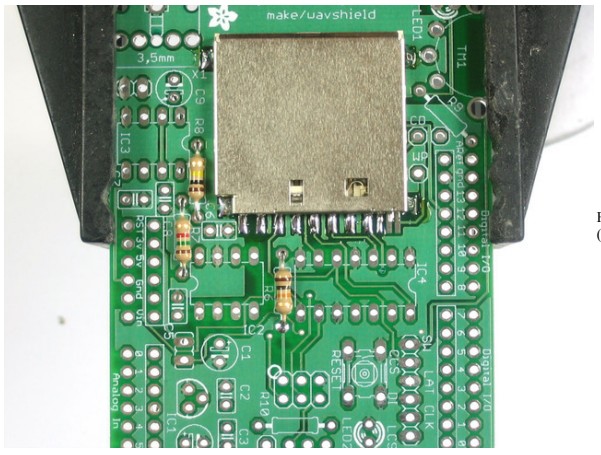




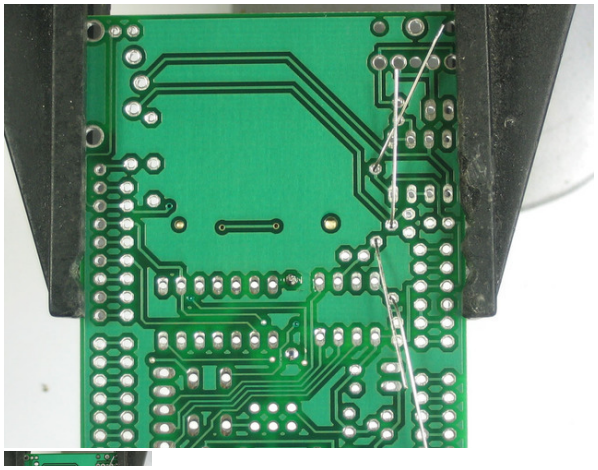
Use your diagonal cutters to clip the leads off just above the solder joint.

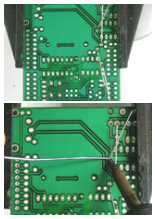




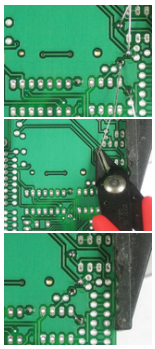


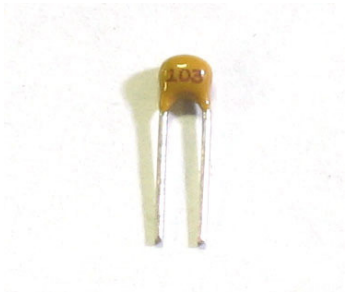
Finish up the resistors by placing **R8** (100Kohm), and **R7** (1.5K)





Solder the components.





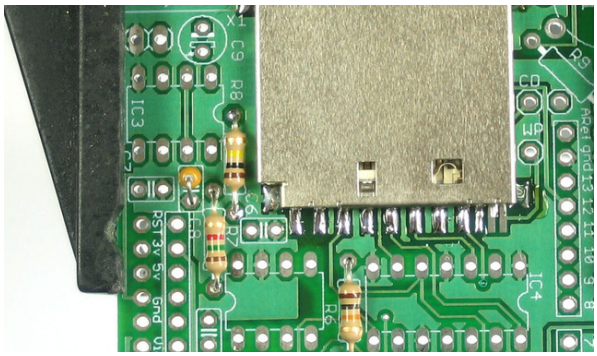
Next is the 0.01uF ceramic capacitor **C8**. The tricky part here is that in older kits there are many 0.1uF ceramic capacitors in the kit that look identical to the 0.01uF!

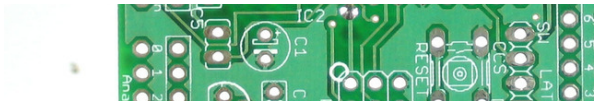
The way to tell the difference is look for the **103** printed on it. If it says **104** then it's a 0.1uF. Make sure it says **103**! This capacitor forms the output low-pass filter for the audio so its important to have the right value.

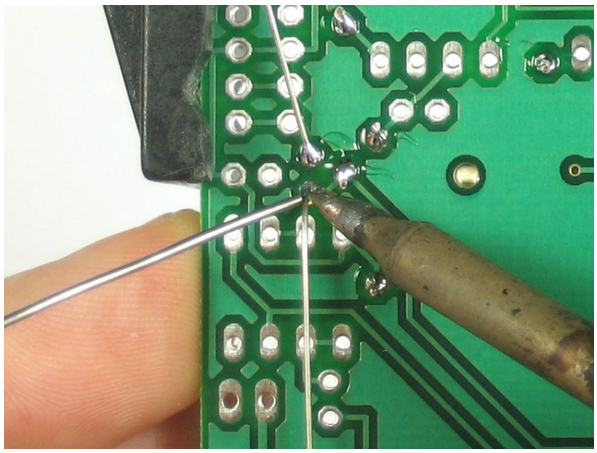
Lately I have been shipping kits with *axial* (long-ways) package, not *radial* (side-ways) package. These are longer (see left) and are easy to bend over for soldering. This way there is less confusion. Either way, try to spot the **103** marking.

Place the capacitor right next to R7.

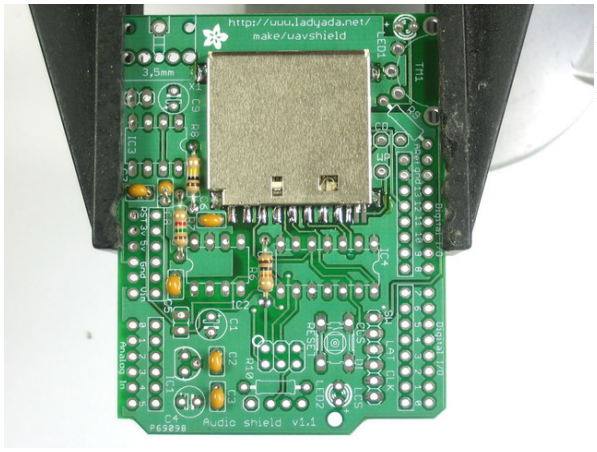
Ceramic capacitors are non-polarized and can go in 'either way.'



- 

- 

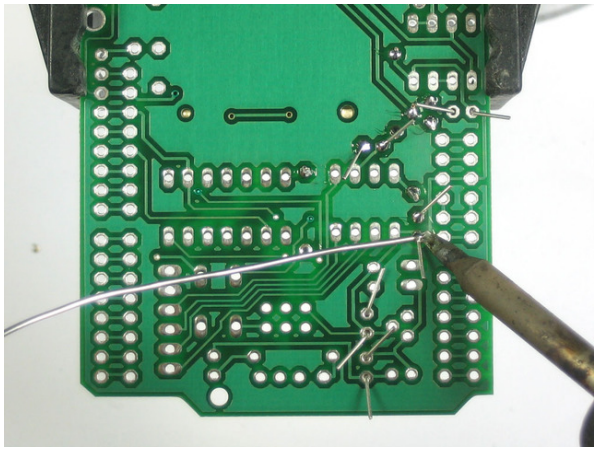
Solder and clip the small capacitor leads.

- 

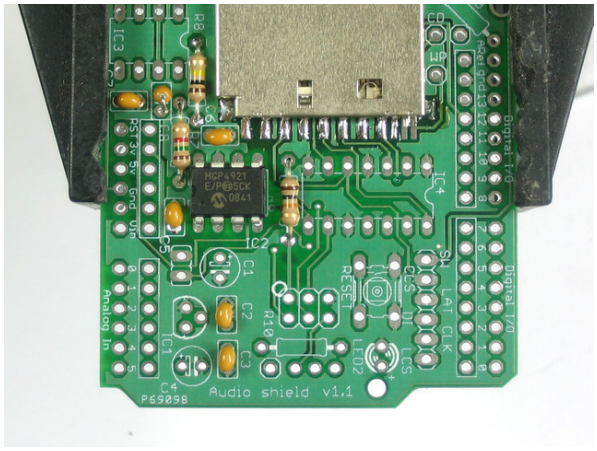
Once you're sure you have **C8** correct, you can place the remaining 0.1uF ceramic capacitors **C2, C3, C5, C6** and **C7**.

Ceramic capacitors are non-polarized and can go in 'either way.'

Note carefully where C5 goes, it doesnt go below C1 but rather next to the 1.5K resistor

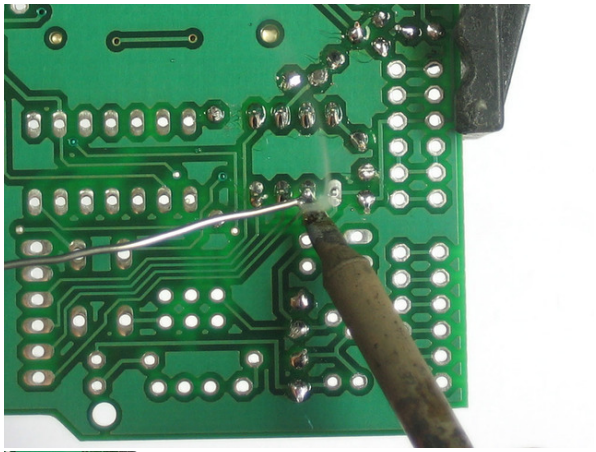
- 

Solder and clip the capacitors.

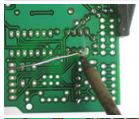
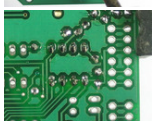
- 

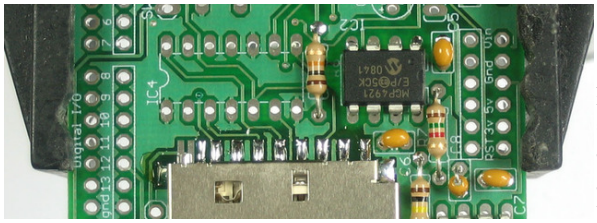
Next is the DAC (digital-analog converter) **IC2**. This is what turns the data into music. Make sure you pick the DAC to solder in here, it says MCP4921 on it and has a stylized M.

The chip has a notch in one end and that notch must line up with the notch in the silkscreen. In this photo, thats on the left.

- 

Flip over the board and solder in each pin of the chip. The pins are already quite short so you dont have to clip them.

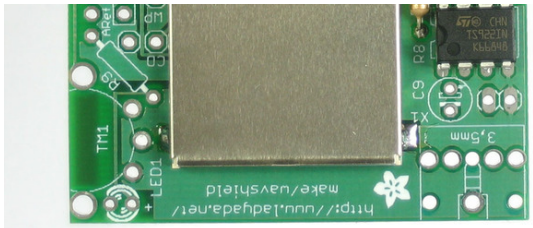
- 
- 

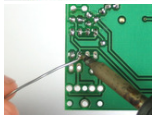


Next is the operational-amplifier (op-amp) **IC3**. It is used to buffer and amplify the output, so that it can drive a small speaker or headphones.

This chip may be labeled TS922 **or** TLV2462

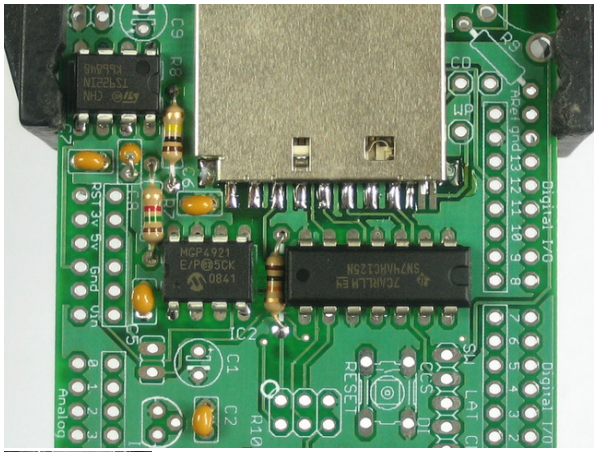
This is a similar-looking chip to the DAC. Again, check that the notch matches the silkscreen notch. In this photo, thats to



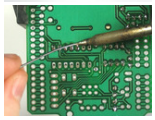


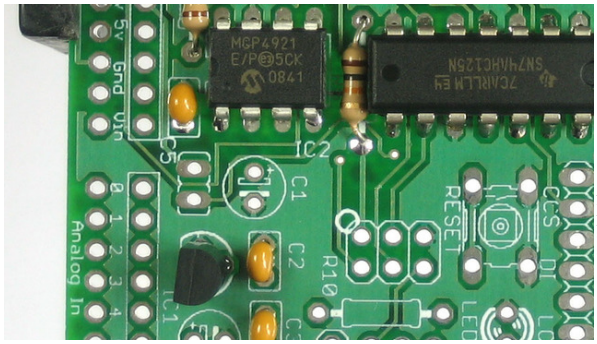
the left.

Solder it in, just like you did with the DAC.

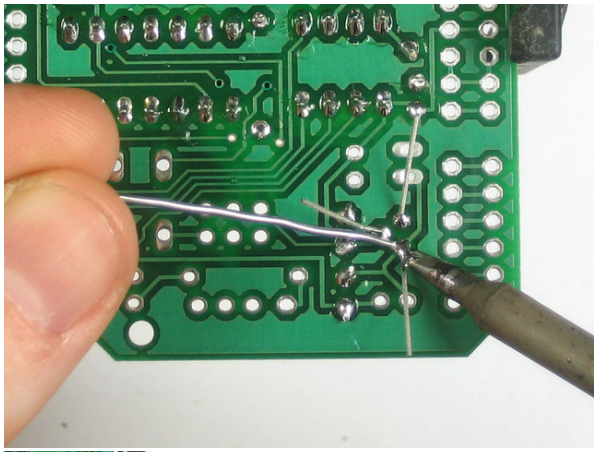


Next is **IC4**, the buffer to talk to the SD card. Match up the notch just like you did with the smaller chips.

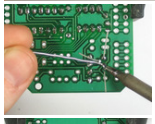


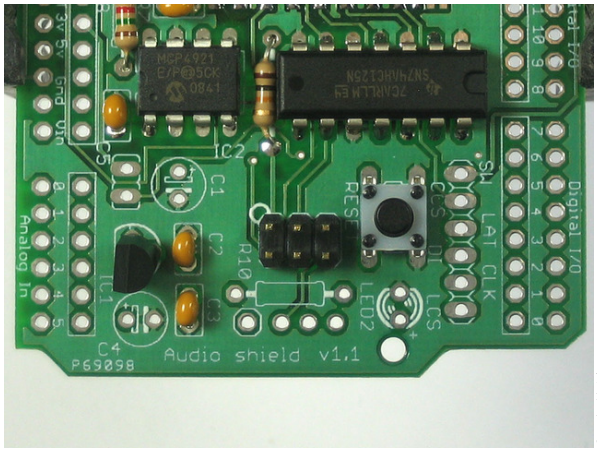


Next is the 3.3V regulator **IC1** that provides a nice powersupply to run the SD card. The regulator comes in a semi-circular package, so make sure it matches up with the silkscreened image.



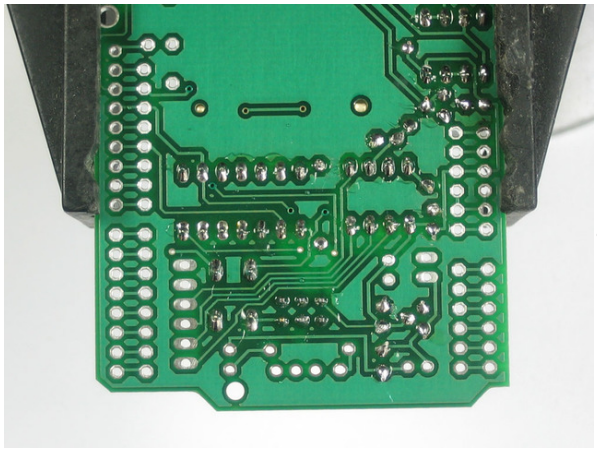
Turn the board over and solder/clip the three leads.



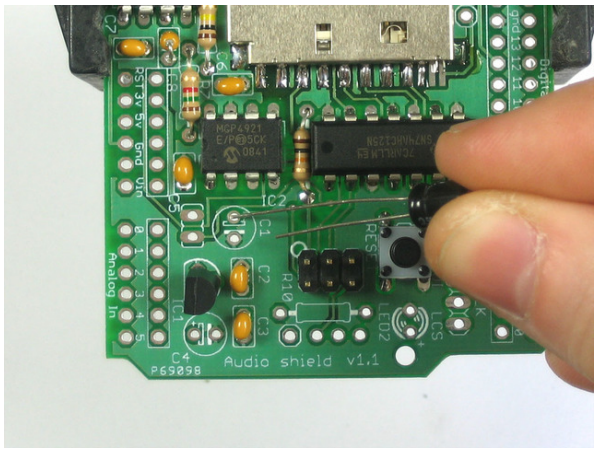


Next is the reset button and the ICSP header. These let you reset the Arduino manually, and reprogram it directly with a AVR programmer.

The button will snap in, its symmetric so it goes in 'either way'. The header is also symmetric, make sure the long end sticks up.

- 

Solder in both components. Their leads are pretty short so you dont need to clip them.

- 

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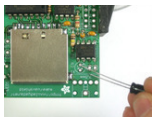
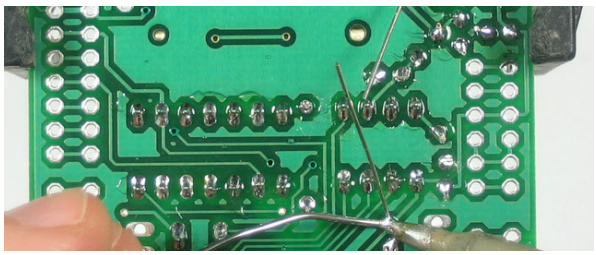
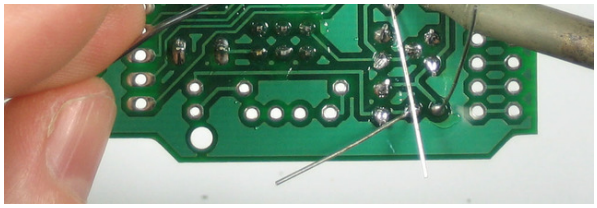
Next are the three electrolytic capacitors **C1 C4** and **C9**.

Electrolytic capacitors are polarized so make sure they go in the right way! The long lead is the positive lead, make sure that goes into the hole marked with a + as shown here.

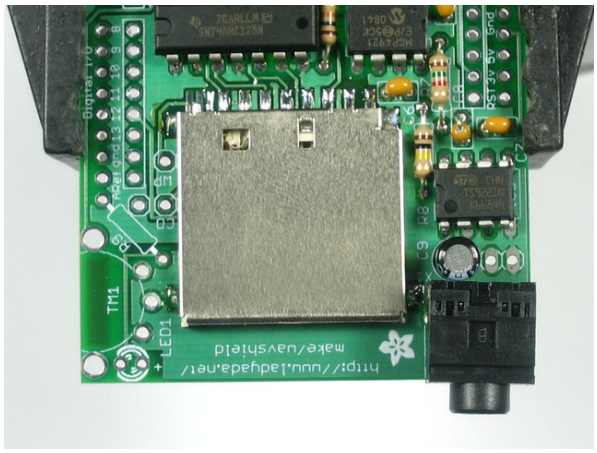
- 

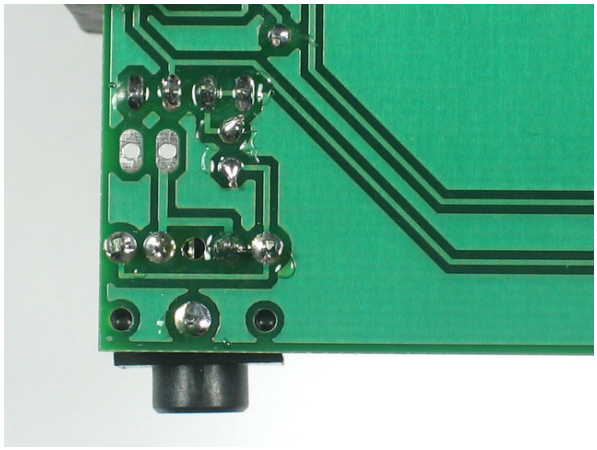
- 

Solder them in.

- 

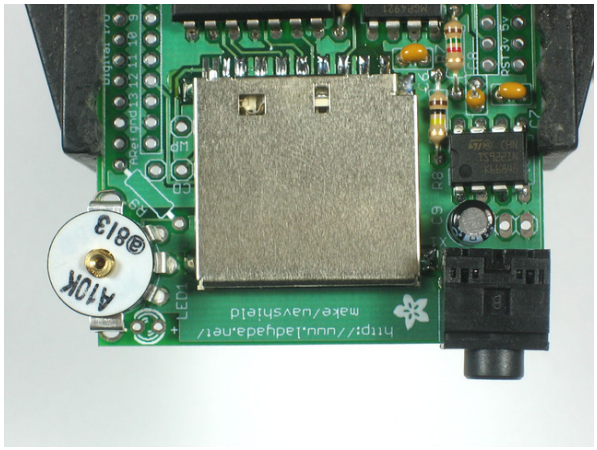
Next is the headphone jack. It snaps into place right at the edge of the PCB.

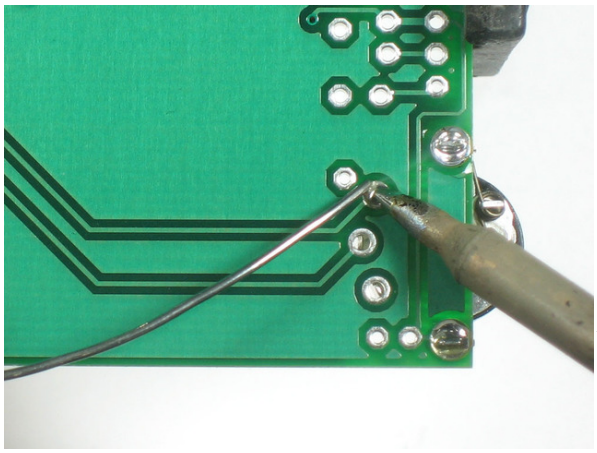
- 

- 

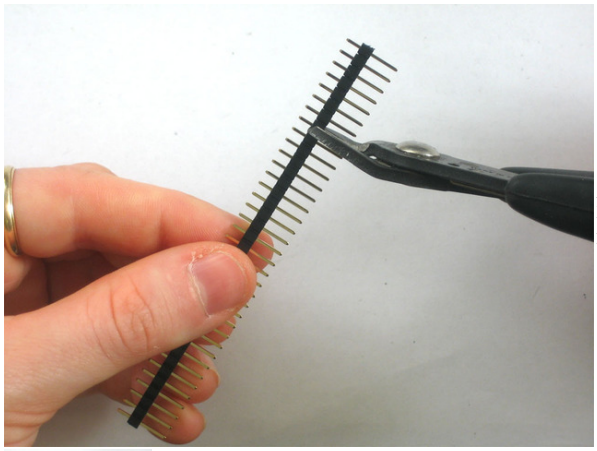
Solder the jack in place. You'll want to clip the legs a little if you can, so that it will sit better on the Arduino.

Next is the volume potentiometer **TM1**. This is an audio-type 10K pot. It will slip into place pretty easily.

- 

- 

Solder all 5 pins of the potentiometer. Use plenty of solder so that it has a lot of mechanical strength.

- 

Next, break the 36-pin header strip into smaller sections so that the shield can be placed on the Arduino. You can use pliers or diagonal cutters. Clip off 2-6pin and 2-8pin pieces.

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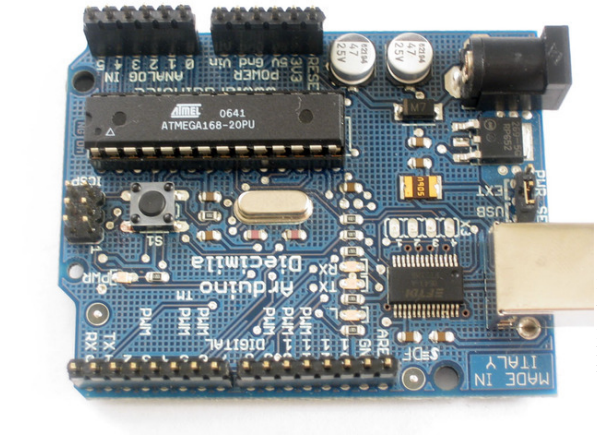
- 

If you're using a Diecimila, Duemilanove, Uno or later Arduino, place the 6 and 8 pin headers into the female sockes.

If you have an NG Arduino, you can place a 3-pin female header (not included) as shown, which will let you use the reset button.

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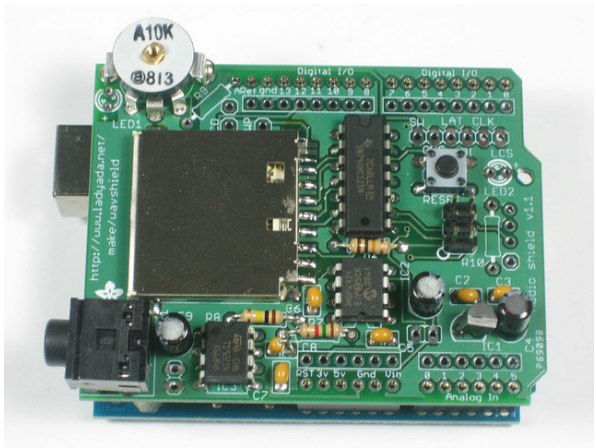
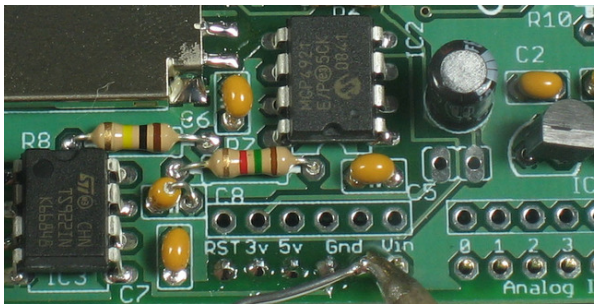
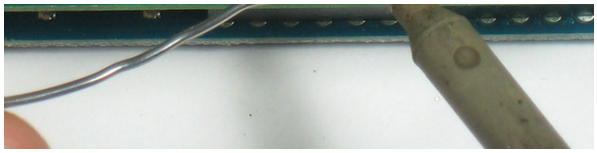
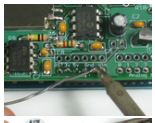
- 

Place the shield PCB onto the arduino so that all the holes match up with the header.



- 

Solder in each and every pin of header.

- 
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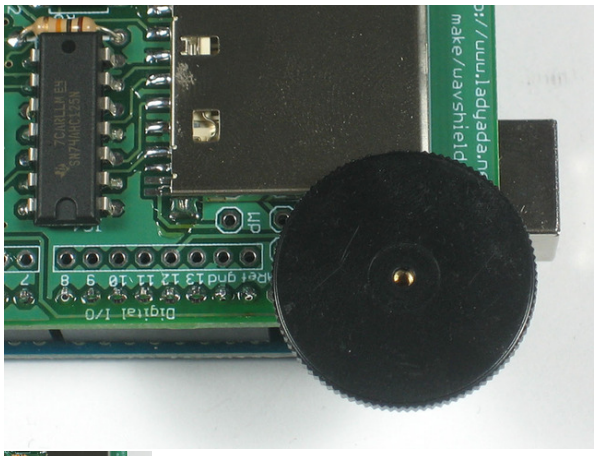
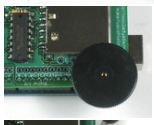
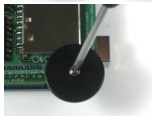
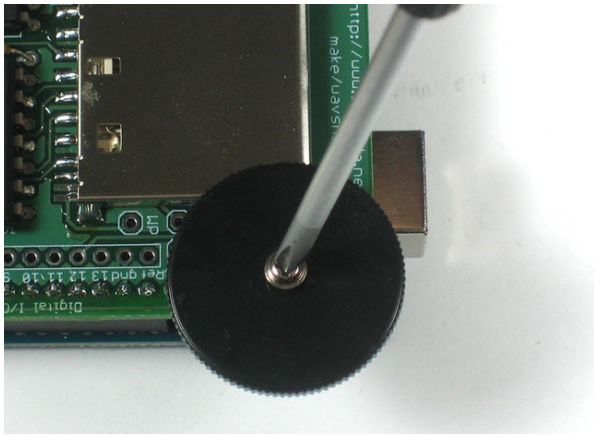
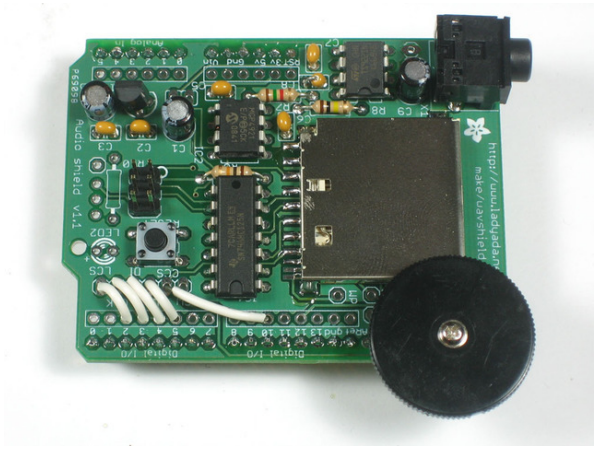
- 

Next you can install the thumbwheel. Use a #0 screwdriver. Align the thumbwheel so it 'grabs' the potentiometer, then gently screw it in place.

- 
- 



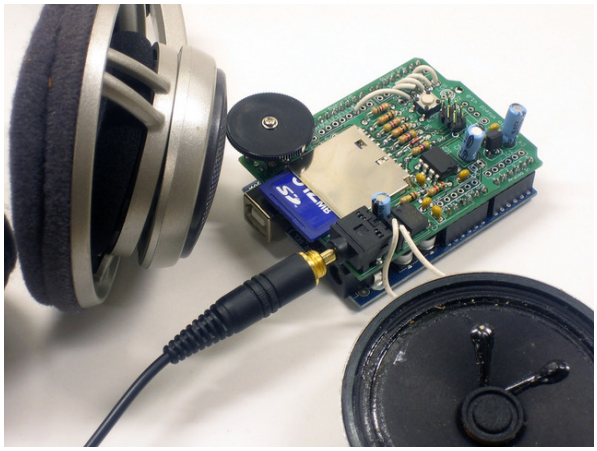
- 

Pins 13, 12 and 11 are used to talk to the SD card and cant be changed. The rest of the pins, however, are more flexible. Still, for all the examples on the site we'll be using this wiring, so it is suggested to just go with this.

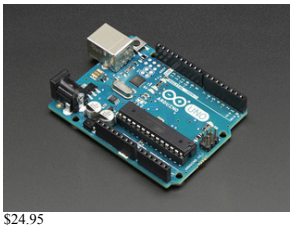
2 -> LCS
3 -> CLK
4 -> DI
5 -> LAT
10 -> CCS

You can use any sort of wire. Solder the jumper wires in place.

Hooray you are done! Now onto the user manual...

- 

PARTS USE IT!
Last updated on 2015-05-04 at 04.27.56 PM Published on 2013-07-17 at 12.39.05 PM



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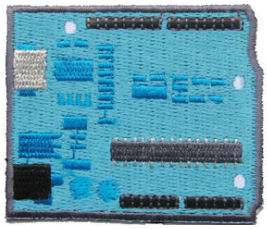


Skill Badge Requirements: Microcontrollers

Have you earned a badge today?
The following badge requirements are geared toward high school environments. They are designed to get students familiar enough with the concepts so that they can use them effectively in their designs and troubleshoot problems when they arise. Enjoy!

ADAM KEMP

- ADAFRUIT PRODUCTS

Adafruit VS1053 MP3/AAC/Ogg/MIDI/WAV Codec Breakout Tutorial

Records and plays a variety of audio formats
This breakout board is the ultimate companion for the VLSI VS1053B DSP codec chip. The VS1053 can decode a wide variety of audio formats such as MP3, AAC, Ogg Vorbis, WMA, MIDI, FLAC, WAV (PCM and ADPCM). It can also be used to record audio in both PCM (WAV) and compressed Ogg Vorbis. You can do all sorts of stuff with the audio as well such as adjusting bass, treble, and volume digitally. There are also 8 GPIO pins that can be used for lighting up small LEDs or reading buttons.

BILL EARL

- RASPBERRY PI / LEARN RASPBERRY PI

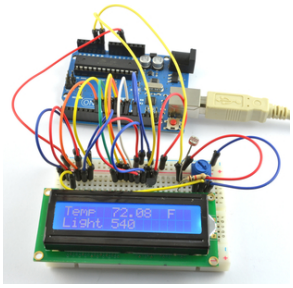
POPULAR

Adafruit's Raspberry Pi Lesson 1. Preparing an SD Card for your Raspberry Pi

This lesson shows you how to create an SD card for your Raspberry Pi.

SIMON MONK

- LEARN ARDUINO



Arduino Lesson 12. LCD Displays - Part 2

Learn Arduino, Lesson 12. LCD Displays - Part 2
This is Lesson 11 in the Learn Arduino Adafruit series. In this lesson, you will build on what we have learnt in lesson 11 and use a LCD display to show the temperature and light intensity.

SIMON MONK
×

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