

Wind Waker Baton with Sound Effect - Assembly Guide

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1 Overview

This guide shows you how to assemble the 3D printed Wind Waker Baton model and how to add the sound effect. After you finished this guide the Wind Waker Baton will play one of the songs from the game every time the tip faces upwards.

The electronic part of this project is a combination of the *GEMMA Talking Toy Guts Sound Pack* and the *Adafruit Audio FX Mini Sound Board*. I would recommend to read the guides from Adafruit to learn more about the parts you will use:

<https://learn.adafruit.com/chirping-plush-owl-toy>

<https://learn.adafruit.com/adafruit-audio-fx-sound-board/overview>

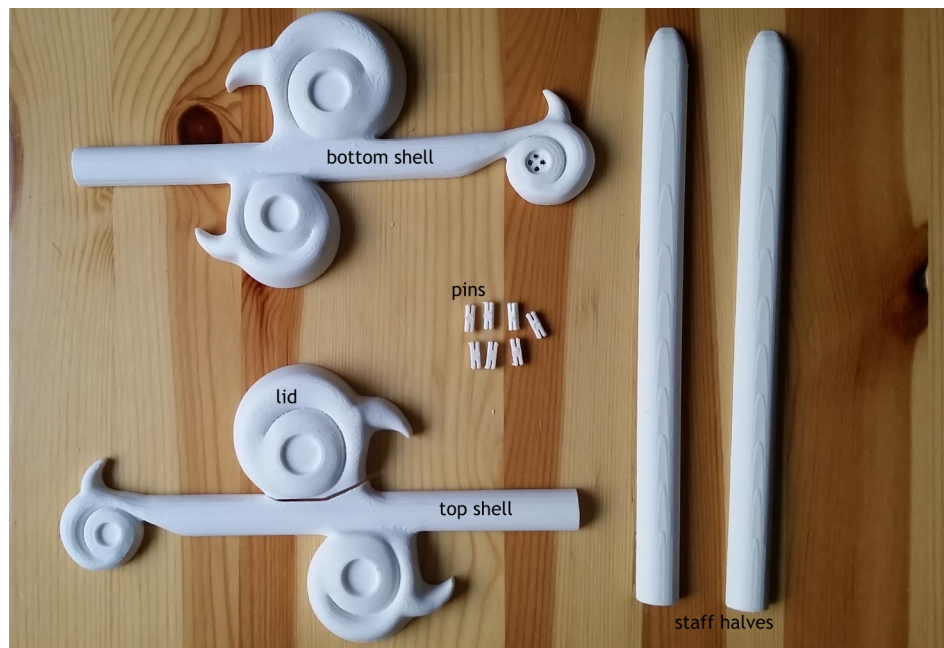
2 Electronic Parts

- Adafruit Audio FX Mini Sound Board - WAV/OGG Trigger - 2MB Flash:
<https://www.adafruit.com/products/2342>
- Mini Metal Speaker w/ Wires - 8 ohm 0.5W:
<https://www.adafruit.com/products/1890>
- Adafruit Mono 2.5W Class D Audio Amplifier - PAM8302:
<https://www.adafruit.com/products/2130>
- Lithium Ion Polymer Battery - 3.7v 150mAh:
<https://www.adafruit.com/products/1317>
- Tilt ball switch:
<https://www.adafruit.com/products/173>
- JST-PH 2-Pin SMT Right Angle Connector:
<https://www.adafruit.com/product/1769>
or use one end of a JST-PH Battery Extension Cable - 500mm:
<https://www.adafruit.com/products/1131>
- Adafruit Micro Lipo - USB Lilon/LiPoly charger - v1
<https://www.adafruit.com/products/1304>
- Adafruit Lilon/LiPoly Backpack
<https://www.adafruit.com/product/2124>
- SPDT Slide Switch
<https://www.adafruit.com/product/805>

3 Tools and Supplies

- solid core wire
- heat shrink tubing and insulation tape
- soldering iron and solder
- micro USB cable

- Wind Waker songs sound files
- hot glue and hot glue gun
- superglue or any other strong glue/epoxy you like
- 4 round magnets (3mm X 3mm X 6mm) (neodymium magnets with a grade N42 should be more than strong enough)
- sandpaper and/or files
- 3D printed Wind Waker parts



4 Loading Sound Files on the Soundboard

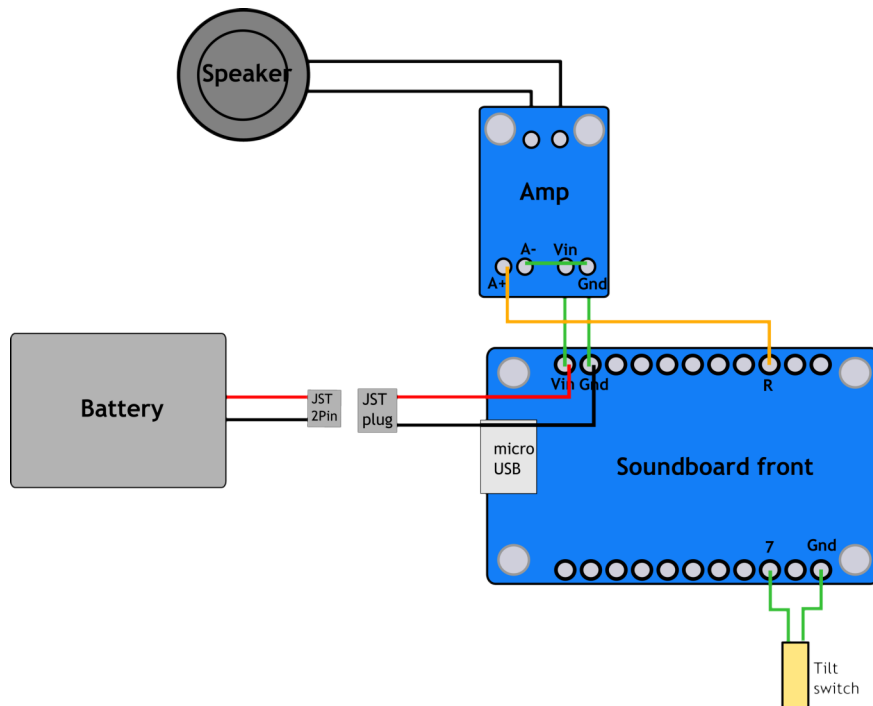
The soundboard comes with different trigger types. For the Wind Waker we will use the *Play Next Trigger* modus and connect the tilt switch to pin 7 so we name the sound files like this:

- first file = T07NEXT0
- second file = T07NEXT1
- third file = T07NEXT2
- ...

Now we simply connect to the soundboard via micro USB and load the sound files on the soundboard.

5 Circuit Diagram

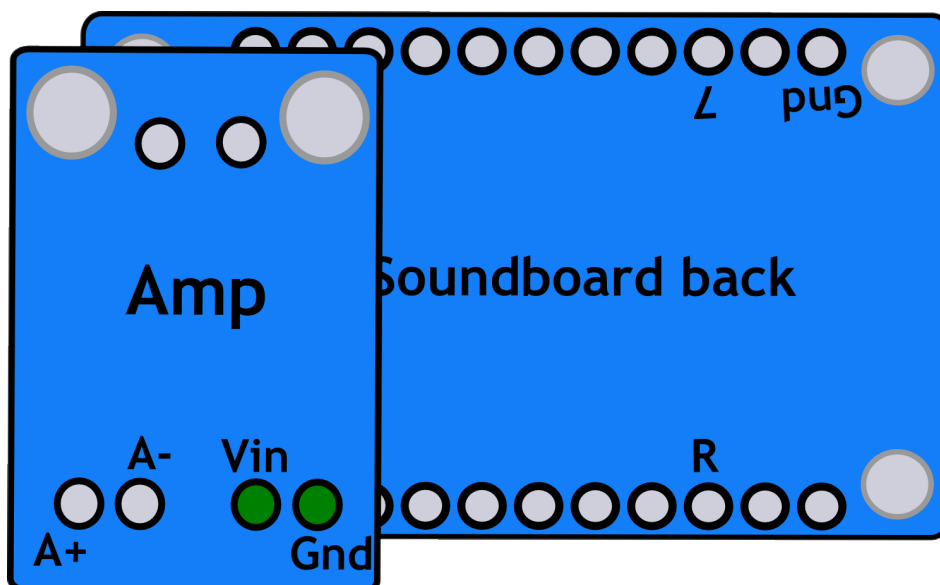
Be aware that some pins like *vin* on the soundboard will be connected to multiple parts and the actual position of the individual parts will be more narrow to fit inside of the Wind Waker Baton.



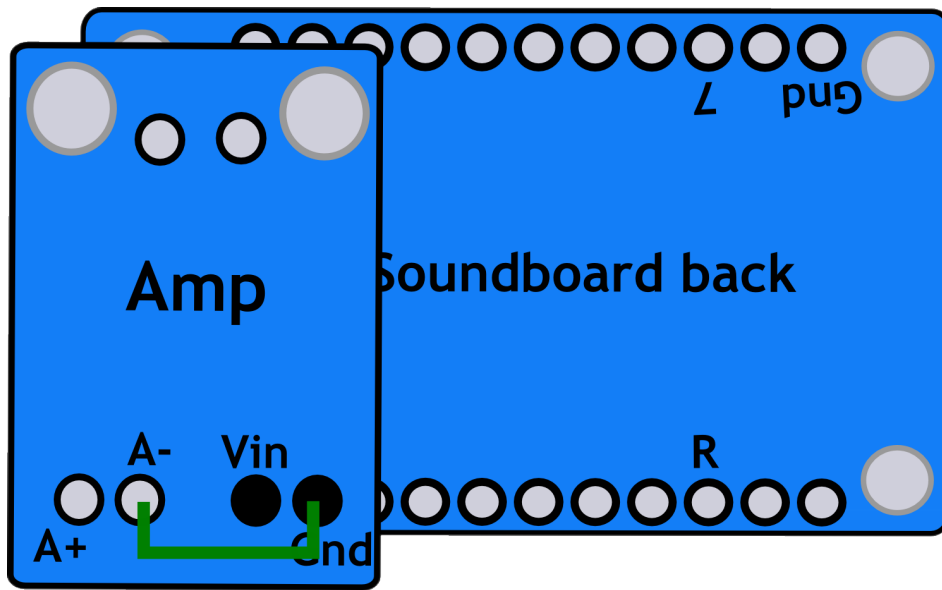
6 Circuit Assembly

The following pictures show the circuit assembly and placement inside of the 3D Printed parts. New added connections are colored in green. Already soldered connections are colored black. Use heat shrink tubing or insulation tape wherever you think it is necessary.

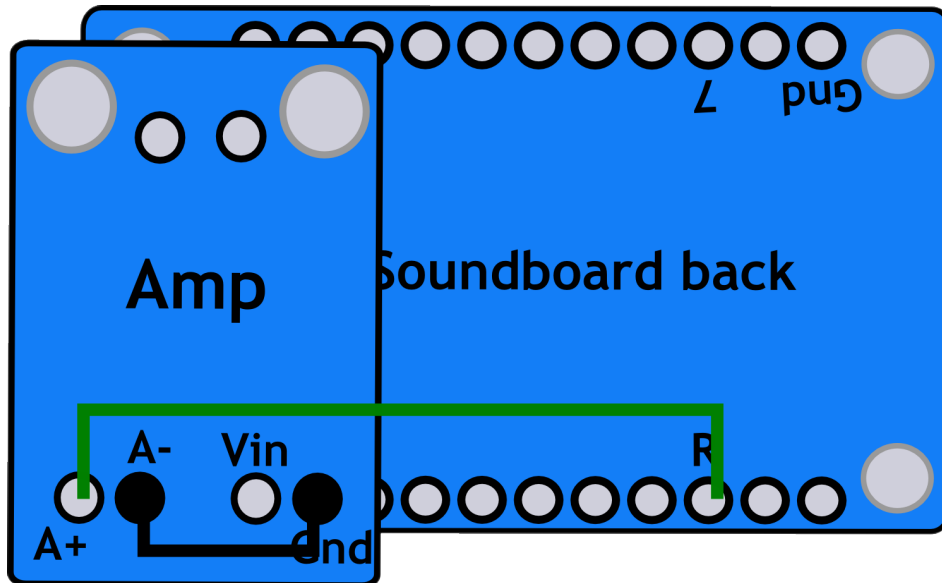
Start by placing the soundboard on top of the amplifier in a way that the both the *vin* pins and the *gnd* pins are overlapping. That way you save space and can solder the two boards in place using straight headers or cut two very short pieces of cable with removed insulation.



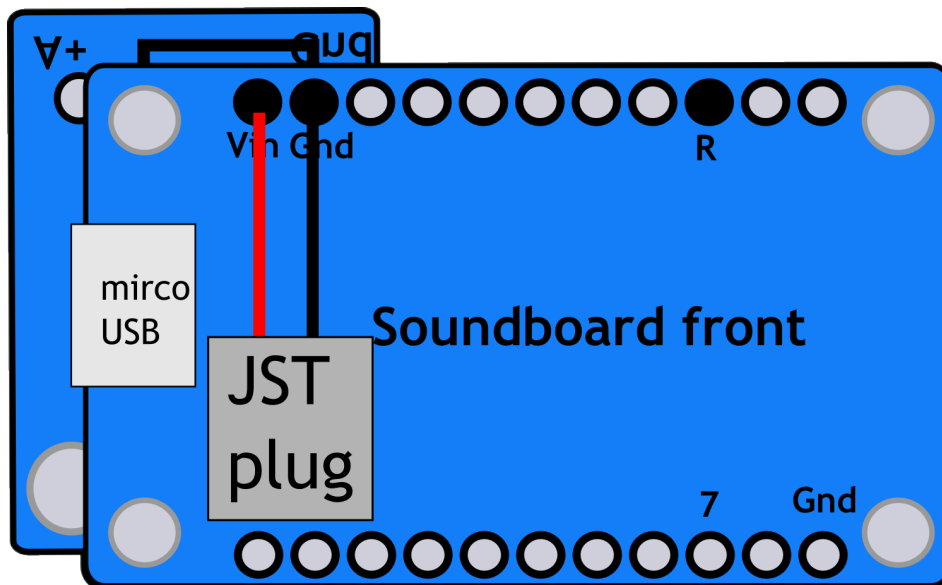
Connect the *A-* pin to the *gnd* pin on the amplifier. The cable length should not be longer than needed, but long enough to not create any tension.



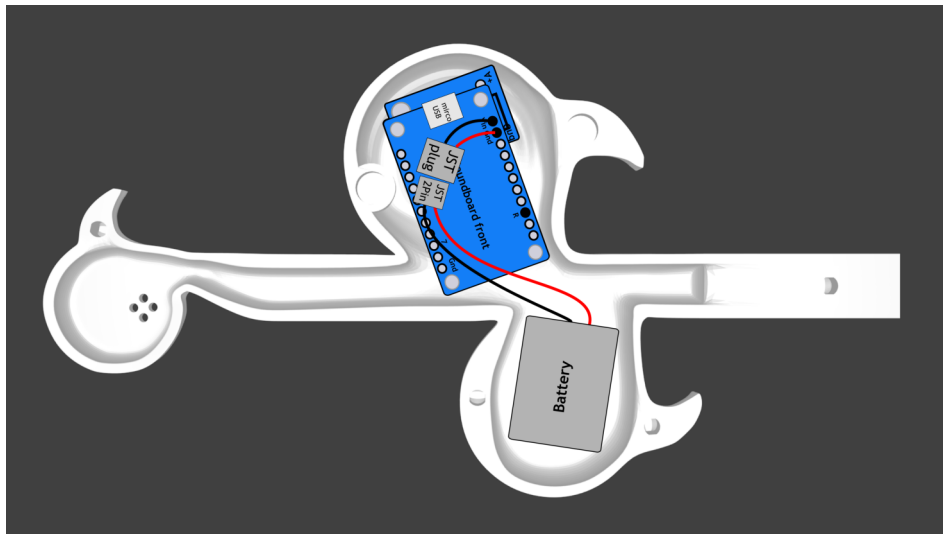
The last connection from the amplifier to the soundboard connects *A+* with *R*. Again measure the cable length as tight as possible.



Now solder two cables on the JST connector, or cut of one end of a JST extension cable. These two cables will make it easier to plug the battery on and off. The cables are soldered to the *vin* and *gnd* pins on the soundboard. Normally the red cable will be connected to *vin*, so keep that in mind while soldering the JSP connector cables to the pins.

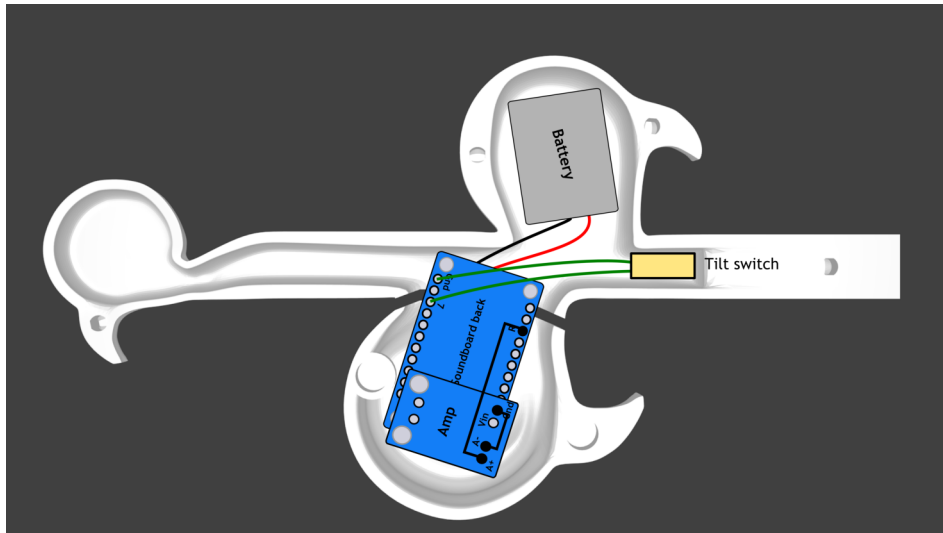


Now place the soundboard and the battery in the bottom shell of the baton. The battery cable can be cut and shortened to fit or warped around the battery and secured with insulation tape.

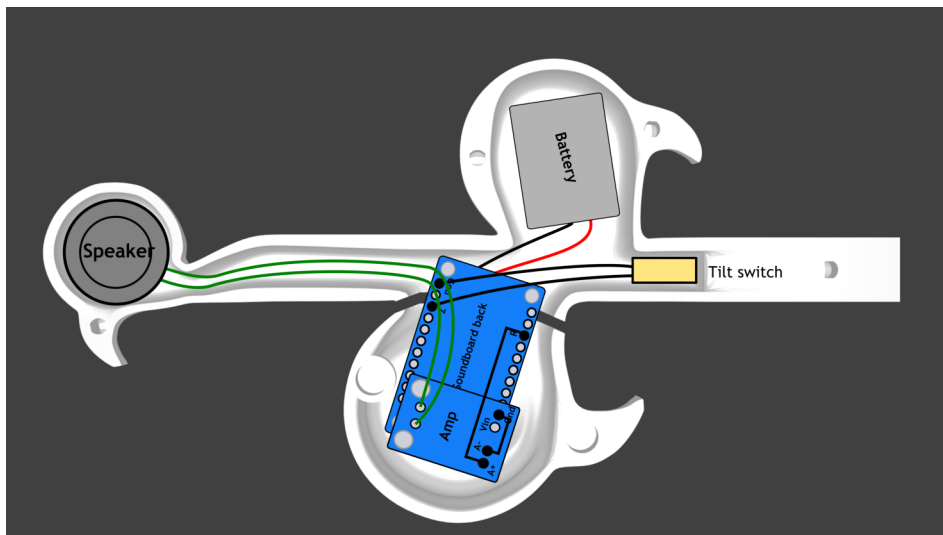


Now turn all parts over and place them inside the top shell and the lid to fit the tilt switch and speaker in place.

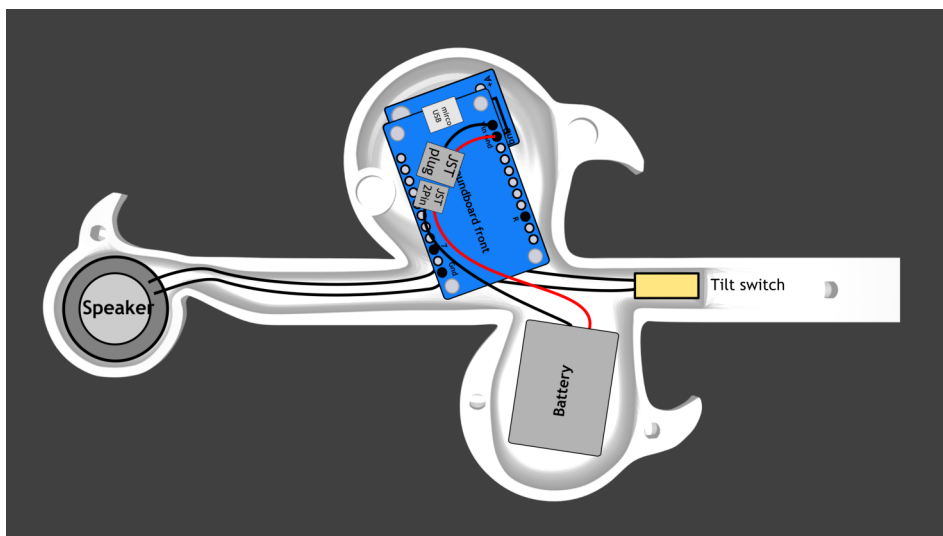
Measure and cut two cables and solder them to the tilt switch ends. Here you can use heat shrink tubing around each solder connection and the whole tilt switch. Now connect any one of the cable to the *gnd* and the other to the 7 pin.



Lastly measure and cut two cables and connect the speaker to the pins on the amplifier. Be aware that the front side of the speaker faces the 4 small speaker holes in the bottom shell.



This is how all parts should be place inside of the bottom half:



Test the circuit by triggering the tilt switch. You should hear the first song playing. Triggering the switch a second time should play the second song and so forth.

7 Final Assembly

You can sand down all 3D printed parts to achieve a smoother fitting, but clean all parts afterwards and let them dry before the assembly. In any case try a test fit with all pieces especially for the magnet sockets.

There are 7 plastic pins and 14 pin holes that mark where the two shells and the two staff halves will be joined together. The pins are fitting pretty tight inside of the holes, so using a pair of pliers is helpful. Add the circuit before attaching the bottom and top shell.

You can use hot glue to insulate and stabilize all solder connections and to fixate the parts inside the bottom shell. But be careful not to use a hot glue gun that is too hot and will melt the plastic. Applying just a bit of glue at a time and not touching the tip of the gun to the plastic should work just fine. You can also add super glue to the plastic pins and shells to further strengthen the baton.

The lid is removable and will be attached with magnets. You have to glue the 4 magnets inside the socket holes in the bottom shell and lid, but of course check the polarity first.

