Boomy The Boombox

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https://learn.adafruit.com/boomy-the-boombox

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Table of Contents

Overview

Boomy The Boombox

For AdaBox subscribers, in each Adabox you'll find super awesome Adafruit Collectible pin. In AdaBox 004, it's Boomy The Boombox. Now you can make boomy into an actual enclosure with 3D printing! Boomy is a super cool boombox that likes good vibrations and enjoys beat boxing. Boomy loves playing music and likes to reminisce about 1980's culture.

From Wikipedia (https://adafru.it/xbf)

> The first boombox was developed by the inventor of the audio compact cassette, Philips (https://adafru.it/xbg) of the Netherlands. Their first 'Radiorecorder' was released in 1966. The Philips innovation was the first time that radio broadcasts could be recorded onto cassette tapes without the cables or microphones...
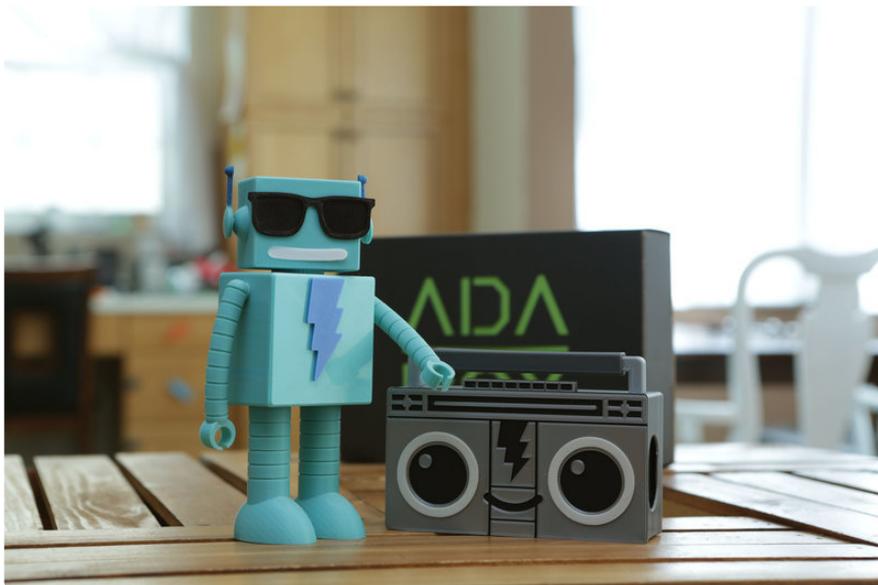

AdaBox 004

This project uses the awesome parts that are included with AdaBox 004. No soldering required! But 3D printing is required! Don't have a 3D printer? Have someone 3D print the parts for you. You can use a service like 3DHubs.com (https://adafru.it/efH) to locate a local maker with a 3D printer – Upload the files and they'll 3D print and ship the parts to you.

Parts

If you don't have an Adabox subscription, you can still make this project, you'll just have to get the parts individually. Below is a full list of parts that were used in this project. You can choose whatever you want for this project, it's not designed for specific hardware!
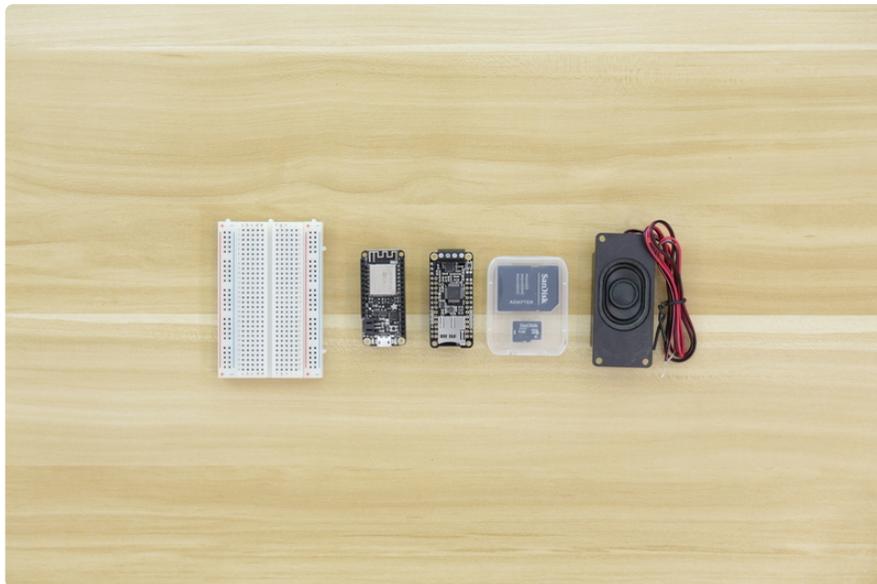
1 x Adafruit Feather HUZZAH
ESP8266 WiFi

https://www.adafruit.com/product/2821

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1 x Adafruit Music Maker FeatherWing
Amp - MP3 OGG WAV MIDI Synth Player - Stereo 3W
Amplifier

https://www.adafruit.com/product/3436

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1 x Breadboard
Half-Size

https://www.adafruit.com/product/64

SD/MicroSD Memory Card (8 GB SDHC)

1 x microSD Card

https://www.adafruit.com/product/1294

SD/MicroSD Memory Card (8 GB SDHC)

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1 x Speaker

https://www.adafruit.com/product/3351

Mono Enclosed Speaker - 3W 4 Ohm

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1 x USB Cable

https://www.adafruit.com/product/592

USB cable - A/MicroB - 3ft

3D Printing

3D Printed Parts

All of the parts are 3D printed with FDM type 3D printers using various colored filaments. All of the parts are separated into pieces to make 3D printing easier. Assembly is pretty easy and straight forward. Use the link below to download the STLs files.

Enclosure Design

Boomy can house a number of different enclosures, not just stuff from AdaBox. You could use a Raspberry Pi, Adafruit Metro or anything really that fits.

Enclosure Workarea: 137mm x 72mm x 37mm

SVG Artwork

If you're DIY-ing your own enclosure, you can use the original vector artwork to customize it. The boomy artwork was designed by Bruce Yan, creative director at Adafruit.

adabox_boomy_outlines.svg

https://adafru.it/yXC

Files

Here's a list of all the parts, what color they should be printed in and where they go. Click the green buttons to download the STL files. The parts can be printed without any support material using regular PLA filament.

File Name	Description	Filament Color
boomy-box.stl	main enclosure	gray filament
boomy-handle.stl	attaches to enclosure	gray filament
boomy-grip.stl	grip attaches to handle	black filament
boomy-cover.stl	attaches to enclosure	gray filament
boomy-face.stl	attaches to enclosure	black, gray and white filament

Download STLs from Thingiverse

https://adafru.it/xbA

Download STLs from Pinshape

https://adafru.it/xbR

Download STLs from YouMagine

https://adafru.it/xbS

Download Fusion 360 Source Files

https://adafru.it/xbB
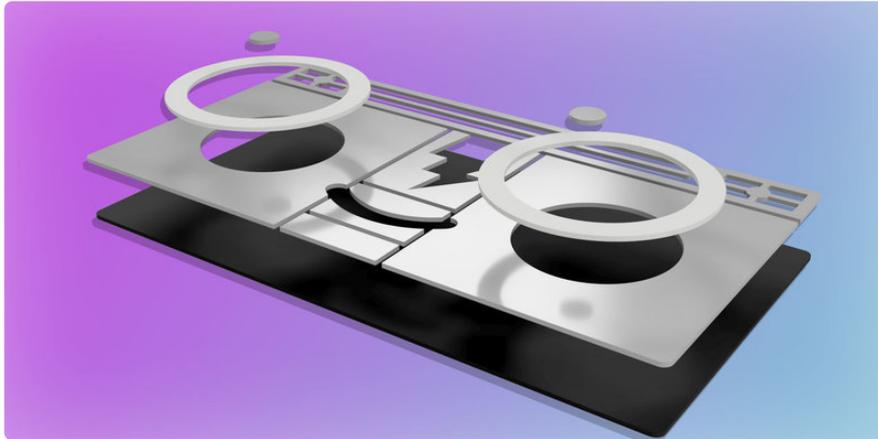


Multi-Color Parts

Boomy's face and buttons are 3D printed with different colored filaments. This can actually be done with single extruder 3D printers – dual extrusion is not required! To achieve a multi-color effect, the face and buttons are designed to be 3D printed in different gcode files.

First, we'll print only 1mm of the boomy-face.stl file using black filament. After the part has completed printing the first millimeter, we'll change the filament and load gray/silver. Then, we'll print the part starting from 1mm and stopping at 2mm. Once thats done, swap the filament out for white and resume printing the part, this time starting from 2mm and stopping at 3mm.

We're essentially stacking different colors on top of each other. In order to create separate GCODE files for your 3D printer, you'll have to setup settings in the slicing software.
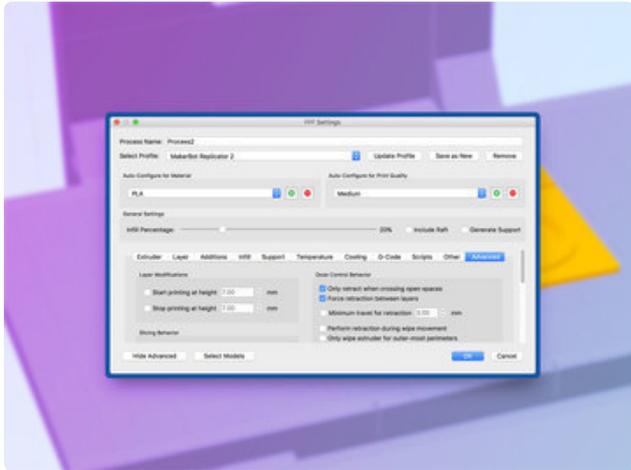
Setting Up Simplify 3D

Setting up processes is easy to do in Simplify 3D. First, start add a new process by clicking on the **Add** button in the sidebar. Choose your 3D printer under the **Select Profile** dropdown. Then, goto the **Advanced** tab and look for the **Layer Modifications** section. This is where we'll tell the slicer to only print specific layers.
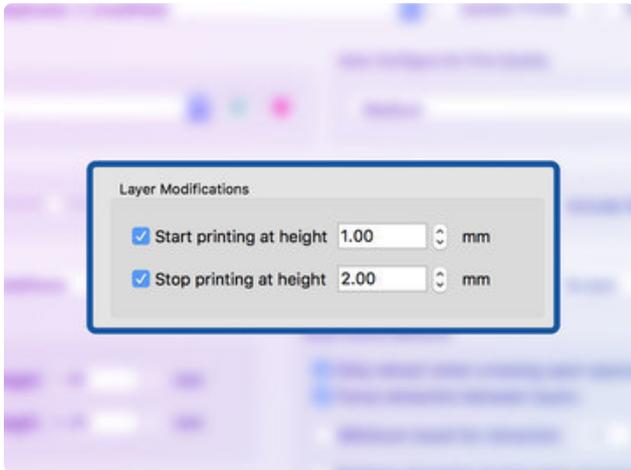
Layer Modifications

Click on the checkbox for "**Stop Printing at height**" and type in "**1.00**" in the input field. This tells the slicer to only print 1mm of the **boomy-face.stl** file. Click OK and Prepare to Print! This will only be about 5 layers. Save out the gcode file and name it something like "**boomy-face-black.gcode**" that way we know which color to use.
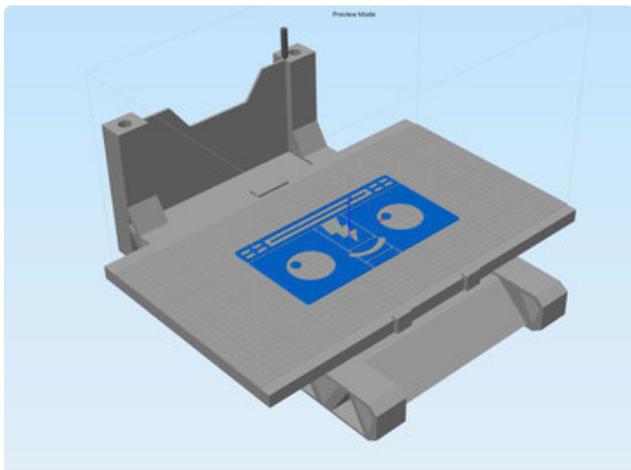
GCODE Files

Once saved out, double-click the process to edit and go back into **Advanced** > **Layer Modifications**. This time, check "**Start printing at height**" and type in "**1.00**". Leave the "**Stop Printing at height**" option checked and type in "**2.00**" in the input field. Click OK and Prepare to Print! You should see boomy's facial features like the eyes and mouth. Here we'll telling the slicer to start printing at 1mm height and stopping at 2mm. Save out the gcode file and name it something like "**boomy-face-gray.gcode**".

Once saved out, double-click the process to edit and go back into **Advanced** > **Layer Modifications**. This time, check "**Start printing at height**" and type in "**1.00**". Leave the "**Stop Printing at height**" option checked and type in "**2.00**" in the input field. Click OK and Prepare to Print! You should see boomy's facial features like the eyes and mouth.

Here we'll telling the slicer to start printing at 1mm height and stopping at 2mm. Save out the gcode file and name it something like "**boomy-face-gray.gcode**".

Next, we'll edit the process once again, going to **Advanced** > **Layer Modifications**. Under "**Start printing at height**" type in "**2.0**" and uncheck "**Stop Printing at height**". Click OK and Prepare to Print! We should only see two circles – These are the outer rings on Boomy's eyes. Save out the gcode file and name it something like "**boomy-face-white.gcode**".

You should be left with 3 separate gcode files named accordingly. Let's get ready to 3D print!

Printing GCODE files

Save the files to your SD Card. We'll need to print the gcode files in the correct order, starting with black, then gray and lastly white.

Start by load your 3D printer with black colored filament. Select the "**black.gcode**" file on your 3D printer and print the part. Once it's done, **DO NOT REMOVE** the part!! You must leave the part on your 3D printer.

Proceed to change the filament to a gray/silver colored filament. Make sure to purge the filament so it's finally transitioned to the new color. Load up the "**gray.gocde**" file and print it. Make sure to babysit the first layer, checking to see if the printer head is printing on top of the part. Once it's done, make sure you **DO NOT REMOVE** the part!!

Repeating the process, swap out the gray/silver for some white filament. Now we can run the last file "**white.gcode**". Once it's done we can safely remove the part from the bed. And thats pretty much it!

Boomy's Buttons

The buttons that go on top of boomy's head are printed in a similar fashion — But, we only need black and gray colored filaments. So we'll end up with just two gcode files for the buttons.

For the first part, we'll use black filament. In the process, set "**Stop Print at height**" to "**7.0**" mm. Save out the gcode and name it "**boomy-button-black.gcode**".

We'll use gray/silver filament for the second part. In the process, set "**Start Print at height**" to "**7.0**" mm and uncheck "**Stop Print at height**". Save out the gcode and name it "**boomy-button-gray.gcode**".

Repeat the same process like we did for boomy's face. Remember to keep the part on the bed when you finish printing the first gcode. Sad to admit but I actually removed the part before printing the second gcode — It's somewhat of a bad habit of mine :-)

Assembly

Visit https://learn.adafruit.com/adabox004 (https://adafru.it/xd6) to get your ADABOX004 up and running, then come back here when you're ready to customize!

Install Breadboard
Peel back the protective film from the breadboard and stick it to the cover with the side that has the inset lip. Use the photo to reference best placement.

Attaching Handle

You'll need to secure the handle to the box using machine screws. Start by placing the handle onto the box. On one of the the sides you'll see two indentation. Insert the ends of the handle on to the indentations. From the inside of the box, you need to install screws into the holes. Fasten a #4-40 3/8" (M3 x 10mm) screws into each hole while holding the handle in place.

Install Grip

Press the grip onto the handle until it clips in place. The handle is symmetrical, so it doesn't matter which side it goes on. Note, you'll have one of the four sides exposed, so make sure it's placed face up. The grip has little nubs on each end that grab onto the sides of the handle.

Add Buttons

Secure the buttons to the box using glue or double-sided tape. The body and gray framing should be facing the side of the box with the flat bottom. Position the buttons center before letting the glue or tape set.

Attach Face

You'll need to secure the face to the box using glue or double-sided tape. I used nitto tape because it's pretty strong but can still be removed. The face should be oriented so the handle is face up. The face attaches to the side of the box with the flat bottom.

Pro Tip: If the corners of the part are warped, you can flatten them out by carefully applying heat using hot air gun (at low temperature). Be very careful not to over heat!! Lightly heat up the corner and gently bend it to shape using a flat edge like a ruler or table.

Install Components

Now you can install your components! You can do this however you like. If you wanted to use screws, you could drill through the plastic cover and install standoffs. The half-size breadboards have a peel-away sticky backing that you can use. You could also mount components to the side of the box.

Install Speaker

Insert the speaker into the box and place it on the side with the oval shaped cut out. Install it at an angle and press until it's flush with the surface.

Snap Cover

Once the components are install, it's time to close up the box! Carefully press the cover onto the box until the lip snaps and locks onto the edge of the case. Be sure to route any necessary cables through the side with the opening – Use a micro USB cable to power the Adafruit Feather and other components.

Gallery