



## 3D Printed Google AIY Voice Kit

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## Overview

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### 3D Print a DIY AI enclosure for the Raspberry Pi!

Upgrade from the included cardboard box to a fully mountable, customizable enclosure! Our design features snap fit lids with standoffs to securely attach all of the comments required to to build your own Google Assistant Voice project!

Our enclosure fits Raspberry Pi boards with the voice hat, opening for all of the ports, as well as mounts for the microphone and arcade button.



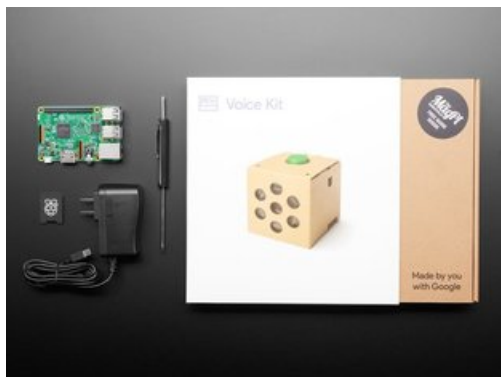
The design is completely open and allows you add include more parts for any type of AI project!



## Parts, Tools & Components

You'll need just a couple a parts to build this project. If you don't have access to a 3D printer, you can send the files to a service or check with your local hackerspace/library.

The kit includes an arcade button, but we choose to use a small 24mm arcade button to decrease the height of the overall enclosure.



Google AIY Voice Kit for Raspberry Pi - Starter Pack  
PRODUCT ID: 2814

<https://adafru.it/Ahm>

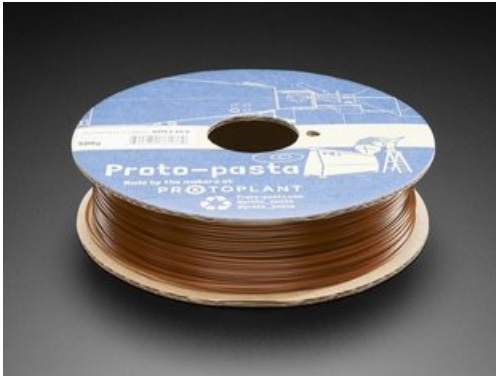
**\$74.95**  
OUT OF STOCK

Your browser does not support the video tag.

Mini LED Arcade Button - 24mm Translucent Clear  
PRODUCT ID: 3429

<https://adafru.it/Ahn>

**\$2.50**  
IN STOCK

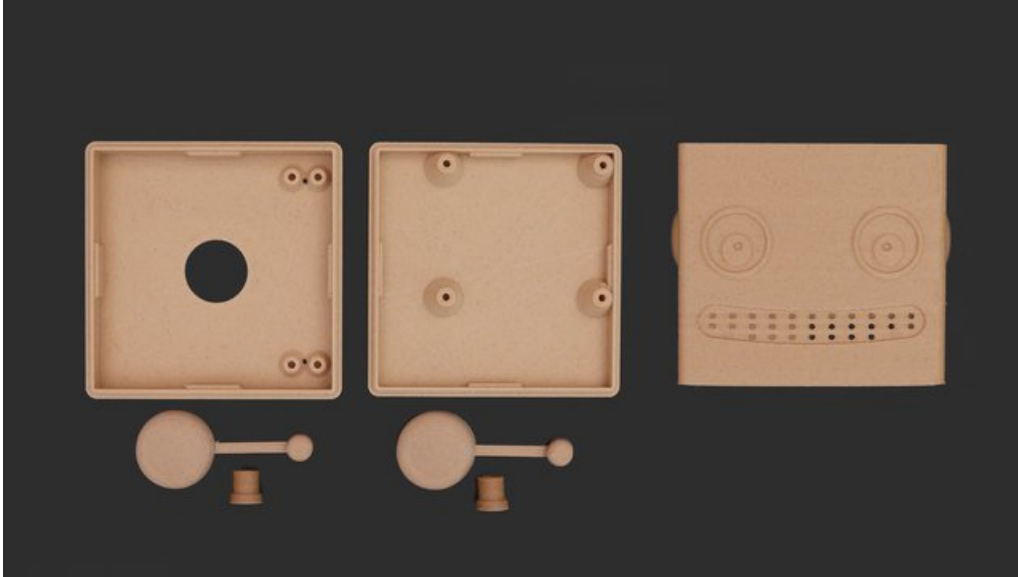


Proto-Pasta - Aromatic Coffee 1.75mm HTPLA Filament  
PRODUCT ID: 3225

<https://adafru.it/yCt>

**\$39.95**  
OUT OF STOCK

## 3D Printing



The 3D printed parts are fairly easy to make with most common home desktop 3D printers that are on the market.

And if you don't have access a 3D printer, you can order our parts by visiting our Thingiverse page and have someone local 3D print the parts and ship them to you.

We used wood filament from Hacthbox and WoodFill from colorFabb. Both allow you to sand and stain the material to give it a finished look.

Download Fusion360 files

<https://adafru.it/AhY>

Download from Thingiverse

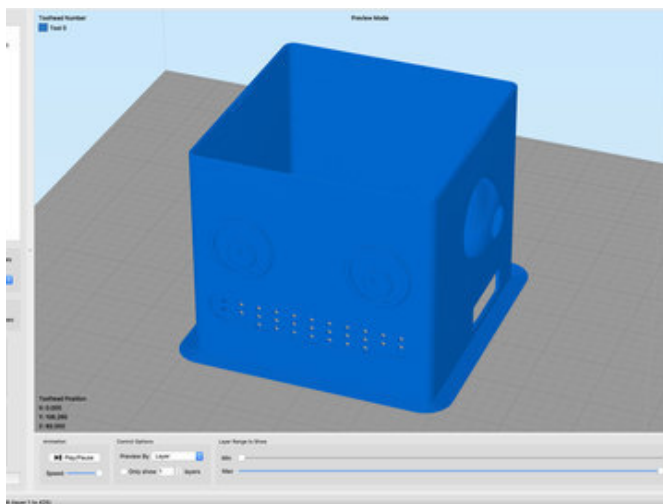
<https://adafru.it/AhZ>

download from Youmagine

<https://adafru.it/Ah->

Download from Pinshape

<https://adafru.it/Aia>



## Slice Settings

Download the STL file and import it into your 3D printing slicing software. You'll need to adjust your settings accordingly if you're using material different than PLA.

- 230C Extruder Temp
- No heated bed (65C for heated)
- 1.0 Extrusion Multiplier
- .4mm Nozzle
- 0.34 Extrusion Width
- .2mm Layer Height
- 30% infill
- No Supports
- Brim
- 60mm/s | 120mm travel speed



## Clean up

We used a flush diagonal cutter to clean up any stringing and overhangs around the port openings and around the standoffs inside the enclosure.

Make sure the openings for the USB ports are cleaned before mounting components. Use a hobby knife to help cut away stringing that could block components from mounting.

To remove the brim, we used a deburring tool to remove the sharp edges on parts.







## Staining

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### Sanding Woodfill

To stain the wood filament, we'll first need to sand all of the parts. Start with an 80 grit sand paper and then finish it off with a 220 grit sand paper.

Fold the sand paper to get into the smaller areas around the face. Create a triangle to sand into areas around the eyes.

Make sure to wear a protective mouth mask and sand in a well ventilated area as it will take a fair amount of time to fully sand all of the parts.





## Stain

We used a dark stain and a lighter coat on top to give it a multilayer stain.

Wood putty can be applied if there are any noticeable gaps on your parts. Apply in and around the gaps and then sand to blend into the material.

Use a stick help stir the can of stain and use a cloth to apply a textured stroke to add those wood grain patterns.



Don't apply a lot of pressure, just gently glide the cloth across parts. Fold the cloth into a small shape that can fit around smaller pieces.

Allow the stain to dry and then use the 220 grit paper to remove any excess colors. The remaining stains between layers will give it a wretched look.



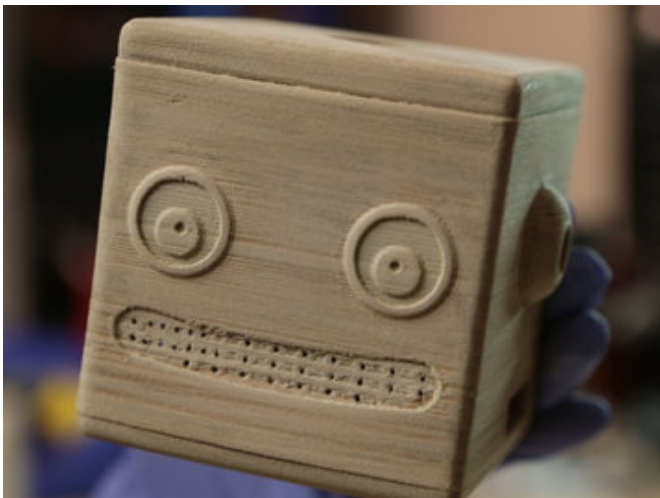
## Multilayer Stain



Give the enclosure depth by applying a second lighter coat of stain. We really like the green stain color to help brighten up the parts.

Use a clean part of the cloth and apply small amounts using a stroke motion to carefully coat parts. Try not to over saturate parts. Fold the cloth into triangle and gently apply thin strokes to the enclosure.

Allow this coat to dry and then sand once more using 220 grit paper.





## Assemble

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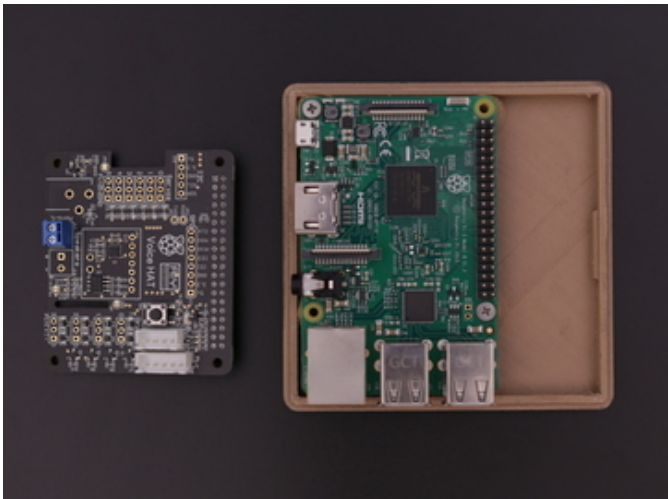


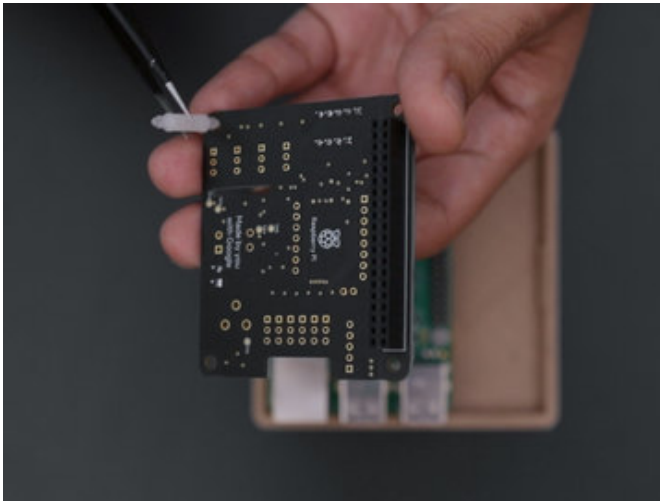
### Mount Pi

Use M3x6mm long screws to secure the pi to bottom lid. Lay the board so the standoffs align with USB ports are over the opposite side.

First tap the standoffs by either using a tapping tool or by just screwing in the M3 screw to help create the threads in the standoff.

Do the same for the Pi board. Turn the M3 screw into the mounting holes on the Pi board before mounting to create the threads. This will make it easier to secure the board to the standoffs.



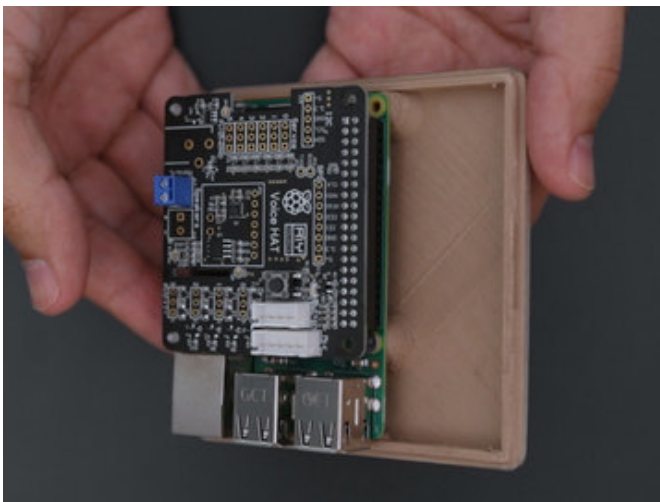
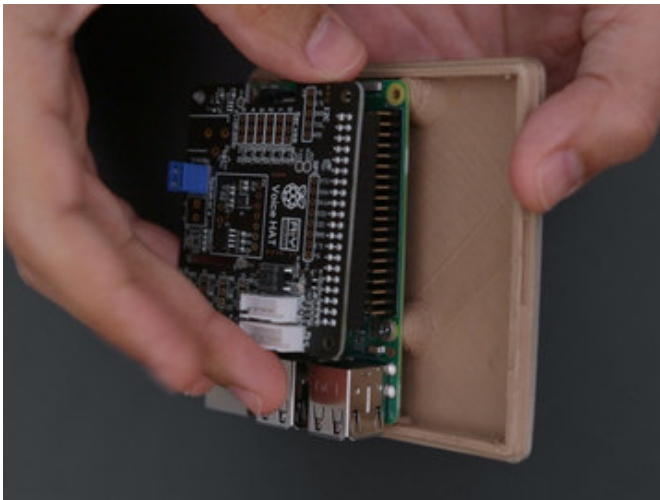


## Voice Hat

The voice hat comes with a header pre-soldered but we'll need to add plastic standoff to help level the board.

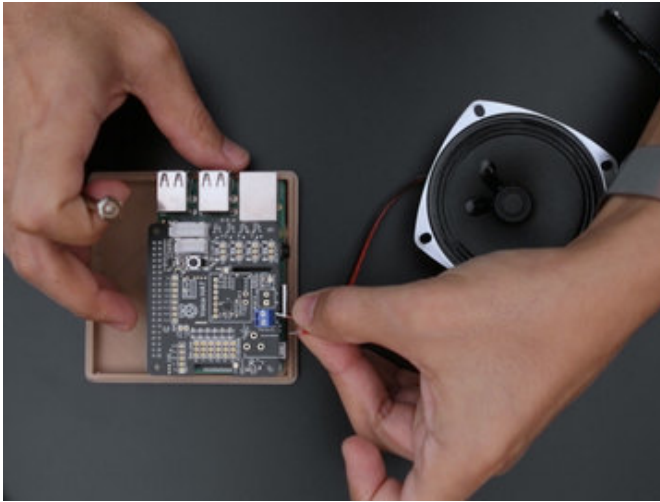
Press fit the two plastic standoffs on the opposite side of the header. Now we can gently attach the head to the header pins on the Pi.

Be careful not to bend the pins. Apply a small amount of pressure to slot the head into the Pi.



## Speaker wire

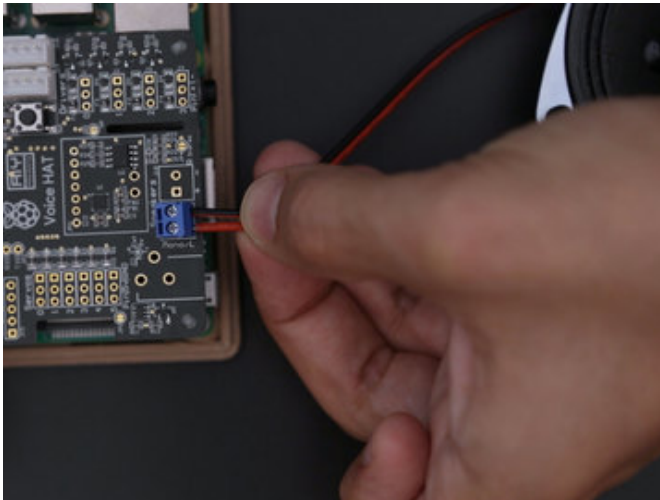




Next we can attach the speaker wires to the terminal block connections on the Voice Hat. Insert each wire into a terminal connector and then use a thin screwdriver to tighten the screw until it firmly grips each wire.

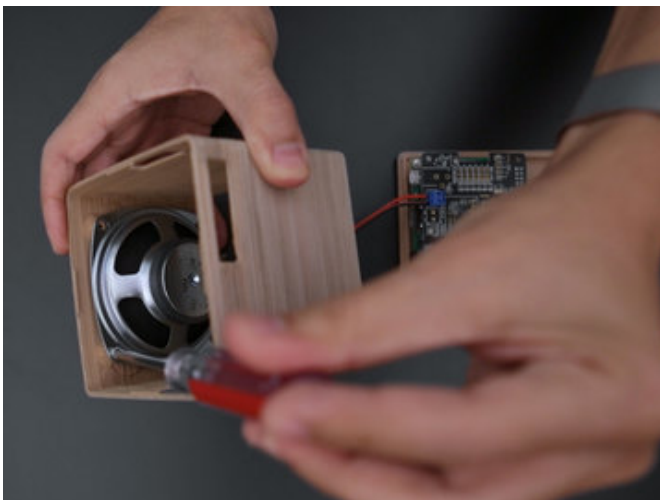
## Mount Speaker

Now we'll need to insert the speaker into the walls of the main part. The standoffs on the main part are all angled 45 degrees to allow the screwdriver to fit a M3x6mm long screw to mount the speaker.

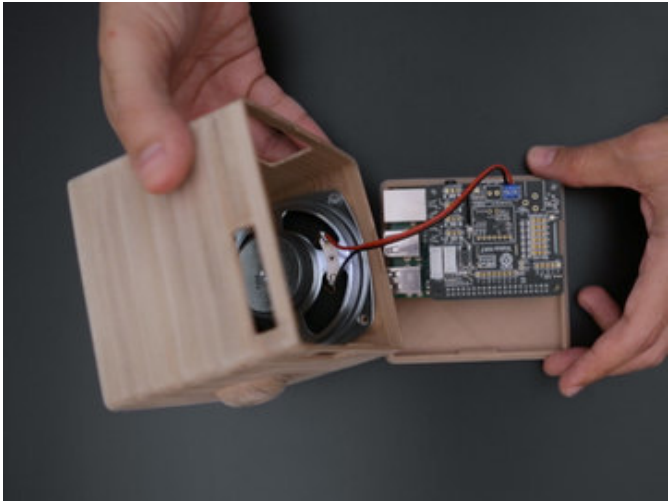


Like before, first make the threads for each standoff by using a tapping tool or screws to create the threads for each standoff.

Now insert the speaker with the wires facing down towards the Pi. This will keep them from interfering with the arcade button connections.

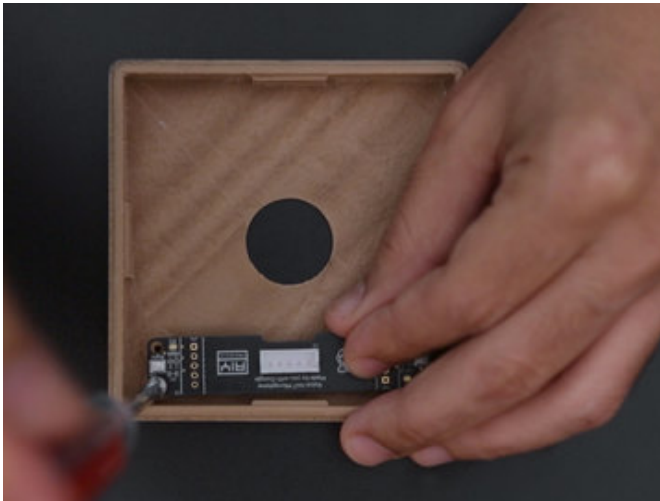






## Attach Bottom Lid

Now we can snap fit the bottom lid to the main part. Insert the lid at an angle so the USB ports fit. Next, we'll need to snap each nub into the side of the main part by applying a small amount of pressure.



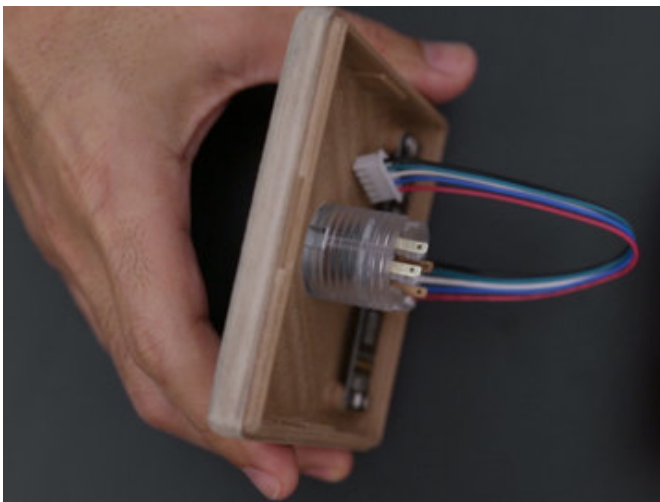
## Mic Mount

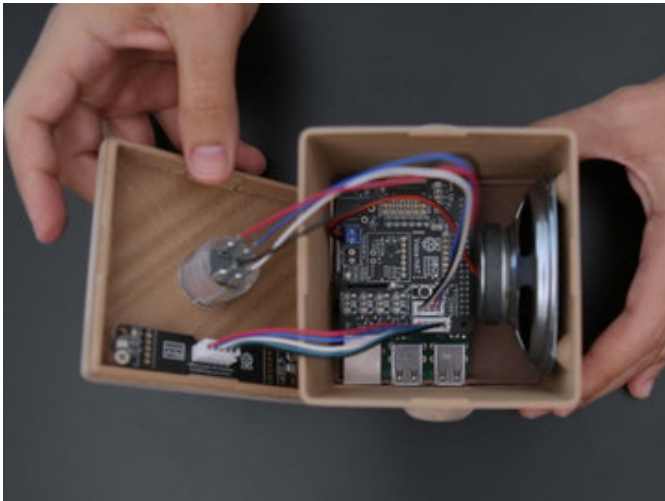
The microphone board will mount to the top lid part with the same M3x6mm long screws. Again, tap the standoffs first and then lay the board on top with cable port facing towards the button mounting hole.



## Button Mount

Now we'll need to mount the arcade button by twisting it into the mounting hole on the lid. Next we can attach each jumper wire into each pin like shown in the included diagram.





## Attach Top Lid

Each connector for the button and microphone is slotted and attaches to the top of the voice hat. Connect each and then position the wires to the bottom of the enclosure.

Finally, we can position the lid on top of the main part and snap fit the in to place.





## Ear assemble

To complete the last bit of details, we'll assemble the ears together. Insert the small end of the pins into the ears. Apply a fair amount of pressure to fit the pins into the ears slots. Next, we'll fit the larger ends into the slots on the side of the main part.

Use a twisting motion to help fit the pins into the mounting slots.





#### Insert SD card

If you haven't done so already, follow the directions in the [included instructions to burn the SD card image](https://adafru.it/Ai0) (<https://adafru.it/Ai0>).

We use tweezers to hold the card and slide into the slot.

Make sure to insert the SD card before powering up the Pi.

