



Simple Mini Fume Extractor

Created by Ruiz Brothers



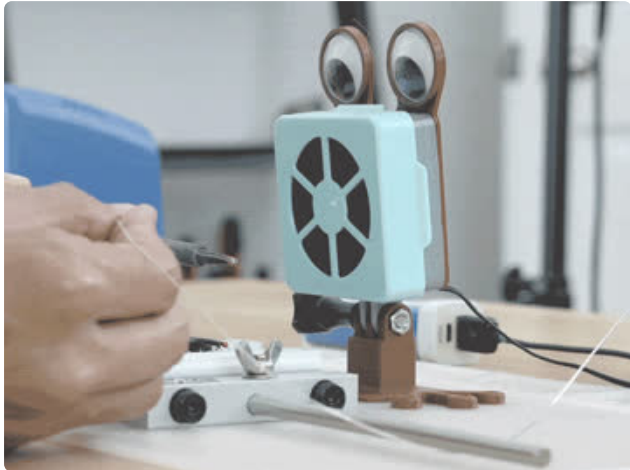
<https://learn.adafruit.com/simple-mini-fume-extractor>

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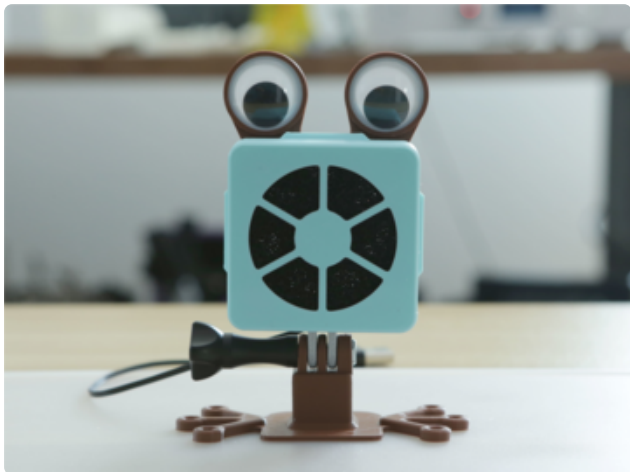
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Overview



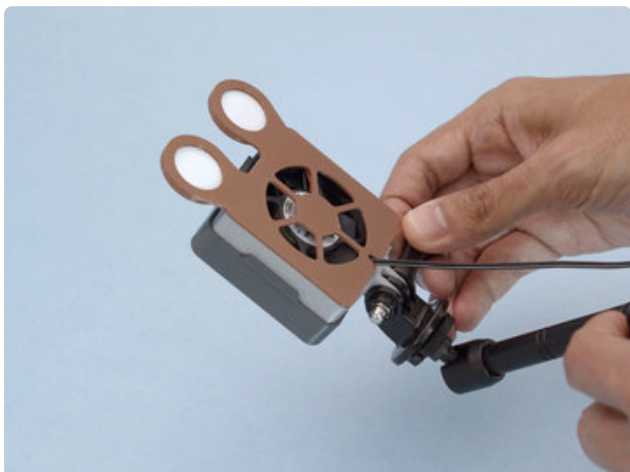
USB Solder Fume Extractor

This uses a 5VDC fan and it's wired up to a USB connector so we can plug it into a USB battery. The 3D printed enclosure snap fits and allows for easy carbon filter replacements.



Small and Cute!

The fan is only 50x50mm so it doesn't take much space on your work surface. Just plug it into any 5V USB rechargeable battery. Keep the air clean, fume-free and save space on your work bench!



Easy-to-Mount!

Features a GoPro style hinge so you can adjust the angle of the fan. It's compatible with GoPro style adapters so it can be set up on a tripod or even a magic arm.



Parts

List of parts used to build this project.

There are a few options for the USB Type A connector and a rechargeable USB battery.

5VDC Fan (<https://adafru.it/Lnd>) (Digikey)

5VDC Fan (<https://adafru.it/Lkb>) (Amazon)

Carbon Filter (<http://adafru.it/3836>)

USB DIY Connector Type A (<http://adafru.it/1387>)

10-wire silicone ribbon cable (<http://adafru.it/3890>)

2200mAh Rechargeable USB Battery (<http://adafru.it/1959>)

1 x 5V DC Fan

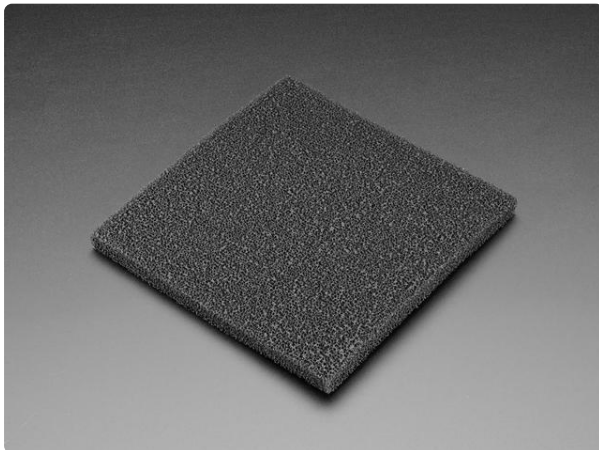
Purchase from Digikey

<https://www.digikey.com/product-detail/en/cui-devices/CFM-5010-03-10/102-4012-ND/6194920>

1 x 5V DC Fan

Purchase from Amazon

<https://amzn.to/2ZFw1UI>



Carbon Filter for Solder Smoke Absorption

If you do a lot of soldering indoors, a Carbon Filter is essential for absorbing that solder smoke and leaving your air smelling fresh. These measure about...

<https://www.adafruit.com/product/3836>



USB DIY Connector Shell - Type A Male Plug

Make your own USB connections without slicing apart a USB cable and soldering those thin wires inside. These DIY "USB shells" are available in

<https://www.adafruit.com/product/1387>



USB DIY Slim Connector Shell - A-M Plug

Make your own USB connections without slicing apart a USB cable and soldering those thin wires inside. This is the 'slim' version of the DIY USB-A Male connector. It's a...

It's a...

<https://www.adafruit.com/product/1827>



Silicone Cover Stranded-Core Ribbon Cable - 10 Wire 1 Meter Long

For those who are fans of our silicone-covered wires, but are always looking to up their wiring game. We now have Silicone Cover Ribbon cables! These may look...

<https://www.adafruit.com/product/3890>



USB Battery Pack - 2200 mAh Capacity - 5V 1A Output

A smaller-sized rechargeable battery pack for your Raspberry Pi or Raspberry...

<https://www.adafruit.com/product/1959>



3D Printing



Parts List

STL files for 3D printing are oriented to print "as-is" on FDM style machines. Parts are designed to 3D print without any support material. Original design source may be downloaded using the links below.

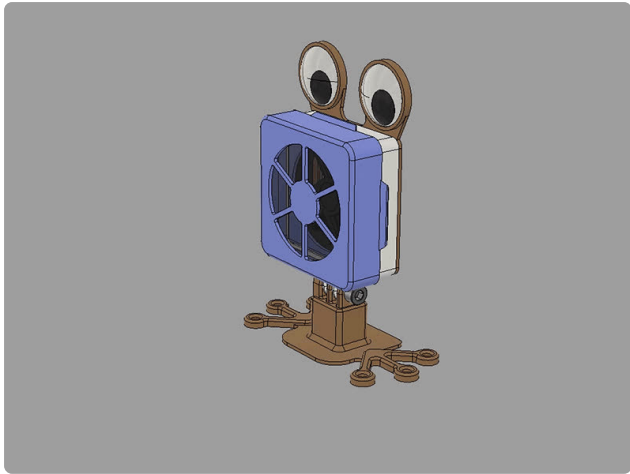
fan-box.stl
fan-cover.stl
fan-plate.stl
back-cover.stl
base.stl

Download CAD files from Fusion
360

<https://adafru.it/LfL>

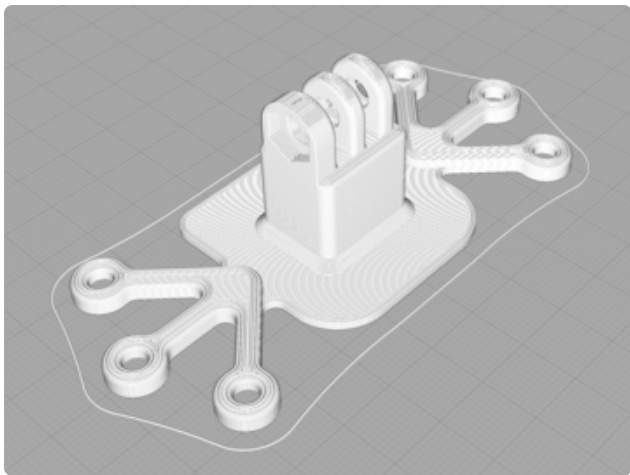
Download CAD files from
Thingiverse

<https://adafru.it/Lgd>



CAD Assembly

The 5VDC fan is placed into the fan-box. The back-cover is press fitted onto the fan-box. The fan-plate is placed over the 5VDC fan. A carbon filter is placed into the fan-cover. The fan-cover snap fit over the fan-box. The base is secured to the fan-box with an M5 x 20mm long screw and hex nut.



Slicing Parts

No supports are required. Slice with settings for PLA material.

The parts were sliced using CURA using the slice settings below.

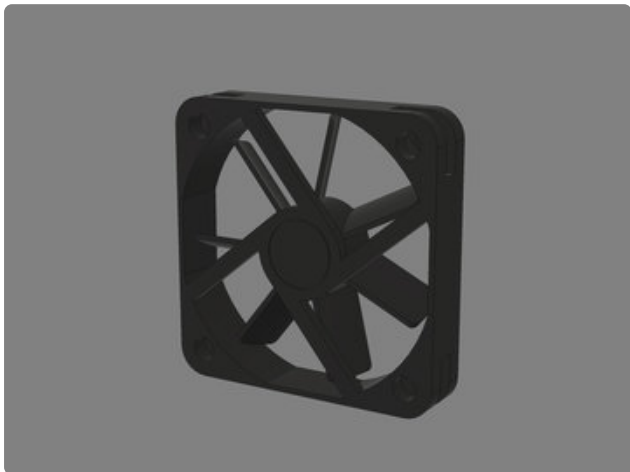
PLA filament 220c extruder

0.2 layer height

10% gyroid infill

60mm/s print speed

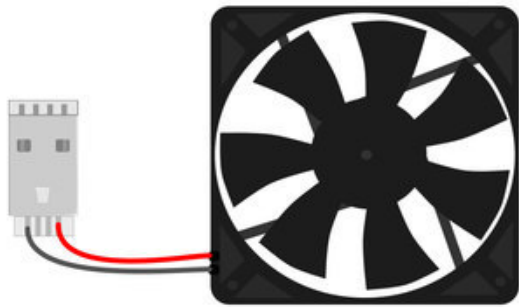
60c heated bed



Design Source Files

The project assembly was designed in Fusion 360. This can be downloaded in different formats like STEP, STL and more. Electronic components like Adafruit's board, displays, connectors and more can be downloaded from the [Adafruit CAD parts GitHub Repo \(https://adafru.it/AW8\)](https://adafru.it/AW8).

Wiring



fritzing

Circuit Diagram

Reference the orientation of the USB Type A connector. The voltage wire is connected to the pin on the far right. The ground wire is connected to the pin on the far left. The fan can be powered by any 5V USB hub or 5V USB Battery.



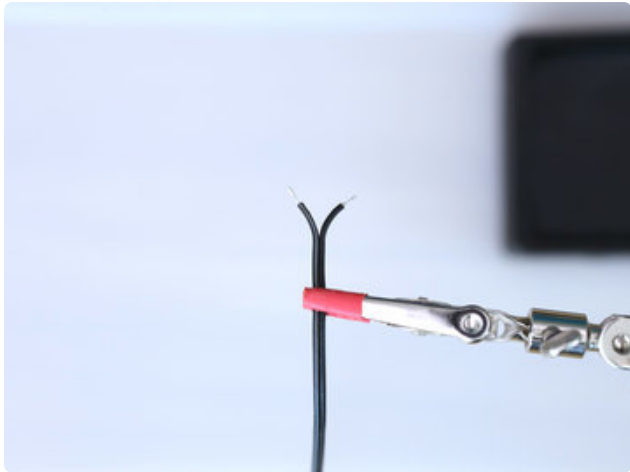
USB Type A Connector

Get the USB connector, shell and strain relief plug ready. The USB connector will be soldered to a piece of 2-wire ribbon cable.



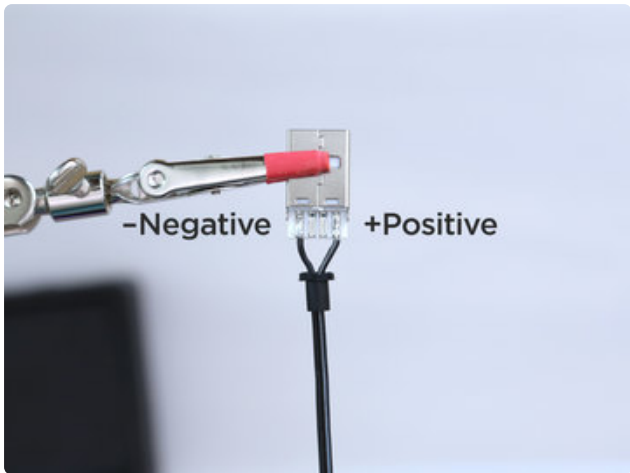
Wire for USB Connector

Peel and cut a piece of 2-wire 11in(28cm) in length from the 10-wire ribbon cable.



Wire Tinning

Using wire strippers, remove a bit of insulation from the tips of each wire. Third helping hands can be used to hold wires in place while soldering. Tin the tips of each wire using a bit of solder. This will help prevent the strands of wire from fraying.



Solder USB Connector

Tin the pins on the far left and right of the USB type A connector by adding a bit of solder. Attach the two wires to the pins on the USB connector. Reference the photo for correct polarity.



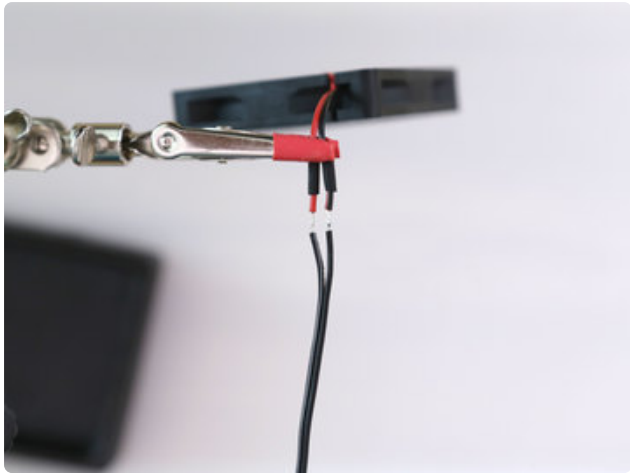
Install Shell

Insert the wire into the strain relief plug and pull the wiring all the way through. Install the shell by threading the wire through the hole.



Wired USB Connector

Press shell through the USB connector to install. Pull strain relief plug through the hole.



Wire Fan

Cut the wire from the fan short or to your desired length. Solder the wires from the USB connector to the 5V fan. Double check polarity is matching and correct. Use pieces of heat shrink tubing to insulate exposed wired connections.



Wired Fan

Double check wiring and ensure solder joints are solid. Plug in the USB connector to a USB battery to test the fan. Be cautious of the spinning blades. If the blades do not spin, check the wiring and ensure the battery is charged.

Assembly



Install Goggly Eyes

The back cover features eye sockets for a pair of goggly eyes. Eyes are 24mm in diameter.



Goggly Eyes Installed

The goggly eyes are press fitted into the eye sockets on the back cover.



Install Box

The 5V fan is fitted into the fan box with the front of the fan facing up. Reference the photo for correct orientation.



Installed Box

Fit the fan onto the four standoffs. Press the tabs into the mounting holes. Route the cable so it's fitting near the bottom.



Install Back Cover

Orient the back cover with the fan box and line up the snaps. Place the wiring from the fan through the slit near the bottom.



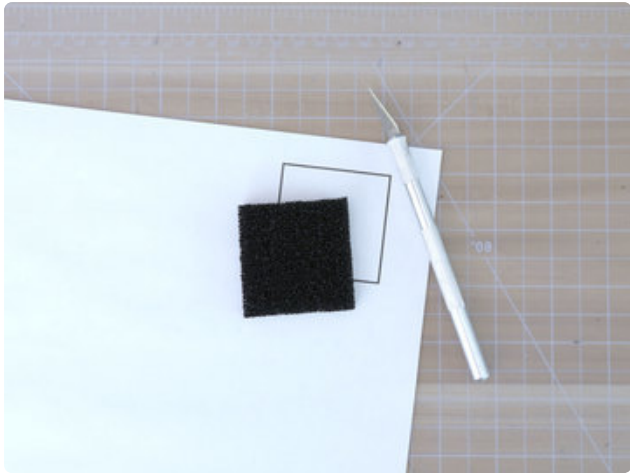
Installed Back Cover

Firmly press the back cover onto the fan box. Ensure the wiring is properly inserted through the slit in the back cover.



Install Fan Plate

Lay the fan plate over the fan with the posts going through the four mounting holes. This guards the fan blades and prevents them from hitting the filter.



Carbon Filter

The carbon filter will need to be cut and sized down to a 49.5mm x 49.5mm square. Use a sharp hobby knife with a ruler as a guide to cut out a square piece from the filter. A cutting mat can be used to protect work surfaces.

Be extra careful around sharp cutting instruments. Adults should help younger Makers.



Installing Carbon Filter

The carbon filter is fitted into the fan cover.



Carbon Filter Installed

Place the cut filter into the recess in the fan cover. It should have a loose fitting. This allows the filter to have some wiggle room so it can easily be replaced.



Installing Filter Cover

Orient the fan cover with the fan box with the snaps lined up and matching.



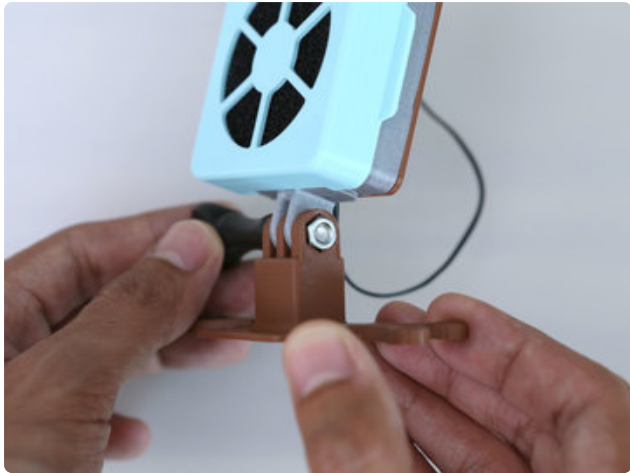
Press Fit Cover

Place the fan cover over the fan box with the snaps lined up. Firmly press the two parts together. Check all sides are pressed together.



Installing Base

The base is mounted to the fan box using a M5 x 20mm long screw and M5 hex nut. Insert the mount from the base to the mount on the bottom of the fan box. Line up the mounting holes and hold parts in place.



Secure Base

Insert the M5 x 20mm long screw through the mounting tabs. Place the M5 hex nut into the side with the hexagonal recess. Fasten M5 screw into M5 hex nut.



Final Build

Adjust angle by loosening and tightening the M5 screw. And that's it! Your new mini fume extractor is ready for soldering!