



# Fish Head MONSTER M4SK Eyes

Created by John Park



<https://learn.adafruit.com/wide-set-monster-m4sk-creature-eyes>

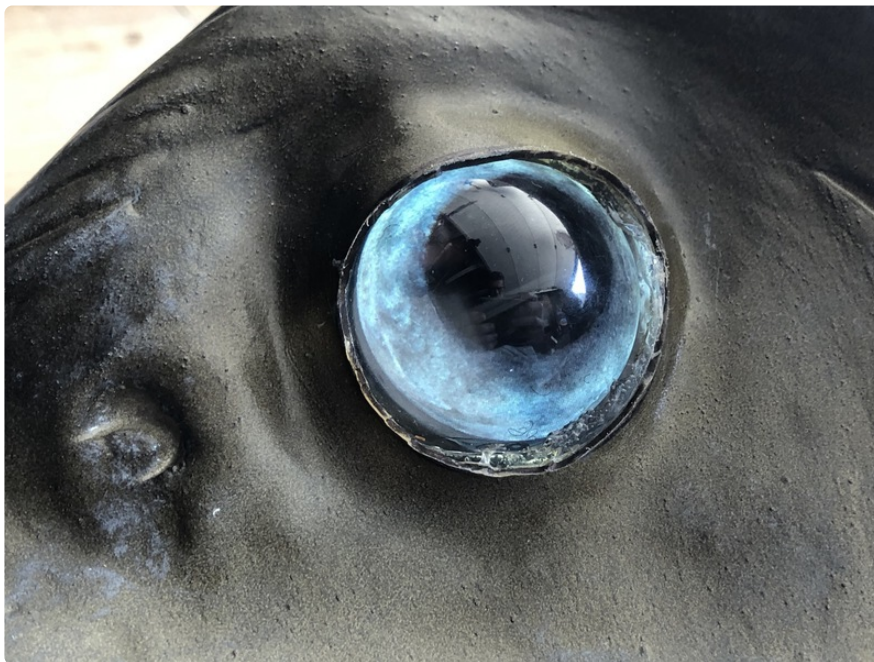
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## Overview







You can get flexible and creative with the MONSTER M4SK when building your own costumes and props! Do you sometimes feel constrained by the typical human interocular distance? Who doesn't? No problem! Simply snap the two halves of the MONSTER M4SK off of the conveniently perforated bridge section and go bonkers!

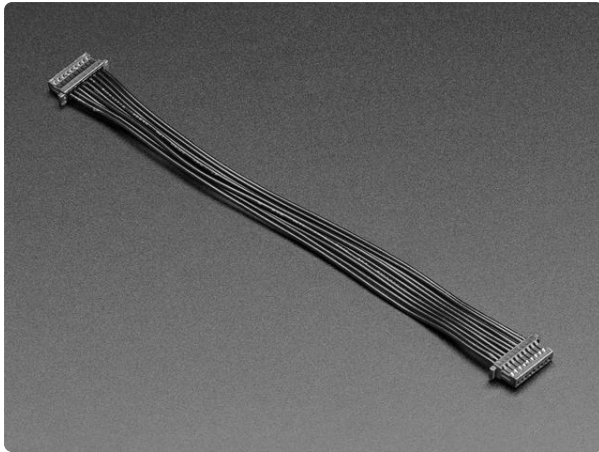
By re-wiring the M4SK with our 9-pin JST connector cable, you'll be able to use the screens and all other features (with the exception of the capacitive touch boop nose) in a new, flexible, wider arrangement!

## Parts



### Adafruit MONSTER M4SK - DIY Electronic Eyes Mask

Peep dis! Have you always wanted to have another pair of eyes on the back of your head? Or outfit your costume with big beautiful orbs? The MONSTER M4SK <https://www.adafruit.com/product/4343>



#### JST SH 9-Pin Cable - 100mm long

This 9-pin cable is just about 100mm / 4" long and fitted with JST-SH female connectors on both ends. Compared with chunkier JST-PH these are 1mm pitch instead of 2mm,...

<https://www.adafruit.com/product/4350>



#### Convex Plastic Lens with Edge

The eyes have it! Add this little lens to make a big expression with our Spooky Eyes demo for microcontrollers or Raspberry Pi. These are plastic lenses, with brilliant clarity and a...

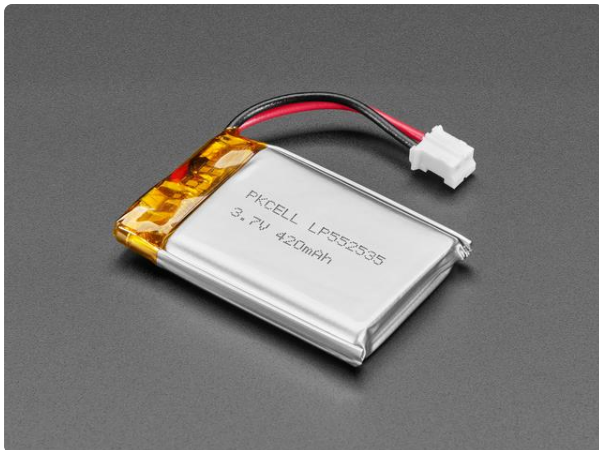
<https://www.adafruit.com/product/3917>



#### Convex Glass Lens with Edge - 40mm Diameter

The eyes have it! Add this little lens to make a big expression with our Spooky Eyes demo for microcontrollers or Raspberry Pi. These are gorgeous glass (not plastic/acrylic!)...

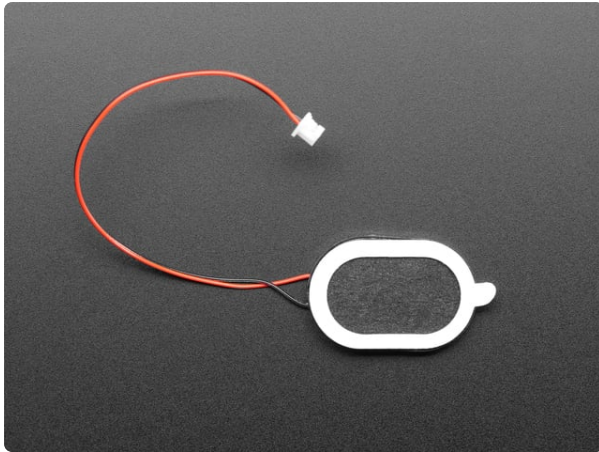
<https://www.adafruit.com/product/3853>



#### Lithium Ion Polymer Battery with Short Cable - 3.7V 420mAh

Lithium-ion polymer (also known as 'lipo' or 'lipoly') batteries are thin, light, and powerful. The output ranges from 4.2V when completely charged to 3.7V. This...

<https://www.adafruit.com/product/4236>



### Mini Oval Speaker - 8 Ohm 1 Watt

Hear the good news! This wee speaker is a great addition to any audio project where you need 8 ohm impedance and 1W or less of power. We particularly like...

<https://www.adafruit.com/product/3923>

## Materials and Supplies

In addition to the parts listed above, you'll need the following:

- A creature head/mask with wide set eyes, such as Frank the Fish featured here
- Marker
- Scissors or hobby knife
- E6000 glue (also sold as Goop brand)
- Velcro hook and loop fastener with adhesive backing (industrial strength is best)
- Isopropyl alcohol for surface cleanup/prep

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## Separate the MONSTER M4SK

### Quickstart

You should be familiar with the basic setup of the M4 Eyes project based on the most excellent [Adafruit MONSTER M4SK guide Quickstart \(https://adafru.it/FDD\)](https://adafru.it/FDD). Before you proceed with making your own eye pattern texture maps, be sure you've got the [M4Eyes.UF2 \(https://adafru.it/FDD\)](https://adafru.it/FDD) working properly using the default [Hazel eyes graphics \(https://adafru.it/FDD\)](https://adafru.it/FDD).





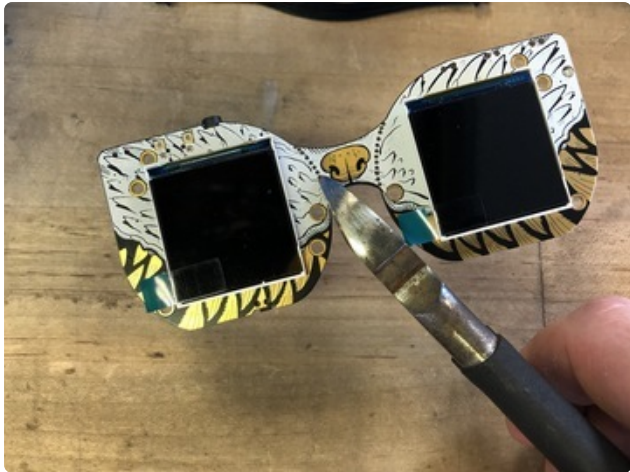
As terrifying as this may seem, the first thing we're going to do is BREAK the MONSTER M4SK! It's going to be OK, though -- It was designed to be broken! That's what those little perforations on either side of the bridge are there for. We promise!

The MONSTER M4SK will not boot up just one half of the board, so be sure to plug them together with the 9-pin cable! Want a single eye board? Check out the HalloWing M0 or HalloWing M4.



Note, you'll lose the capacitive touch nose booper capability in the process. But, other than that, by reconnecting the two halves of the board with the 9-pin JST-SH cable, everything else will work exactly the same as before.

Wear eye protection when cutting the PCB, as sharp piece can fly off at high velocity.



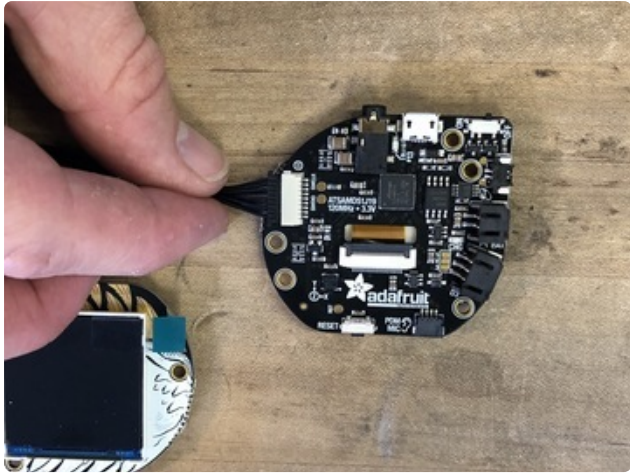
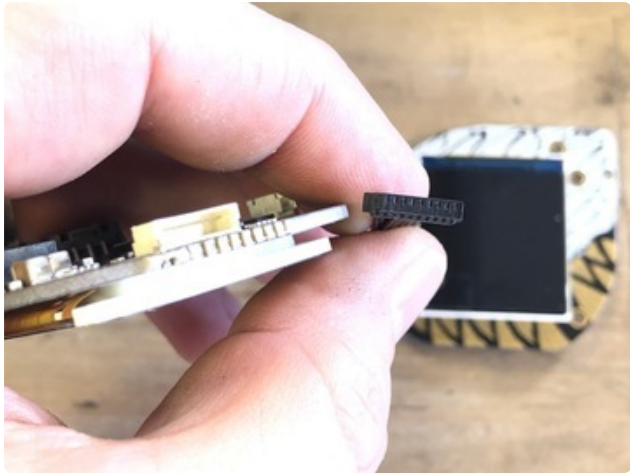
## Cut the Bridge

Using diagonal cutters, snip the perforation starting at one end, then flip the board around and finish the cut.

Then, trim the bridge from the other side as well, using the same procedure.



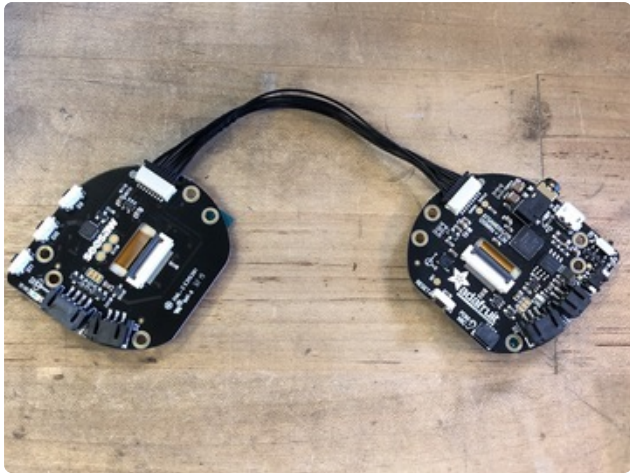




## Plug it In

Next, use the 9-pin JST-SH cable to reconnect the boards.

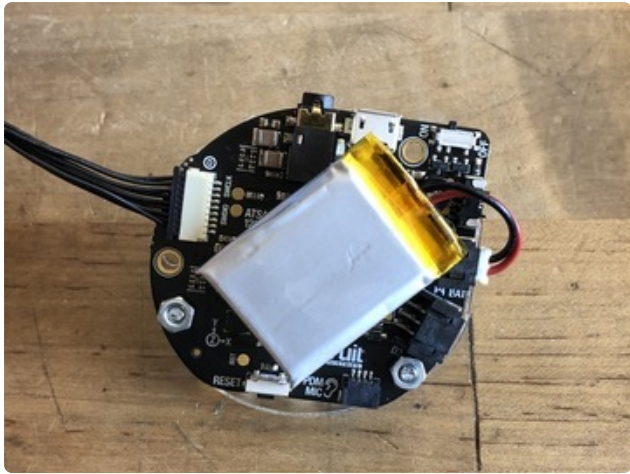
Note, while each end of the cable is identical, the plugs have polarity and can only be plugged in one way to the board connectors. Don't force them in if they aren't plugging in easily, just flip them around and try again.



Try powering the M4SK and turning it on now and you should see it running just as normal! Here, I've got the default test code running that ships on the M4SK.







## Battery Power

Using double-stick foam tape, secure the LiPoly battery to the back of the MONSTER M4SK's right eye board and plug it in.

Depending on your plans for the M4SK, you can now add lenses and [lens holders](https://adafru.it/FL9) (<https://adafru.it/FL9>), put on some eyeball .UF2 code, maybe [customize the eye graphics as shown here](https://adafru.it/FIc) (<https://adafru.it/FIc>).



For the fish head mask, we'll go about it a bit differently, so no need for the lens holders.

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## Add Eyes to a Creature Costume

Add the Fish Eye graphics and **config.eyef** file (linked in the green button below) to your MONSTER M4SK as [per the quickstart instructions](https://adafru.it/FDD) (<https://adafru.it/FDD>).

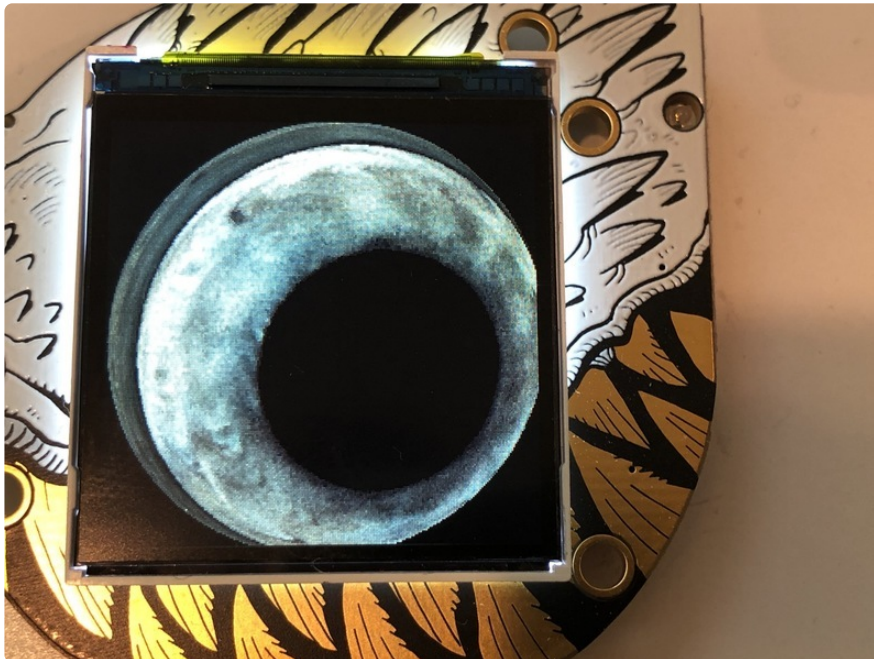
I made these graphics to look pretty fish-like and I turned off the lids so there's no blinking! You can see in the config file below that they've also got very large pupils.

## Download Fish Eye Graphics

<https://adafru.it/FLa>

```
{
  "eyeRadius"      : 125,
  "eyelidIndex"    : "0x00", // From table: learn.adafruit.com/assets/61921
  "pupilColor"     : [ 0, 0, 0 ],
  "backColor"      : [ 0, 0, 0 ],
  "irisTexture"    : "fish_eyes/iris_fish.bmp",
  "scleraTexture"  : "fish_eyes/sclera_fish.bmp",
  //"upperEyelid"   : "hazel/upper.bmp",
  //"lowerEyelid"   : "hazel/lower.bmp",
  "irisRadius"     : 120,
  "pupilMin"       : 0.4,
  "pupilMax"       : 0.5,
  "left" : {
  },
  "right" : {
  }
}
```

Be sure to place the **config.eye** file at the root level of the MONSTER M4SK and then press the reset button to see your changes.



## Mask Prep

Next we'll prepare our rubber fish head mask for the eye transplant.







## Eye Sockets

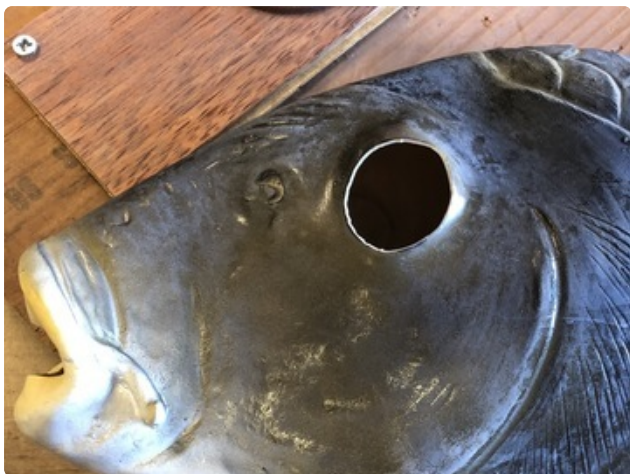
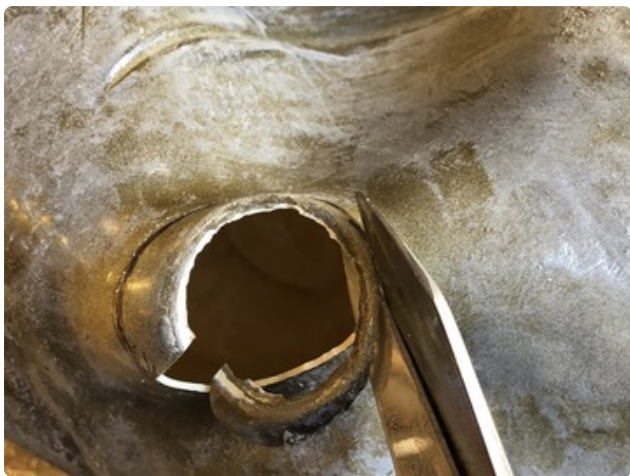
Start by removing the plastic, glued-on eyes if your mask has them.



Next, cut out the existing eye holes -- I found those to be a bit too small to fit the lenses, so I marked a circle the same size as the lenses by using a lens holder as a guide.

If you don't have a lens holder as reference, print and cut out the template below to for a circle sized for marking.







Test your lens fit and adjust if needed. You can always make the hole bigger, so be careful to trim away small amounts at a time.



The exposed, unpainted rubber is a bit noticeable, so you can paint or color over the edge using a marker.



Repeat all the above steps for the other eye, then it's time to add the lenses.





## Glue the Lenses In Place

Flip the mask inside out and get ready to glue in the lenses.

First, clean off any powder from the eye socket area using isopropyl alcohol and a cloth or shop towel.

Then, do a test fit of the lens into the socket.

Use a small dowel or other applicator to add a thin bead of glue around the lip of the lens, then press the lens into place.

You can also add glue to the mask and blend it into the rim of the lens, just try to keep it off of the flat part of the lens that'll be in contact with the screen.



Now, let the glue dry for at least 12 hours before proceeding. Once it's dried, you can scrape off any bits of glue that may have made it onto the flat side of the lens, so don't panic if you make a bit of a mess like I did here!





## Board Mounting

Once you've glued in the lenses to both eye sockets, it's time to mount the boards in place with the screens centered in the lenses. The easiest way I've found it to use strong Velcro. This allows you room for adjustment, is strong enough to hold the boards in place indefinitely, and you can remove them if needed.







## Add Velcro

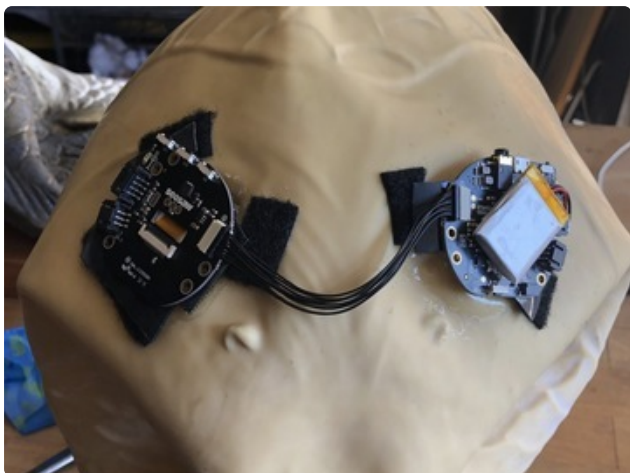
Cut three small strips of adhesive backed Velcro per eye, and then array the pile side strips as shown. Press them each down firmly into the rubber of the mask for thirty seconds so they are very well adhered.



Add the complimentary hook side Velcro strips to the PCB of the MONSTER M4SK boards as shown, again pressing firmly for a strong bond.

Press the strips together to mount.

Repeat for the other eye.





Flip the mask back to the outside out position (inside in?) and you can adjust the positioning of each eye to align them just right.

You'll still be able to reach the on/off button, and can even plug into USB for charging the battery.

Time to put on your mask and go be your best fish headed self!