RIBCAGE: YI 4K

Installation Guide

Back-Bone

V1.1

RIBCAGE: YI 4K INSTALLATION GUIDE

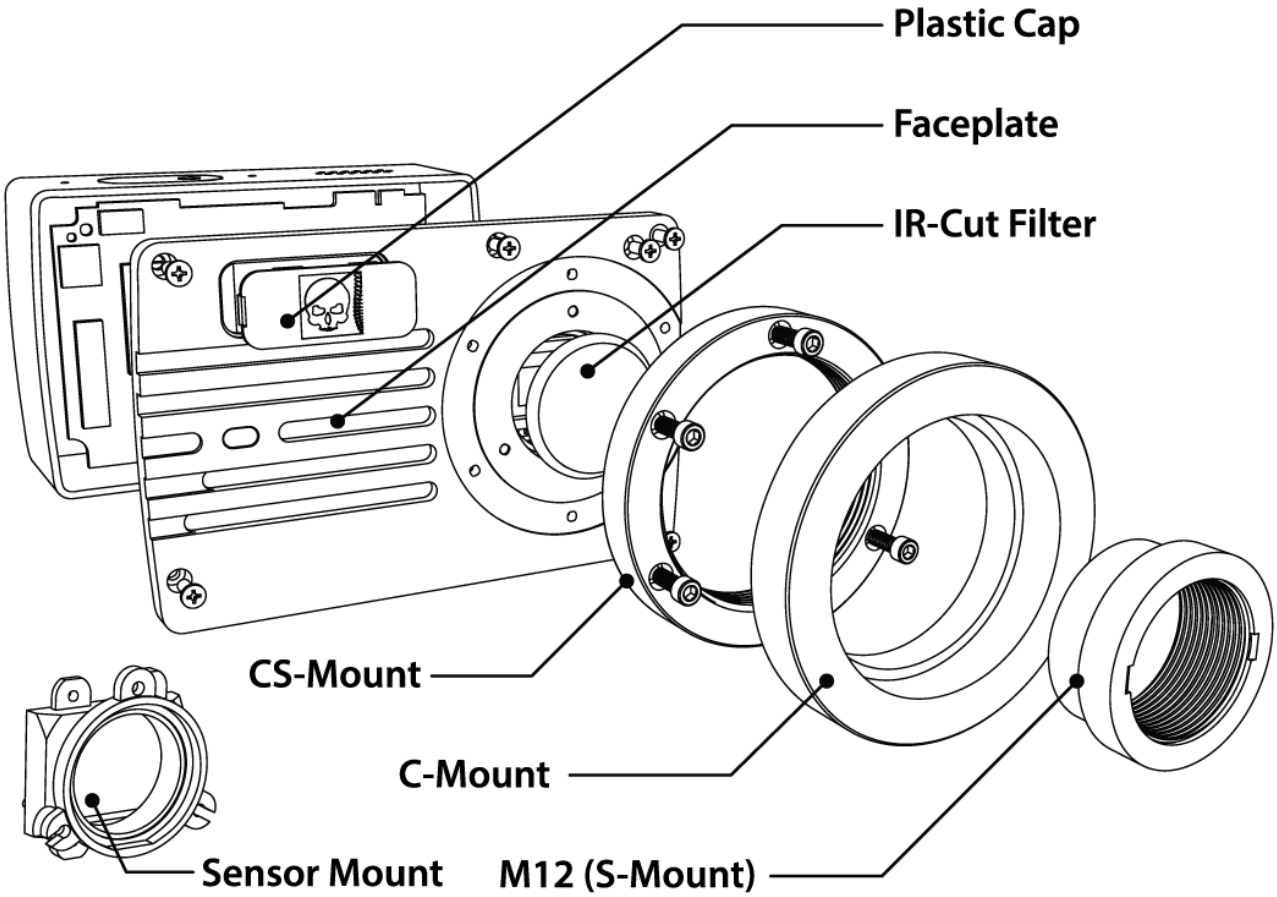
Contents

Before You Get Started

It is important to set up a clean workspace that's well-lit and free from dust. **Any screws removed from the camera must be saved** as they will be re-used. We recommend taking the time to keep the different screw sets separate and labeled during your project.

Tools You Will Need:

1. A set of precision screw drivers with a **Philips #000** and a small slot (flathead) screwdriver
2. A small pair of wire cutters
3. Optional: plastic spudger
4. Optional: Lens cleaning kit
5. Optional but Recommended: LensPen MiniPro, Air Puffer



CAUTION!

1. Read all our documentation thoroughly before beginning your installation
2. This kit is for the YI 4K Action Camera only. No other models are supported.
3. Make sure to charge your battery before beginning the installation.
4. NEVER force or exert force on any components. IF YOU FEEL THE NEED TO USE FORCE THAN YOU'RE DOING SOMETHING WRONG.
5. The Ribcage DIY kit consists of highly machined parts and fine threaded through holes. NEVER FORCE any screws as this can strip the fine threads on the through holes. Instead check your assembly and registration and try again. All parts are highly accurate and DO NOT require force to assemble.
6. Ensure your work area is clean, well-lit and free from dust.
7. We recommend inspecting and removing any dust or debris from the parts before you begin.
8. Never overtighten any of the small screws, especially on the faceplate and tripod mount. Excessive force or overtightening can result in stripped threads on the aluminum parts. Always loosely fit all screws in place before screwing them in until seated. Additional tightening is not required.
9. By applying this or any modifications to your YI 4K camera you will void the original manufacturer's warranty.
10. Back-Bone takes no responsibility in your ability to use this modification
11. The Ribcage DIY kit is provided "as is" and without warranty
12. Disclaimer: Ribcage Mod Kits are a product of Back-Bone Gear Inc., and are not manufactured, distributed or endorsed by YI Technology.

Helpful Tips:

- A clean and well-lit work space is a must.
- It may seem like a small thing but don't work at the edge of your table or desk. Move the parts farther back so that small parts and screws are less likely to drop onto the floor and get lost.
- When inserting tiny screws, it may help to put them on the tip of the screw driver first and hold them in place with your finger. You can always use your other hand to steady and guide the screw into place. A magnetic screw driver also helps.
- Never force any of the components. If you are using undue force to do any of the steps you are doing something wrong and risk doing damage.
- When removing the screws, make sure you save them all for use later as there are no extras for the ones taken from the camera.

Section 1: Teardown

1-1 Update and Functionality Check

Before opening the camera, we recommend that you perform a full functionality check to make sure it's working properly. Perform any firmware updates using the smartphone app. Make sure you have a fully charged battery.

1-2 Remove Accessories

Remove any accessories, the battery and the SD card.

1-3 Remove the Faceplate

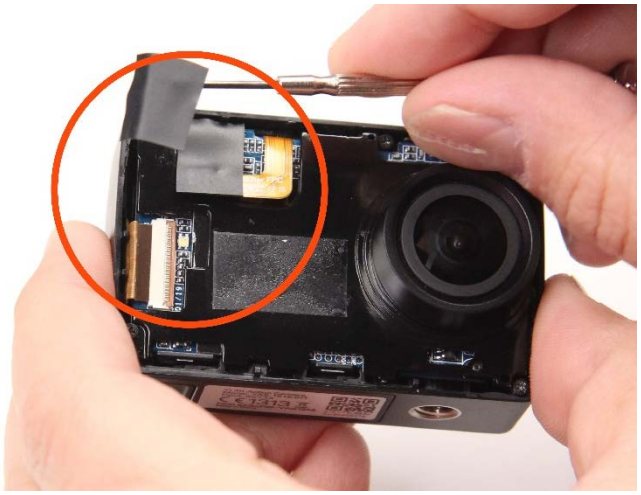
The front plate is snapped on securely with tabs on all sides. There is also some double-sided tape located near the LED light on the front. It can take a fair bit of pressure to pop out the first snap tab but once you do it gets much easier. It's best to start on the bottom next to the battery compartment. Insert a tool such as a small flat head screw driver between the body and the faceplate.

Work the tool in slightly and push the faceplate away from the camera body. Work it right, toward the lens. The first tab is located directly below the lens but use caution as there are some exposed electronics under it. Once you've popped out that tab work your way around the camera counterclockwise to remove the rest. Once you have popped a couple of

the tabs out it's easiest to use your fingers to pop the rest free. Use slow steady pressure to release the double-sided tape and pull the cover off from right to left. Set it aside.

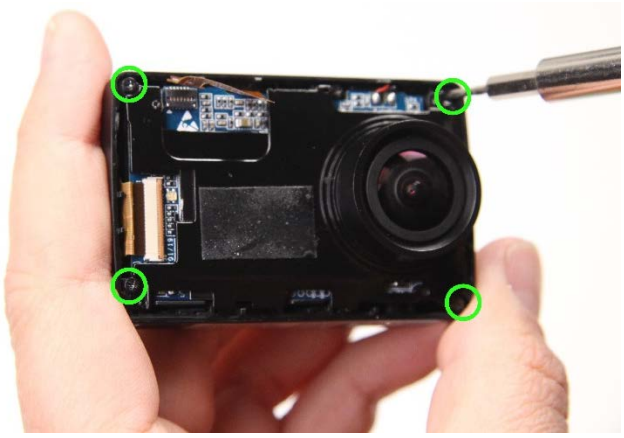
1-4 Remove the Board Assembly

Carefully remove the protective black tape covering the connectors on the left. Slowly and gently peel it off being mindful of the delicate ribbons and locking tabs underneath.

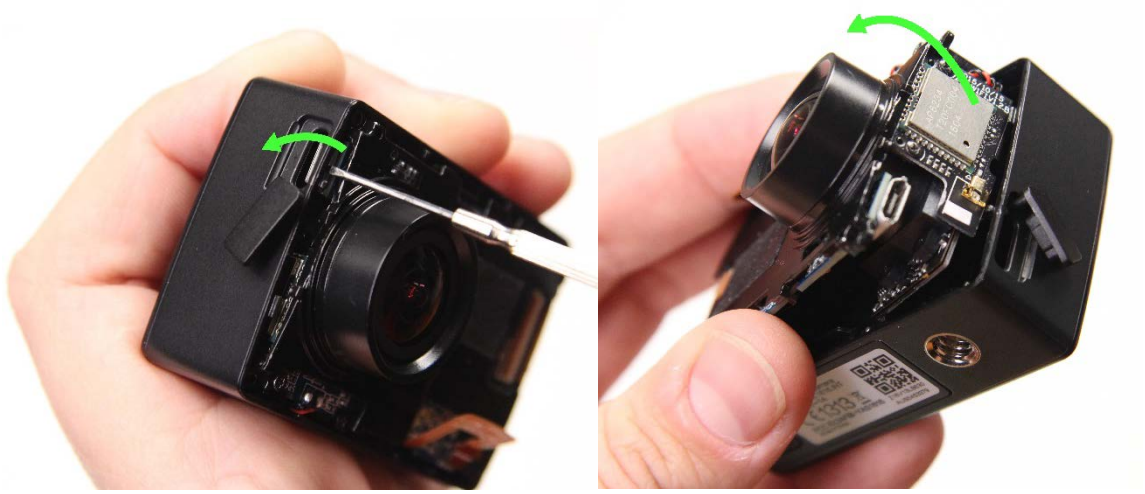


Pop up the two ribbon locking tabs with your small flat screw driver being mindful not to damage the ribbon. Leave the side ribbon in place for now but pop out the ribbon on the top.

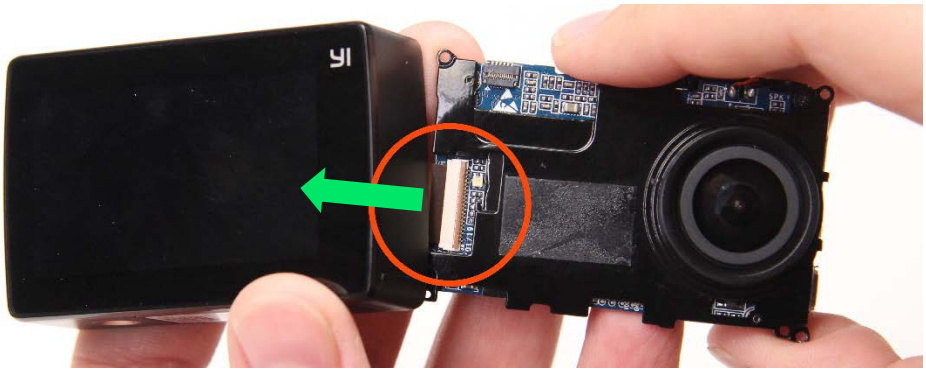
Use your screw driver to peel off the tamper seal located on the lower right. Use a Philips #000 to remove the four screws located in the corners. ***Be sure to save them for use later. (SCREW TYPE 'A')***



Now let's pull out the assembly. Pop the USB port out on the right side and pivot the assembly out as pictured.



Take note that the ribbon is still in place on the left side of the assembly. Verify that the locking tab is still up and gently pull the ribbon free.

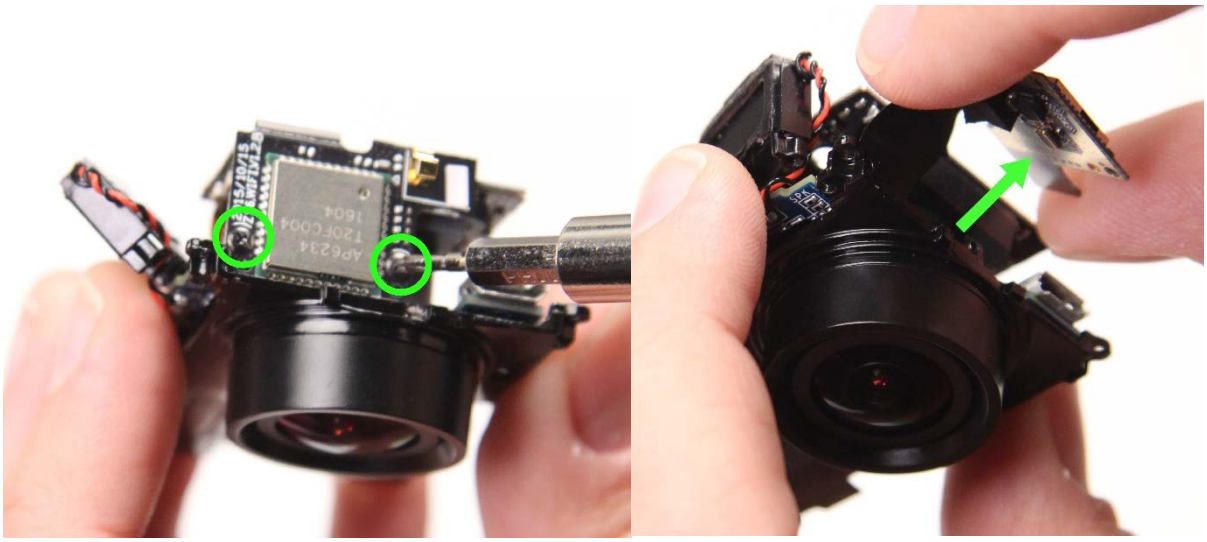


1-5 Disconnect the Speaker Mount

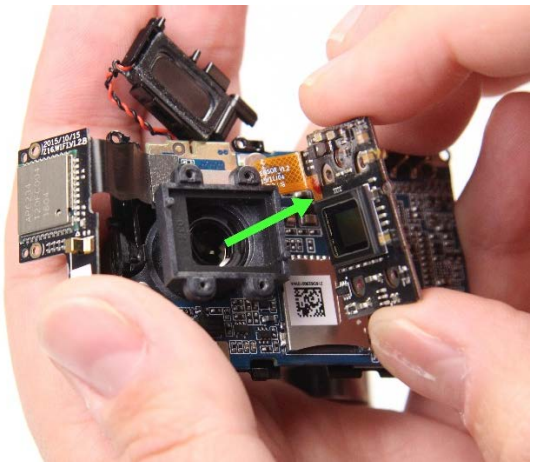
Use Philips #000 to remove the two screws holding the speaker mount over the lens. Put them aside with the four corner screws you just removed for use later ***(SCREW TYPE 'A').*** Pull out speaker and move it forward. Take care not to break the solder points where the speaker attaches to the main board. They are easily soldered back in place should that happen.

1-6 Remove the Image Sensor & WIFI Module

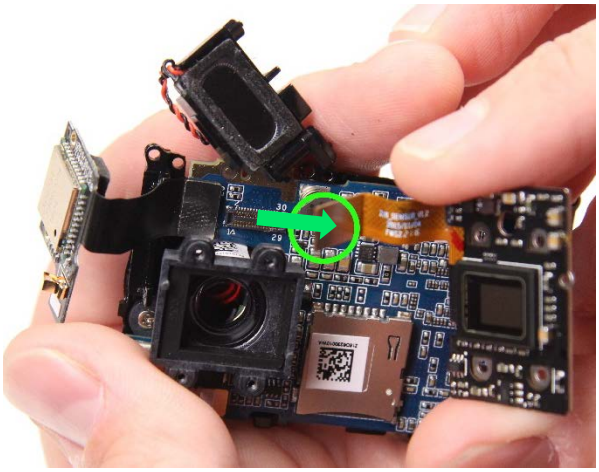
Remove the two screws holding the small WIFI board on the side. Put the screws aside for use later ***(SCREW TYPE 'B').*** Pull the board out slightly but don't disconnect it yet.

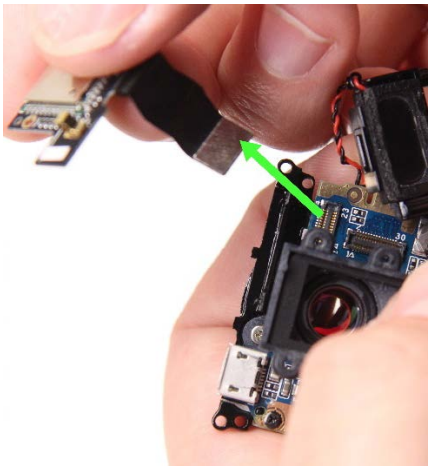


Remove the 4 screws on the rear of the CMOS sensor and put them aside for use later ***(SCREW TYPE 'C').*** Remove the rubber gasket around the glass of the sensor.



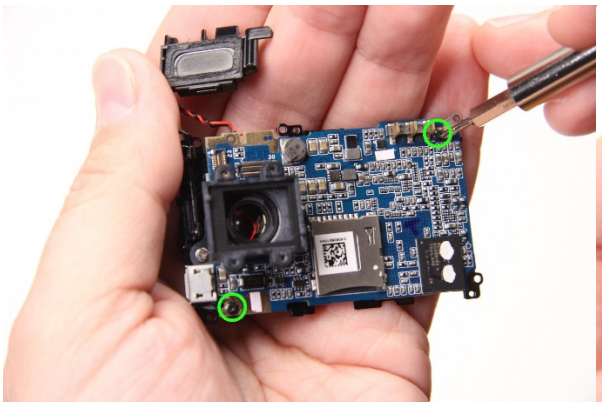
Gently pop the connector off the main board with a small flat head screw driver taking care not to scratch or damage any of the board components. It will unsnap and come free. Take special care not to bend or twist the ribbon in a rough manner. Next use your small screw driver to gently pop the WIFI module connector off the board.

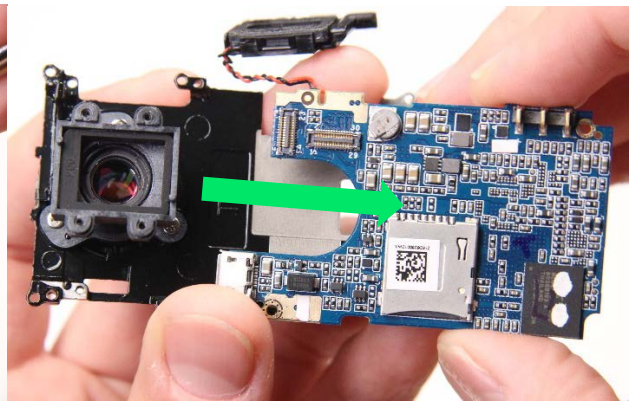




1-8 Detach the Main Board

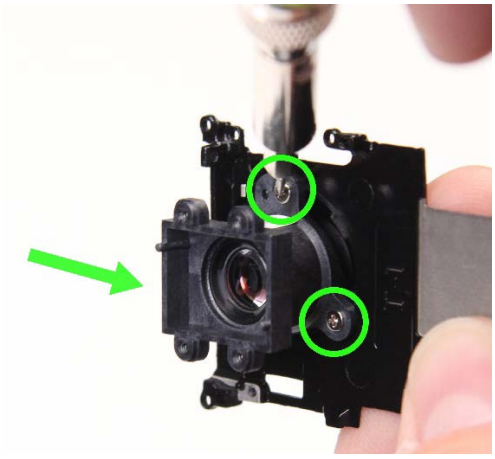
Remove the main board mounting screws on the lower left and upper right again making sure to save the screws ***(SCREW TYPE 'B')***. Lift up and out to separate the board from the aluminum plate.





1-9 Remove the Lens assembly

Remove the three screws holding the lens assembly onto the aluminum plate and put them aside ***(SCREW TYPE 'D').*** Pull the lens assembly free. We'll outline how to prepare the lens for use in your modified camera later in the document. *The disassembly is now complete!*



Section 2: Assembly

2-1 Your Ribcage Kit

Now that your camera is disassembled let's look inside your modification kit. It includes:

- Premium Machined Aluminum Faceplate
- Sensor Mount
- Plastic cap with logo
- IR-Cut Filter
- Filter Clip
- CS-Mount Ring (stainless steel)
- C-Mount Ring
- Reversible M12 mount
- M12 'Key'
- Black 0-80 Screws and L-Key
- LED Light Cover

You should also now have the following screws that you removed during Section 1:

6 x Type 'A' (Removed from the 4 corners of the housing and the speaker harness)

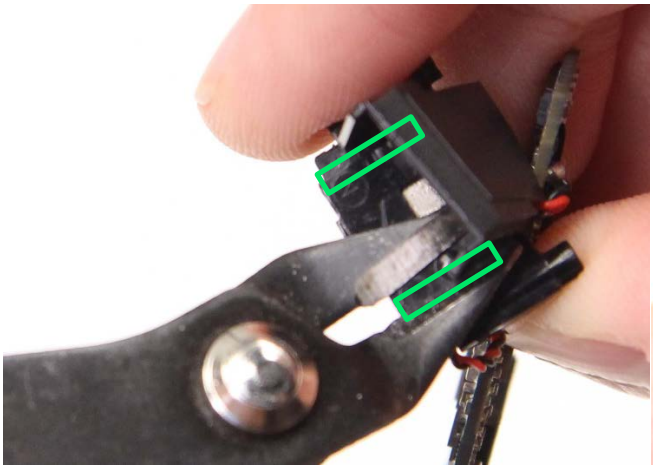
4 x Type 'B' (Removed from the main board and WIFI Module)

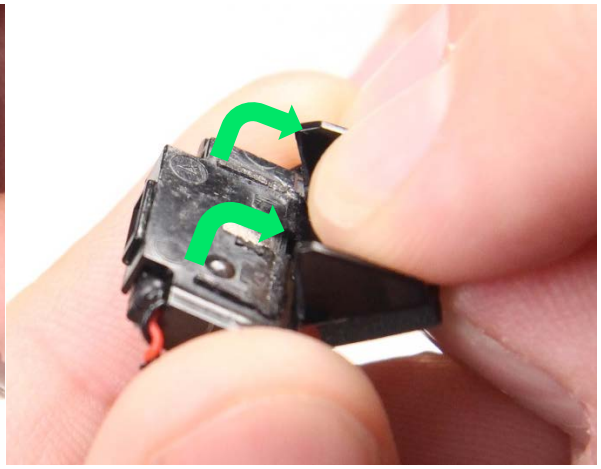
4 x Type 'C' (Removed from CMOS Sensor)

3 x Type 'D' (Removed from lens assembly)

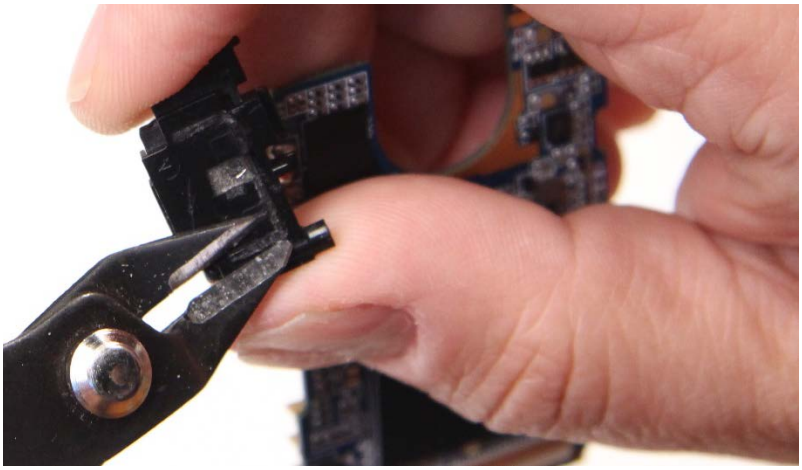
2-2 Clip the Speaker Harness

Next we'll take a set of wire cutters and clip part of the plastic harness. Clip the two short sides of the harness at the base as pictured. Once clipped bend the remaining portion back and forth until it breaks off, being mindful not to sever the wire connections. Clip off the small plastic tab in the center.



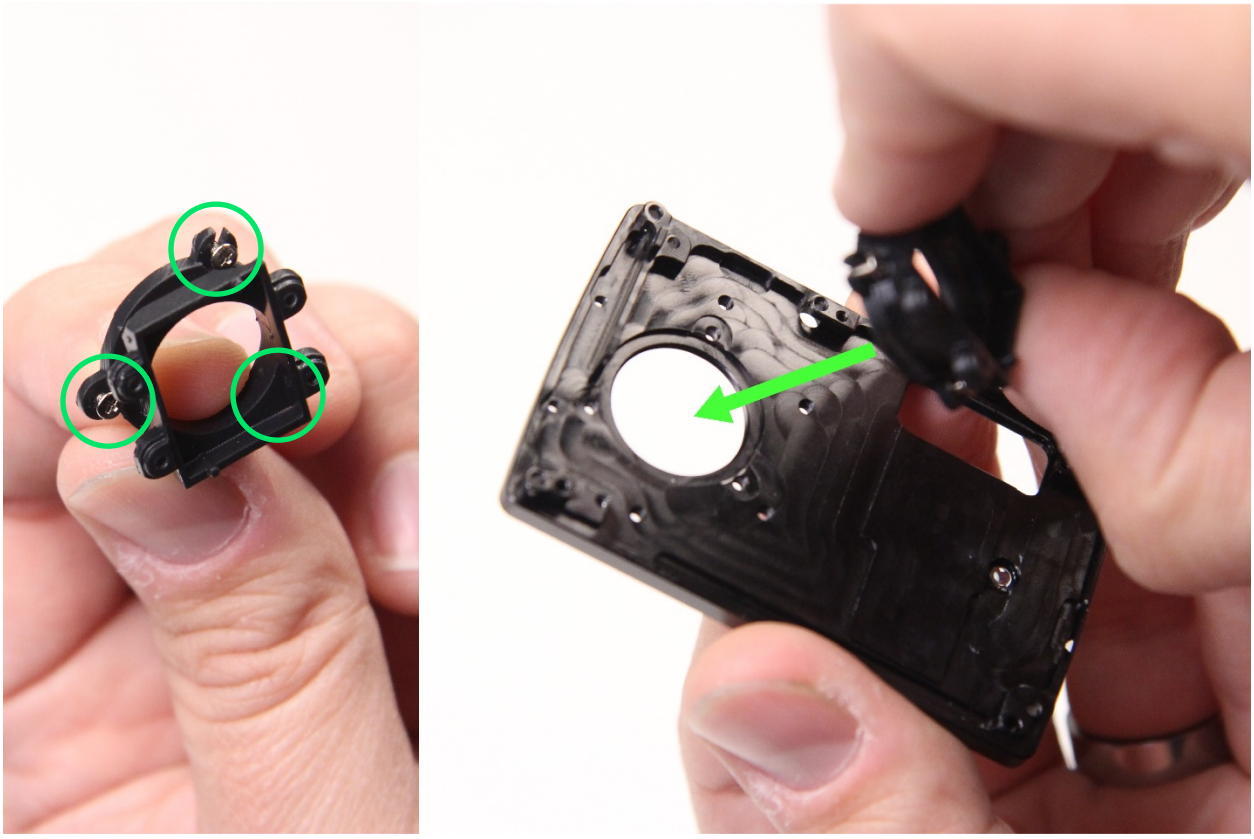


Once the part has been removed use your wire cutters to remove any remaining plastic bits and get the area as flat as possible.



2-3 Attach the Sensor Mount

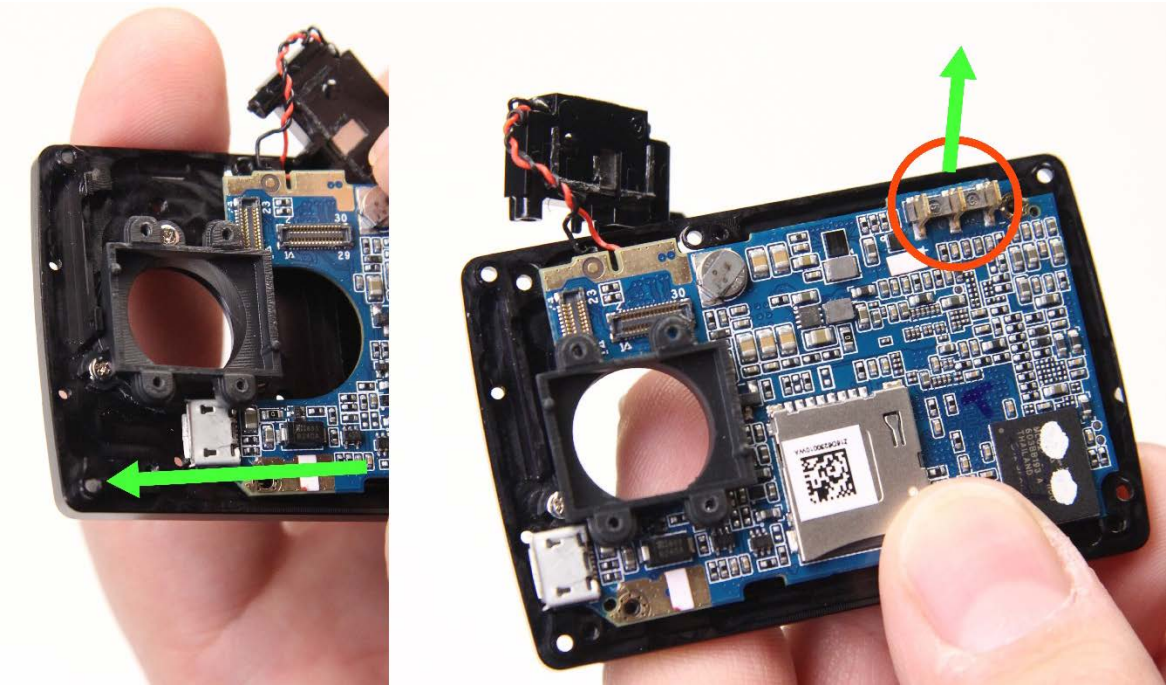
Take the three screws you removed from the original sensor mount (TYPE 'D') and insert them into the new mount as shown. Use your screw driver to push them into place if needed. Align the mount with the groove on the rear of the faceplate. Give it a wiggle and you should feel it click into place once it's aligned with the groove.



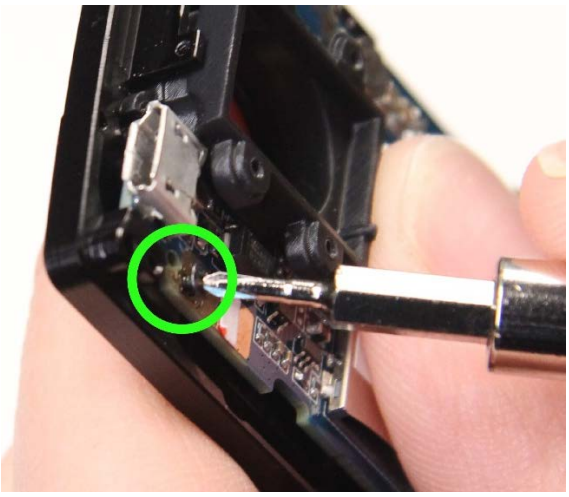
Use your Philips #000 to screw in the top and right screws jut to the point of contact, don't overtighten. The left screw will be left loose until the main board is mounted.

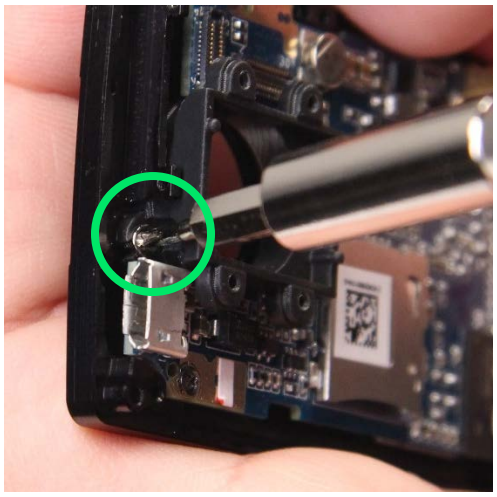
2-4 Mount the Main Board

Next take the main board and slide it straight to the left so that the rounded slot in the board fits around the lens mount. Make sure the three battery connector pins are facing up.



It's a little tricky to get the alignment perfect so you might have to wiggle it a bit, but it should go in with no force at all. If needed lift up on the left side of the lens mount a little to give the USB port more clearance. Make sure the board is properly in place over the registration pin on the upper right.



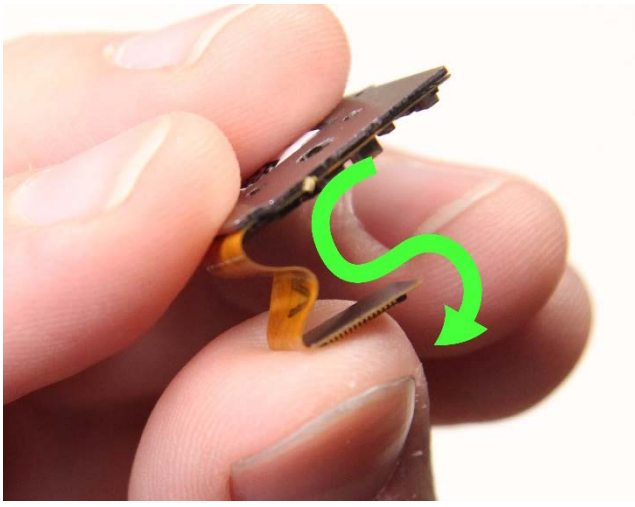


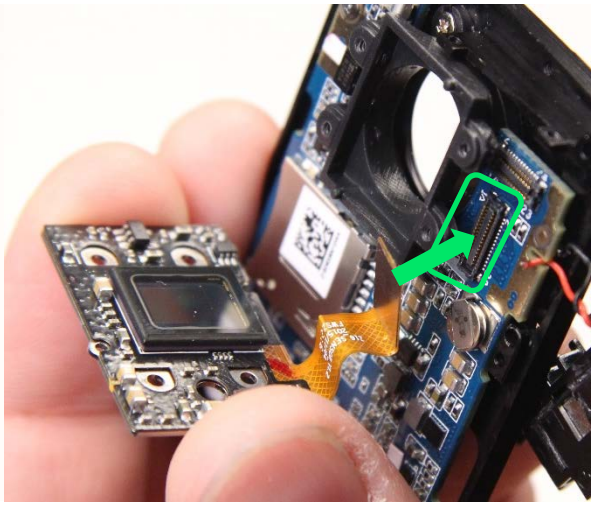
Secure the board with one of the mounting screws you removed earlier ***(TYPE 'B')***. Place it in the bottom left hand corner, the upper right will be left free for now. Finally, tighten the remaining screw on the lens mount.

2-5 Mount the CMOS Sensor

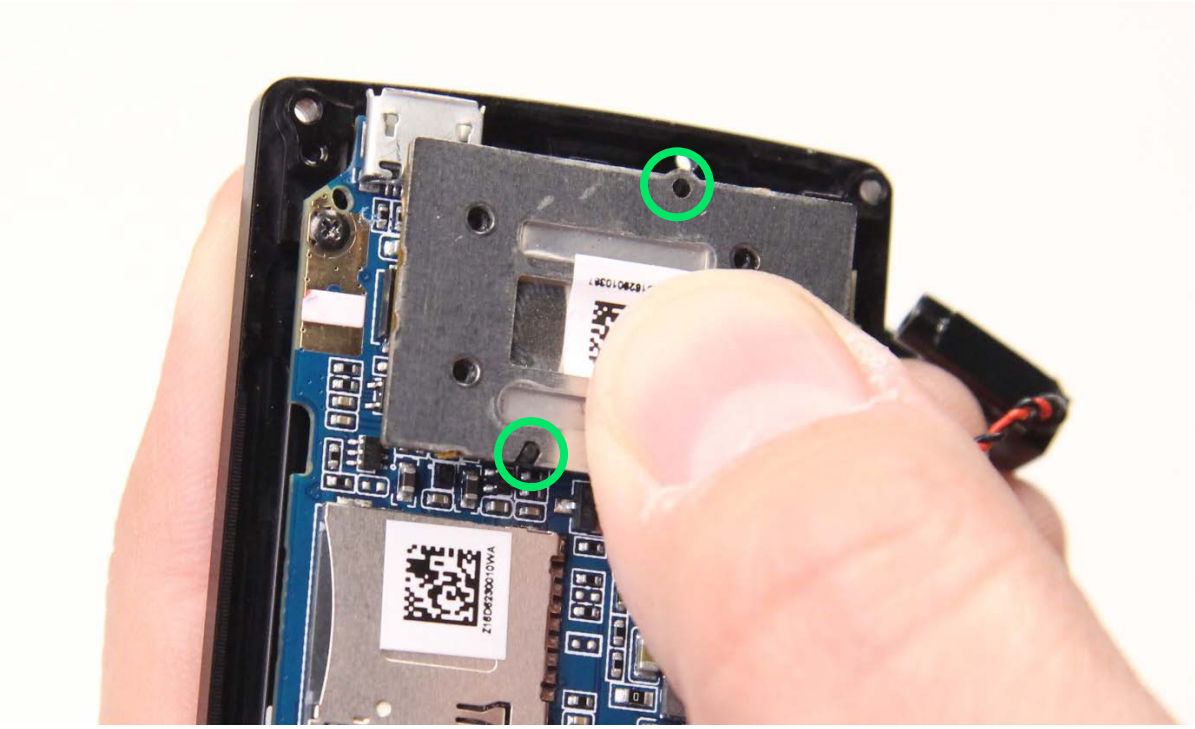
Now is a good time to make sure your image sensor is clean and free from fingerprints and dust. Lens fluid and a microfiber cleaning cloth do a great job. If you need to clean the sensor, spray some fluid on the cloth (not directly on the components) and wipe the sensor clean. We recommend a puffer to blow off any remaining particles. The sensor can also easily be cleaned after assembly using a Lenspen MiniPro (our favorite) or other cleaning tools.

Take the CMOS sensor and create a small 'S' bend in the ribbon as pictured. It's important to get the bend as close to this image as possible. Be sure not to bend or twist the ribbon sharply. Next connect the sensor to the socket on the main board as shown. Make sure the connectors are properly aligned before applying any pressure. They should click together easily.

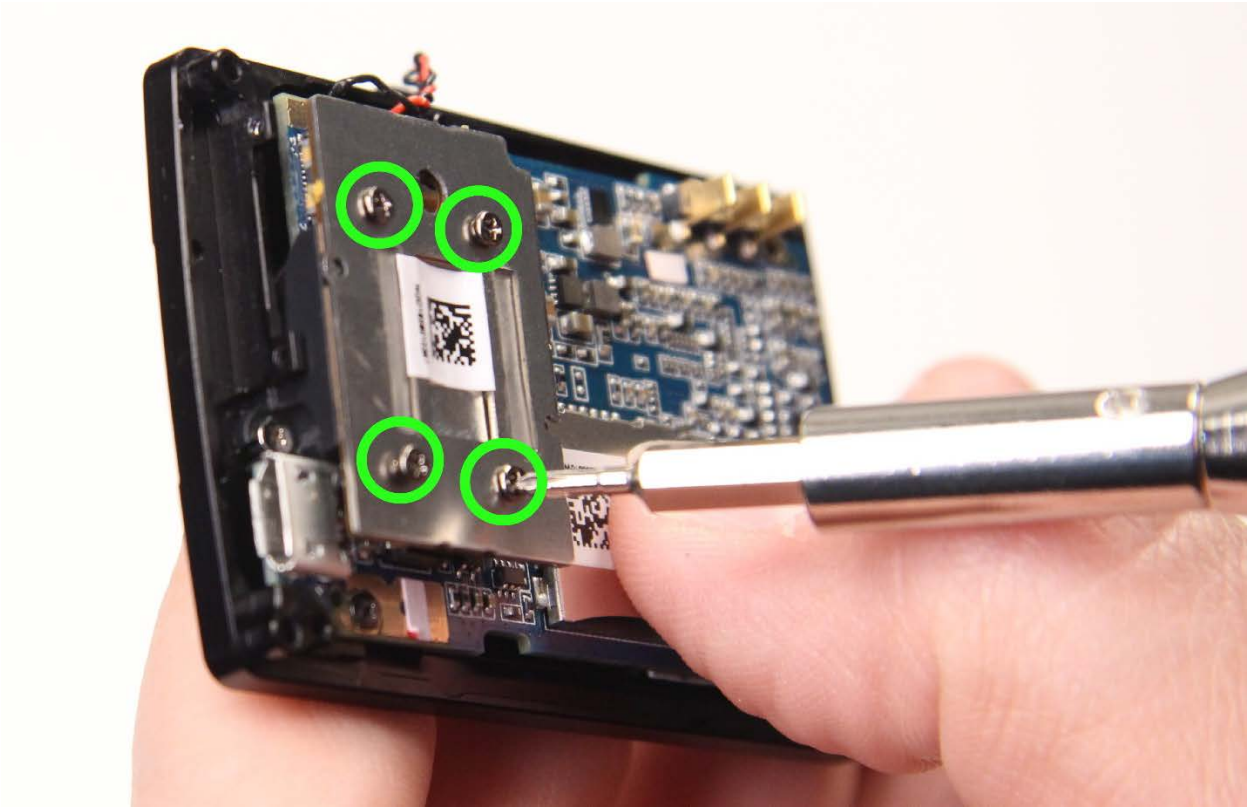




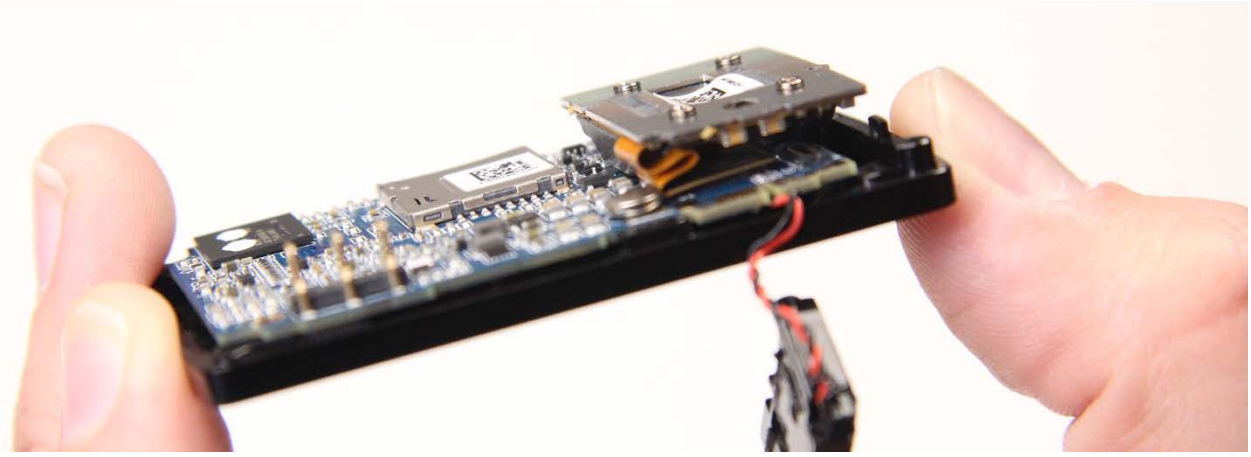
Place the CMOS sensor onto the back of the mount so that it lines up with the registration pins as shown.



Use the four screws you removed previously ***(TYPE 'C')*** and tighten the sensor in place in a crisscross fashion. Tighten only to the point of contact. If you overtighten you might risk damaging the plastic.

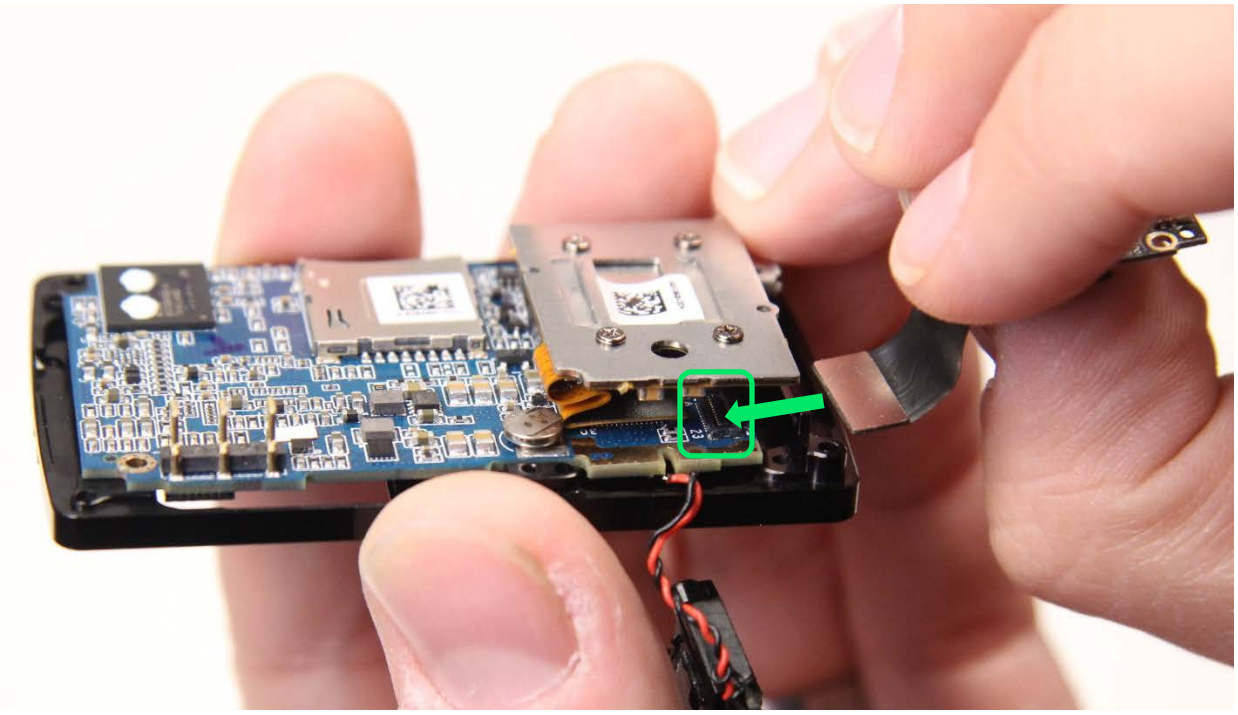


Verify that the image sensor ribbon is still connected to the main board. If not click the connector back in with the tip of your screw driver. Make sure the ribbon is tucked under the board as shown.

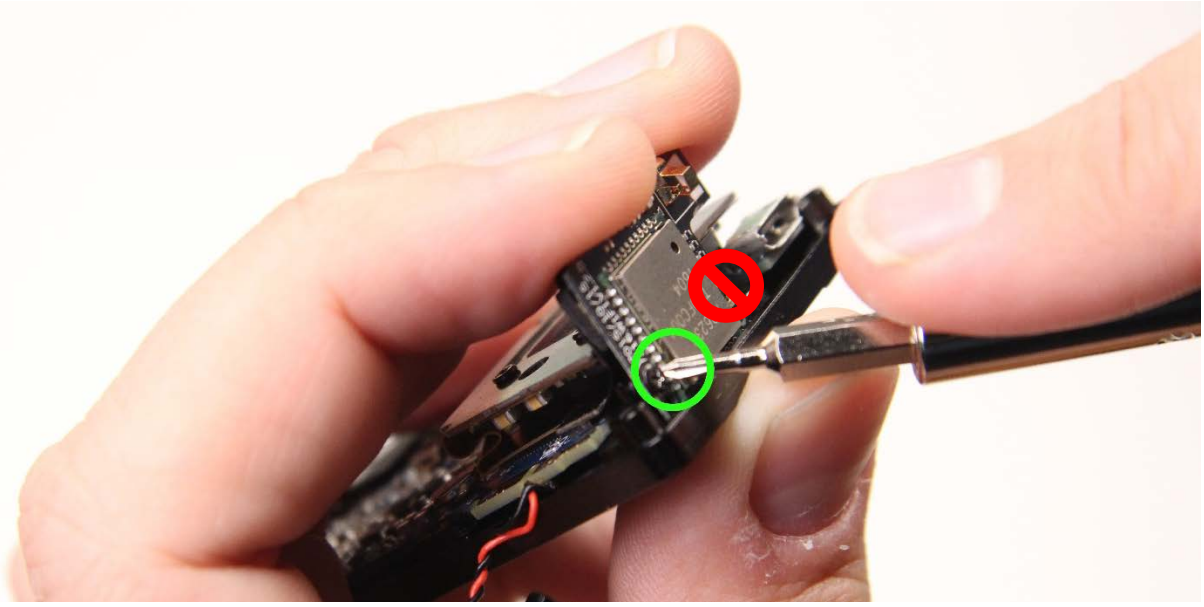


2-6 Connect the Wi-Fi Module

Take the small Wi-Fi board. You will find a small foam rubber pad on the back. Cut approximately half the height of the foam off with your cutters. Align the connectors as shown and click them together with the end of your screw driver.

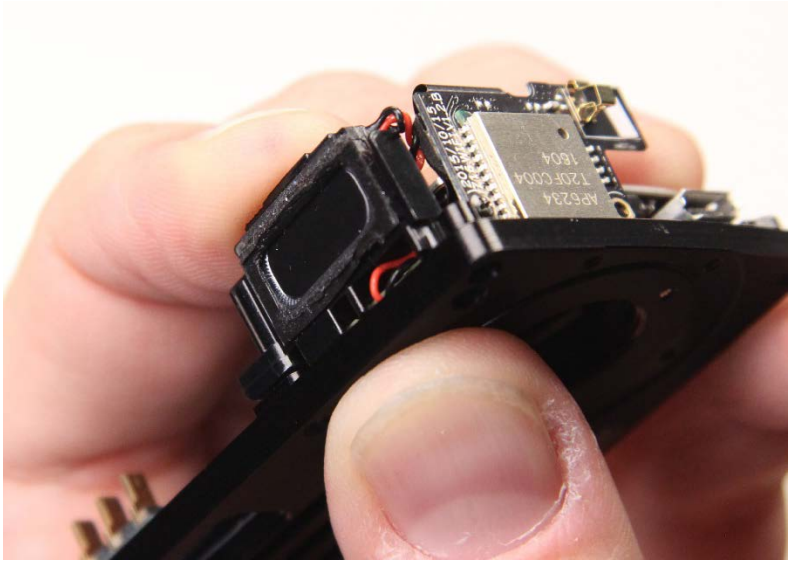


Next align the Wi-Fi board with the mounting points on the metal plate as shown. Take one of the screws you removed from the Wi-Fi board previously ***(TYPE 'B')***. Tighten it into the socket shown. As you tighten push the small board away from the screw slightly to give it a little more space. Don't overtighten. The remaining hole on the right will be left empty



2-7 Mount the Speaker

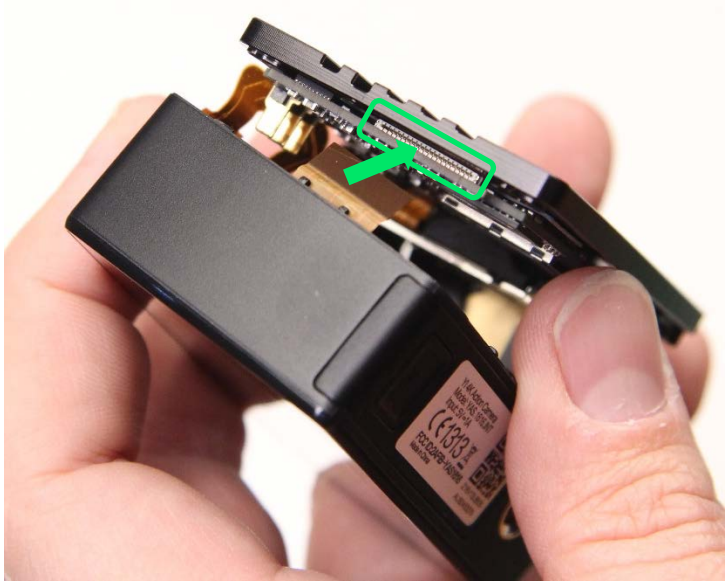
Take the speaker and one of the screws you previously removed ***(TYPE 'A').*** Align the speaker with the plate as shown making sure the plastic registration pin goes into its socket. Move the wire so that it passes under the speaker and around the back as pictured.



Insert the screw through the faceplate on the left side of the speaker and screw it very loosely into place. Take the remaining screw and add it into the assembly through the front plate. Before tightening the two screws verify that the wire is not kinked or pinched. Tighten the two screws until snug.

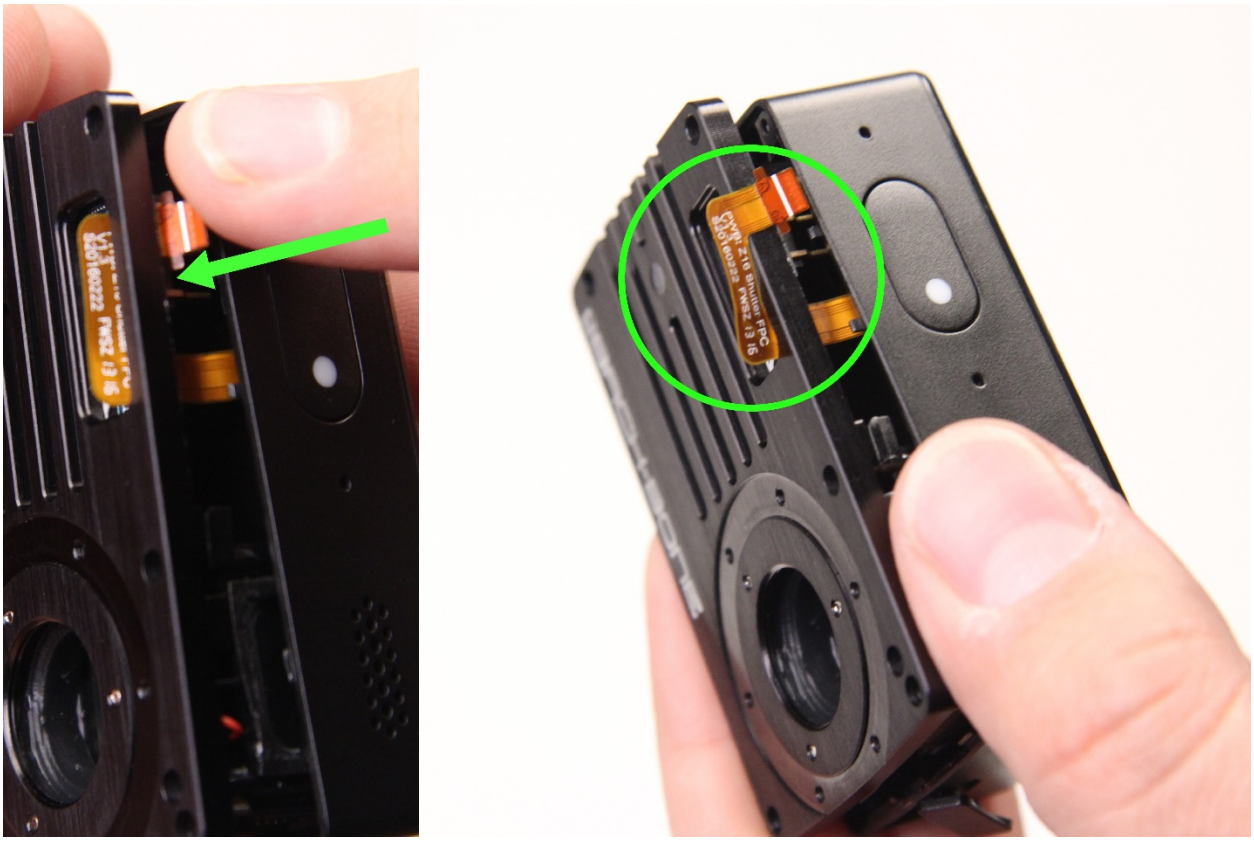
2-8 Place the Assembly Back in the Housing

With the two parts positioned as shown, insert the broad ribbon into the socket on the side of the board. It's a little tricky to align the ribbon and socket perfectly – once aligned it's helpful to wiggle the ribbon a little side to side as you push it in. Make sure it's all the way in and then flip down the locking tab to hold it in place. You must use a small tool to do that, such as a tiny flat head screw driver. Take care not to scratch or damage the ribbon or the main board. If needed you can lift the board away from the surface of the plate slightly to make more room. Use patience and care with this step.

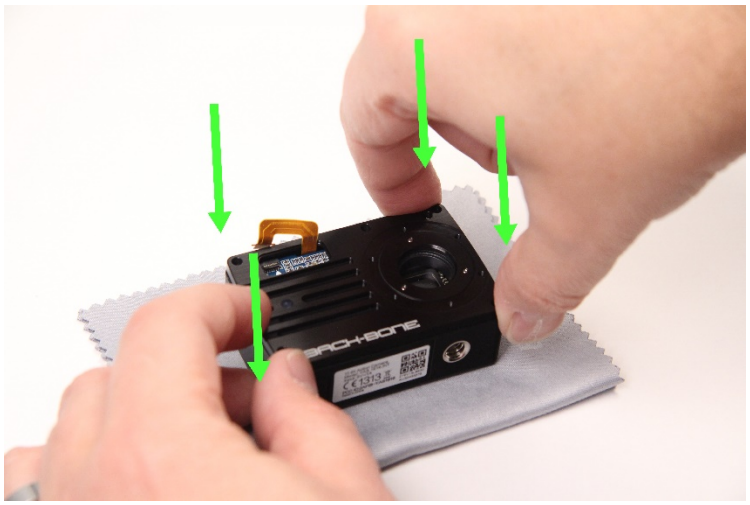


Insert and tighten the remaining screw to hold the main board onto the plate.

Turn the front assembly over so that it rests on the front of the housing. Feed the small ribbon through the opening in the aluminum plate as shown. Pull the end up and over the edge.



Apply gentle even pressure to the assembly until it clicks into place inside the housing and there are no gaps along the seam. If pressing down on the assembly while the housing is on a flat surface, **make sure the area is clean and there are no screws or small pieces that can damage or crack the screen when you push down.** You may wish to put something soft such as a lens cloth under the camera first.



Place the original ***(TYPE 'A')*** screws in the four corners and tighten them until the faceplate sits flat and snug.

Flip up the tab on the ribbon connector socket. Insert he ribbon and flip down the tab to lock it in place.

2-9 Functionality Test

Insert your battery and turn the camera on. If you hear the beeps as it starts up that means the speaker is working. Verify that the rear screen is working (the image will just look pink without a lens). If the camera doesn't power on first check the ribbon connection on the front if the camera as that connects to the power/mode button. If the camera still doesn't power on you must check the remaining connections inside the camera. See the 'Troubleshooting' section at the end for help.

2-10 Add Protective Cap

Fold the small ribbon over as pictured and insert the protective cap. Take care not to push the cap too hard as it might go underneath, but if it does you can remove it and try again.

2-11 M12 Lens mounting

If you wish to use M12 lenses you can now add the reversible M12 mount. Insert it with the longer socket going into the camera for short lenses, or turn it around and screw it in with the socket extending out for lenses that need extra room.

To remove the M12 mount when it's fully inserted into the camera, simply align the circular key with the groves in the mount. Use a coin such a quarter to unscrew it from the faceplate. The circular key can also act as a protective cover for the camera when the M12 mount is not present. Simply screw it into the opening.

2-12 Add the CS Mounting Ring

This step is not required if you plan on using only M12 lenses. Add the silver 'CS' ring to the front of the camera and align it with the screw sockets as pictured. Use the provided L-key to add the black 0-80 socket screws to hold it in place. This ring will allow a small selection of CS-Mount lenses to be used as well as Entaniya Super-fisheye VR lenses.

2-12 Mount the IR-Cut filter

Remove the M12 socket adapter. Examine the image sensor and make sure it's free from dust and smudges. Clean if necessary. Take the IR-Cut filter from your kit. Hold it by the edges and make sure it's clean. Turn the camera on a slight angle and insert the filter until it drops into place. Add the filter clip with a small tool as shown, taking care not to get the filter dirty.

2-13 Add the C-Mount Ring

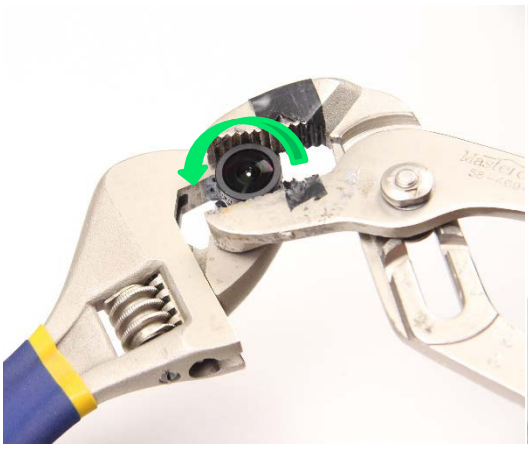
To use C-Mount lenses you will need to add this simple 5mm spacer ring to get proper focus. Make sure that the M12 socket adapter has been removed before adding your lens.

2-14 ALL DONE!

Now your mod is complete! Have fun shooting!

2-15 (OPTIONAL) LENS PREP

If you'd like to use the original YI camera lens with your new mod you will need an adjustable wrench and a pair of vice grips. Grip the base of the lens with the wrench so that it's secure and won't turn. Take the vice grips and apply a small amount of counterclockwise turning force to crack the glue holding the lens in place. You can optionally wrap some electric tape around the wrench or wrap a rubber band around the outside of the lens to protect it. Once the glue bond cracks you can easily unscrew it with your hands. Remove any additional glue. To use the lens add it to the M12 mount in your camera and turn it until you achieve sharp focus.



TROUBLESHOOTING

The camera won't power on – Make sure your battery is charged. The camera should power on even with several of the components disconnected. Also, check to make sure the ribbon from the power/capture button is properly connected (located under rubber cap on the front of the camera).

Blank rear screen – The broad ribbon on the side of the main board is not properly connected so the LCD panel is not receiving power.

Rear screen is on but no image, recordings are black – Check to make sure the CMOS sensor is properly connected to the main board.

Camera freezes when changing modes or when attempting to record. - Check to make sure the CMOS sensor is properly connected to the main board.

No WiFi connection – Check to make sure the WiFi module is properly connected

No sound from camera speaker during playback/power on – Make sure the two wires connected to the speaker are still connected. If one of them has broken loose it will need to be re-soldered.

Spots on recorded images – This is likely dust or debris on the image sensor or IR-cut filter. Spots will become more visible when closing your iris. We recommend using an air puffer to blow off any loose particles. You can remove the IR-cut filter and clean it with some lens fluid and a micro-fiber cleaning cloth. A Lenspen MiniPro does a great job cleaning the sensor, with a follow-up puff from an air puffer. Also, make sure that the rear element of your lens is clean.

Video is noisy – Use a lower ISO setting to limit how much gain the image sensor will use. Using a small iris setting or an ND in low light will cause more noise. Opening your iris in low light will help a great deal.