GoPro Hero4 Session Teardown

Teardown of the GoPro Hero4 Session in July of 2015.

Written By: Evan Noronha

INTRODUCTION

Surf's up! The new GoPro Hero4 Session just dropped in and it's totally tubular. It is GoPro's first waterproof camera that doesn't require a case. Will the sealants on this Session keep it far from a 10 on our repairability scale? Grab your board and hit the waves because this teardown is about to hang 10!

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TOOLS:

- T4 Torx Screwdriver (1)
- Tweezers (1)
- Spudger (1)
- Metal Spudger (1)
- iFixit Opening Tools (1)
- iOpener (1)
- Rotary Tool (1)
- Flush Wire Cutters (1)
- Phillips #000 Screwdriver (1)

Step 1 — GoPro Hero4 Session Teardown

- After three years of development, GoPro takes the wraps off a radical new action cam with a fresh form factor. Here's what they have to say about it:
  - Rugged waterproof design
  - 1030 mAh rechargeable lithium-ion battery
  - Built in Wi-Fi, micro-USB, and microSD slot (expandable up to 64 GB)
  - Plenty of video capture modes, ranging from WVGA at 120 fps to 1440p at 30 fps
  - 8 MP wide field of view stills

Step 2

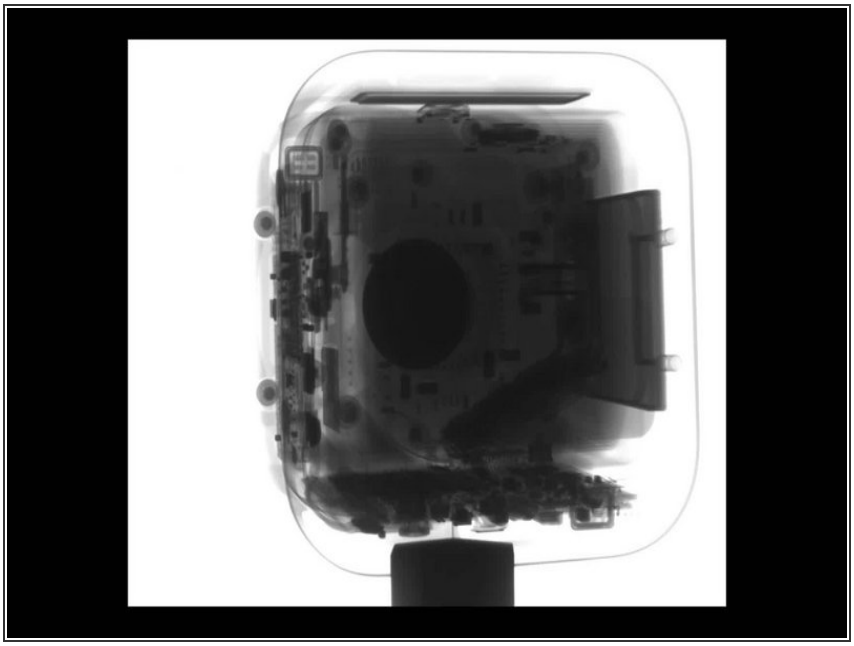
- We grabbed a GoPro Hero3+ for comparison; here's what we found:
  - Same weight: 74 g.
  - Almost the same ports. Both feature microSD, but the Session moves up to micro-USB instead of mini-USB, and drops the accessory port of traditional GoPros.
    - The Session also hides its ports under a water-sealed hinged door, while the 3+ keeps its ports under a pop-out door that we took out and lost.
  - Very similar volume! By our rough understanding of geometry, both the Hero3+ and the Session are just over 50 cubic centimeters in volume.
    - So is it actually fair to call the Session *smaller*? Yes. Waterproofing the camera lets users ditch the bulky case, which more than triples the volume of traditional GoPros.

Step 3

- Stills or video—capture either with a single button! GoPro also included handy directions on the back for how to do either.

We were a little surprised by the inclusion of a backlit display—just another power drain for a device with an integrated battery.

Step 4



- Before we begin, let's turn the tables on this GoPro and shoot some video of our own.
- Our awesome friends at Creative Electron gave the Session a spin in the ~~clothes dryer~~ X-ray machine, revealing a radical 360-degree view of the internals.
- It looks like we have our work cut out for us.

Step 5



- Hey look, a batch of T4 Torx screws on the front! You had us worried for a second there, GoPro.

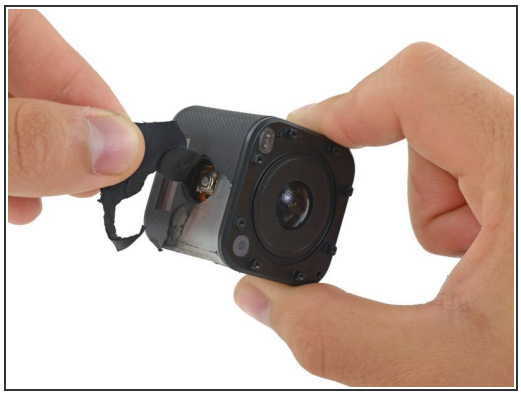
  Manufacturers' first attempts at waterproofing usually result in completely glued devices, oftentimes without a non-destructive means of entry. Looks like things are going to be different here.

- Screws out, and the lens cover comes free, revealing access to... an o-ring.

The glass lens cover is probably the most likely part to break on the Session, but it's also the easiest to replace. It's good to see that GoPro had repairability in mind for the lens cover, as they sell a complete lens cover replacement kit.

Step 6





- Okay, so the screws were a bit of a red herring. They'll come in handy for replacing a cracked lens cover or o-ring, but they didn't get us inside.
- Prying at the front and back covers didn't get us anywhere either. So, we gave our new camera a hot iOpener hug to soften up the adhesive on its rubber cover—and then started cutting and peeling.
- At the top of the camera, the shutter button is integrated into the rubber cover, with a hole in the plastic case underneath exposing the microswitch.

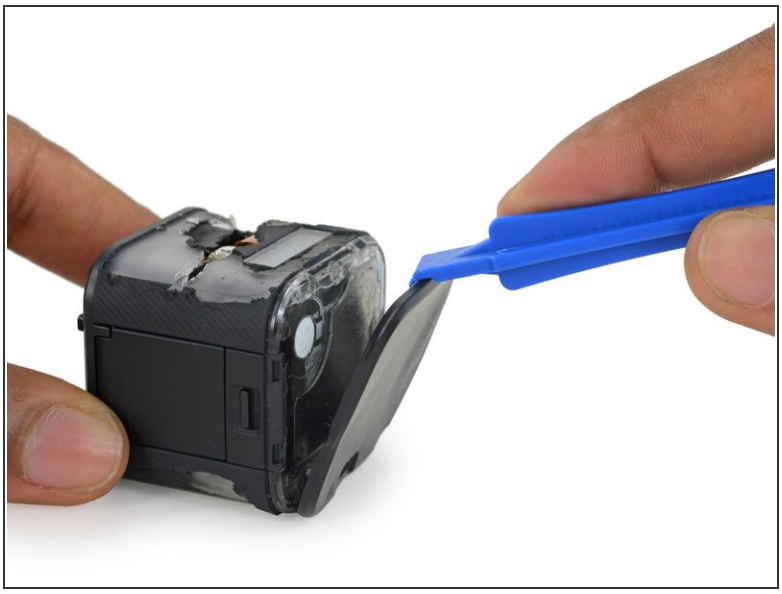
Step 7

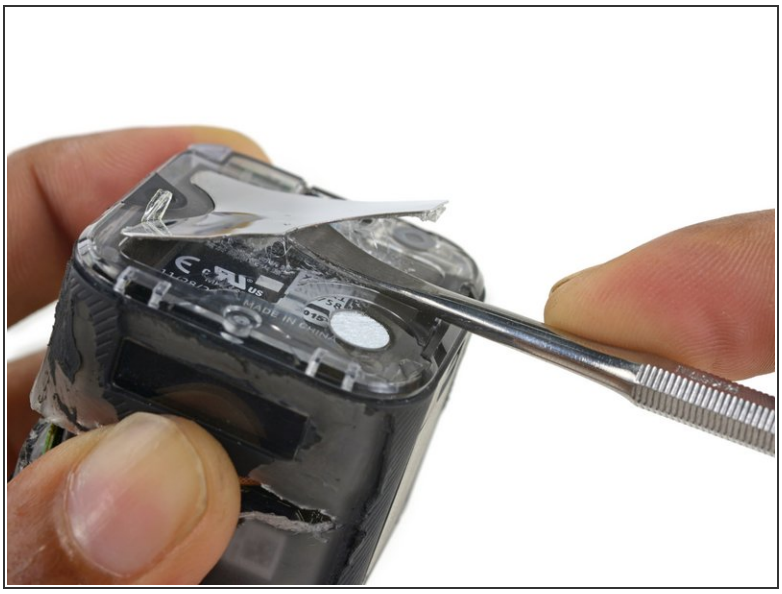
- With the rubber cover peeled off, we get a look at what lies beneath—a clear plastic cube, tantalizing us with exciting innards like one of those sweet see-through phones.

We're so close! There are boards right there! But seeing inside doesn't mean we can *get* inside.

- Unfortunately we didn't find any external screws or clips—looks like this puppy is all sealed up. Time to attack the Borg cube with some flush cutters.

Step 8

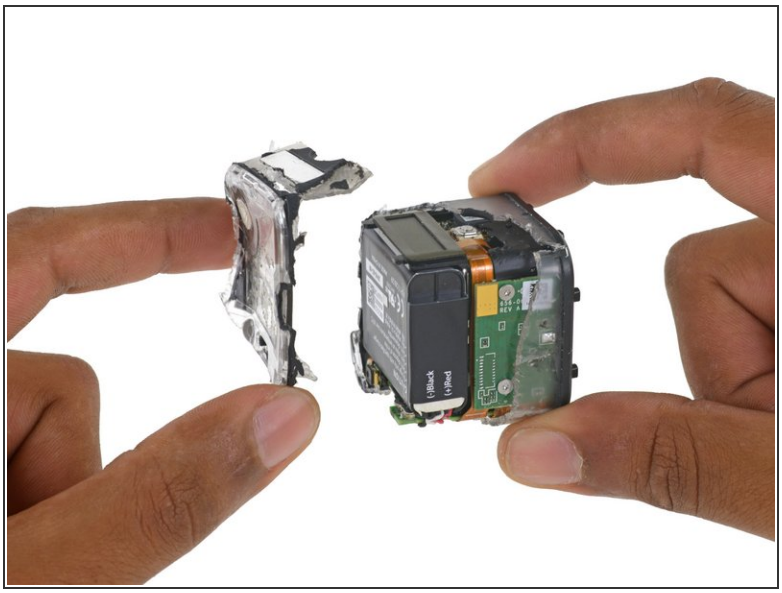


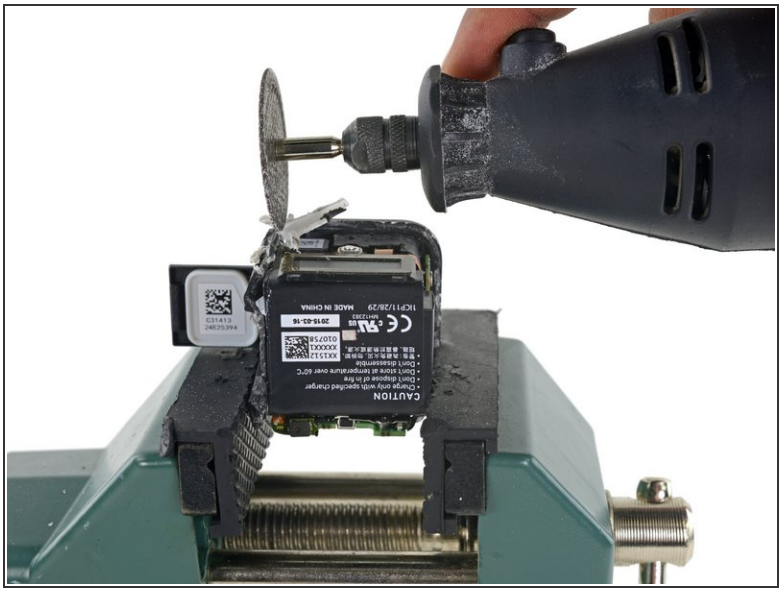


- There has to be a better way to get inside that we're just not seeing, right? Let's peel up this end cap.
- ...and this metal plate...
- ...and nope. No way in. Back to clipping.

Seriously though, we're hoping we got this wrong. Maybe with some free, publicly available repair documentation, this stuff would be easier...

Step 9

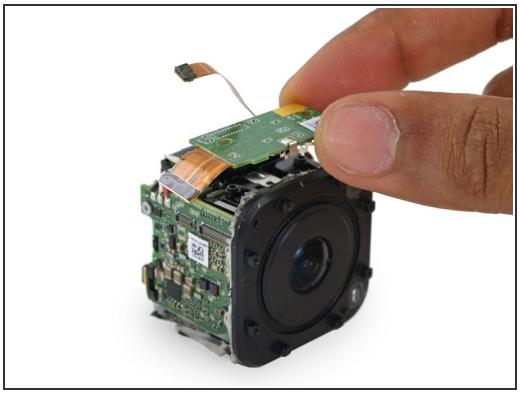


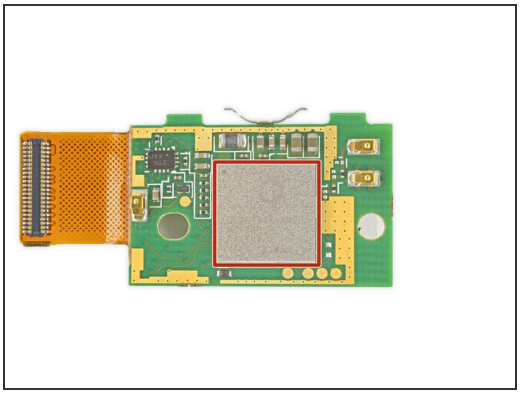


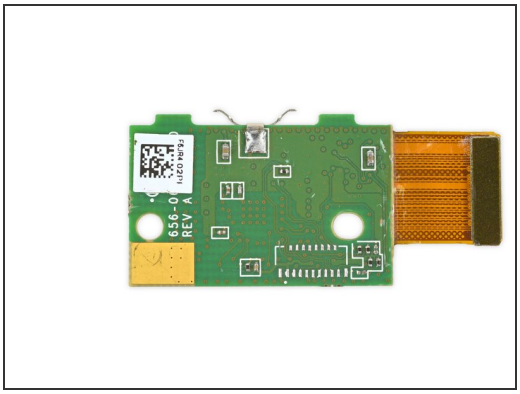
- Houston, we have liftoff—of *one* portion of the outer case. The interior components are a tetris'd tangle of parts with no obvious way to extract the battery.
  - *Sigh.*
- Impatience gets the best of us and we bust out the rotary tool for the last stretch.

We can practically taste the interior components. Then again, maybe that's just the plastic dust.

Step 10

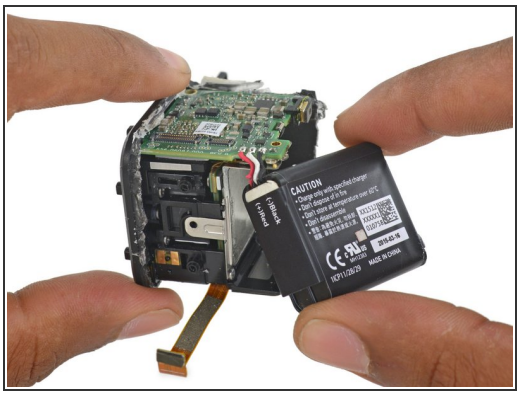






- Success! Time to actually do some analysis.
- The first component out is the wireless communications daughterboard, featuring some Qualcomm hardware:
  - Qualcomm QCA6134X-AM2D Wi-Fi/Bluetooth SiP

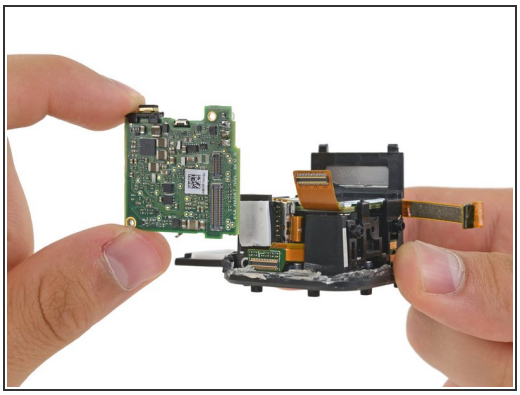
Step 11

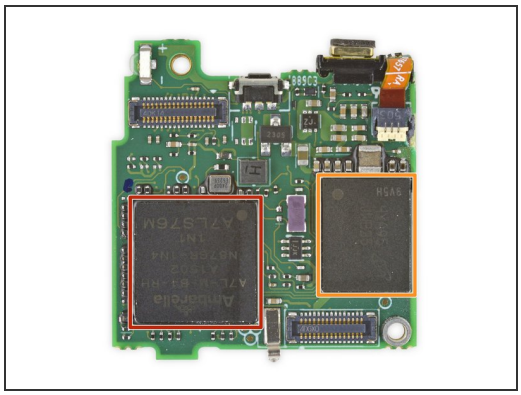


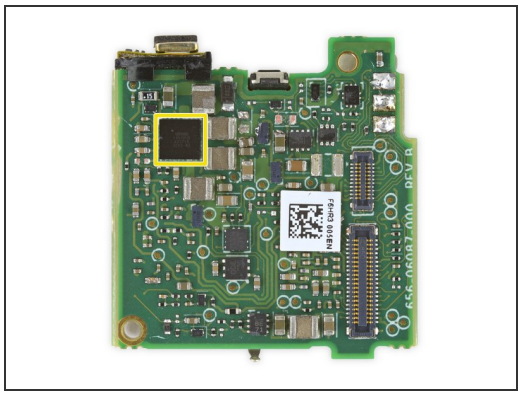
- After savaging most of the exterior, we aren't surprised to find the GoPro's battery soldered to the motherboard *and* glued into a bracket.
- No more removable batteries—presumably in the interest of waterproofing.
- The Hero4 Session packs a 3.8 V, 1000 mAh, 3.8 Wh battery, just about on par with the Hero 3+, and smaller than the 1160 mAh battery in the Hero4.

With an estimated two-hour battery life, you're going to be recharging often—increasing the number of charge cycles on your camera, and decreasing its life before you need to, *but can't*, replace the battery.

Step 12

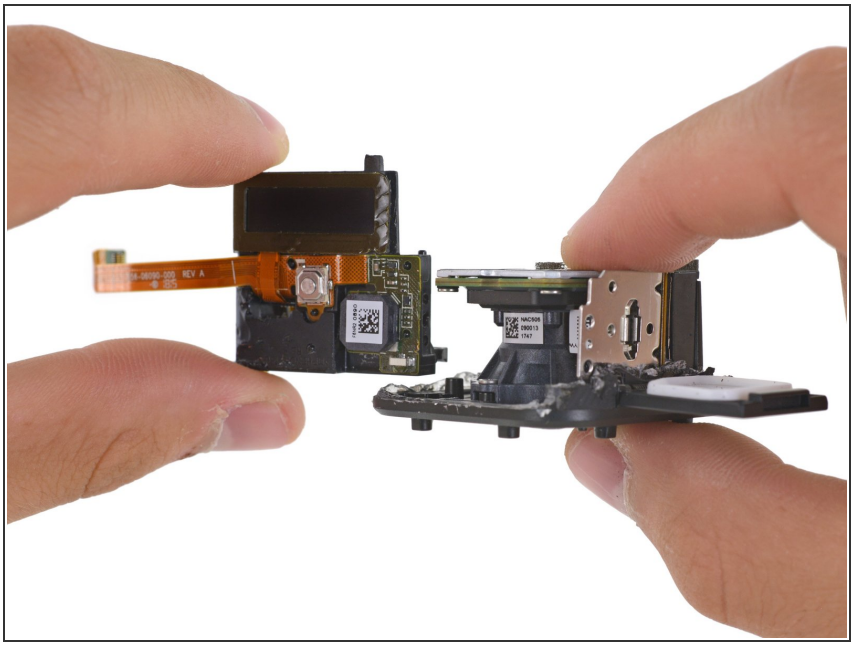






- We've finally extracted the motherboard. Let's see what it's packing:
  - Ambarella A7LS Video and Image Processing SoC
  - Micron JWB25 NAND Flash + LPDDR2 MCP
  - AMS AG AS3715 Power Management Unit

Step 13



- With a flick of the wrist goes the display and the power/capture button—everything a user needs to operate the GoPro on one confusing bracket.

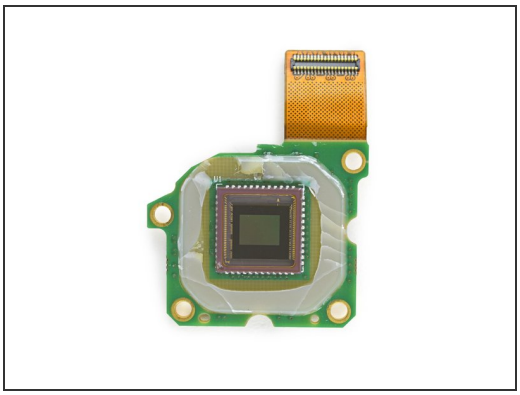
Like everything else on the Session, these components are smaller, and feature more complex, intertwined flex cables than in models past.

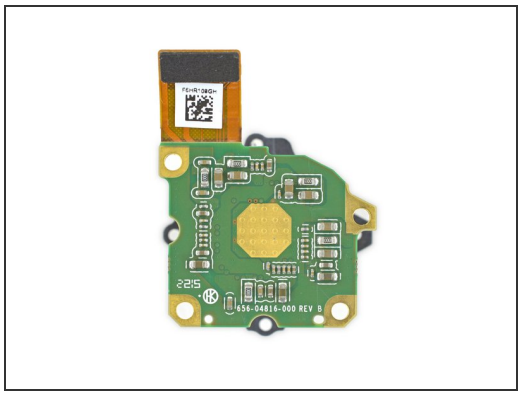
Step 14

- Finally! The heart—er, eye of the GoPro is free!
- Just like the Hero4 cameras that came before it, the Session features an *ƒ*/2.8 glass lens with an "Ultra wide-angle field of view with reduced distortion".

Let's hope the waterproofing and structural protection really work—it'll be pretty much impossible to replace this lens without destroying your camera.

Step 15

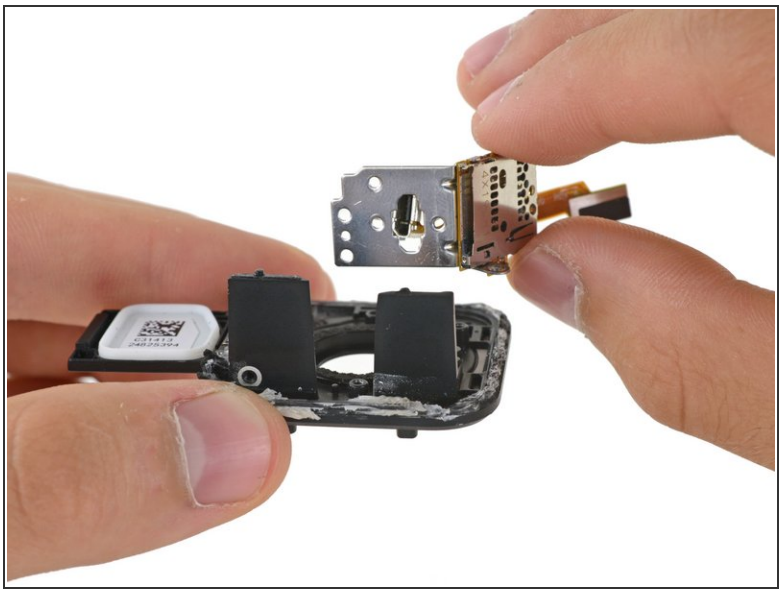


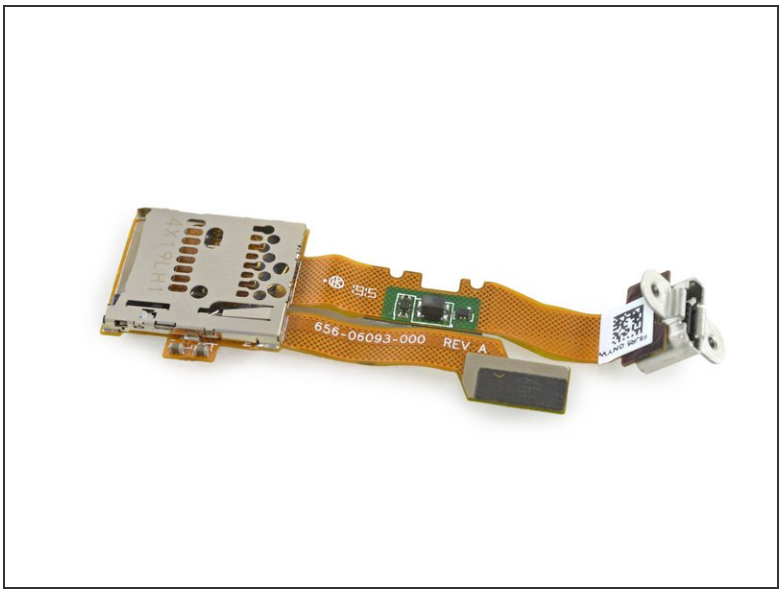


- Remember back when you could unscrew the image sensor board from the back of the lens assembly? iFixit remembers.
- Alas, those days are long gone. A ring of glue is the only thing that adheres the lens to the image sensor in the Session.
- The 8 MP sensor in the Session drops the 4K capability found in the Hero4 Black/Silver 12 MP sensors, instead supporting resolutions up to 1440p at 30 fps.

After some quick measurements, we found the image sensor in the Session to be roughly 4.5 mm x 3.4 mm, which would mean a 1/3.2" sensor format (which appears to be the same format found in the cheaper GoPro Hero).

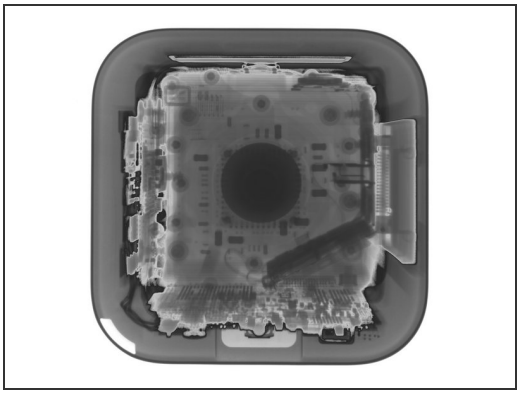
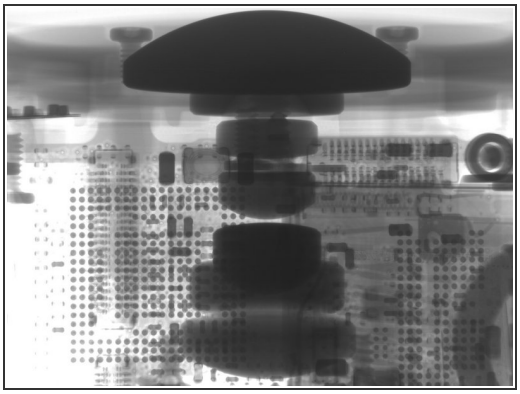
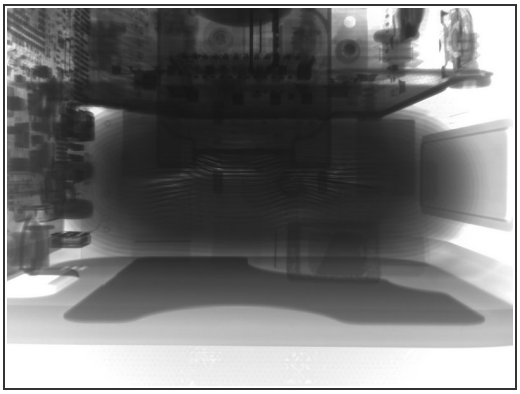
Step 16





- The last tetris block is the tricky, angled microSD card slot. Also part of this assembly: the micro-USB port.
- Unlike its bigger, more expensive brothers, the Session lacks an accessory port. This means that you won't be able to mount things, such as an LCD screen or secondary battery, to your GoPro.
- While it's the last component out of the camera, this teardown's not quite over...

Step 17

- That's right—it's X-ray time! With the GoPro magically reassembled and re-compactified, we can get a closer look at how it all fits together.
- If there's room to pack anything more into this little cube, it's news to us. Look how the little microSD card slot has to angle its way in there.
- That multi-stage mushroom cloud is actually the lens assembly!
- The oblong, noodley oval is the battery, composed (like an onion) of layers.

Step 18

- GoPro Hero4 Session Repairability Score: **1 out of 10** (10 is easiest to repair)
  - The front bezel is held in place with eight T4 Torx screws and is easily replaceable.
  - Accessing the device for internal repairs means ripping, tearing, and dremeling through a rubber band, plastic casing, and copious amounts of glue, making reassembly infeasible.
  - The inner components are assembled together in a web of circuitry and adhesive.
  - The "integrated" battery is soldered and glued to the rest of the device, meaning battery replacement is next to impossible.
- As always, a hearty thanks to our friends at Creative Electron for their eye-popping images and expertise!

To reassemble your device, follow these instructions in reverse order.