



Motorola Razr Teardown

iFixit tears down the foldable 2020 Motorola Razr to investigate the new/old clamshell design and explore its inner workings.

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INTRODUCTION

If you're still rocking that iconic Razr flip-phone from 2004, we have good news: those "podcast" things really took off, *The Incredibles* finally got a sequel, and there's a brand-new Razr that'll blow your mind. We've already [rigorously confirmed its pocketability](#), and now we must test its teardown-ability. Dust off your tools and join us!

Oh, and if you rock some *other* Motorola model, [we've got your fix](#). Full disclosure: we are an official parts distributor for Motorola.

For more teardowns, behind-the-scenes content, and the latest and greatest in repair news, follow us on [Instagram](#), [Twitter](#) and [Facebook](#). For iFixit delivered, subscribe to our [newsletter](#).



TOOLS:

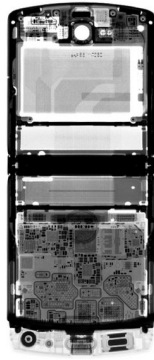
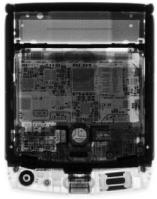
- [T3 Torx Screwdriver](#) (1)
 - [iFixit Opening Picks set of 6](#) (1)
 - [iOpener](#) (1)
 - [ESD Safe Tweezers Blunt Nose](#) (1)
 - [Spudger](#) (1)
 - [Plastic Cards](#) (1)
 - [Heat Gun](#) (1)
 - [Isopropyl Alcohol](#) (1)
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Step 1 — Motorola Razr Teardown



- It has been said that we only care about repairability and tend to overlook important specs like color accuracy, but this is only partially true. There are many *other* specs we can overlook, such as:
 - 6.2" foldable plastic OLED display with 2142 × 876 resolution (~373 PPI)
 - 2.2 GHz octa-core Qualcomm Snapdragon 710 processor paired with 6 GB of RAM
 - 128 GB of internal storage
 - 2510 mAh of battery power
 - One 16 MP, *f*/1.7 main camera with dual-pixel autofocus and one 5 MP, *f*/2.0 selfie camera
 - No official IP rating, but Motorola claims that it is "*Splash-proof with [a] water resistant nanocoating*"
- ☑ One thing that probably won't be returning from the original Razr is a user-removable battery.
[Those were some good times!](#)

Step 2



- Before putting our Razr under the knife (or dull plastic edge), we take an X-ray peek with some help from our friends at [Creative Electron](#).
- Rolling your mouse over the two X-rays, you'll note that a few passive components move up and down slightly as the phone opens and shuts. Those are probably attached to that flexible OLED display, which actually slides down and [tucks into the chin of the phone](#) as it closes.
- Meanwhile, it appears the brains of this operation lie in the bottom half of the phone—while the top half houses the extra screen, a battery, and the camera setup.
- And if you look [really closely](#), you can see the inner workings of the continuous geared hinge at the center of all the folding action. More on that later.

Step 3



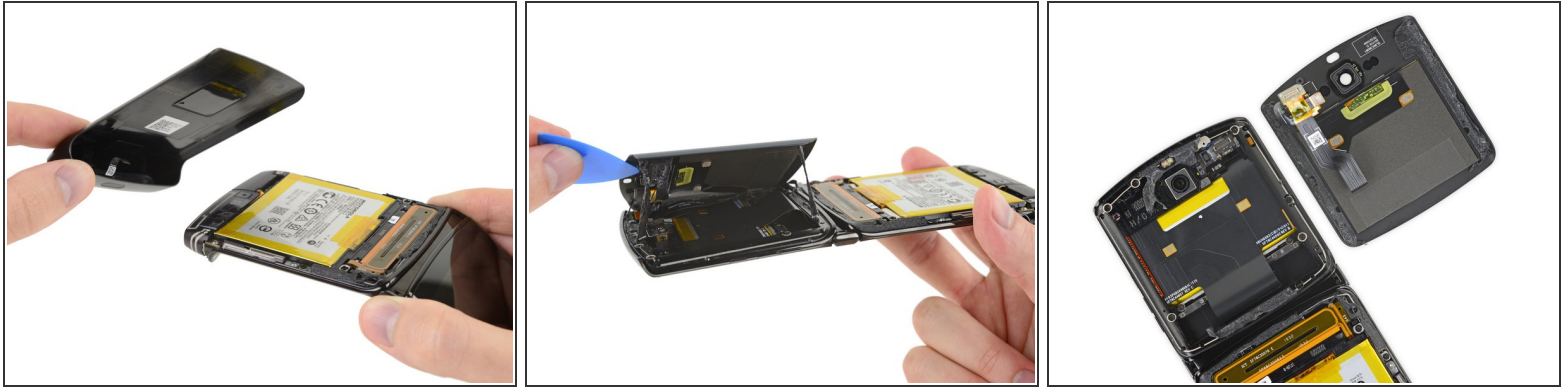
- Back in our day, the Motorola Razr was the coolest thing around. We're happy to see that the new Razr keeps the sleek look of the original—despite the significant upgrades to the screen, camera, speakers, and silicon it packs.
- All that modern-day gear adds bulk, though! The new Razr is 35% wider and 118% heavier than our 2004 V3, making it [less pocketable](#) than you might think.
- Pockets aside, a closer look at the folding action reveals a small gap between the hinge and display on each side. Similar gaps, you might say, to those that contributed to [the demise of some of the first Galaxy Folds](#).
- ❗ This gap appears mainly midway through the folding action, and doesn't plague the Razr in open configuration. So maybe it's safe? But at \$1500 USD, it's a potentially expensive "maybe."

Step 4



- Our first target is the Razr's lower rear cover. Behind the fancy folding façade, this is still a smartphone like any other, so we're guessing a hot [iOpener](#) is our ticket in.
- Just a little heat does the trick! We're able to wedge an opening pick in there and begin our journey.
 - We're grateful for the innovations of modern smartphones, but boy, would we love to see the slide-off plastic or metal [access panels](#) of yesteryear.
- Once all the glue is sliced, the cover can wiggle free. But wait! Eagle-eyed viewers may spot the fingerprint sensor cable next to the home button, just waiting to be torn by an eager disassembler.
- ⓘ Without repair documentation, booby traps like these can turn a simple fix into a DIY nightmare.

Step 5



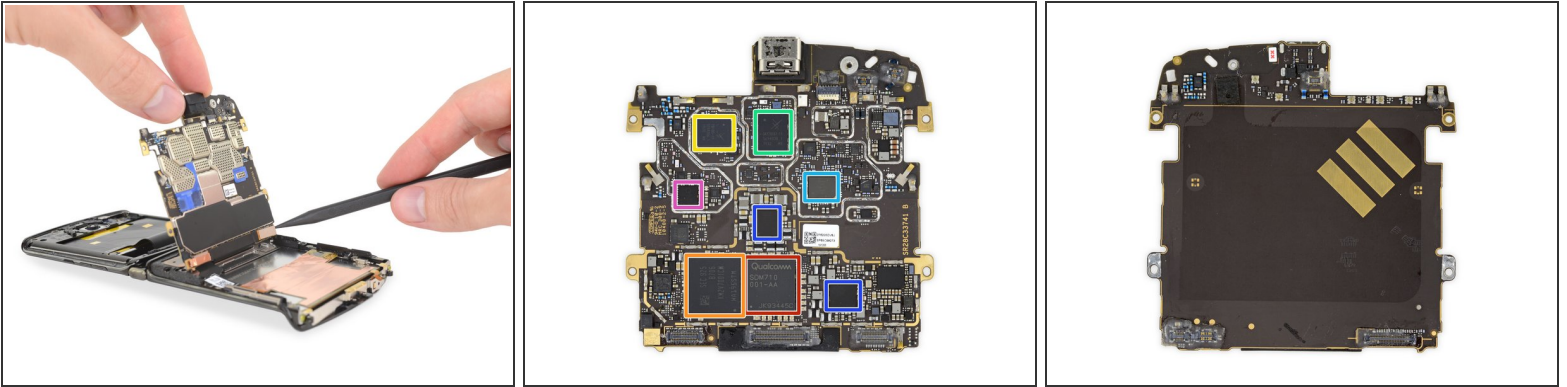
- Battery Ho! But no other fun goodies below this cover, so we opt to pop the Quick View display off the other side. Despite some nasty glue, it eventually comes free.
 - Outer display out of the way, we catch our first glimpse at the second battery. The first battery's ready for removal in the bottom half of the phone, but the second is still hiding behind some cables in the top half.
 - Above the batteries, the single 16 MP main camera stares back at us. These days it's pretty rare to see just one main/rear camera on a smartphone, but it's easy to understand that Motorola had [other things on their mind](#) in the four years they spent developing this phone.
- i** Wanna steal this look? Show off the internals of your phone (without the gluey mess) with our [teardown wallpapers](#)!

Step 6



- So far disassembly has been relatively straightforward. As we hone in on the flexible display, we hope we don't screw it up—but for now, we're breezily unscrewing some Torx screws with our handy [Mako kit](#)!
- With a bit of [alcoholic coercion](#), the first battery of two comes free (weighing in at 4.7 Wh and just 2.6 mm thin)—but more on those later, we're on the fast track to silicon town now!
- One brief pit stop on our race to motherboard glory: in removing the vibration motor (a pretty boring coin-style one) we spot some curious slime!
- ❗ This goop could potentially be some equivalent of [dielectric grease](#) (more commonly seen in cars)—an inexpensive way to add a bit of water resistance to the board.

Step 7



- Digging out the motherboard we spy some [serious](#) shielding strategy—what treasures could these caps cover?
 - Qualcomm SDM710 Snapdragon 710 processor
 - Samsung KM2V7001CM 6 GB LPDDR4 memory and 128 GB storage package
 - Skyworks SKY 78185-11 Low Band 2G/3G/4G Module
 - Skyworks SKY 78187-11 High Band 2G/3G/4G Module
 - SDR660 003 radio frequency IC
 - Qualcomm PM670 & PM670A power management ICs
 - Qualcomm WCN3990 WiFi 802.11ac, Bluetooth LE, and FM SoC

Step 8



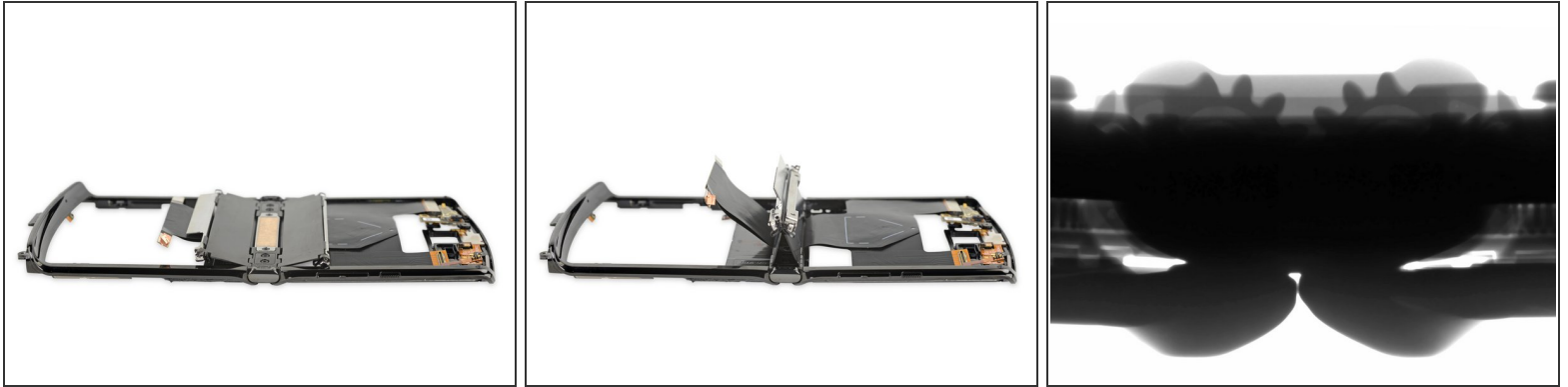
- Flipping this floppy foldable is a lot easier after a few more screws, and gives us access to [the cameras](#) and the second battery.
- Eager to get our hands on that bendy OLED, we execute a series of complex teardown maneuvers:
 - First, we evacuate another handful of Torx screws. Then we carefully extract a metal bracket. Finally, we tenderly unstick the thick cable that runs through the hinge and over the second battery.
- ① Did that sound easy? It wasn't. We're surprised that Motorola is offering to [replace these displays for just \\$299](#).

Step 9



- With the pOLED display removed, we're a bit dismayed that the battery comes with it. Prying against this flexible sheet for a battery swap doesn't seem ideal, even if the battery *is* in a metal caddy.
- Nine steps in we *finally* have both batteries: This yellow rectangle packs slightly more punch, at 1265 mAh and 4.8 Wh, than the wafer-thin 4.7 Wh cell we extracted earlier.
- The batteries add up to Motorola's claim of 2510 mAh, or 9.7 Wh of power. For comparison, just one of [the Galaxy Fold batteries](#) has about the same capacity of *both* of these things put together. [The giant L-shaped iPhone XS Max battery](#) manages to dwarf them all at 3969 mAh, or 15.04 Wh.
- The pOLED display (allegedly a [BOE](#) screen, potentially using [LG Display](#) technology) isn't giving up many secrets—but we do spy some Samsung tech:
 - Samsung S6SY77CX, likely an iteration of Samsung's [popular touch controller](#).
 - GigaDevice [GD25LQ40C](#) 512 KB serial NOR flash memory
 - pOLED display driver

Step 10



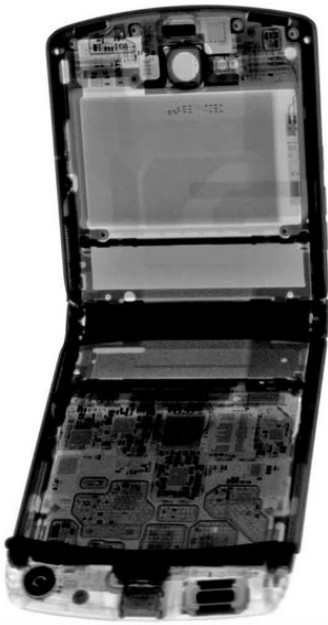
- Here's something you don't usually see on a smartphone teardown: mechanical parts. Big ones!
- The folding action of this Razr comprises a continuous geared hinge, a [cat-head cam](#), two support plates, and a few springs.
- [Motorola's patents illustrate](#) the way the cam and the support plates work together to protect the fragile OLED display. They provide support and hold it taut while the phone is open, then get out of the way to allow for a nice big radius (which helps to prevent a crease in the display from forming) when it shuts.
- In X-ray closeups of the hinge area, you can see the continuous geared hinge as well as the [springs](#) embedded in each side of the frame.
 - ⓘ The gears keep both halves of the phone moving synchronously, very similar to the gears in the [Galaxy Fold](#).
 - ⓘ The springs in each half of the phone press inward against the cam in the middle to hold the phone [open](#) or [closed](#), and provide some resistance when moving the hinge.

Step 11



- Motorola's nostalgia-stoking Razr officially wins the award for *most complicated phone-based contraption we've ever taken apart*. We're impressed with the numerous feats of engineering that Moto pulled off to resurrect their iconic clamshell.
- It won't win any awards for serviceability, but just bringing this impossible gizmo into existence was such a tall order that we're not surprised serviceability didn't make it into v1.0. It's fun to see how they made it happen (if not so fun to tease it all apart).
- We're going to score it all the same (just like we did the [Galaxy Fold](#)), but we know this is a first-gen design and we shouldn't expect functionality *and* repairability to come all at once.
- We doubt the foldable craze will end anytime soon—Samsung's recently announced [Galaxy Z Flip](#) is already on its way. Hopefully manufacturers will figure out how to make these things both durable and repairable before too long, especially at these price points...

Step 12



- Thanks for sticking around! Here's some bonus material: A 360-degree X-ray view inside the Moto Razr.
- ✦ This would have been so much easier than a physical teardown—X-rays make everything look easy. But hey at least a teardown delivers full color!
- PS: Are you getting [Spinning Dancer](#) vibes, too? Is it spinning left? Right? You decide—we've got to score this thing.

Step 13 — Final Thoughts

REPAIRABILITY SCORE:



- The Motorola Razr earns a **1 out of 10** on our repairability scale (10 is easiest to repair):
 - The only driver you'll need is a standard T3 Torx.
 - The delicate primary display is replaceable, if you're determined.
 - Every repair starts (and ends) with stubborn, glued-on outer covers.
 - Replacing the battery—or rather, *batteries*—requires near-total disassembly.
 - The charging port is soldered directly to the main board.
 - Complex construction and multiple flex cable booby traps makes for tricky repair work.