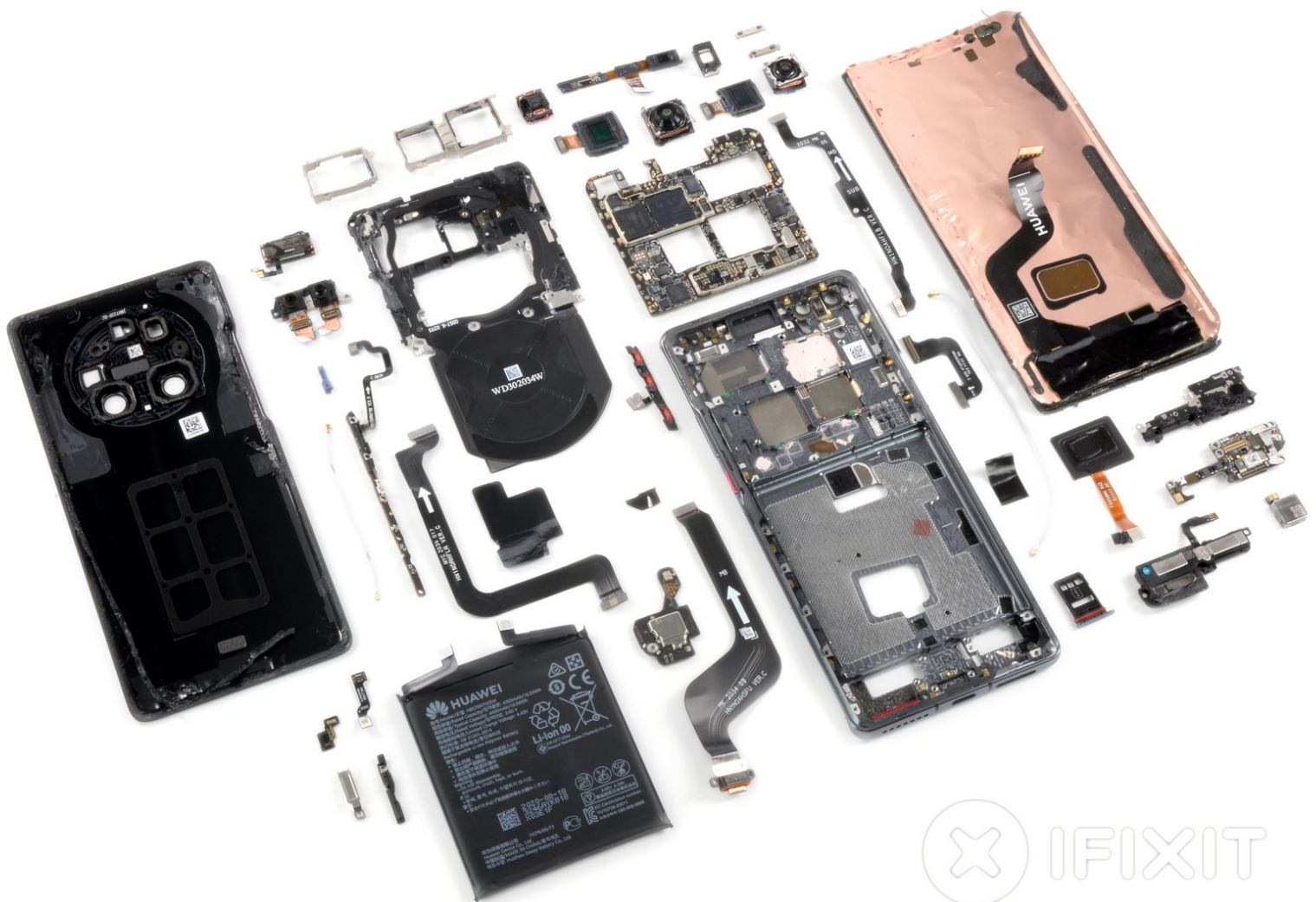




Huawei Mate 40 Pro Teardown

An exploratory teardown of Huawei's Mate 40 Pro smartphone, performed in November 2020.

Written By: Dominik Schnabelrauch



INTRODUCTION

Still mostly [barred from Google](#) services, Huawei has given their Mate-series smartphones another go with the Mate 40 Pro, enticing would-be buyers with unbeatable specs and shiny new silicon. We wanted to spend a little more time with the Mate before deciding whether or not it is indeed a friend of ours. And by *spend time*, of course, we mean *tear down*.

Be the very first to know when the newest consumer tech hits the teardown table—follow iFixit's [YouTube channel](#), [Instagram](#), or [Twitter](#), and subscribe to our [newsletter](#).



TOOLS:

- [iOpener](#) (1)
 - [iMac Opening Tool](#) (1)
 - [Marlin Screwdriver Set - 5 Standard Precision Screwdrivers](#) (1)
 - [Spudger](#) (1)
 - [Tweezers](#) (1)
 - [Heat Gun](#) (1)
-

Step 1 — Huawei Mate 40 Pro Teardown



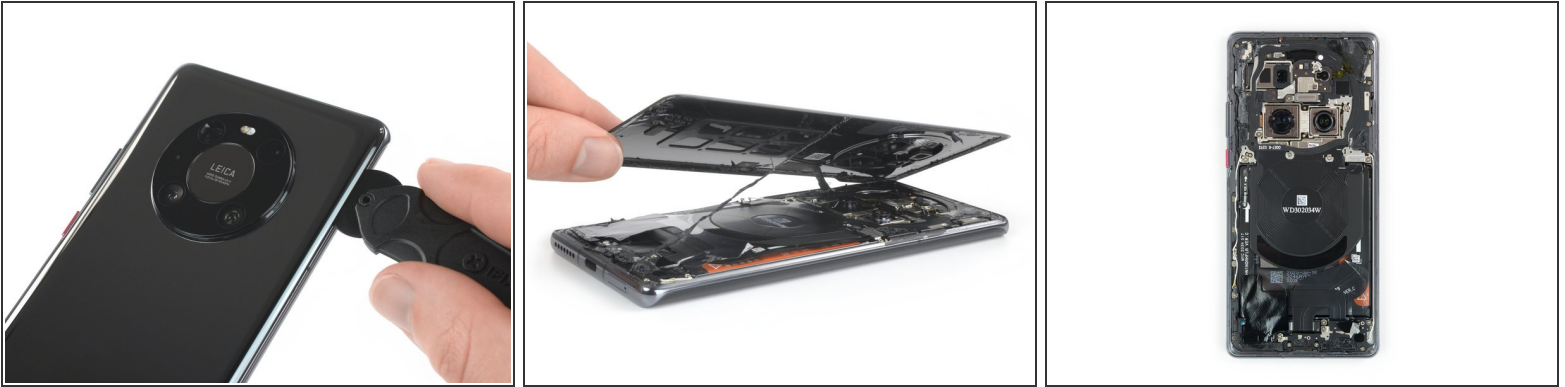
- These days, a smartphone can't compete on specs alone. But that won't stop anyone trying—and the Mate 40 Pro certainly tries. Our teardown unit includes:
 - Kirin 9000 octa-core SoC with integrated 5G modem and 24-core Mali-G78 MP24 GPU
 - 6.76-inch OLED display with 1344 × 2772 resolution, 90 Hz refresh rate, and HDR10
 - Triple rear camera setup with 50 MP *f*/1.9 wide, 12 MP *f*/3.4 periscope zoom, and 20 MP *f*/1.8 ultra-wide modules, and Leica optics
 - 256 GB internal storage plus [Nano Memory](#) expansion for an additional 256 GB
 - "Sub-6" 5G connectivity, Wi-Fi 802.11ax 2x2 MIMO, Bluetooth 5.2
 - 66W fast charging, 50W fast wireless charging, and 5W reverse wireless charging
 - 3D Face Recognition, optical under-display fingerprint sensor, and gesture controls

Step 2



- Let's do a quick visual comparison of the Mate 40 Pro to its [Mate 30 Pro predecessor](#) before examining its internal friendliness. What's new?
- The *Halo Ring* camera array has migrated, grown an integrated single-LED flash, and been renamed *Space Ring*.
- The Mate 40 Pro loses one front-facing camera, and the remaining two now hang out in an elongated hole-punch at the top left corner of the screen.
- ✦ Unlike Samsung, Huawei hasn't moved on from curved glass displays. They're pretty but prone to accidental touches, and more importantly they are ridiculously difficult to replace or refurbish.
 - Despite the heavy curvature of its screen, the Mate 40 Pro has physical volume and power buttons clinging to a sliver of frame on the right edge. Additionally, there's a lefty-friendly "virtual button" on the opposite side.
 - Finally, a speaker grille at the top suggests the Mate 30 Pro's [screen-vibrating speaker driver](#) didn't make the cut this year.

Step 3



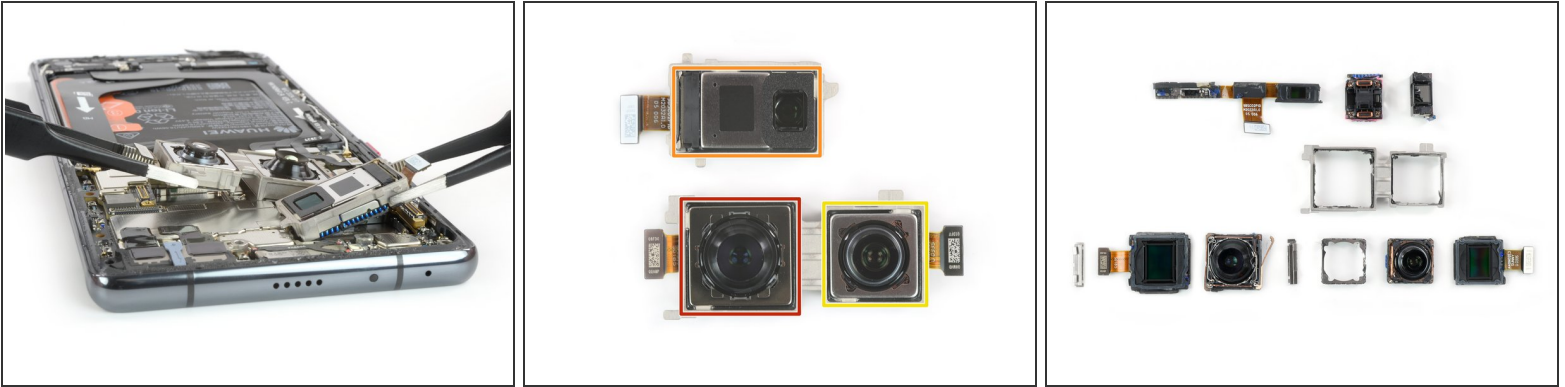
- Our usual procedure of heating, lifting and slicing doesn't go exactly to plan today: the adhesive refuses to budge under our suction cup. But the gap between the rear glass and the midframe is *just* wide enough for our [iMac Opening Wheel](#) to slice into.
- There were no hidden cables to accidentally slice when opening the [Mate 30 Pro](#), and since the 40 Pro *also* sports an under-display fingerprint reader, we expect no booby traps here. Reader, we were wrong.
 - ❗ A small flex cable next to the power button sadly made the, uh... *cut*.
- Apart from that slightly disappointing setback, our entry is successful! Inside we see the thick adhesive strips that gave us a hard time, and the four unblinking eyes in the *Space Ring*. Most of our view at this point is blocked by shields and the wireless charging coil.
- Not to play favorites, but we must admit this first look is less tidy than the [clean new iPhone](#) lineup.

Step 4



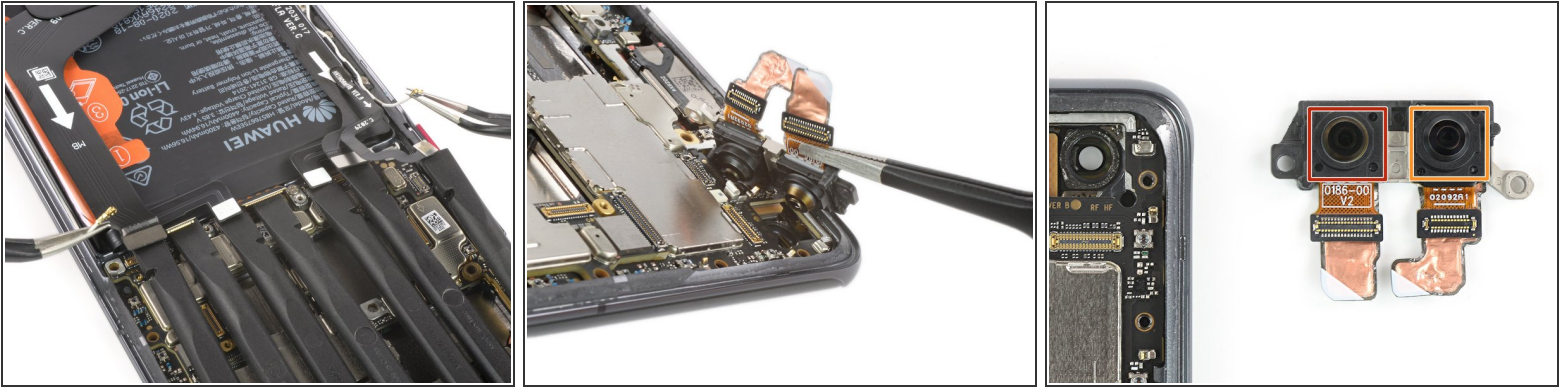
- The first component to come loose is not the motherboard shield or charging coil, but the flash sensor assembly.
 - ⓘ This is actually decent news, since [last year](#) the flash was part of the motherboard shield, not modular like it is now. When it comes time to make repairs, every little extra bit of modularity helps.
- Next, our [Marlin Screwdriver Set](#) dispatches some Phillips screws and we get our first glimpse at ~~machine-city~~ the motherboard.

Step 5



- We can now pull a few square camera modules from their home in the round *Space Ring*.
- Here are the Mate 40 Pro cameras laid bare:
 - 50 MP, $f/1.9$ wide camera (23 mm) with a $1/1.28''$ RYYB pattern Sony IMX700Y sensor (1.22 μm pixel size)
 - By comparison, the new wide sensor in the [iPhone 12 Pro Max](#) touts a 1.7 μm individual pixel size, albeit at lower res.
 - Generally speaking, larger camera sensor pixels can absorb more light and capture sharper images in low-light scenarios. Pixel size doesn't always *directly* correlate to better images though, especially with modern computational photography tricks.
 - 12 MP, $f/3.4$, telephoto camera (125 mm) with 5x optical zoom and OIS featuring an RYYB pattern Sony IMX351Y sensor
 - 20 MP, $f/1.8$, ultrawide camera (18 mm), featuring an RGB pattern Sony IMX718 sensor
- ☑ One final note on cameras—the periscope zoom got its own housing this year, which means it can now be replaced on its own. Yay modularity!

Step 6



- Like most smartphones, the Mate 40 Pro motherboard has a whole bunch of flex and antenna cable friends at this party, most of them inconveniently blocking our way to the silicon bar.
- With the help of a full squad of [spudgers](#) and tweezers we plow through the crew, stumbling over the selfie cam halfway through:
 - 13 MP, $f/2.4$, ultrawide (18 mm), Sony IMX688 sensor (1.22 μm individual pixel size)
 - ⓘ This is the first time we've seen an ultrawide angle lens in the selfie cam set-up of a Huawei phone. That means both front and rear cameras have up to 100° fields of view—just wide enough to include all those friends you haven't seen for months.
 - 2 MP ToF camera for 3D depth and biometrics
- ☑ If you're into high-res selfie videos, the Mate 40 Pro can shoot 4k HDR video with that 13 MP sensor. Not bad, Mate.

Step 7



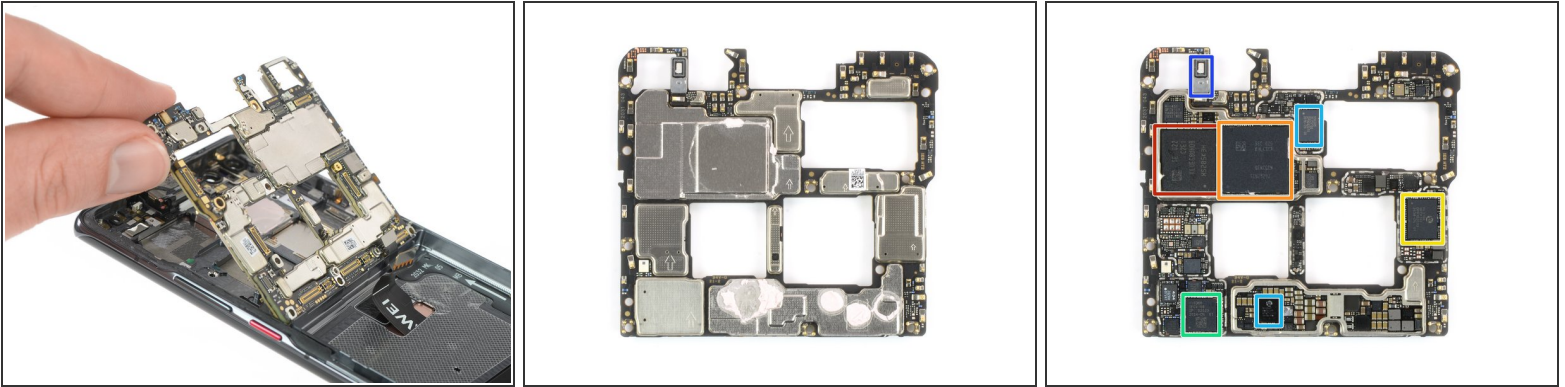
- The bottom third comes out next: these cables and components might not be flashy, but they all have one great thing in common: modularity.
- ① One minor oddity is this USB-C port flex cable, which spreads out in the middle like someone flattened it with a rolling pin. We're not sure why, but it seems unlikely Huawei did that just for fun.
- Betwixt all those cables, we have a fairly standard lower-half-of-a-smartphone situation on our hands here: SIM tray, small daughterboard, loudspeaker (32-bit/384 kHz), and some shielding.

Step 8



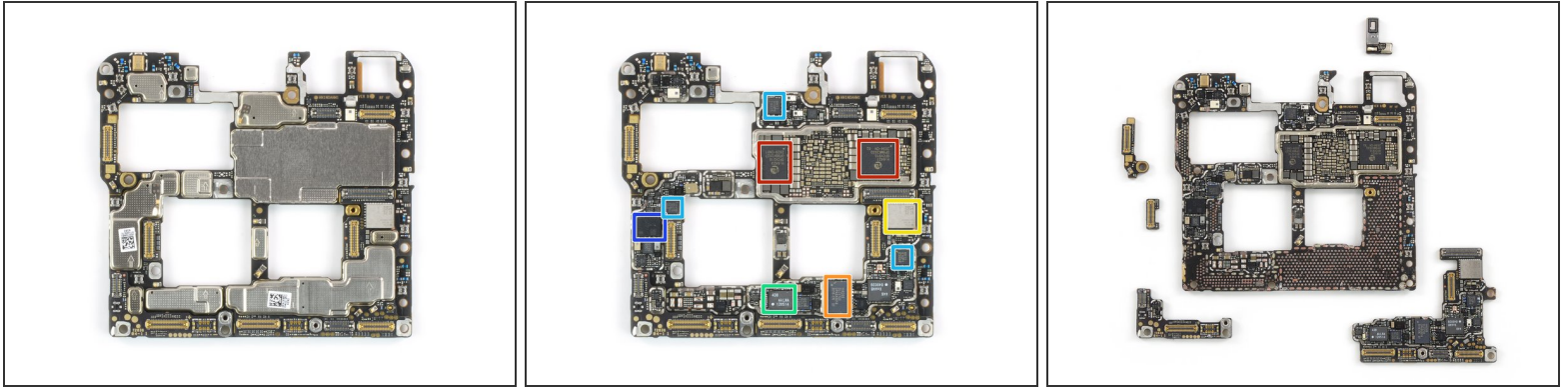
- Reaching the battery, we are quite happy to see that Huawei has *stuck* to its pumpkin flavored colored pull tabs, which allow for heatless battery removal.
- The Li-Ion battery in the Mate 40 Pro is 16.94 Wh (4400 mAh, 3.85 V)—slightly less capacity than the 17.32 Wh (4500 mAh, 3.85 V) cell we found in the [Mate 30 Pro](#).
- ❗ For more context, the [iPhone 12 Pro Max](#) L-shaped cell is 14.13 Wh (3687 mAh), the tiny [iPhone 12 mini](#) battery is 8.57 Wh (2227 mAh), and the [Samsung Galaxy S20](#) Ultra houses a giant 19.30 Wh (5000 mAh) pack.
- Those two connectors are very likely two separate routes for electrons coming in via a wire vs. those coming in *through the air* as seen in the [iPhone 11 Pro](#).
- ❗ This battery can be charged at up to 66 W with a cable, and up to 50 W wirelessly. Those are huge numbers! 66 W is more juice than either of the new [M1 MacBooks](#) sip from their respective charging bricks.
- The Mate 40 Pro can also dole out 5 W to another device via reverse wireless charging.

Step 9



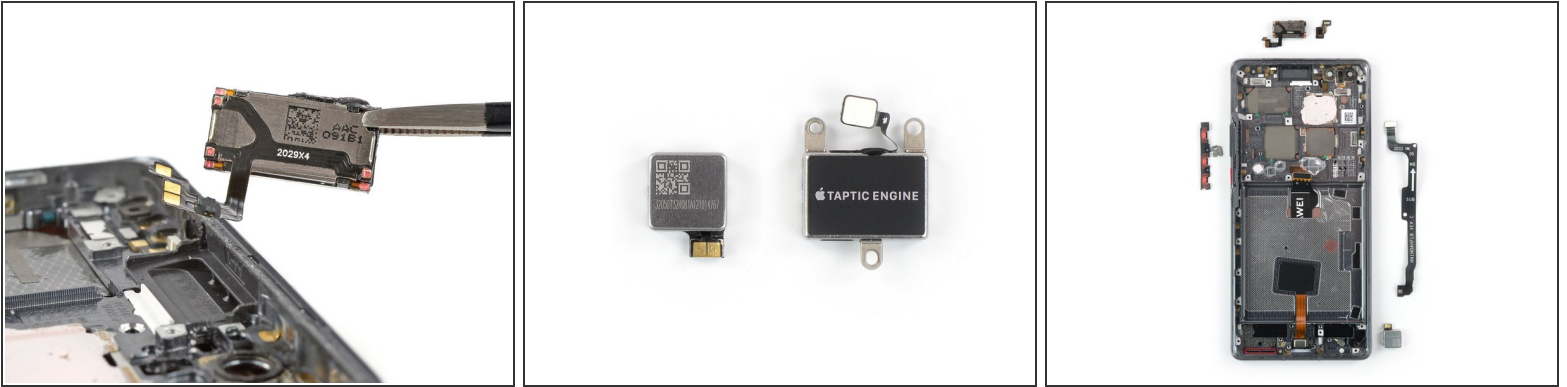
- Now that we've removed nearly everything else, we can finally make that trip to the silicon bar. Here's what's on tap today:
 - Samsung KLUEG8UHDB-C2E1 256GB UFS 3.1
 - ⓘ Strangely this Samsung seems to be replaced in the Pro+ and RS models by Huawei's self-developed SFS 1.0 flash memory according to a teardown from Gizmochina's [Jed John Ikoba](#).
 - A never-before-seen Chengyan K3LK3K30EM-CGCN LPDDR5 SDRAM from SEC (Samsung Electronics Corporation) layered over the 5 nm Kirin 9000 5G SoC with octa-core CPU (1x3.13 GHz Cortex-A77 & 3x2.54 GHz Cortex-A77 & 4x2.05 GHz Cortex-A55) & Mali-G78 MP24 GPU
 - HiSilicon Hi1105 Wi-Fi 6 module
 - HiSilicon Hi6365 RF Transceiver ([as seen in the Mate 20x](#))
 - HiSilicon Hi6525 Power management (top) and HiSilicon Hi6D05 Power amplifier (bottom)
 - Dot projector

Step 10



- On the flip side we find some more HiSilicon and some mystery chips:
 - HiSilicon Hi6421 and Hi6423 Power management IC ([as seen in the Mate 20x](#))
 - HiSilicon Hi6D05 Power Amplifier Module
 - 6S03V100 2029S13 0022
 - 438 AkLNA 120514
 - 6H12 V1GP1 63024/V1HP510025
- Most of the connectors are soldered onto the motherboard as the second layers only reveal contact points underneath.
- ① If you know more, feel free to to help us out and leave a comment.

Step 11



- Our friendship test is nearly finished, but let's fish out the final remaining components.
- First on the hook is a second speaker along the top edge of the phone, doing double duty as both an earpiece speaker and a second loudspeaker for stereo sound in landscape mode.
 - ★ This is not just an acoustical win, but also one for repairability! The structure-borne speaker driver we found in the [Mate 30 Pro](#) complicated display replacements. Nice to see that Huawei decided to omit this fancy (annoying) tech in the Mate 40 Pro.
- The second catch is the tiny linear actuator vibration motor. Since we've still got all these iPhones laying around, here's a comparison:
 - ⓘ The Mate 40 Pro's motor measures in at a puny 9.28 mm x 9.28 mm x 3.3 mm, making it just about half the size of the already-minuscule Taptic Engine from the [iPhone 12 mini](#).
- The last components in the net are a proximity sensor, a power and volume button cable, and one last interconnect cable.

Step 12



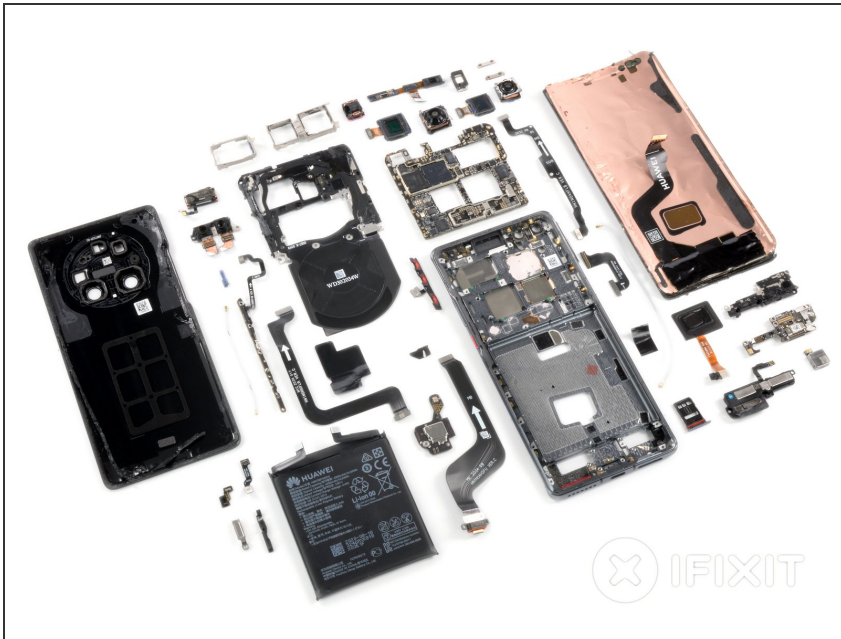
- For our last trick, we'll attempt to remove this 88° curved 6.76" screen.
 - ❗ Unlike [Apple's latest series of smartphones](#), Huawei didn't choose between 5G and a high refresh rate display—the Mate 40 Pro gets both! Making things even smoother, the display has a 240 Hz touch sampling rate.
- First, we treat the screen with copious amounts of heat. After several minutes of hard work, we manage to press our iMac Opening Wheel under the screen ... only to watch the glass *immediately* shatter.
- ☑ Our hunch is that Huawei may be using a stronger new adhesive for this Mate 40 Pro display. Even after *more* heat, the screen refuses to yield—no matter which tool we use, or what angle we attack.
- We knew going into this that curved displays were a nightmare to remove, but even we were not prepared for how terrible this one would be. No thanks, Mate.

Step 13



- We refuse to surrender after coming so close to full disassembly. After a few more cracks and plenty of cursing and prying, we manage to peel back the display. Ta-da!
- No matter which way you cut it (and boy did we cut it), display replacements for the Mate 40 Pro will be horrible. Can't say we're surprised—just disappointed.
- With a final weary sigh, we remove the under-display fingerprint sensor. There's no way to replace this part without removing the screen, so... let's hope it doesn't break.

Step 14



- After the display debacle, our journey with the Mate 40 Pro comes to a somber end. Just like that, its many components lie peacefully in front of us, ready for our final judgement.
- Though it was eager to befriend us, the Mate 40 Pro turned out to be hiding some unpleasant secrets.
- Its relative modularity and battery pull tabs are heartwarming, but booby trap cables and a disorganized design are the first drops of rain on the parade. The downpour starts when you get to the display though. No critical component should be that difficult to replace.
- *i* It was nice to see Huawei make the call to return to the original stereo speaker setup: the new/old earpiece speaker is a modular part that greatly simplifies replacements.
- Let's find out just how friendly this Mate will be to its future owners! Keep scrolling to see our repairability score.

Step 15 — Final Thoughts

REPAIRABILITY SCORE:



- The Huawei Mate 40 Pro earns a **4 out of 10** on our repairability scale (10 is the easiest to repair):
 - Huawei uses standard Phillips screws throughout the phone.
 - All major components are modular enough to be accessed/replaced independently... if not easily.
 - Pull tabs make the battery removal easier, but you'll have to work your way through plenty of cables and covers first.
 - Glass on front and back doubles the likelihood of drop damage.
 - The display adhesive is insanely strong.
 - The display can't be replaced without removing the battery, and the under-display fingerprint reader can't be replaced without removing the display.