



Huawei P20 Pro Teardown

Teardown of the Huawei P20 Pro in April 2018.

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INTRODUCTION

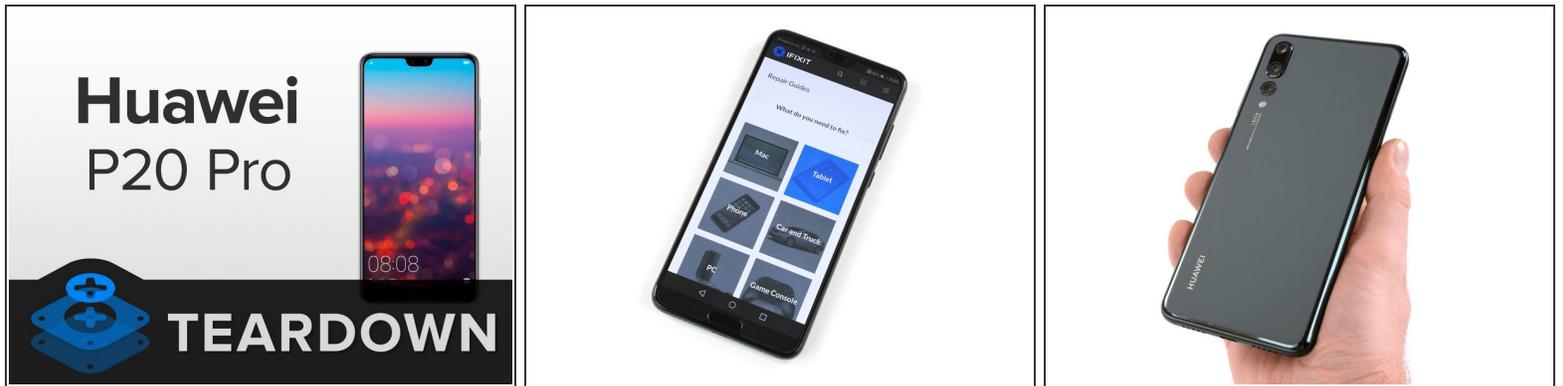
Huawei is angling for the high end segment with its three-eyed raven P20 Pro. They packed a ton of tech in here, what with three cameras, plus a 24 MP selfie cam—all topped off by a notched display. Hate it or love it, we're tearing it down..

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TOOLS:

- [iOpener](#) (1)
 - [Phillips #00 Screwdriver](#) (1)
 - [iFixit Opening Tools](#) (1)
 - [iFixit Opening Picks set of 6](#) (1)
 - [Spudger](#) (1)
 - [Halberd Spudger](#) (1)
 - [Suction Handle](#) (1)
 - [Tweezers](#) (1)
 - [iFixit Adhesive Remover \(for Battery, Screen, and Glass Adhesive\)](#) (1)
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Step 1 — Huawei P20 Pro Teardown



- ~~Winter~~ spring is coming and so is the new flagship from Huawei. Let's have a quick look at those flourishing specs:
 - 6.1-inch OLED touchscreen with 2240 × 1080 resolution and an aspect ratio of 18.7:9
 - Octa-core Kirin 970 with Mali-G72 MP12 GPU and a dedicated NPU
 - Triple camera 40 MP + 8 MP + 20 MP, $f/1.6$ and $f/2.4$ main camera unit by Leica
 - 24 megapixel (no that's not a typo) $f/2.0$ selfie camera
 - 128 GB storage and 6 GB RAM

Step 2



- Unlike [Samsung](#), Huawei has opted to notch their display around its camera and earpiece speaker.
 - That said, the P20 Pro seems a little lukewarm on the notch front—the [EMUI](#) offers its user the option to ["hide" the notch](#).
- The notch isn't the only thing Huawei borrowed from Apple, it sports an [iPhone X-style](#) 1.4 mm mesa with two cameras and a more modest [iPhone 6-style](#) "button" for the monochrome sensor.

Step 3



- Stacked against (under) the P10, this new Huawei comes with some beefed up dimensions: 155 × 73.9 × 7.8 mm (6.10 × 2.91 × 0.31 in) and 180 g in weight.
- Flipped over, we see [evolution](#) in action: Two cameras bad, three cameras good!
- The 40 MP and 8 MP cameras work together to get a 3x optical zoom. The 20 MP monochrome camera brings more details and extra sharpness.
- Since the P20 Pro's "extra" cameras live on the back, and it doesn't need [Face ID hardware](#), its notch takes up a bit less real estate than the iPhone X it takes after (on the right).
- ⓘ Sizing aside, there's also some [interesting notch geometry](#) to consider.

Step 4



- But enough about the outsides—in teardown land, it's what's *inside* that counts.
- Eliminating [pesky pentalobes](#) was a welcome move, but no screws at all? Time to try our luck with the trusty [iSclack](#).
- To our surprise the P20 Pro opens almost as easily as a flower in the spring sun. Almost. We've never had to use an opening pick on a flower...
- This teardown is really starting to bloom, look at all that techy nectar—er, is this metaphor getting away from us?

Step 5



- We go to remove the back cover and are foiled! No fingerprint scanner back here and there's *still* a cable primed to be ripped during opening.
- ⓘ Looks like Huawei opted to mount the laser autofocus sensor on the rear case to stack it over the cameras.
- We finally get our hands on some screws and make quick work of the NFC antenna and motherboard shield.
- That's an NFC antenna, *not* a wireless charging coil—that crackable glass back is just for show, and for getting broken...

Step 6



- Finally, we come to the brains of this operation—the motherboard—and wrestle it free from its various connectors.
- Huawei [once again](#) sticks to its [usual](#) motherboard design, opting for a wider battery and a smaller board than [some other](#) Android phones.
- The trio of cameras comes along for the ride, holding fast to the board, with the rear flash module in tow.
- So many options, which to investigate first—cameras, or motherboard? We opt for the peepers and take the front-facing camera along for the ride.

Step 7



- The three rear cameras get by with just two connectors—the main camera and the monochrome camera share one port, while the telephoto camera gets the other all to itself.
 - From the side we can compare the relative elevations:
 - Left: 20 MP (monochrome $f/1.6$). Middle: 40 MP (main camera $f/1.8$). Right: 8 MP (telephoto $f/2.4$)
 - Lastly, we've got all four eyes lined up for inspection, including the P20 Pro's selfie cam with *only* 24 MP.
- i** Samsung's time atop the smartphone camera rankings leaderboard [lasted less than a month](#). Incredibly, the Pixel 2 is still holding its own in the top 5 with just a single main camera.

Step 8



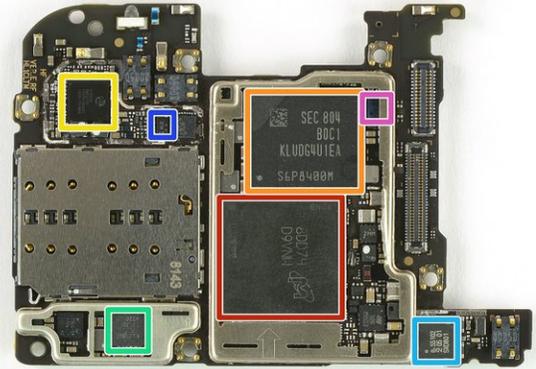
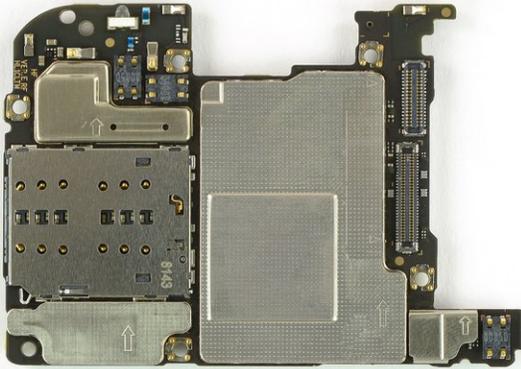
- The P20 Pro may not have a fancy [dual-aperture lens](#), but it can laser focus. And deep focus. And phase focus. And contrast focus. Basically, [it does a lot of fast focusing](#).
- Officially, only the little 8 MP telephoto cam gets hardware OIS—the others, saith Huawei, rely on Kirin's Neural Processing Unit for things like predictive focus, settings for over 19 different scenes, and filter effects like bokeh.
 - That said, this sure looks like OIS hardware to us—three OIS hardwares, to be exact. Are you holding out on us, Huawei?
- The primary RGB camera uses a 1/1.7 inch sensor (for reference: iPhone X 1/2.9 inch, Samsung Galaxy S9+ 1/2.55 inch) and has a maximum ISO of 102,400—ready for nightly skyline shots and party pix.

Step 9



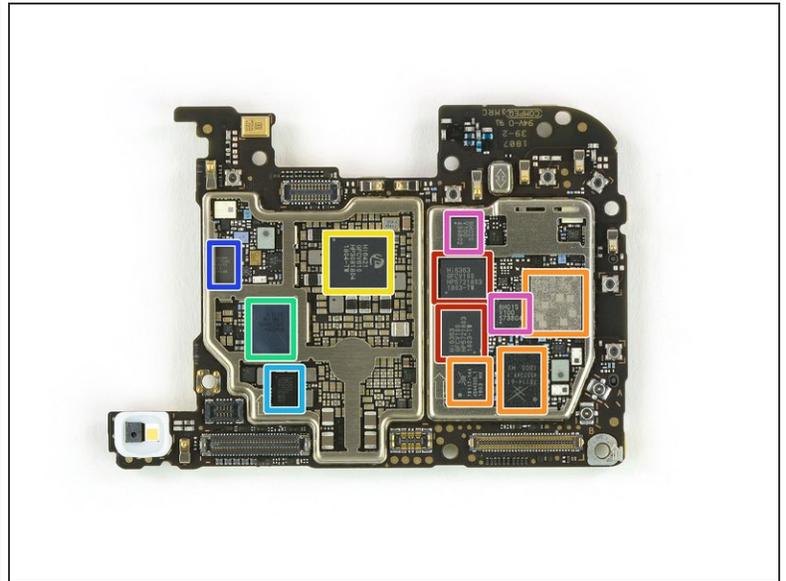
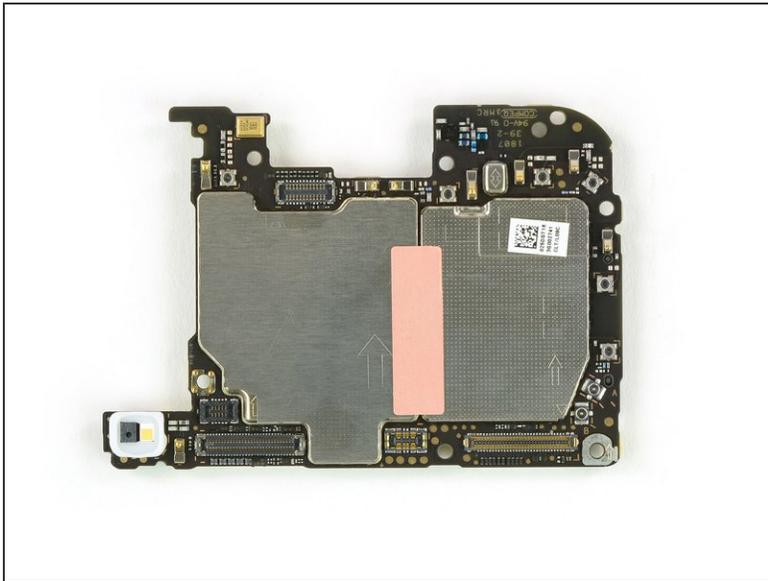
- Oh what the heck. We're as curious as you are, so here are the triplets completely dissected. You won't get more teardown for your money—wait, this is free.
 - And while we're at it, let's also take a closer look at the sensors.
 - In the middle is the 1/1.7 inch RGB sensor, with the 1/2.7 inch monochrome sensor cozying up to its left. On the right we see the telephoto with a 1/4 inch sensor.
- i** Probably some sort of memory near the image sensors for the first two cameras from the left.

Step 10



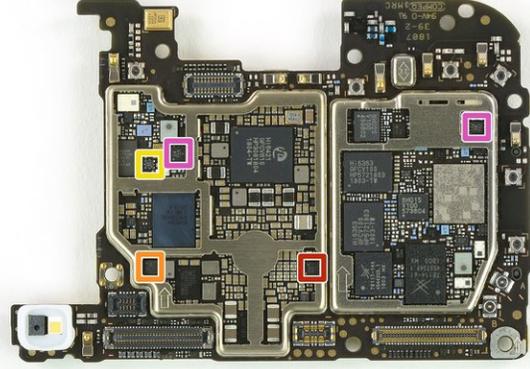
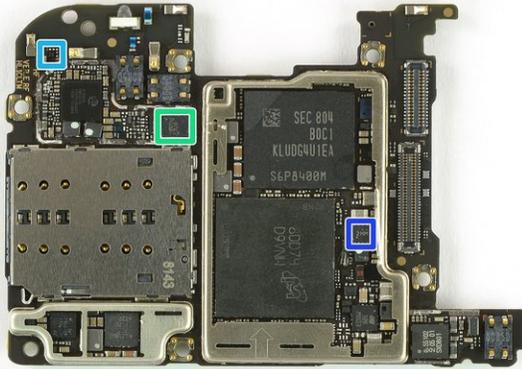
- What kind of [fancy chips](#) did Huawei pack in the phone? Let's see:
 - Micron [MT53D768M64D8WF-053 WT:D](#) 6 GB LPDDR4 SDRAM with the [Kirin 970](#) SoC underneath
 - Samsung [KLUDG4U1EA-B0C1](#) 128 GB V-NAND flash memory
 - HiSilicon [Hi6403-GWCV110](#) audio IC
 - Texas Instruments [BQ25895](#) I2C battery charger controller
 - NXP [55102 PN548](#) NFC controller
 - ON Semiconductor [NLAS2750](#) dual SPDT analog switch
 - ON Semiconductor [FSA644UCX](#) 1.5 Gbps 4-data lane switch

Step 11



- Let's flip it with a spatula and check the back:
 - HiSilicon [Hi6363-GFCV100](#) RF transceiver
 - Skyworks [SKY78113-14](#), [SKY78114-61](#), and [SKY78117-4A](#) Skyone Front End LTE modules
 - HiSilicon [Hi6421-GFCV810](#) power management IC
 - Cypress [BCM43596](#) Wi-Fi and Bluetooth module
 - HiSilicon [Hi6423-GWCV100](#) power management IC
 - Broadcom [BCM4774](#) GNSS receiver w/ sensor hub
 - HiSilicon [Hi6H01S](#) and Hi6H02S RF Switch/LNA

Step 12



- IC Identification, continued:
 - Texas Instruments [DRV2605](#) haptic driver
 - Texas Instruments [LM3642](#) boost LED flash driver
 - Skyworks [SKY13351-378LF](#) GaAs SPDT switch
 - STMicroelectronics [LSM6DSM](#) 3-axis accelerometer/gyroscope
 - AKM Semiconductor [AK09918C](#) 3-axis electronic compass
 - Richtek [RT8095GQW](#) 2 A synchronous step-down converter
 - Probably RF switches

Step 13



- We usually don't like barriers between us and battery replacements, but we might make an exception for this modular charging port. That'll be a painless replacement!
- Since we got this far without heat, we stay cool and attack the battery glue with some [drops of magic](#). Wait just a tick—then, opening pick.
- As smartphone batteries go, this one's a heavyweight—4,000 mAh at 3.82V, or 15.28 Wh.
 - That beats the [Samsung Galaxy S9+](#) (13.48 Wh) and the [iPhone X](#) (10.35 Wh) by far and is on par with its kinsman the [Mate 10 Pro](#). To be fair software has a big effect on power efficiency.

Step 14



- We turn our focus to the bottom of the frame and find a tiny daughterboard, hiding amongst a loudspeaker and vibrator motor.
- Compared to the battery extraction, the glue securing this collection of parts is a breeze—albeit a sticky one.
- But where's the headphone jack!?
- ⓘ Only the P20 Lite comes equipped with an aux port, whereas the vanilla and the Pro are a little more "[courageous](#)".
- Good thing that charging port is modular, because it'll be doing double duty with headphones and charging cables!

Step 15



- Time for one last iOpener/pick song and dance—for this refrain: display removal!
- We make the display assembly like a [banana and "split."](#)
- The display lifts out of the body, but only after the display cable makes a harrowing journey through a hole in the mid frame.
- ⓘ Luckily this repair will probably only happen to a broken screen—unluckily this common repair requires tunneling through a well-adhered glass back and the battery.

Step 16



- Display separated, we're left with not much intel. However, one item does remain.
- Some gentle prying and the home button is freed!
 - Lacking Face ID hardware or iris scanning, this phone still uses the "archaic" physical button. No word on whether it's locked to its motherboard.
- In an unusual twist, the proximity and brightness sensor is buried under the display in the midframe—making for a rather anticlimactic end to our teardown.

Step 17



- Time to move on! Throw a last glance at the insides of the [three-eyed](#) phone from Huawei and look forward to more teardown fun from iFixit!
- Want to see inside your own P20 Pro *without* taking it apart? Check out this [layered wallpaper](#) and download it on your phone!
- ① Wanna be the first to break the teardown news? Sign up for our [press list](#) and get the inside scoop!

Step 18 — Final Thoughts

REPAIRABILITY SCORE:



- The Huawei P20 Pro earns a 4 out of 10 on our repairability scale (10 is the easiest to repair):
 - Many components are modular and can be replaced independently.
 - Replacing the battery is possible but at the expense of some time and effort.
 - Double the risk for breakage with glass front and back.
 - Replacing the screen requires going through at least two layers of adhesive and some disassembly.