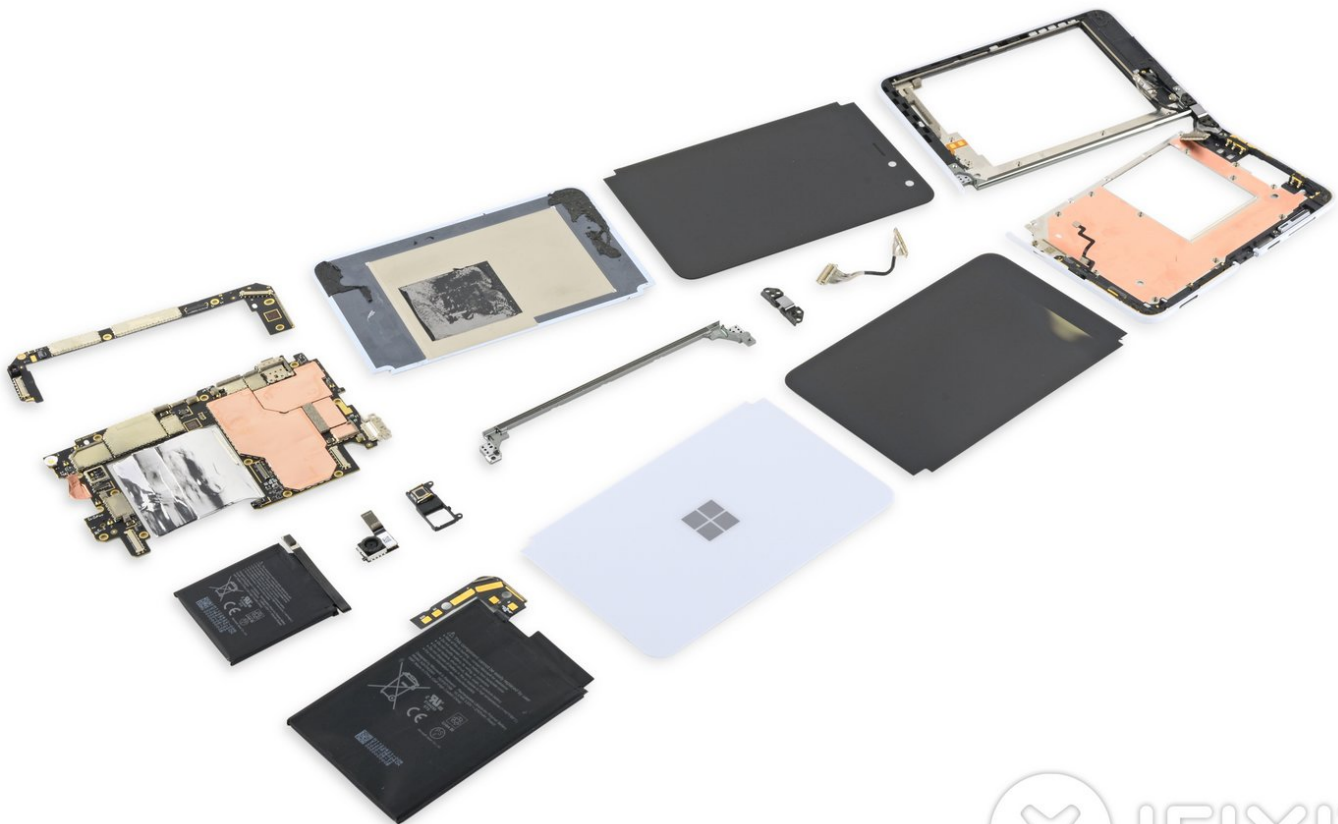




Microsoft Surface Duo Teardown

An exploratory teardown of the Microsoft Surface Duo, a brand-new take on foldables with a surprisingly simple hinge but precious few concessions to repair.

Written By: Taylor Dixon



INTRODUCTION

Microsoft has reportedly been working on the Surface Duo for six years. We can probably tear it down in less time than that, but with any brand-new form factor, there are no guarantees. Here's hoping the Duo boasts the repairability of recent Microsoft sequels like the Surface Laptop 3 or the Surface Pro X—otherwise, we could be in for a long haul. Let's get this teardown started!

For more teardowns, we've got a *trio* of social media options for you: for quick text we've got [Twitter](#), for sweet pics there's [Instagram](#), and for the phablet of the media world there's [Facebook](#). If you'd rather get the full scoop on what we're up to, sign up for our [newsletter](#)!



TOOLS:

- [T2 Torx Screwdriver](#) (1)
 - [T3 Torx Screwdriver](#) (1)
 - [T5 Torx Screwdriver](#) (1)
 - [Tri-point Y000 Screwdriver](#) (1)
 - [Spudger](#) (1)
 - [Tweezers](#) (1)
 - [Heat Gun](#) (1)
 - [iFixit Opening Picks set of 6](#) (1)
 - [Plastic Cards](#) (1)
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Step 1 — Microsoft Surface Duo Teardown



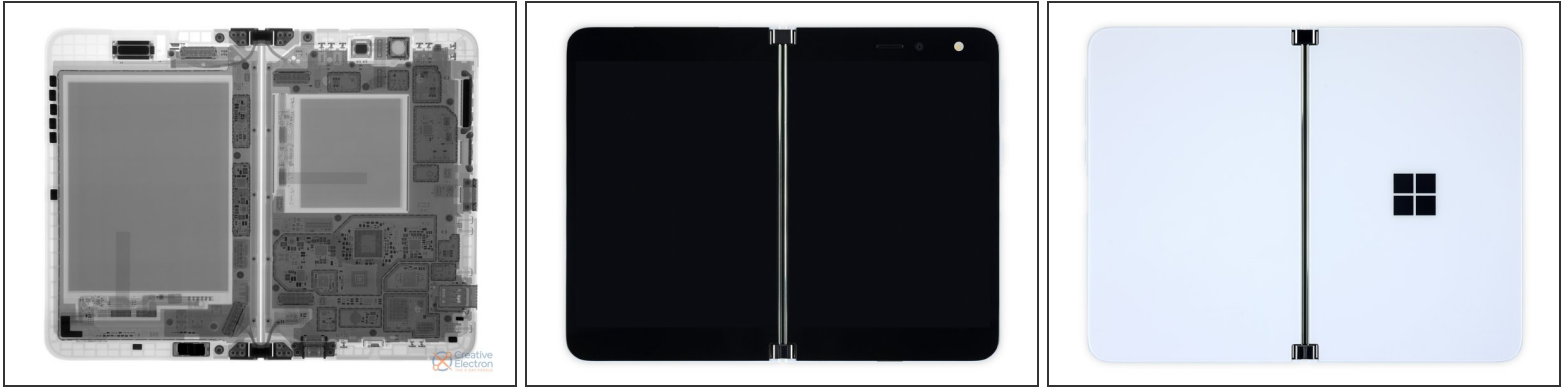
- The long-awaited Surface Duo is here! For \$1,400 you get two impossibly thin slices of hardware that you can fold up and put in your pocket... kinda. We're eager to see what's inside, and here's what we know about so far:
 - Two 5.6" AMOLED displays (each 1800x1350, 401 PPI)
 - Two batteries working in tandem, totaling 3577 mAh of juice
 - A Qualcomm Snapdragon 855 SoC paired with 6 GB of DRAM
 - 128 GB or 256 GB internal flash storage
 - A single 11 MP f/2.0 camera, optimized for both front and rear use
 - WiFi-5, Bluetooth, 5.0, 4x4 MIMO LTE, and USB-C 3.1 connectivity hardware
 - 360° hinges for unlimited folding potential

Step 2



- Unfolded, this "not a phone" is wicked thin—just **4.9 mm**. For comparison, the famously [so-thin-it-bends](#) iPhone 6 Plus was 7.1 mm.
- While it is a non-phone, the Duo features a removable SIM like [other Surface devices](#). (No handy [trap doors here](#), though.)
- When folded, the Duo undercuts Samsung's [original Fold](#) by 7 mm (9.8 mm thick vs the Fold's 17 mm)—ludicrously thin, if [less pocketable](#) than, say, the Moto Razr.
- The hardware honeymoon ends as we try to use the dysfunctional software to load a web page. Crashes, flashing screens, and flickers galore!
- ⓘ We're used to using broken devices (we *occasionally* break things around here), but [many reviewers](#) seem to be having similar software issues.
- Thankfully, Microsoft has promised [three years of software updates](#) for the Duo—long enough to iron out lots of kinks. But will this ultra-thin, all-glass slab last that long in your hands?

Step 3



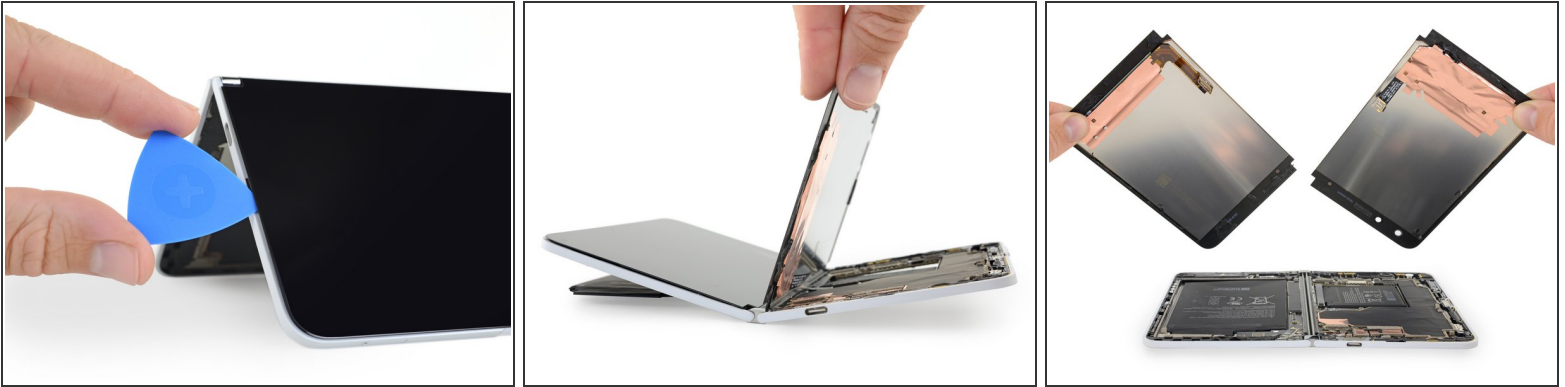
- Here's a view you won't see anywhere else, unless you have an X-ray machine from [Creative Electron](#). While our teardown is just getting started, theirs is already done.
- The Duo's entire left half bears a striking resemblance to a [miniature iPad](#)—great big battery, with a sliver of circuit board snaking around the right side.
- The right half looks like nothing we remember seeing before—it's almost a solid wall of circuit board, with a little window in the middle for the second battery.

Step 4



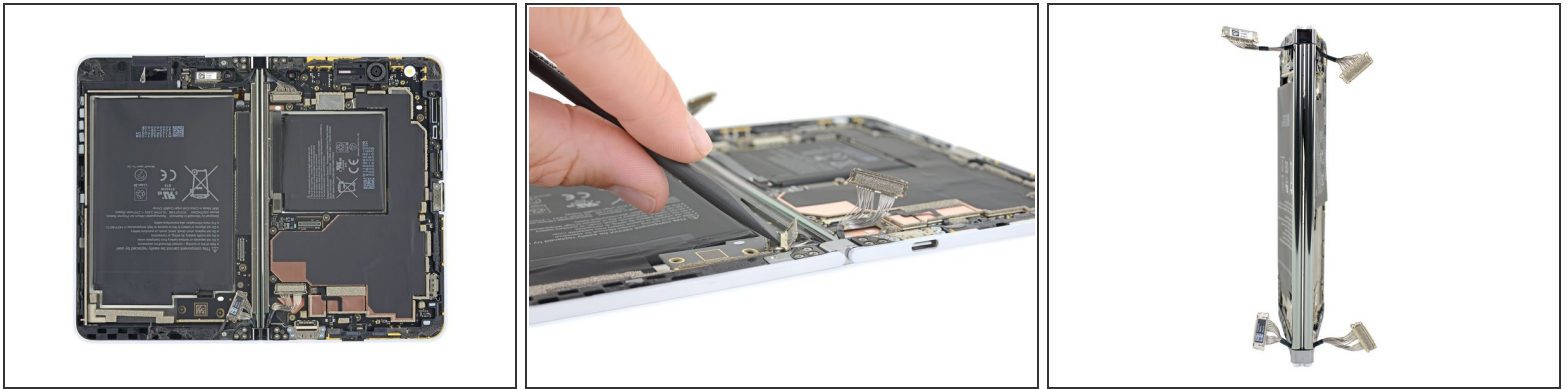
- Opening pick, meet chassis gap. That's right, no heat or suction cups necessary just yet! This is way too good to be true!
- ...and it is. We quickly get bogged down in adhesive and have to break out the heat gun.
- Further complicating matters, the panels are booby-trapped. Both batteries were firmly stuck to their respective rear panels, and tethered to the rest of the phone via fragile cables.
- Careful carving through graphene cooling sheets and sticky strips of adhesive eventually does the trick, but there is almost a casualty.
 - We nearly destroyed an [eensy flex cable](#) that houses some indicator LEDs and connects the earpiece speaker to the circuit board nearby.
- Alright, that ended up being much dicier than initial impressions led us to expect. Was this the right way in? Maybe the screens are supposed to come off first...

Step 5



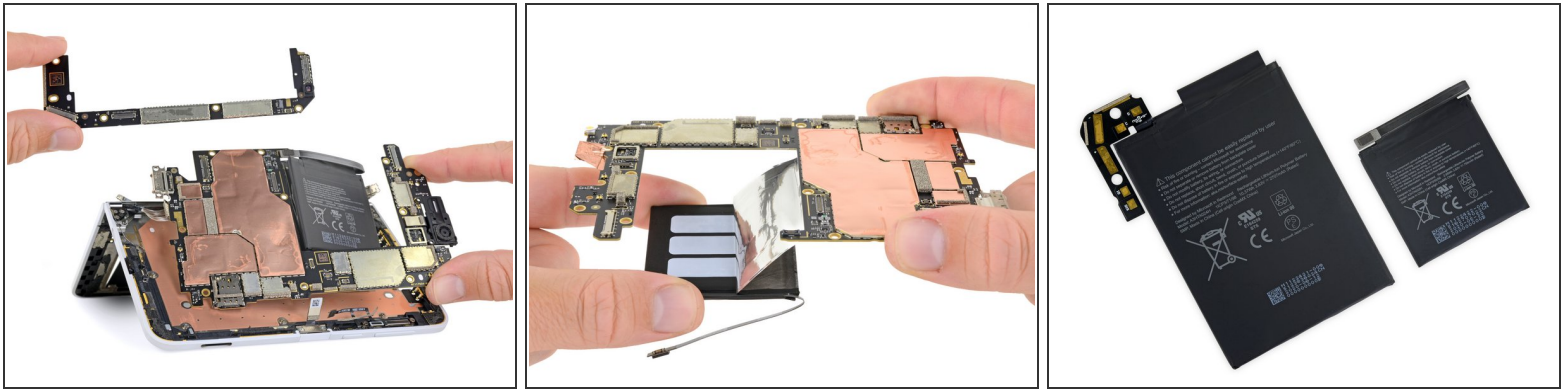
- On the flip side, we find some easy purchase under a speaker grille—the cutout is conveniently in the case rather than a thin part of the screen, making the glass a bit less prone to [cracking around our pick](#).
- That said, this screen-first entry is no picnic. Hefty heat, some booby-trap cables, and unprotected displays under the glass make this procedure a doozy.
- Eschewing those trendy and somewhat unproven folding displays in favor of a twin-screen configuration was bold, but potentially a lot of work if you ever have *two* cracked screens to repair. Double jeopardy!
- ❗ We suppose the dual-screen factor is what makes this a "Duo." That means if and when they transition to a foldable display, it will be a ... Solo?
- Like some of the other specs in this device, the displays are flagship-tier by 2019 standards, which means no high-refresh rate here. Just two venerable 60 Hz AMOLED panels from LG Display.

Step 6



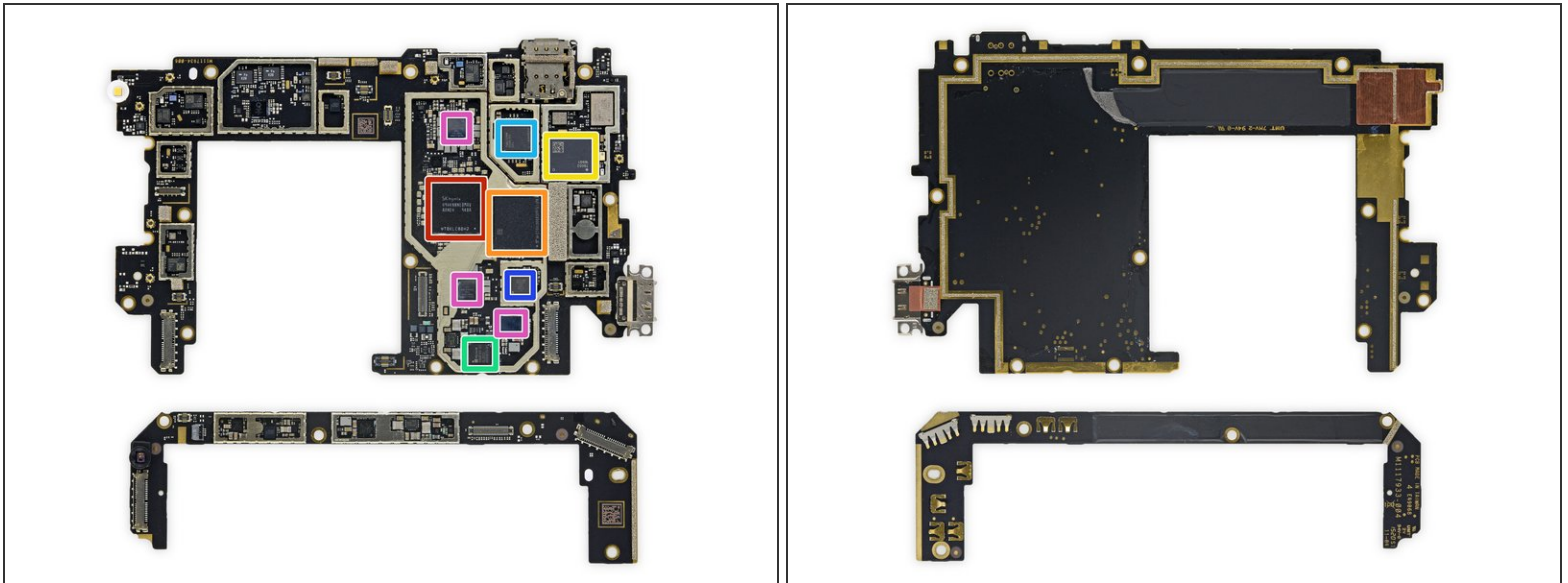
- Glass off, and right off the bat we spot the Duo's dual batteries. One battery in each half is shaping up to be standard for folding tech. Unlike other foldables though, the larger battery in the Duo is *bonkers* huge—easily double the capacity of its sibling.
- The Duo's hemispheres are connected by two multi-strand interconnect cables routed through the hinges. They remind us more of old-school [MacBook display cables](#) than the [flat ribbon cables we've seen](#) in other hinges.
- ★ We're hopeful that this style of cable will be able to hold up to a lot of abuse—ribbon cables seem to have issues [on occasion](#).

Step 7



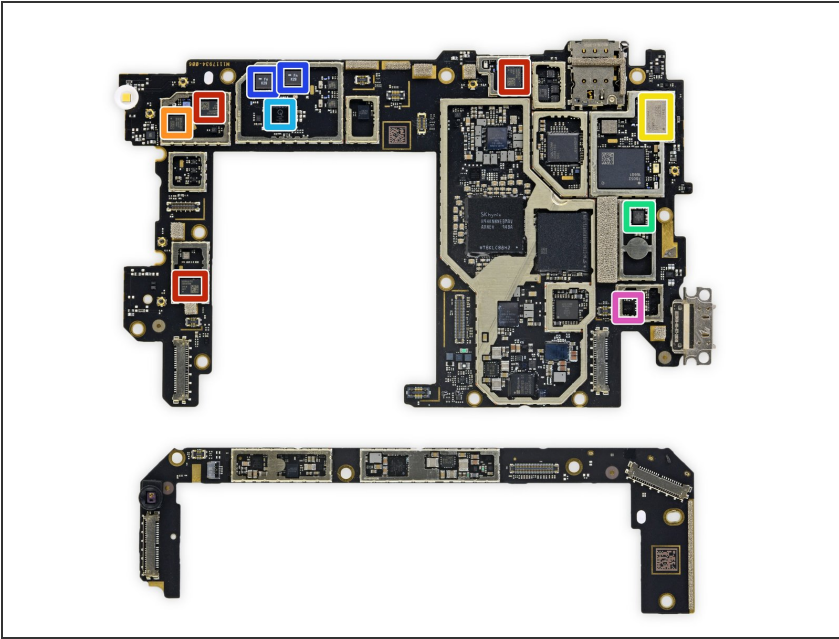
- Let's talk about battery replacement. Obstacle 1: glue. Lots. Obstacle 2: Tri-point screws. Yuck. Obstacle 3: One battery's connector is pinned underneath the motherboard.
 - ✦ As is often the case with Microsoft devices, it seems like the only way to kill power is to remove the board completely... Making any repair just a short circuit waiting to happen.
- It really doesn't seem like Microsoft had any thought of battery replacement in mind here. \$1400 is a lot to shell out for any device, let alone one with a built-in death clock.
- The larger of the two batteries clocks in at 10.37 Wh, and the smaller one at 2.89 Wh. That's good for a total of 13.26 Wh.
 - Both are quite fittingly labeled, *"This component cannot be easily replaced by user."* ([So, you're telling us there's a chance!](#))
- ❗ That's not quite [Galaxy Fold](#) or [Huawei Mate Xs](#) status (16.87 Wh and 17.32 Wh, respectively), but it's better than both smaller foldables: the [Galaxy Z Flip](#)'s 12.74 Wh and the [Moto Razr](#)'s 9.7 Wh.

Step 8



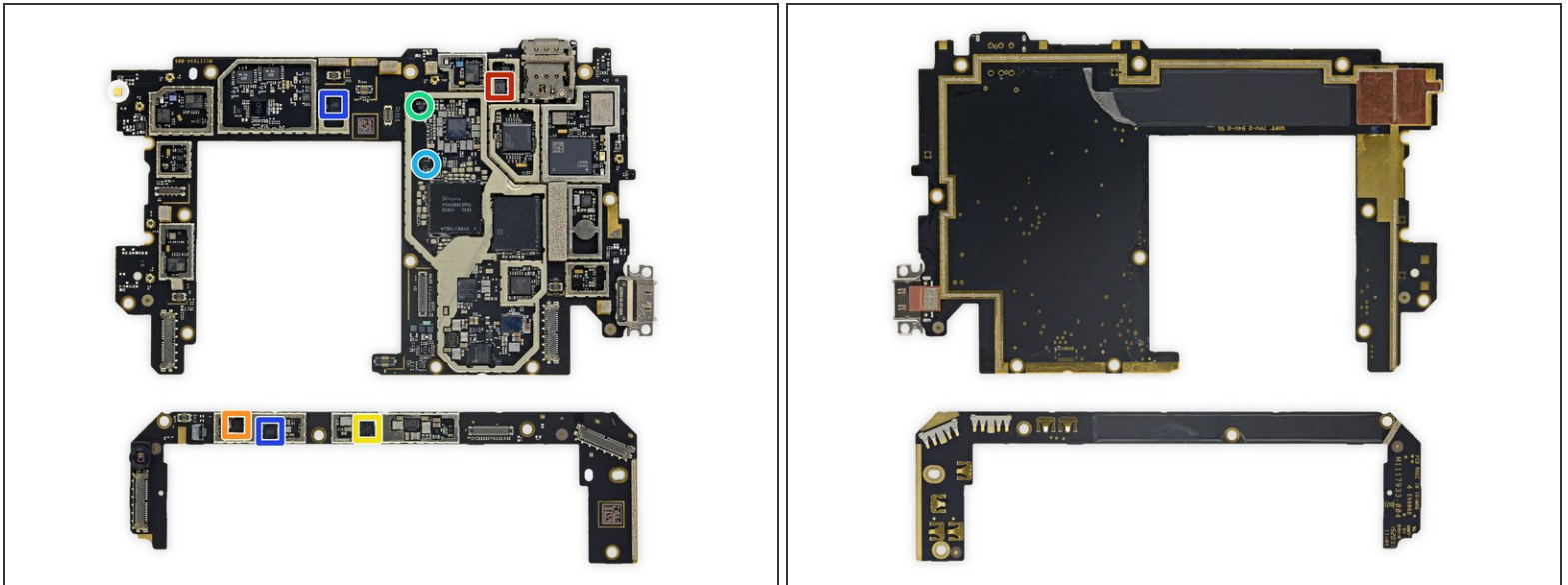
- And now for the main event, chips! A lot of this is last year's silicon, but that doesn't mean it's not worth stopping to catalog:
 - Qualcomm Snapdragon 855, layered under 6 GB of SK hynix DRAM
 - 128 GB Toshiba UFS 3.0 storage
 - Qorvo 78052 [RF Fusion](#) MHB front-end module
 - Microsoft X904163 display driver
 - Qualcomm SDR8150 LTE Transceiver
 - Qualcomm [WCD9340](#) audio codec
 - Qualcomm PM8150 power management ICs

Step 9



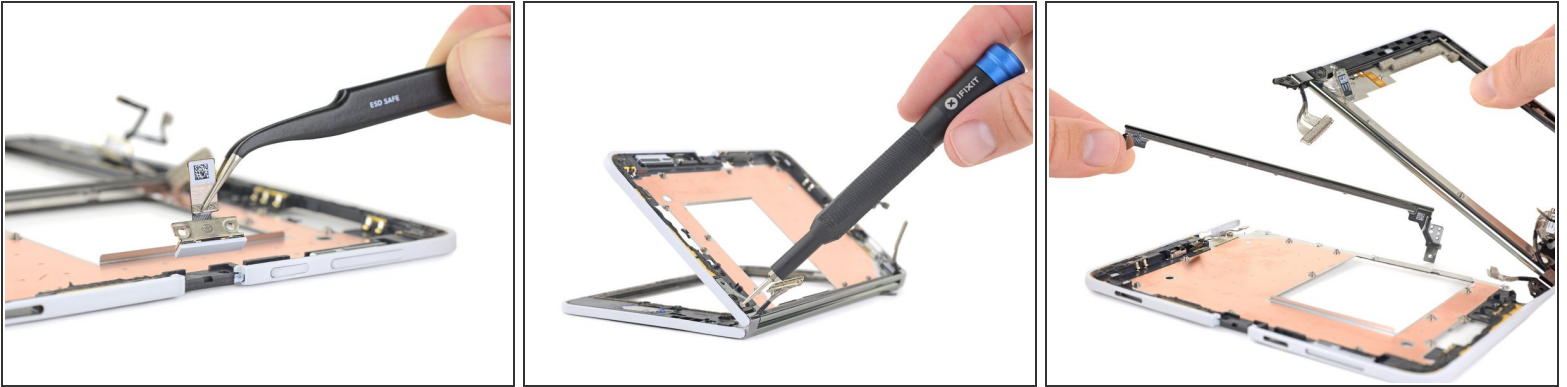
- If you thought those last chips were cool, wait till you see what else we found:
- Qualcomm QDM4670 front end module
- Qualcomm QDM4620 front end module
- Likely a Qualcomm QPM4621 power amplifier module
- Qualcomm QET5100 envelope tracker
- Qualcomm Atheros [WCN3998](#) 802.11 WiFi transceiver
- Likely Murata K29 front end modules
- ON Semiconductor [FSA4480UCX](#) USB-C analog switch

Step 10



- A third round, our treat:
 - NXP Semiconductor [NX3DV642](#) 3-lane high-speed MIPI compatible switch
 - Qualcomm [WSA8815](#) 4 W, Class D smart speaker amplifier
 - Qualcomm [SMB1381](#) battery quick charger
 - Nexperia [74LVC1G332GV-Q100](#) 3-input OR gate
 - Nexperia [74HC1G08GW-Q100](#) 2-input AND gate
 - STMicroelectronics [LSM6DSO](#) 6 DoF inertial measurement unit

Step 11



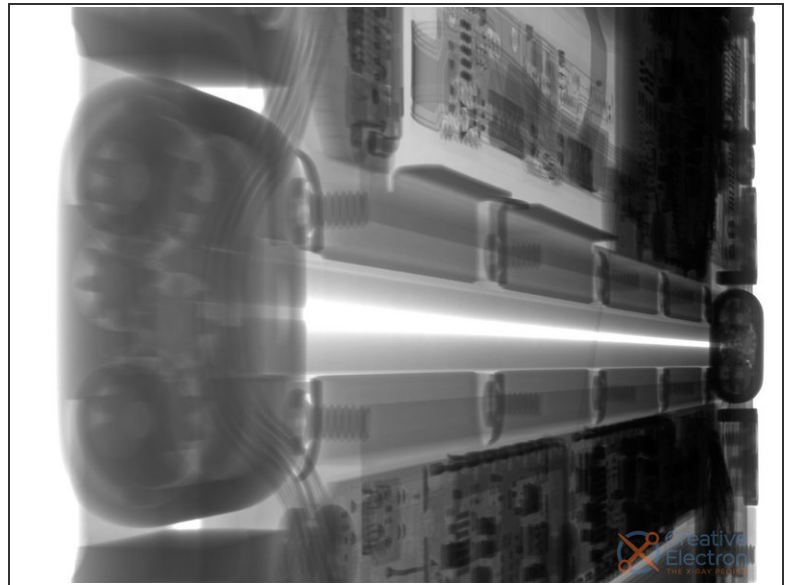
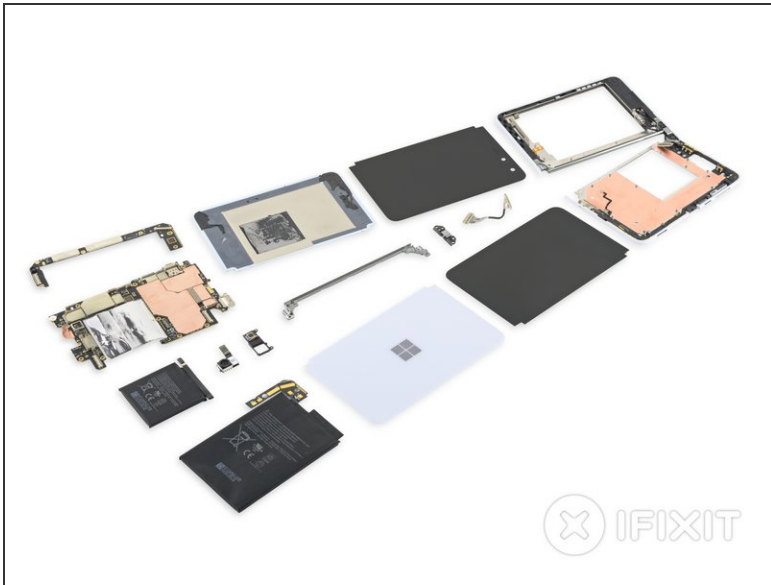
- The little divot on the side edge below the power button houses this stealthy, modular fingerprint sensor—easily accessed at this stage of disassembly, and not so easily accessed in any other sense of the phrase.
- ❗ Most Surface devices rely on *Windows Hello* for biometric verification (although fingerprint-reading cases exist). Our guess is the Hello tech was too bulky to include in this hyper-svelte form factor.
- Next we twist away tons of teeny Torx screws securing the spine and hinges—thankfully not quite so intense as the [original Surface Pro's](#) *ninety* screws, but it's still a workout.
- After a final de-boning, the two big wings are free to fly away from the central spine.
- ❗ These frames provide a lot of the device's structure and torsional rigidity, helping the two halves open evenly. This also provides mounting points for most of the internals, so it's not all stuck to the displays or the back cover.

Step 12



- Two geared hinges straddle the great divide and cling to each side's stabilizer bars with a trio of screws.
 - The board interconnect cables [dip into each hinge housing](#) as they cross over to the other side, preventing them from being pinched as the Duo performs its folding tricks.
 - It all makes for a refreshingly simple hinge design compared to those we've seen in other foldables. It's sort of like of like a miniature [360° laptop hinge, cable routing and all](#).
- ❗ *Simple* doesn't mean *easy*. No doubt Microsoft spent loads of time tuning these little folding mechanisms, and their work has paid off. The Duo *is* incredibly satisfying to open and close.

Step 13



- It's time to fold up our toolkit and reflect. What did we learn?
- Where Samsung and Motorola spent thousands of hours crafting elaborate hinges, external micro-screens, and hold-back-the-flood dust sweepers, the Duo is refined simplicity.
 - It's a bold, impressive idea, even if it was a bit of a mess to take apart.
- As with prior first-generation Microsoft portables, the thin, premium, category-creating Duo is not something meant to be repaired, maybe not even by Microsoft.
- Recent [Surface devices](#) have shot up the repairability charts, so we're hopeful that this is just the first chapter in the Duo story.
- Enough talk, let's give this thing a score. We'll give you a hint: it's Duo.

Step 14 — Final Thoughts

REPAIRABILITY SCORE:



- The Surface Duo earns a **2 out of 10** on our repairability scale (10 is the easiest to repair):
 - Displays and back glass covers can be replaced without disassembling any other components.
 - Batteries are glued and require extensive disassembly to service.
 - The USB-C port is soldered directly to the main board.
 - Uncommon tri-point screws secure key components.
 - Delicate OLED panels are not well protected from accidental prying, yet must be removed for most repairs.
 - Stubborn glue at all entry points complicates any repair attempt.