



Samsung Galaxy S9+ Teardown

Teardown of Samsung's 2018 flagship, the Galaxy S9+ performed by iFixit.

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INTRODUCTION

While phone makers and operating system developers of dubious numeracy skip straight from eight to ten, Samsung stays strong and gives us the Samsung Galaxy S9+ (sans notch, even). Only teardown will tell if this phone is a true contender, or just a weird AR Emoji machine.

We've also got a [teardown of the smaller, standard Galaxy S9](#)—check it out!

There's way more to iFixit than just teardowns! Check us out on [Facebook](#), [Twitter](#), and [Instagram](#) to stay up-to-date on all things tech!



TOOLS:

- [Heat Gun](#) (1)
 - [Suction Handle](#) (1)
 - [iFixit Opening Picks set of 6](#) (1)
 - [Spudger](#) (1)
 - [Phillips #00 Screwdriver](#) (1)
 - [Tweezers](#) (1)
 - [Halberd Spudger](#) (1)
 - [iFixit Adhesive Remover \(for Battery, Screen, and Glass Adhesive\)](#) (1)
 - [iSlack](#) (1)
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Step 1 — Samsung Galaxy S9+ Teardown



- The S9+ bumps specs, *and* the number of aperture sizes. Here's what we know:
 - Notchless 6.2" AMOLED Display with resolution of 2960 × 1440 (~530 ppi)
 - Qualcomm Snapdragon 845 or Samsung's own Exynos 9810, depending on location
 - 12 MP OIS dual-aperture main camera—f/1.5 and f/2.4 modes—plus a 12 MP OIS secondary camera and an 8 MP selfie cam
 - Headphone jack and microSD slot
 - IP68 water/dust-proofing rating
 - Android 8.0 Oreo

Step 2



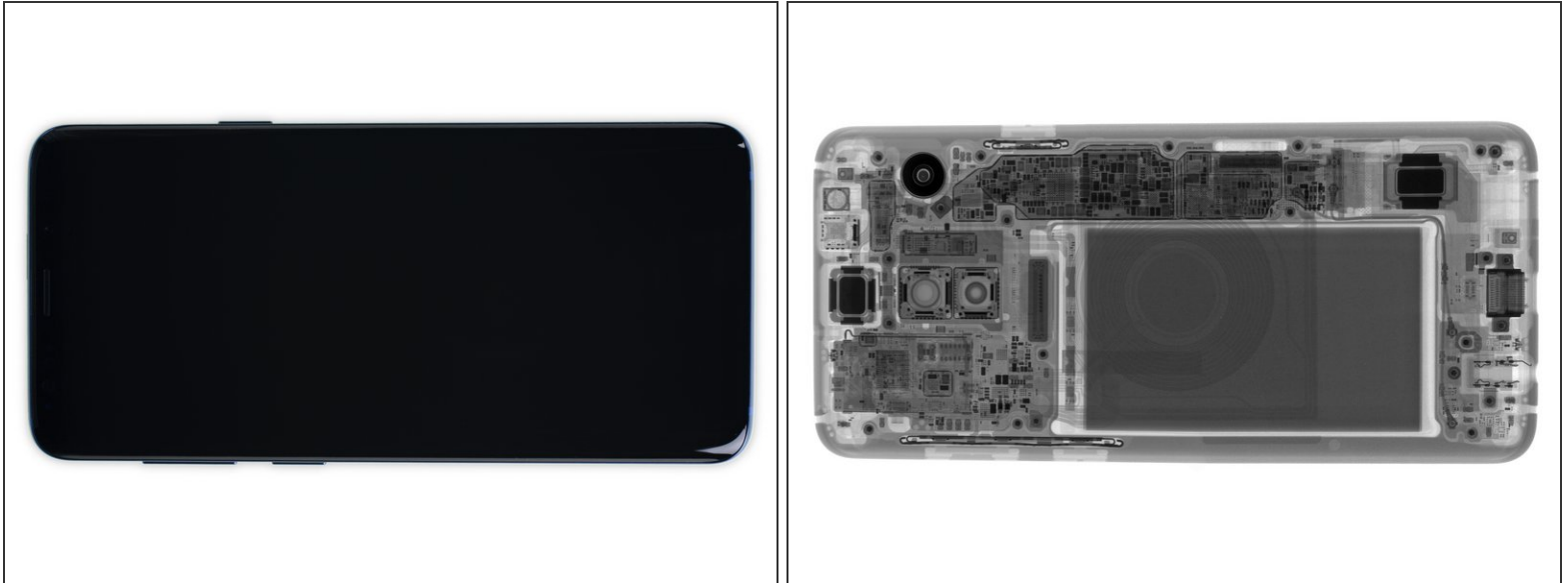
- Topside, we find the standard SIM slot, and a slightly rearranged camera/fingerprint sensor array. Say goodbye to [smudgy lenses](#)!
- The bottom end looks almost the same as the S8—yes, that means the 3.5 mm audio jack *lives*!
- At first glance , the speaker grille seems to be replaced with a port—but no, that's still a grille, with the mesh tucked wayyy back there. Is there a benefit to speaker holes you can fill with lint?
- ❗ As if the SIM-eject-impersonating microphone hole topside wasn't enough, now we've got a false charging port to match.

Step 3



- Admirably, in a [sea of iPhone imitators](#), Samsung stays notchless, *and* manages some pretty teeny bezels.
 - S9+ featured left and "bezel-less" notched iPhone X on the right.
- On the backside, the iPhone X camera bump may reach ugly heights, but the S9+ sensor arrangement is more sprawling and awkward looking in comparison.
 - These glass backs are rapidly becoming the industry standard thanks to wireless charging. Cool feature; bad news for butterfingers.
 - Of course, the iPhone 4S had a glass back you could replace in two minutes; we suspect that won't be the case here.

Step 4



- Before diving in, we call upon our friends at [Creative Electron](#) for some high-energy recon.
- Besides a new dual camera and some shuffling of minor components, things look pretty much the same here as they did [last time around](#).
- ❗ In fact, this battery-surrounded-by-motherboard layout is common in many recent smartphones, with [one notable exception](#).

Step 5



- While it's no [S4](#), the S9 is actually a welcome respite from our more recent, [destructive teardowns](#).
- The standard application of heat and opening pick helps us along, but it's definitely no picnic!
- Thanks to prior experience—no thanks to Samsung—we are able to safely dispatch the sensor assembly cable with no casualties. Documentation makes the dream work!

Step 6



- After navigating a treacherous opening, we find our way into the back of the phone.
- We head straight to the rear camera to get a look at the fancy new dual aperture camera in action.
 - ❗ The camera auto-adjusts the aperture to adjust for low light (at f/1.5 it's got the widest aperture of any phone) while maintaining a more standard (and sharper) f/2.4 for normal photos.
- Standard camera lenses [use at least five aperture blades](#) to keep the [aperture](#) roughly circular throughout many [f-stop](#) adjustments. This Galaxy's aperture has just two rotating, ring-like blades for its single adjustment.

Step 7



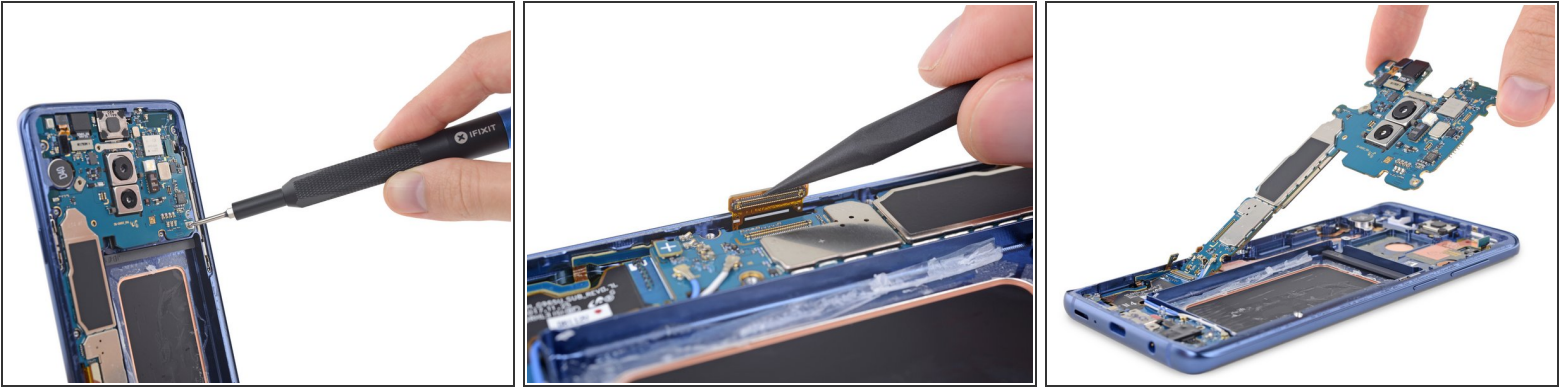
- The [relocated](#) fingerprint sensor becomes our first victim as we pry it from its home. A ring of stickiness keeps the sensor in, and your liquids out.
- We're a little disappointed Samsung hasn't yet thought up a better way to route that fingerprint sensor cable—it got ensnared in some nasty glue as we pried off the back cover, nearly costing us the sensor. Next year Samsung?
- Fifteen screws later, the familiar two-piece midframe wafer pops out, with its integrated wireless charging coil, antenna assembly, and lower speaker all aboard.

Step 8



- What do you need to remove a glued-down battery from a Galaxy phone?
 - **Option 1:** lots of heat, a pry tool, a fire extinguisher, a bucket of sand, and nerves of ~~steel~~ vibranium.
 - **Option 2:** a syringe loaded with a little [iFixit Adhesive Remover](#).
- We opt for the latter and splash a bit of the blue stuff into the little tub that cradles the battery. A few minutes later, we have our prize.
- ⓘ This here's a 3.85 V, 3500 mAh battery weighing in at 13.48 Wh. Sound familiar?
 - Yep, those are the [exact same specs](#) as the battery we found in the S8+ last year... and the [infamous Note7](#).
 - By the way, Samsung [really likes to put](#) this sticky black webbing on top of their batteries, and we've never learned why. Give us a shout if you can offer a clue.

Step 9



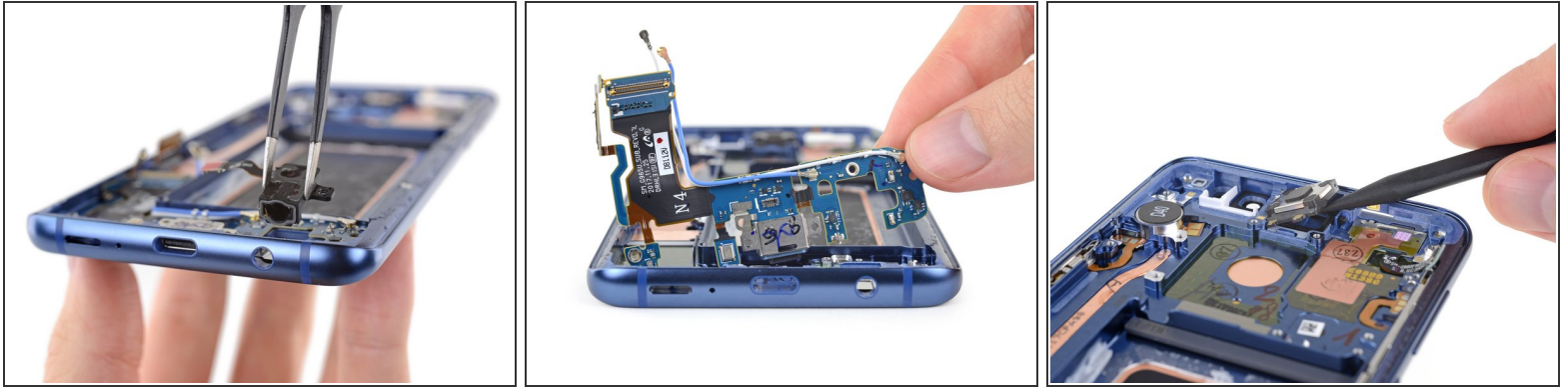
- We'll have the motherboard free as soon as we twirl away two screws and spudger off a couple FPC connectors.
- No one could have expected this display cable to be threaded through a slit in the chassis and latched onto the motherboard as if trying to pull it down to its doom...
- ...No one except for you, if you've read pretty much any of our Galaxy teardowns in recent years.
- Samsung, we see why you did it, but we're pretty sure you're smarter than this. It's 2018—show us a display we can disconnect and replace without having to carve off a glued-down back cover. We dare you!
- Motherboard achievement: unlocked.

Step 10



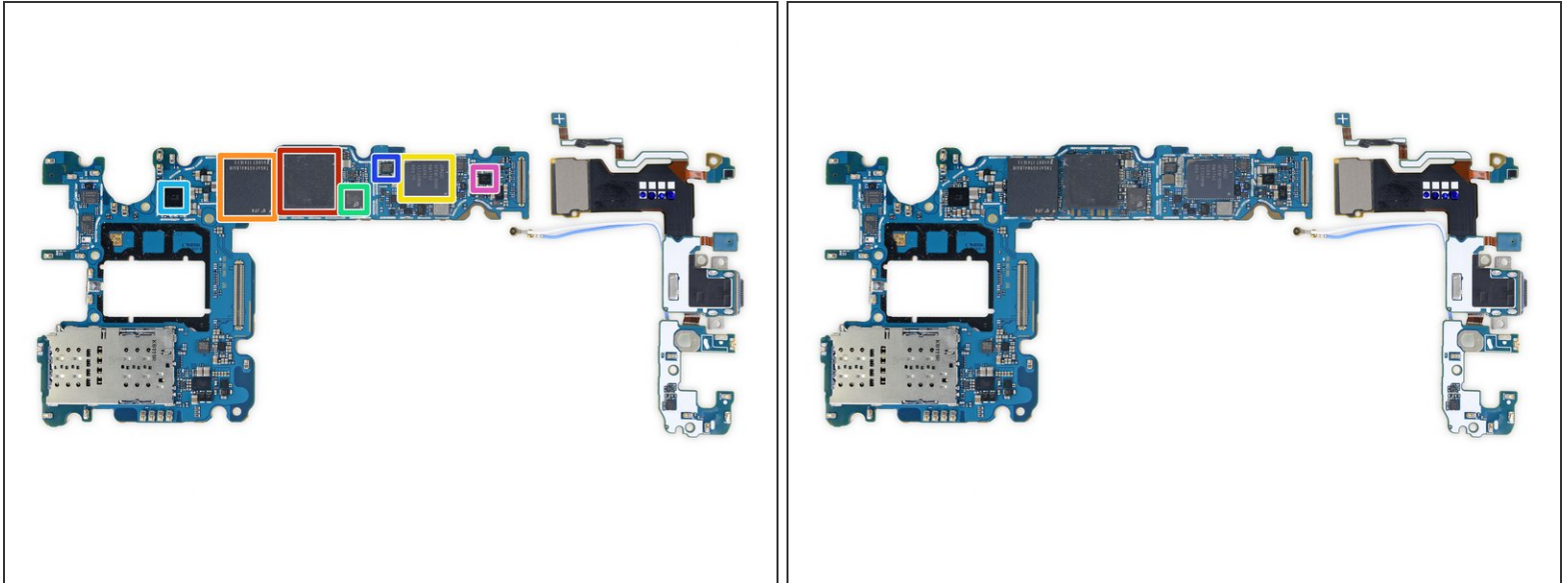
- Despite the dual image sensors, this double camera is a single unit, on a single PCB, with a single connector!
- The S9+ camera grand total now comes to four—in addition to the (newly) dual main camera, we have the selfie and iris cameras.
- ① An argument can be made that with the addition of the dual-aperture camera, the total is five cameras. Four image sensors yes, but five ways to capture those images.
- The camera line appears to be called Star this time, compared to last year's ["Dream"](#) cameras.
- Our friends over at [TechInsights](#) pulled the camera modules apart, and there are chips lurking in there. Samsung claims that their integrated DRAM helps the camera wrangle up to four times more image data. 960 FPS slo-mo, anybody?

Step 11



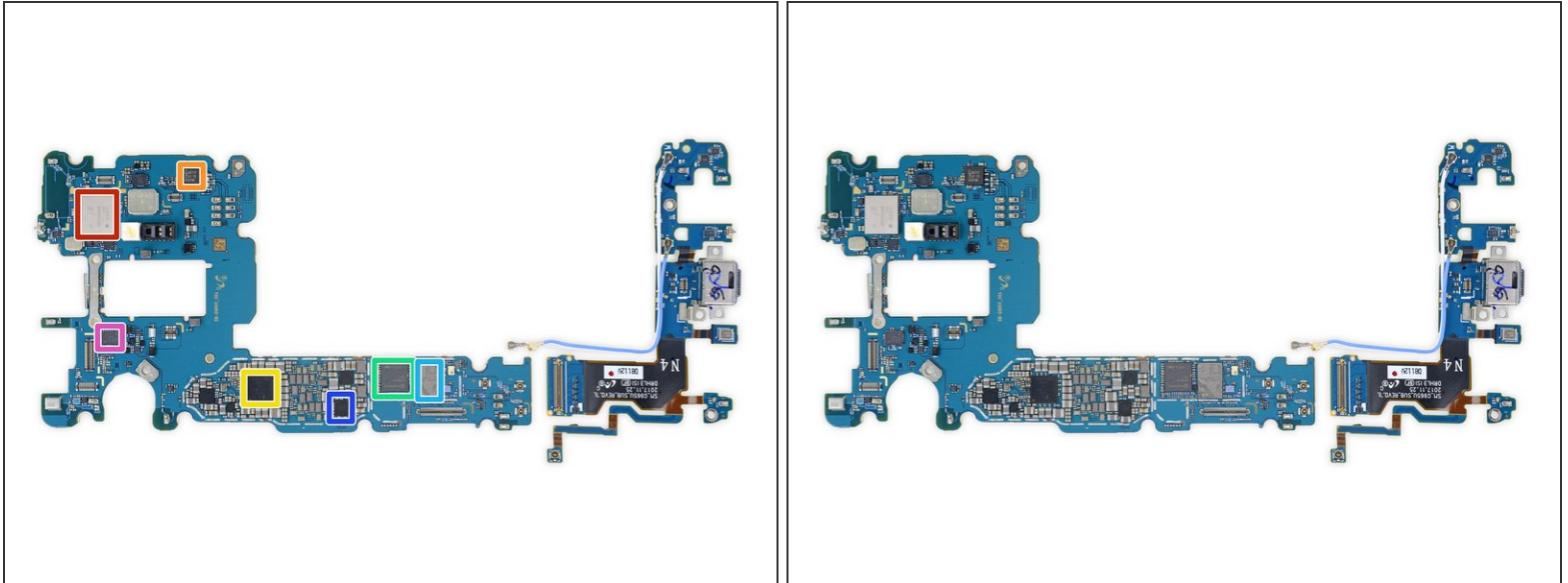
- The mighty headphone jack makes a valiant return. Its gasket protects the phone, and its modularity promises an inexpensive repair should it need replacement.
- We snag the multi-purpose daughterboard assembly, featuring coaxial interconnect cables, microphone, USB-C connector, and oodles of spring contacts.
- ❗ The daughterboard-mounted charging port is a cheaper and easier replacement than one on the motherboard. Thanks, Samsung!
- Next out is the second of the speakers—the earpiece—which newly doubles as a loudspeaker, enabling not just stereo but "*surround*" sound (such as a phone can offer).

Step 12



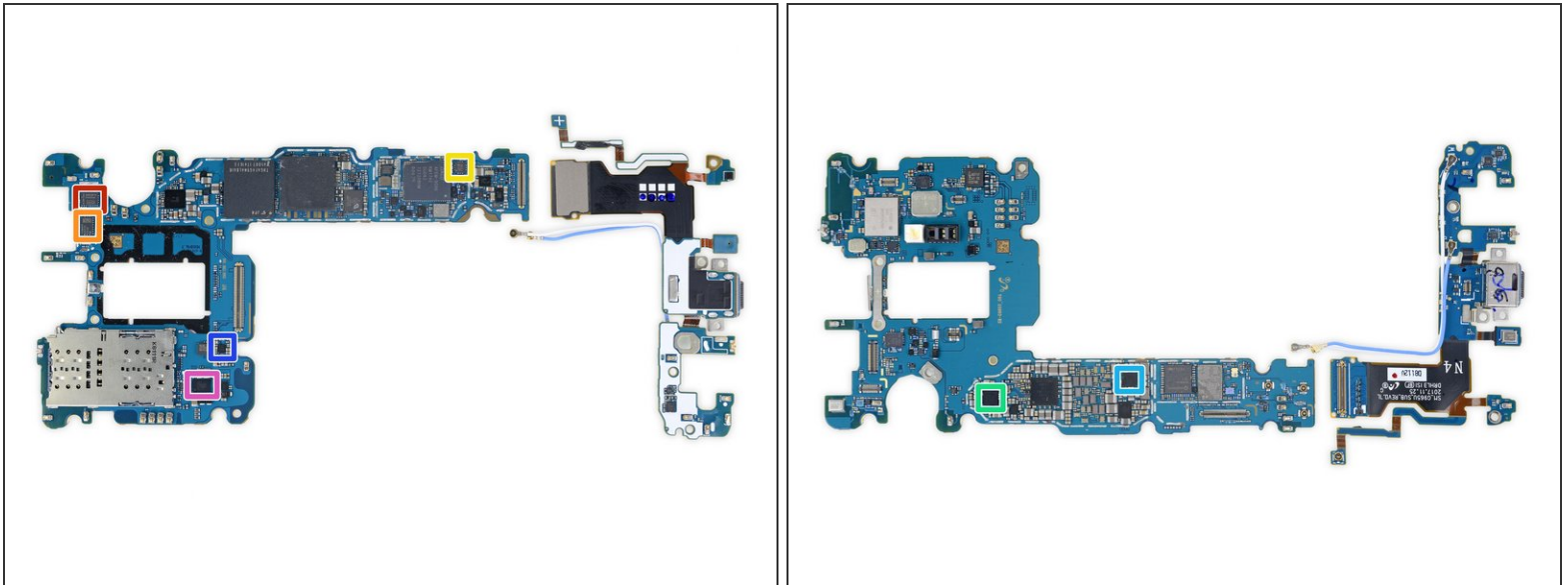
- Throw that mobo on the table and give it a spin! Side A has all the big hits:
 - Samsung [K3UH6H60AM-NGCJ](#) LPDDR4X 6 GB DRAM, layered over a [Qualcomm Snapdragon 845](#)
 - Toshiba [THGAF4G9N4LBAIR](#) 64 GB UFS (NAND flash + controller)
 - Avago AFEM-9096 front end module
 - Qualcomm Aqstic™ [WCD9341](#) audio codec
 - Maxim Integrated MAX77705F PMIC
 - Qualcomm [QET4100](#) envelope tracker
 - Maxim MAX98512 audio amplifier

Step 13



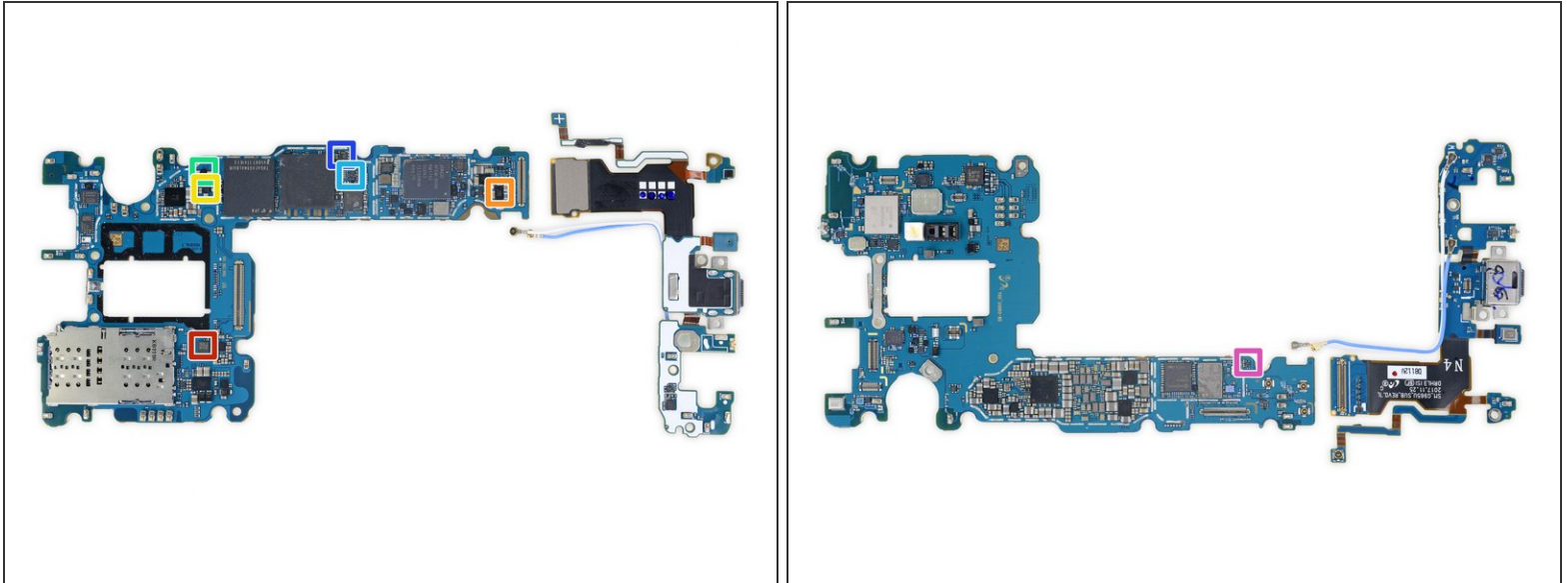
- Side B has all the hits they couldn't fit:
 - Murata KM7N16048 Wi-Fi/Bluetooth module
 - NXP [PN80T](#) NFC controller
 - Qualcomm PM845 (likely PMIC)
 - Qualcomm [SDR845](#) RF transceiver
 - Skyworks [SKY78160-11](#) WLAN front-end module
 - Qualcomm PM8005 PMIC
 - Skyworks [SKY13716-1](#) low band front end module

Step 14



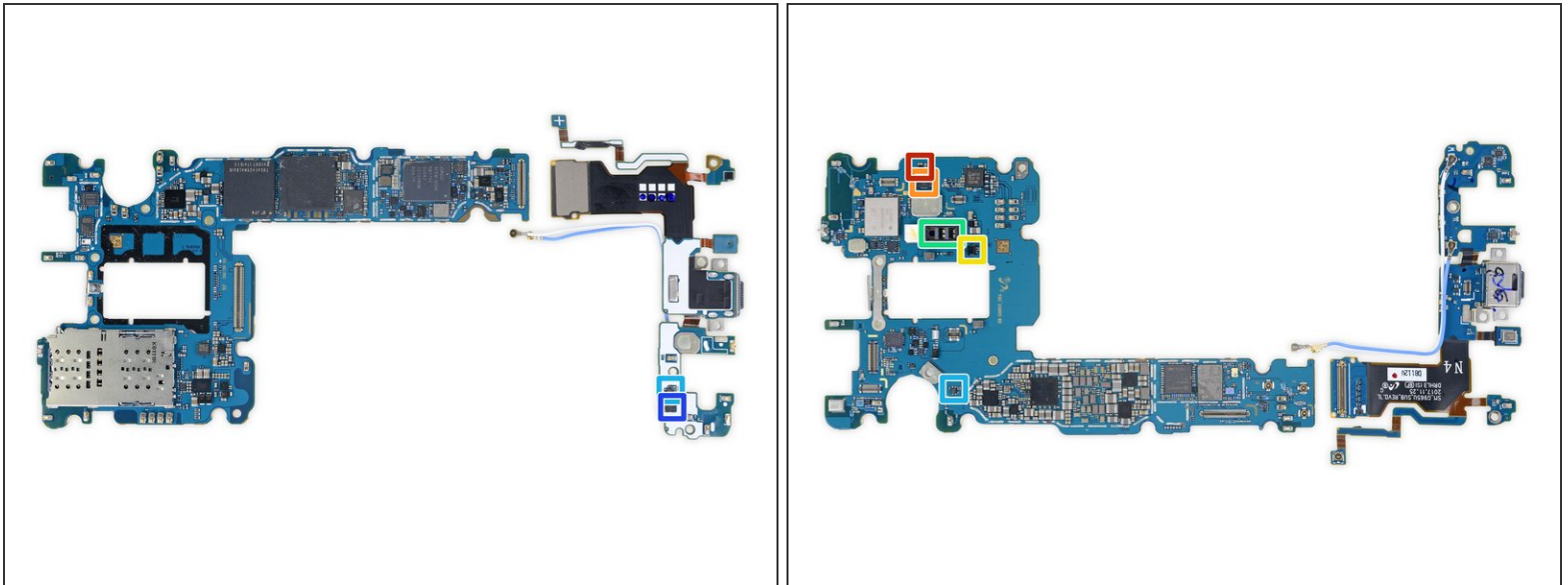
- IC Identification, pt. 2:
 - Qualcomm QDM3870 high-band diversity front-end module
 - Qualcomm D5319 mid-band diversity front-end module
 - RDA Microelectronics RDA6213N FM transceiver (likely)
 - Samsung S2MPB02 camera power management
 - Samsung S2DOS05 display power management
 - Samsung S2MPB03 camera power management
 - Renesas (formerly IDT) P9320S wireless power receiver

Step 15



- IC Identification, pt.3:
 - NXP Semiconductor [PCAL6524](#) 24-bit I/O expander
 - ON Semiconductor FPF3688UCX load switch
 - Texas Instruments boost converter (likely)
 - ON Semiconductor [FAN48618BUC53X](#) 1 A boost regulator
 - Vishay [DG2730](#) 2-port, 480 Mbps USB 2.0 DPDT analog switch
 - Richtek [RT8010GQW](#) 1 A step-down DC-DC converter
 - Texas Instruments [TPS7A05](#) 200 mA LDO regulator

Step 16



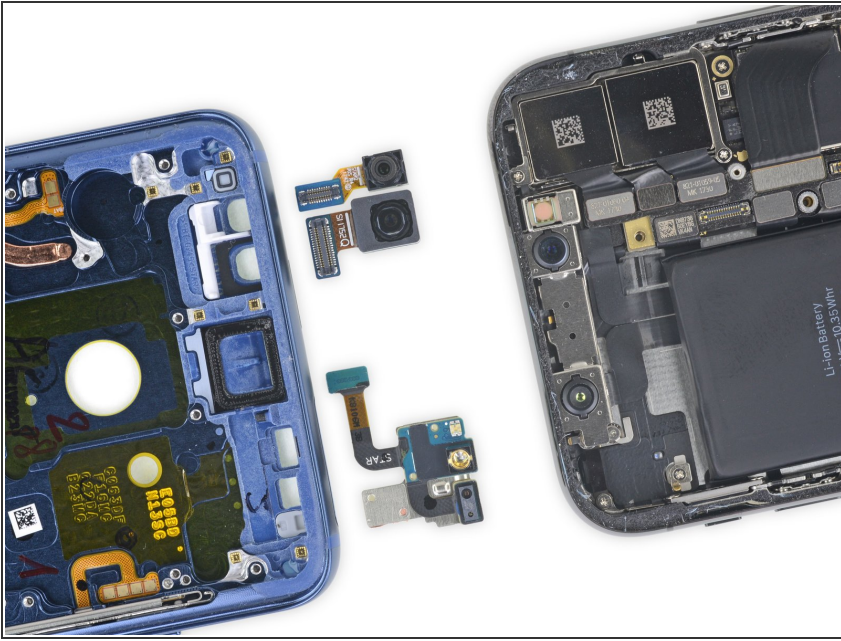
- IC Identification, pt. 4 (sensors):
 - STMicroelectronics [LSM6DSL](#) 3-axis accelerometer/gyroscope
 - AKM Semiconductor AK09916C 3-axis electronic compass
 - STMicroelectronics [LPS22HB](#) pressure sensor
 - heart rate sensor
 - Ablic (formerly Seiko Instruments) [S-5712CCDL1-I4T1U](#) hall sensor
 - Semtech SX9320 proximity sensor (likely)

Step 17



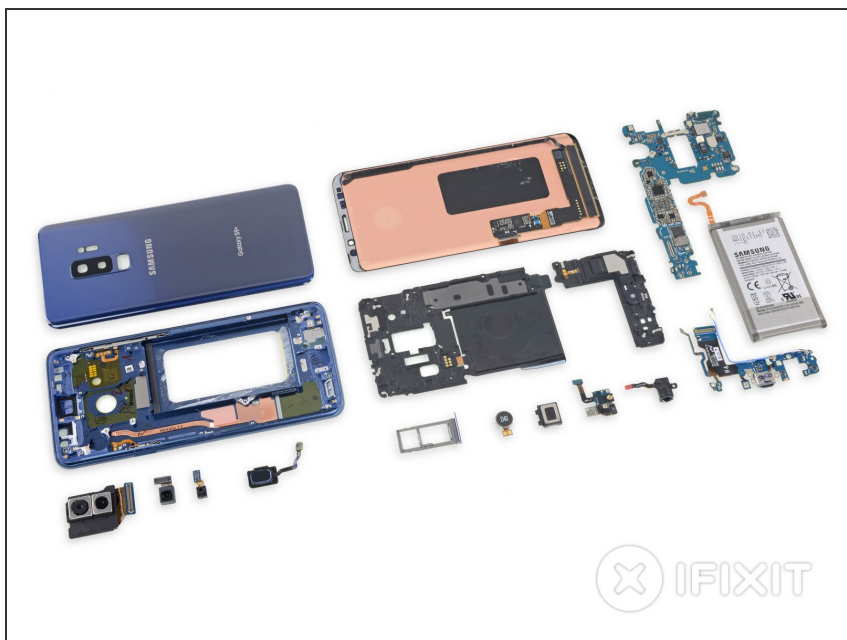
- It's a hotbed of teardown activity as we attempt to unseat the display—but this glue is trying our patience, and we abandon our pile of iOpeners in favor of a heat gun once again.
- As before, the heat and opening pick can do the job, but it's a marathon slog to get here if you're replacing a broken screen.
- The Samsung-made display cable, like the cameras, is labeled Star, and combines both display and digitizer in one sealed unit.
- There's two final chips piggybacked onto the display:
 - Samsung S6SY761X touch controller (as seen on the S8 series)
 - Winbond [W25Q80EWUXIE](#) 8 Mb serial NOR flash

Step 18



- Time for a biometrics faceoff.
 - On the left, looking pretty much exactly like [what we found last year](#), we have the S9+ hardware: iris scanner, front-facing camera, IR emitter, and proximity sensor (likely AMS TMD4906).
 - On the right, the *raison d'être* for [Apple's infamous notch](#): Face ID hardware including a front-facing camera, IR dot projector, IR camera, plus room for the flood illuminator and rangefinder embedded in the display.
- ✦ Some assembly required.
- Based on early reviews, it may have been overly ambitious of Samsung to jump on the Animoji train without a hardware update to bring it up to speed.

Step 19



- That's a wrap! For now anyway. Feast your eyes on these Galaxy S9+ bits and look forward to more teardown fun from iFixit!

- ① Wanna be the first to break the teardown news? Sign up for our [press list](#) and get the inside scoop!

Step 20 — Final Thoughts

REPAIRABILITY SCORE:



- The Samsung Galaxy S9+ 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.
 - The battery replacement is technically possible, but accessing it is an unnecessary challenge.
 - Glued-down glass both front and back means greater risk of breakage, and makes repairs difficult to start.
 - Screen repairs require a lot of disassembly while battling tough adhesive.