



# Apple Watch Series 5 Teardown

Teardown of the Apple Watch Series 5 GPS+Cellular, performed in Germany on September 20, 2019.

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## INTRODUCTION

What's new in the Apple Watch Series 5? It looks like a Series 4, it feels like Series 4, it ticks like a Series 4. Let's find out why there's a new version, and what if anything on the inside has changed—with a quick teardown!

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## TOOLS:

- [iOpener](#) (1)
- [Technician's Razor Set](#) (1)
- [iFixit Opening Picks set of 6](#) (1)
- [64 Bit Driver Kit](#) (1)
- [Tri-point Y000 Screwdriver Bit](#) (1)
- [Tweezers](#) (1)
- [Spudger](#) (1)

## Step 1 — Apple Watch Series 5 Teardown

### Apple Watch Series 5



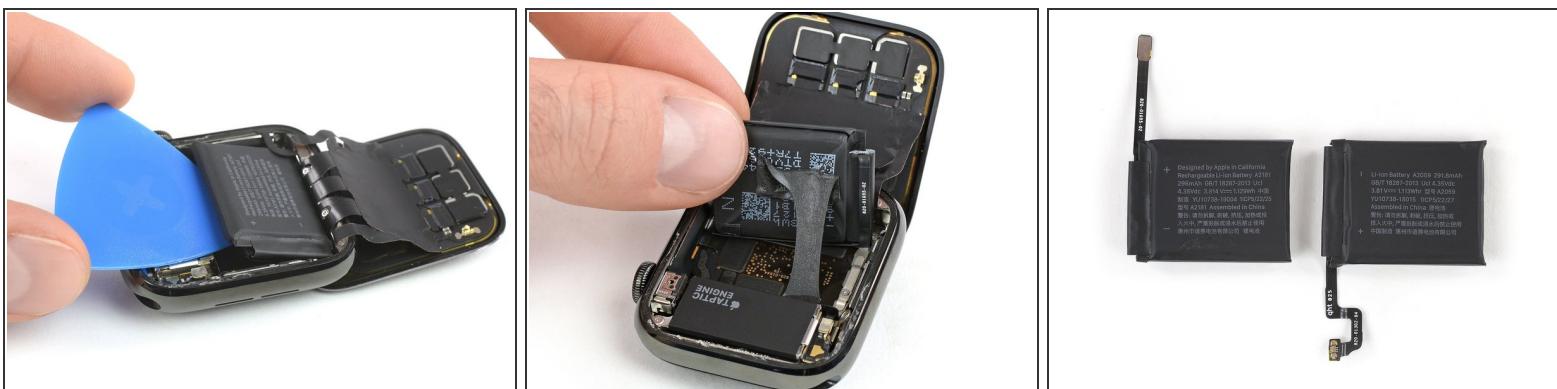
- A quick comparison of the Series 5 with yesteryear's edition tells us ... very little actually. We'll need to put our spudgers to work mining for differences. To start with, here are the details we know:
  - LTPO OLED Retina display with Force Touch, optimized for always-on functionality
  - Custom-designed Apple 64-bit dual-core S5 SiP (System in Package)
  - Heart rate sensor and ECG
  - Comes in GPS-only or with optional LTE and brings a compass and ground elevation
  - Water resistance to a depth of 50 meters

## Step 2



- The model number doesn't lie: **A2157** tells us it really is a new Apple Watch.
- Although the usual heat-and-slice action opens up the display, this model was clam-shelled shut a bit tighter than we expected.
- The Force Touch gasket connector sits in its corner behind the display cables, where it moved with the last iteration.

## Step 3



- Disconnecting the power requires first extracting the glued-down battery, which we know how to do (although we reserve the right to make a grumpy face as we do it).
- This year's energy source is labeled A2181 and provides 1.129 Wh (296 mAh at 3.814 V).
- That amounts to a very slight 1.44% improvement over last year's [1.113 Wh battery](#). It's clear that battery improvements didn't drive the switch to the 18-hour always-on display—that technology is being enabled by something else.

## Step 4



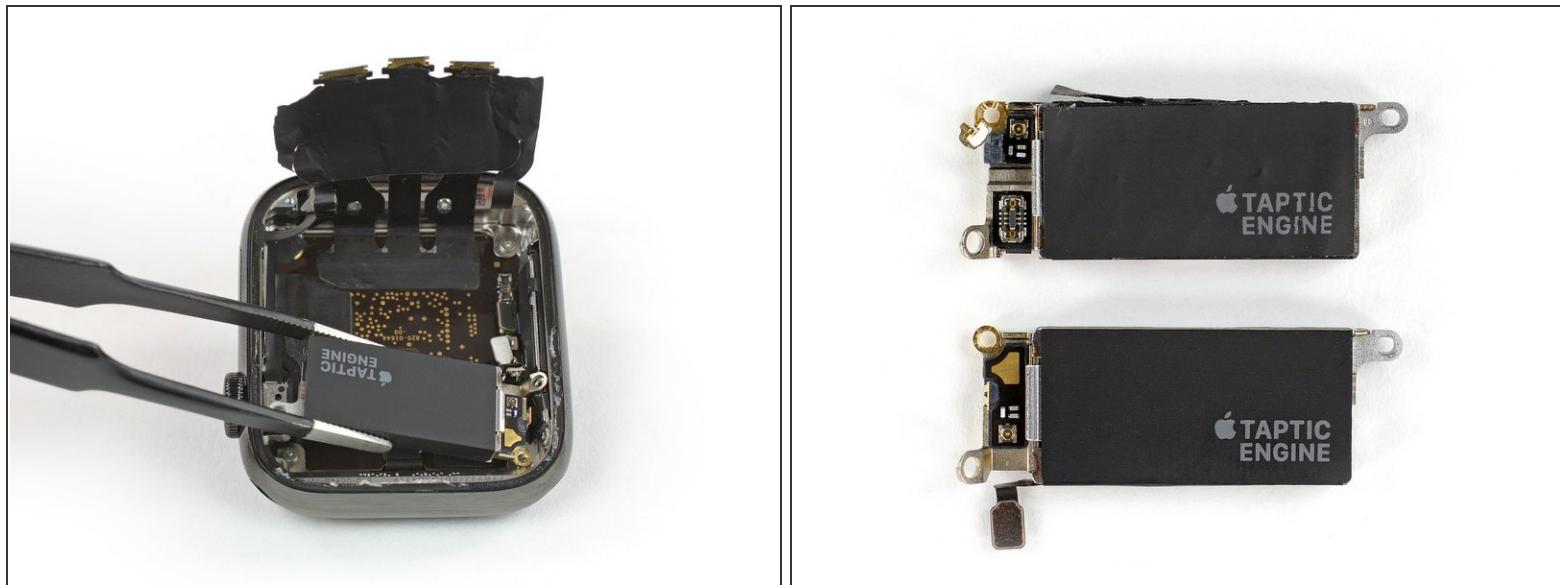
- **Teardown Update:** We cut into the smaller 40 mm Apple Watch Series 5, and found a surprising new battery design with a 10% capacity boost. We can only speculate as to why the 44 mm watch didn't get this upgrade, but you can [read all about our findings over here](#).

## Step 5



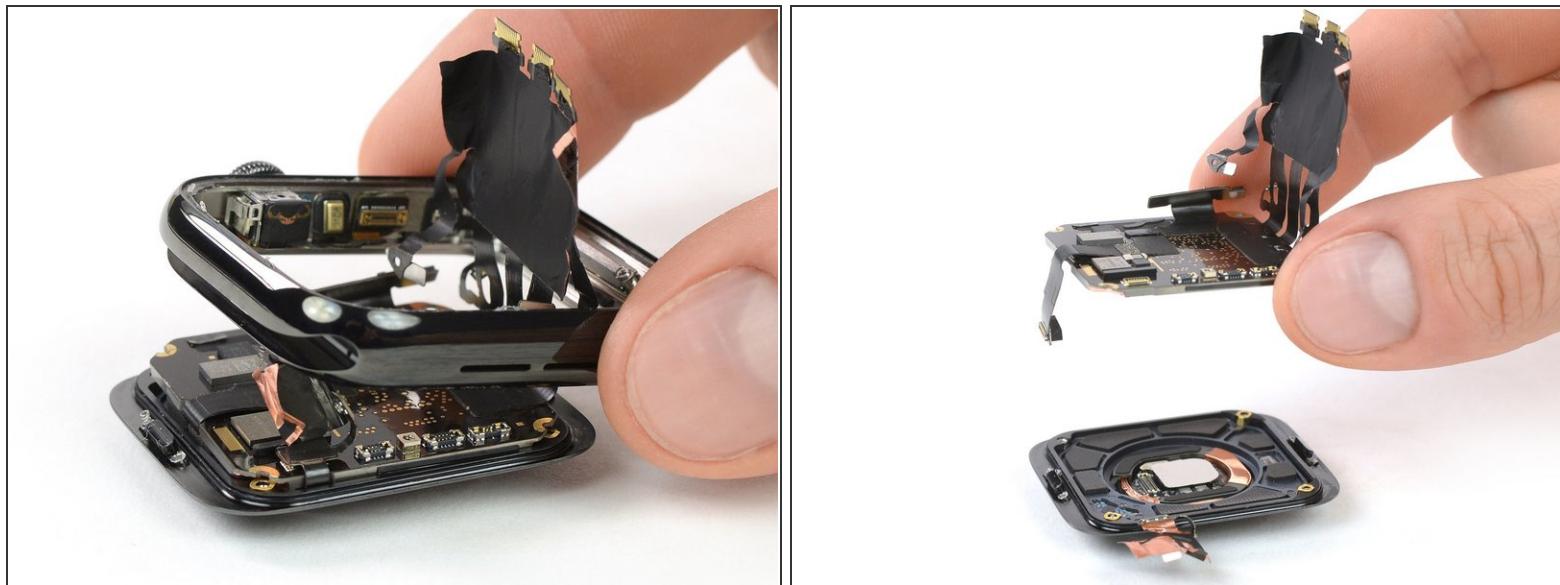
- The new LTPO display on the Series 5 (left) doesn't seem to physically look all that different from last year's Series 4 display (right)—which also used LTPO technology. But Apple has been busily tinkering under the hood.
  - ***(i) We know*** there's at least a new display driver and power management IC in there somewhere to enable the always-on feature. Without a significantly bigger battery, this watch stays awake by sipping power more efficiently.
- The LTE antenna connector occupies its usual spot, but a change in form factor prevents these displays from ever working interchangeably.
- The resolution and dimensions are still the same: 368 × 448 pixels on the 44 mm version covering 977 sq mm.

## Step 6



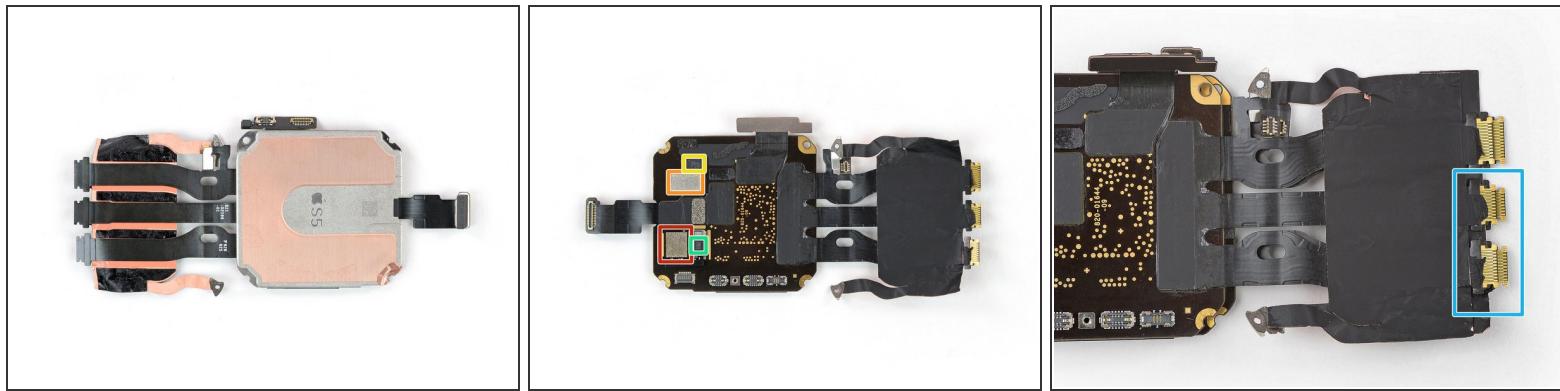
- After carefully [tweezing](#) the Taptic Engine away from an antenna connector, we can have a closer look for comparison.
- Again, they look superficially very similar—but at the very least the connectors have been re-engineered, so we know the parts won't be compatible with last year's models.

## Step 7



- With enough screws removed, the rest of the watch drops out the bottom, more or less as we remember from the Series 4:
  - We leave the digital crown, microphone, and side button clinging to the frame ...
  - ... whereas the heart rate sensor, ECG components, and charging coil escape with the bottom plate.
- We'll focus the rest of our attention on what's between: the S5.

## Step 8



- Out comes this ticker's brain, the all-new—[or maybe not?](#)—S5 system-in-package.
- Although it benefits from a new compass and double the onboard storage—32 GB, up from 16—most of the integrated circuits remain entombed under a solid layer of resin, out of our reach. Of the few [chips above the surface](#), here's what we can make out:
  - Skyworks 229-15 465371 1918 MX, most likely front-end module
  - 16 CJ
  - YY NCJ 7NE (likely the acceleration + gyro sensor)
  - API 924 920
- Looking at the attached display flex cables and laying them over those of the Series 4 for comparison, we can see that the plug in the middle gained 4 pins and the one on the bottom gained 2. Without knowing their function, this closes the door on interchangeability.

## Step 9



- That's as far as we go. Although this year's always-on display is a huge leap forward in functionality, it's masked by surprisingly subtle changes in the underlying physical components.
- Same basic construction, similar-looking components, and same amazing engineering in a mildly-annoying-to-open package. Plus a wild new battery design that only benefits the smaller version of the watch, for now.
- What does it all mean in terms of repairability?

## Step 10 — Final Thoughts



- The Apple Watch Series 5 earns a **6 out of 10** on our repairability scale (10 is the easiest to repair):
  - Screen replacements are difficult but do-able—it's the first thing to come off, and detaches via ZIF connectors.
  - Battery replacements are pretty straightforward, once you're inside.
  - Still a lot of incredibly tiny tri-point screws are used throughout the watch.
  - Several component flex cables are mounted directly to the S5 package, requiring skilled microsoldering to replace.