



# Samsung Galaxy Note7 Teardown

Teardown of the Samsung Galaxy Note7 performed on August 17, 2016.

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## INTRODUCTION

Samsung's line of phones-that-don't-fit-in-your-pocket is back! And in a Microsoftian move, they're going from [Note5](#) straight to **Note7**. On the surface, it looks like an [S7 Edge](#) with a bigger screen and a fancy stylus, but we know better: no guts, no glory. It's teardown time!

*Update:* We added some sweet X-ray imagery, from our friends at [Creative Electron](#).

Do you enjoy the *odd* teardown? We've got three (way cooler than two) ways to stay up to date with the latest repair news: find us on [Twitter](#), join our inner circle on [Facebook](#), and check out our [Instagram](#)!

[video: <https://www.youtube.com/watch?v=LbtbtGxb7q0>]

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### TOOLS:

- [iOpener](#) (1)
  - [iSlack](#) (1)
  - [iFixit Opening Picks set of 6](#) (1)
  - [Phillips #0 Screwdriver](#) (1)
  - [Spudger](#) (1)
  - [Tweezers](#) (1)
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## Step 1 — Samsung Galaxy Note7 Teardown



- It's a mix of new and familiar as we peruse the Note7's specs:
  - Curved panel 5.7" Super AMOLED display with 2560 × 1440 resolution (518 ppi) and Gorilla Glass 5
  - Qualcomm Snapdragon 820 processor with 4 GB RAM + Adreno 530 GPU
  - 12-megapixel,  $f/1.7$  rear camera with OIS, dual pixel autofocus, 4K video; 5-megapixel/1080p selfie camera
  - 64 GB internal storage, with an additional 256 GB available via MicroSD expansion
  - Iris scanner, fingerprint scanner
  - S Pen stylus, USB-C, and headphone jack (*phew*)
  - IP68 dust and water resistance rating

## Step 2



- As we boldly go where no tinkerer has gone before, we come across some ~~stap~~ports hiding out near the bottom edge. From left to right we observe:
  - [Headphone jack](#)
  - USB-C port
  - Microphone port
  - Speaker grille
- That last one's not a port at all, it's the illustrious S Pen. Removing the S Pen is as smooth as slicing warm butter.
- ⓘ Building off the Note5's mid-production [design modification](#), the S Pen doesn't fit into its slot backwards. Now that's progress.

## Step 3



- Our teardown hands are itching to get down to business, but we take a moment to test out the S Pen.
- First impressions: this stylus stacks up pretty well against [Microsoft's Surface Pen](#) and [Apple's Pencil](#).
  - The S Pen is smaller (and more stow-able) than either, but still has a scan rate of 360 Hz and senses 4,096 levels of pressure compared to the Pencil's 240 Hz and the Surface Pen's 1,024 levels of sensitivity.
- ⓘ In an additional level of customization, the S Pen comes with *two* interchangeable tips: a soft tip for writing on smooth glass, and a hard tip for use with screen protectors.

## Step 4



- If opening stubbornly adhered Samsung devices was an Olympic sport, our teardown room would be [filled with gold medals](#).
- We take a minute to stretch while the iOpener works its magic, softening the adhesive under the rear glass.
- *Bang!* The gun sounds. We fly off the starting blocks, [iSclack](#) and opening pick in hand. *Pop!* The rear glass dislodges from the chassis. *Whoosh!* The rest of the adhesive didn't stand a chance. *Ka-pow!* We're in.
- ⓘ *And the crowd goes wild.* Okay, but really. This is something of a delicate procedure, and we still miss the days of plastic peel off rear cases.

## Step 5



- [Tinkerers love Phillips screws](#). Seeing these good ol' familiar screws draws our focus down to what they're securing: a sweet wireless charging coil.
- ⓘ Samsung states that "once you've had wireless charging, there's [no going back](#)." It's like having the event horizon of a black hole right in your phone, with all the convenience that entails.
- We suspect the NFC antenna is also bundled into this wafer-thin assembly. NFC is no stranger to [Galaxy Phones](#).
- With that, we get our first full reveal of the Note7. [Cue oohs and aahs]

## Step 6



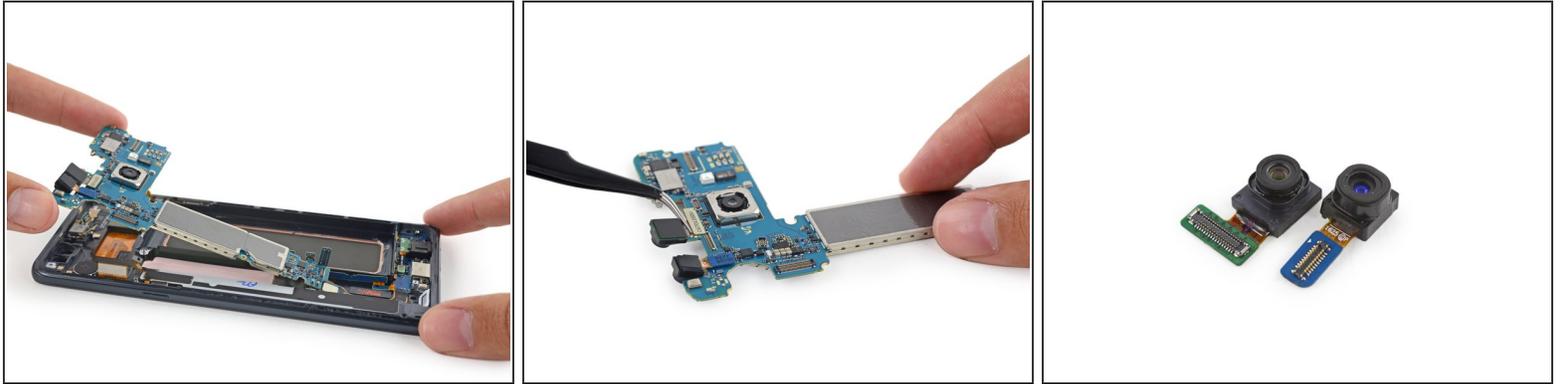
- We come across an unusual battery cable design. At first glance, this is most definitely a [slide](#). We're getting a little motion sick just looking at all of those winding curves.
- Fortunately for us, a flick of a spudger is all it takes to pry the (off-kilter) battery connector cable off the motherboard.
- With battery disconnected we delve deeper.
  - First victim: the single speaker, with built in antenna.
- ⓘ Of note, the speaker pass-through has a gasket and mesh liner, in addition to the grille punched into the case (likely a waterproofing measure).

## Step 7



- We could almost hear the battery laugh in our faces when we tried to pluck it out bare-handed—but our inner Hulk emerges as we muscle with all the might our spudger can muster.
- This 3500 mAh, 13.48 Wh battery is significantly more powerful than the 10.45 Wh one found in the similarly sized [iPhone 6s Plus](#), but it falls just a bit short of its smaller sibling, the [Galaxy S7 Edge](#), which comes in at 13.86 Wh.
- Curiously, the Note7's battery is fortified by walls carved from the rear case, providing extra structural integrity, and maybe even some water protection.

## Step 8



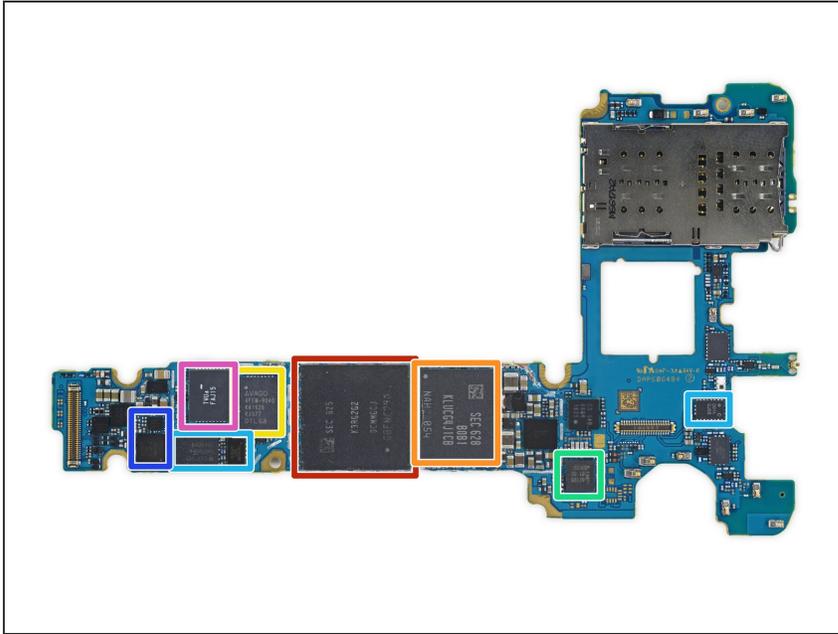
- Out comes the motherboard, with three little cameras in tow.
- Front and rear cameras are familiar fare on smartphones, so what's the *third* camera for?
  - ⓘ That would be the Note7's trick [iris scanner](#). It's actually a two-part system: a nearby infrared blaster invisibly lights up your eye, while the sensor captures an image that's said to be more [secure](#) than a fingerprint.
- For comparison we have the iris scanner (right) with the Note7's 5-megapixel,  $f/1.7$  selfie cam (left).
  - And for the X-ray comparison, [here we have the two cameras](#) still in the device.

## Step 9



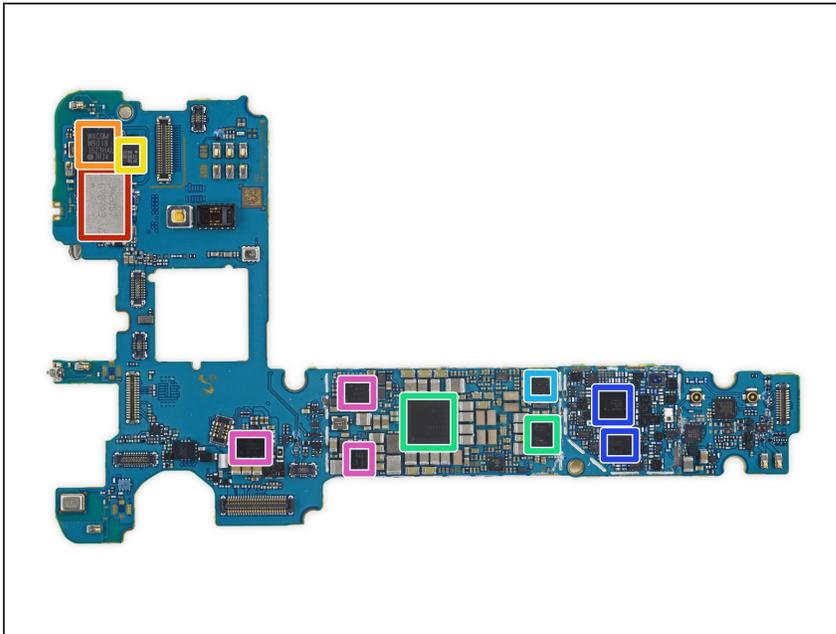
- With the motherboard deftly extracted, we take our tweezers to the hefty [main camera](#) and line him up for closer look.
- It's déjà vu all over again as we pull out what appears to be the same Sony [IMX260](#)-based main camera that we uncovered in the S7 and S7 Edge.
- ... And the similarities go further, all the way down to:
  - the Winbond [Q32FWXGIG](#) serial flash memory
  - STMicroelectronics [L2G2IS](#) 2-Axis MEMS OIS Gyroscope
  - Renesas OIS Driver

## Step 10



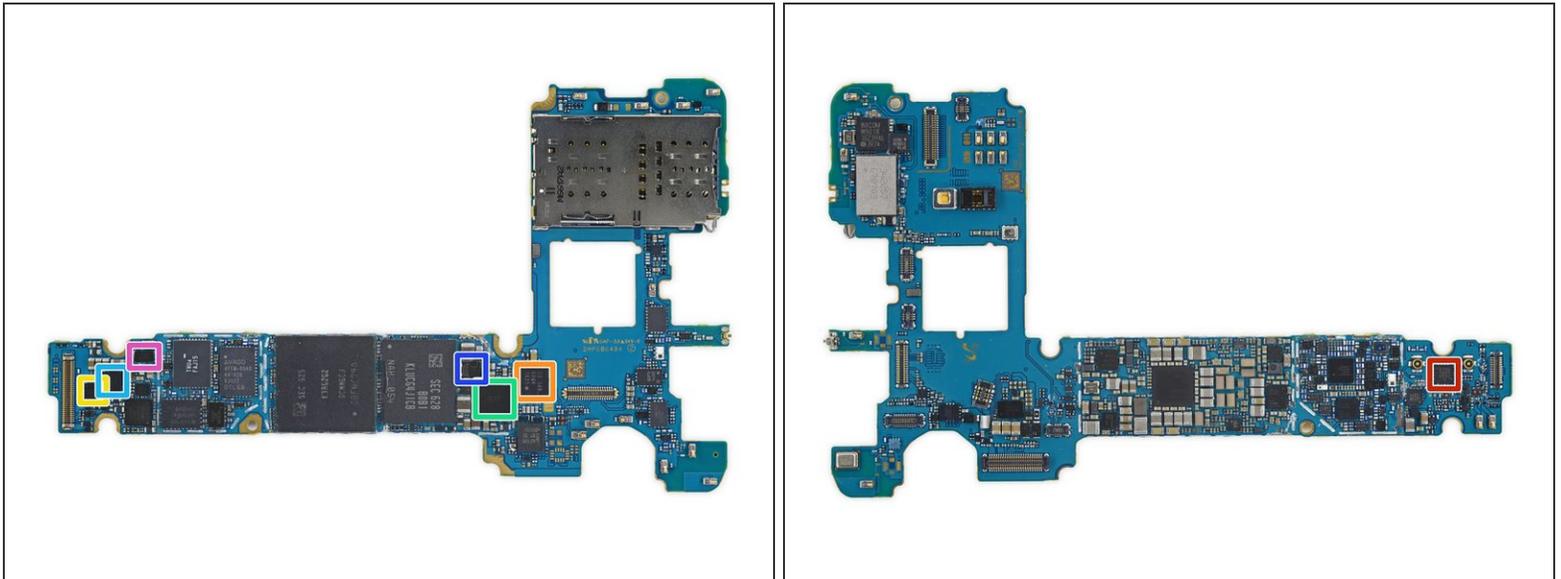
- We're down to the meat and potatoes of this teardown, and it seems like Samsung unified more than their product numbering—this chipset is nearly identical to that found in the [S7](#) and [S7 Edge](#).
- Samsung [K3RG2G20CMMGCJ](#) 4 GB LPDDR4 SDRAM layered over a [Qualcomm Snapdragon 820](#)
- Samsung [KLUCG4J1CB-B0B1](#) 64 GB Universal Flash Storage 2.0
- Avago [AFEM-9040](#) multiband multimode module
- NXP PN67T NFC controller
- Qorvo [QM78064](#) high band RF fusion module, [TQF6260](#) front-end module and [QM63001A](#) diversity receive module
- Qualcomm [WCD9335](#) audio codec and DSP Group [DBMD4](#) audio/voice processor
- Murata [FAJ15](#) front-end module

## Step 11



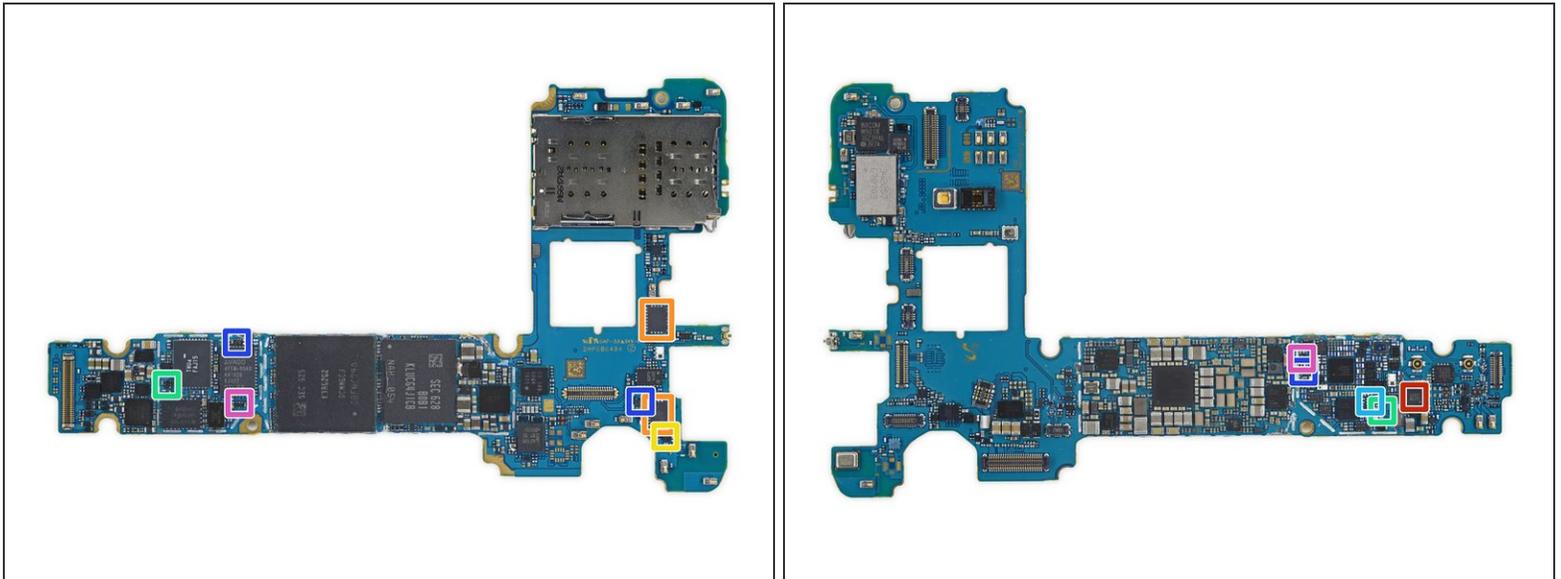
- More *note*-worthy chips hide on the backside:
  - Samsung 3420S7 G707A3 Wi-Fi module (most likely contains a Broadcom [BCM4359](#) Wi-Fi SoC)
  - Wacom W9018 touch control IC
  - ZF10 110630 0625 (likely NXP Semiconductor I/O expander)
  - Qualcomm PM8996 and PM8004 PMICs
  - Qualcomm [QFE3100](#) envelope tracker
  - Qualcomm [WTR4905](#) and [WTR3925](#) RF transceivers
  - IDT P9221S wireless power receiver (likely an iteration of [IDT P9220](#)) + Samsung S2MPB02 camera power management + Maxim Integrated MAX77838 power management IC

## Step 12



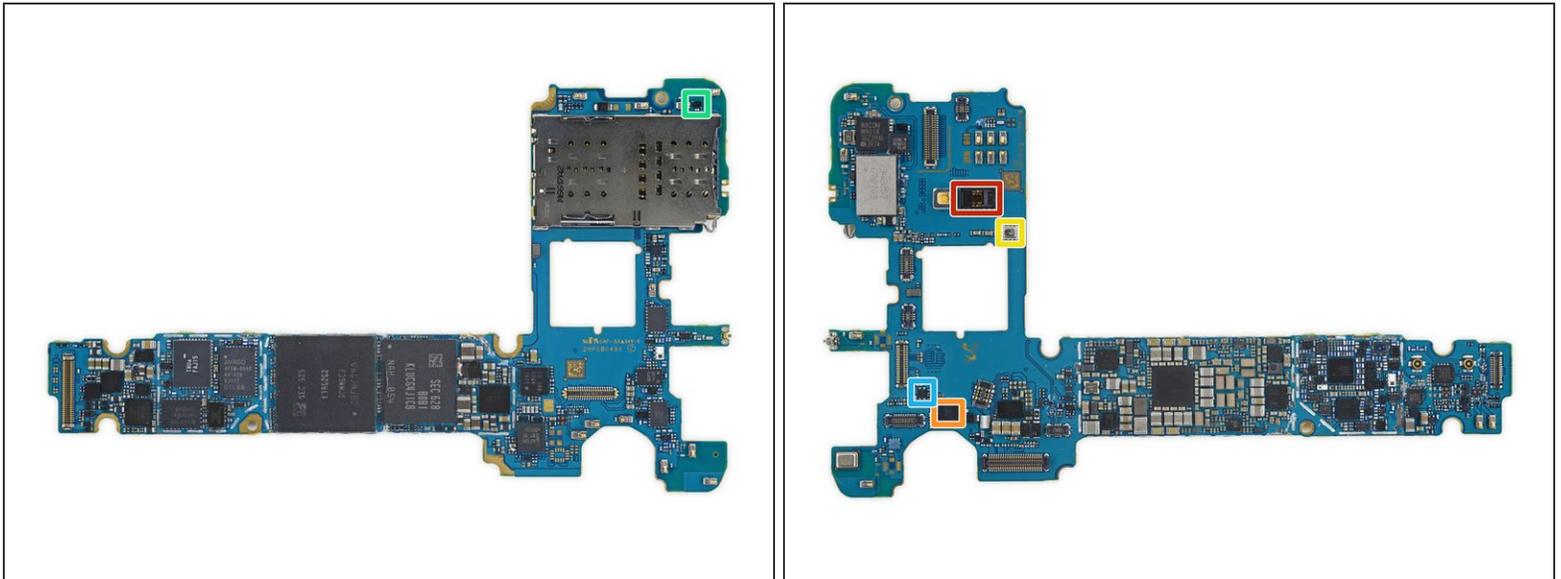
- IC identification, pt. 2:
  - Infineon (previously Cypress Semiconductor) CY8CMBR3145 capacitive touch button controller
  - Samsung Image Processor (likely)
  - Samsung S2MM005X01 power management
  - Maxim Integrated MAX77854F power management
  - Maxim Integrated MAX98506 audio amplifier
  - Texas Instruments BQ25898S battery charger
  - ON Semiconductor FPF3688 load switch

## Step 13



- IC identification, pt. 3:
  - RDA Microelectronics RDA6213 FM radio transceiver
  - Antenna switch module (likely)
  - NXP Semiconductor [BGU8103](#) GPS/GLONASS/Galileo/BeiDou low noise amplifier
  - NXP Semiconductor [BGS8H2](#) LTE low noise amplifier
  - NXP Semiconductor [BGS8L2](#) LTE low noise amplifier
  - NXP Semiconductor [BGS8M2](#) LTE low noise amplifier
  - Infineon [BGS12SN6](#) SPDT RF switch

## Step 14



- IC identification, pt. 4 (sensors):
  - Maxim Integrated [MAX86902](#) heart rate sensor (likely)
  - STMicroelectronics [LSM6DS3](#) 3-axis accelerometer/gyroscope
  - Bosch Sensortec [BMP280](#) pressure sensor
  - AKM Semiconductor [AK09916](#) 3-axis electronic compass
  - Seiko Instruments [S-5712CCDL1-I4T1U](#) hall effect sensor

## Step 15



- Heading south, we hit the modular headphone jack—ready to let the music flow while keeping water out, with a nice sealing gasket.
- ⓘ This phablet ships with an [IP68](#) water resistant rating, meaning it is dust tight, and can survive under 1 meter (or more) of water.
- The USB-C port is [new](#) to the Note line—and while reversibility is handy, change is hard. Samsung kindly includes a micro-USB-to-C adapter to keep your cables relevant.
- Out goes the [daughterboard array](#)! Unlike the one found in the [S7](#), this board used rigid PCB interconnects. This keeps the spidery cable from being flimsy. No one likes flimsy.
- IC identification:
  - Qualcomm [QFE2550](#) antenna tuner
  - Seiko Instruments [S-5712CCDL1-I4T1U](#) hall sensor
  - Semtech SX9320 proximity sensor (likely)

## Step 16



- If you like tiny heat pipes, Note7 has you covered. This looks like the same "liquid cooling" copper heat dispersal apparatus we pulled from the [vanilla S7](#) and [S7 Edge](#).
- Nearby, a *note*-able amount of glue secures this plastic cover over the S Pen chamber. It's probably there to help ingress-proof the stylus' slot.
- ⓘ We're not normally fans of glue—but this waterproofing effort doesn't seem to hinder repair much.
- Inside, a simple clip grabs the S Pen notches, and a gray rubber bumper protects the nib.

## Step 17



- The volume buttons look pretty complicated, but that doesn't slow us down. Braced with years of experience plucking our unibrows, we dive in, a pair of tweezers in hand.
- First out are the microswitches, followed by a reinforcement bracket full of rubber gaskets. Not quite the same, but similar to another [waterproofing approach](#) we've seen.
- But...what's this? The button covers are oddly trapped *within* the outer case. We can't pop them out!
- ⓘ Could this mean the case is double-walled? Is this a waterproofing feature? Perhaps a structural feature? Your guess is as good as ours.

## Step 18



- We're down to slim pickings, and the last component to surrender is this front-facing sensor array containing:
  - Status LED
  - IR blaster to enable iris scanning
    - ⓘ We saw the iris scanning sensor earlier—this component provides the infrared illumination to really make your eyes pop.
  - Proximity sensor (AMS TMD4904 likely)

## Step 19



- And here's the moment you've been waiting for—the exploded (edit: no pun intended) diagram of the Note7.

## Step 20 — Final Thoughts

### REPAIRABILITY SCORE:



- Samsung Galaxy Note7 Repairability Score: **4 out of 10** (10 is easiest to repair).
  - Many components are modular and can be replaced independently.
  - Improved cable routing means the charging port board can be removed without disassembling the display.
  - The battery can be removed without first ousting the motherboard, but tough adhesive and a glued-on rear panel make replacement very difficult.
  - Front and back glass make for double the crackability, and strong adhesive on the rear glass makes it very difficult to gain entry into the device.
  - Because of the curved screen, replacing the front glass without destroying the display is probably impossible.