iPhone 5S Teardown by X-ray

Using a high resolution x-ray system, we did a complete teardown of an iPhone 5s.

Written By: Christina Hall

INTRODUCTION

The iPhone 6 launched last week - and is already out of stock! In preparation to the iPhone 6 teardown, we went ahead with the teardown by x-ray of the Apple iPhone 5S.

Before we begin, let's take a look at the 5s specs.

- Apple A7 processor with 64-bit architecture.
- M7 motion co-processor.
- 16, 32, or 64 GB Storage.
- 4-inch retina display with 326 ppi.
- 8 MP iSight camera (with larger 1.5µ pixels) and a 1.2MP FaceTime camera.
- Fingerprint identity sensor built into the home button.
- Available in three different colors: space gray, silver, and gold.

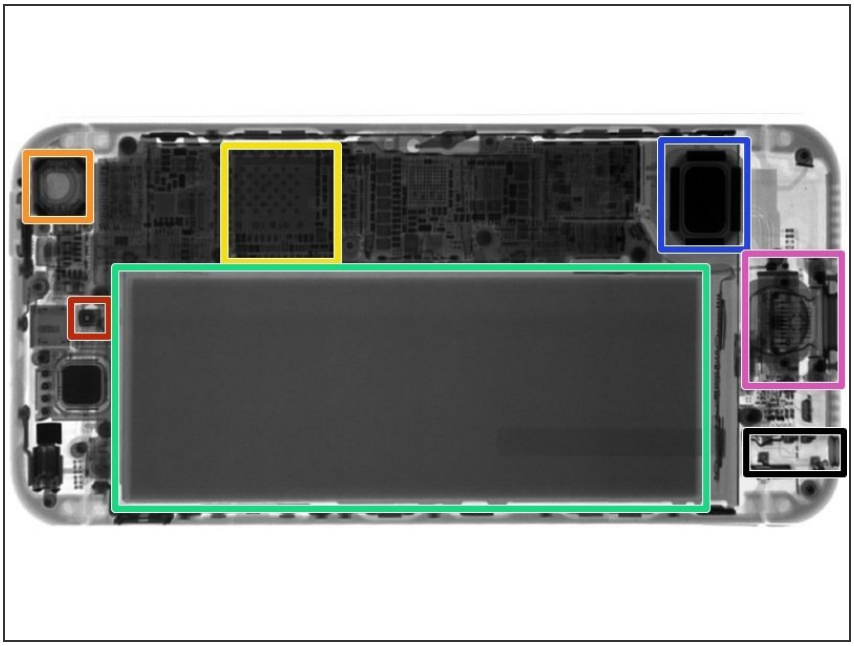
The iPhone 5S we x-ray inspected is a white device with 16GB of memory. The x-ray inspection was done without removing any parts of the phone - we didn't even power it off!

Looks good on the outside, now let's take a look inside.

Step 1 — iPhone 5S Teardown by X-ray

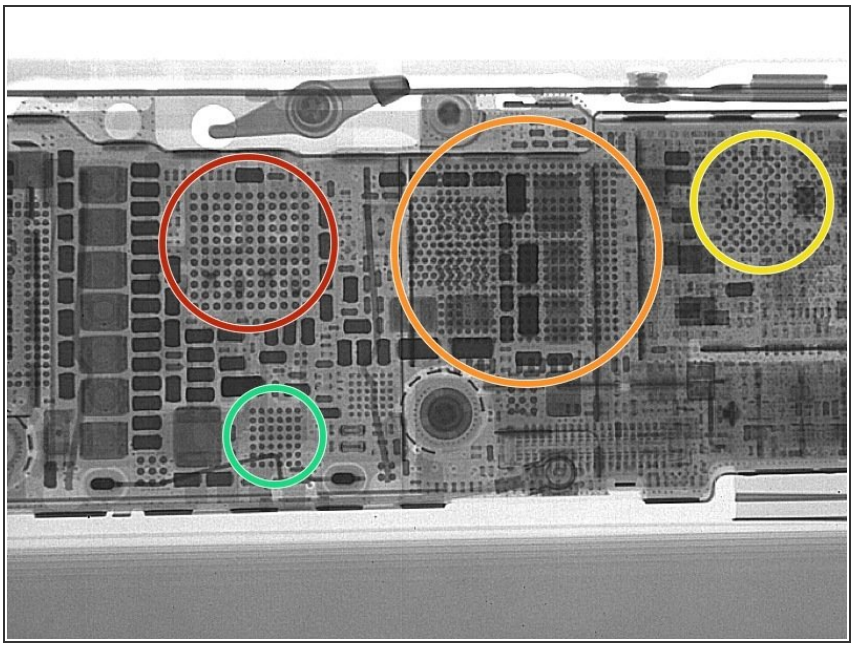
- We are going to take a look inside an iPhone 5s using a high resolution x-ray inspection system - the TruView 200. This system packs an impressive 130kV microfocus source and a large 3"x4" x-ray sensor capable of delivering 1um resolution.
- For more information about the system we used please visit TruView Number Series.

Step 2



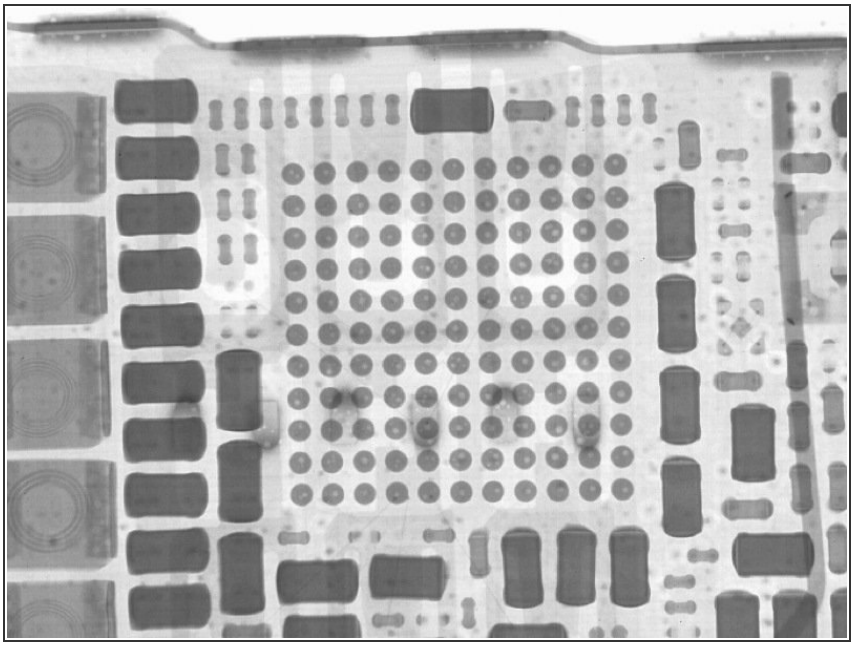
- Now it's time to start the x-ray inspection!
- 1.2MP FaceTime camera.
- 8 MP iSight camera (with larger 1.5µ pixels).
- Yellow: Apple A7 processor with 64-bit architecture
- This iPhone 5S has a 3.8V - 5.92Wh - 1560 mAh battery. Not much improvement from the iPhone 5 3.8 V - 1440 mAh - 5.45 Wh. Talk time: Up to 8 hours on 3G. Standby time: Up to 225 hours.
- Speaker
- Lightning connector and Touch ID interface
- 3.5mm audio jack

Step 3



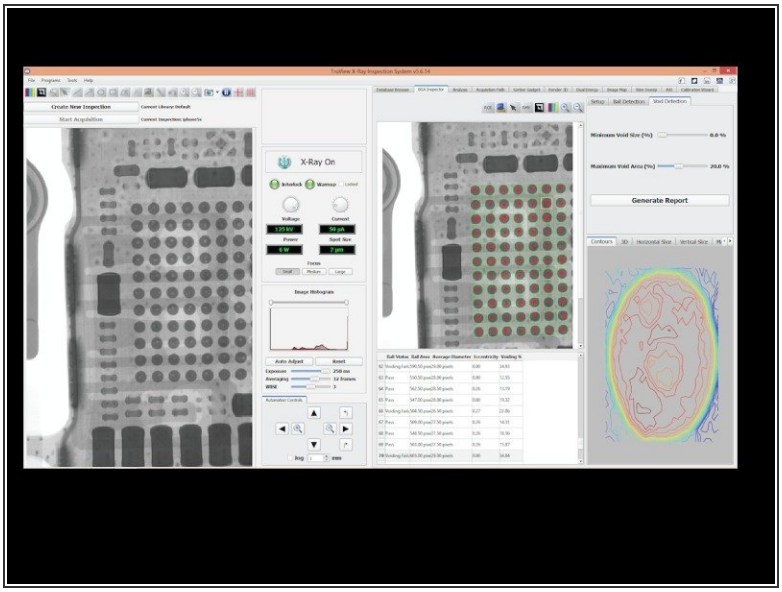
- Here's some of the powertrain in the iPhone 5S:
- Apple 338S120L.
- Qualcomm PM8018 RF power management IC and Qualcomm MDM9615M LTE Modem
- Qualcomm WTR1605L LTE/HSPA+/CDMA2K/TDSCDMA/EDGE/GPS transceiver.
- Avago A790720

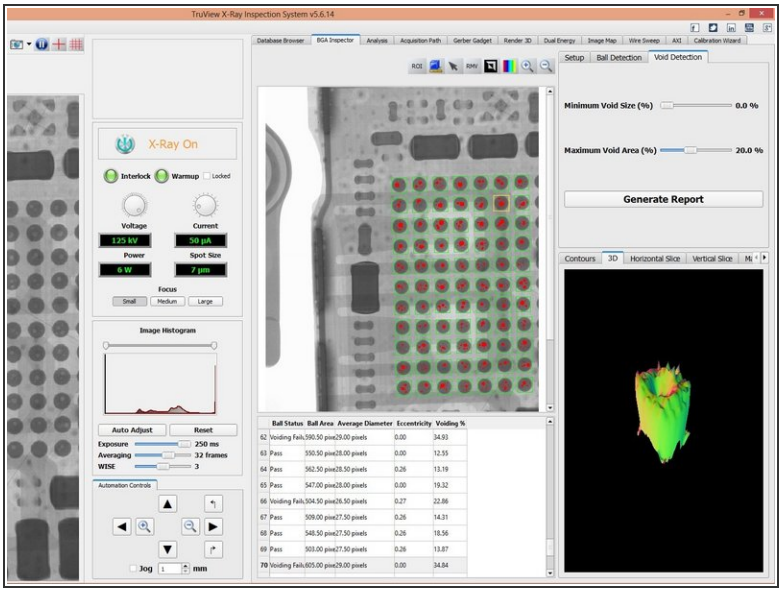
Step 4



- We know voids in ball grid arrays (BGA) can be problematic to the reliability of any electronic product. In our x-ray inspection of the iPhone 5S, we noticed that the Apple 338S120L chipset had a large number of voids. So the natural next step was to use the BGA inspector included in the TruView 200 to measure the voids.

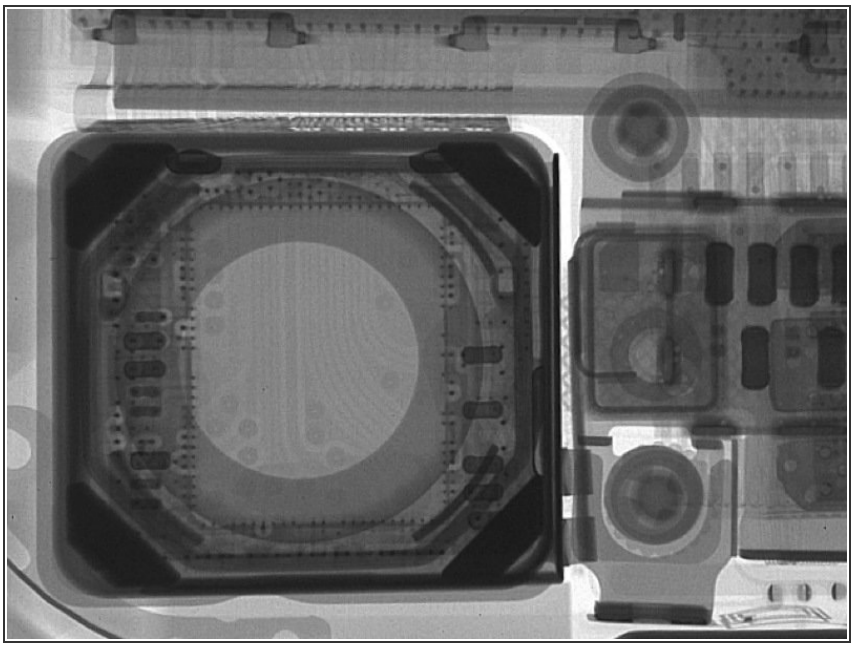
Step 5





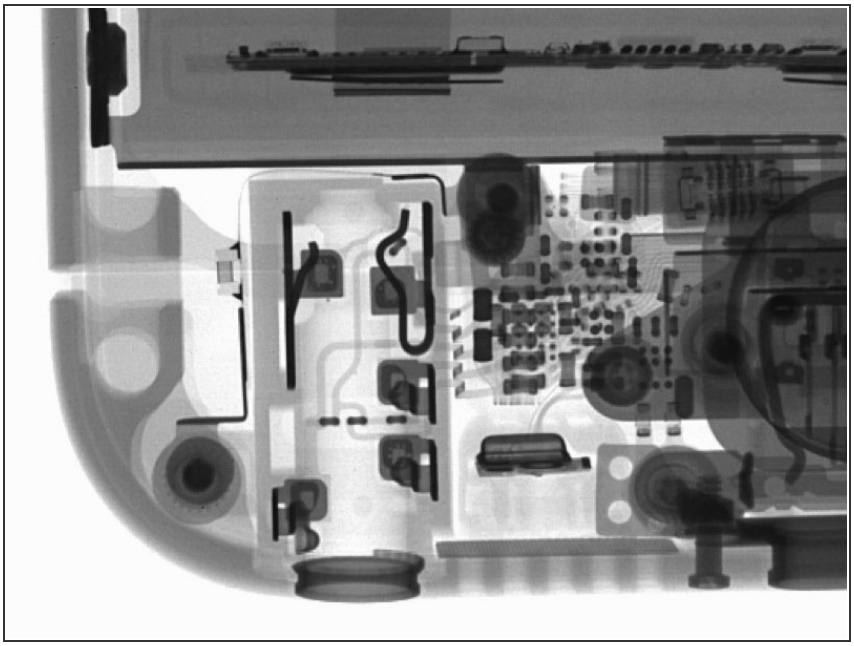
- A quick analysis of the BGA voiding in the Apple 338S120L shows voids as large as 35%. That does not mean this is a problem, but certainly something a quality manager would need to check and validate. Besides, none of the other surface mount components in the iPhone 5S have this level of voiding.
- The BGA inspector allows us to visualize the void in a 3D representation of x-y and density as the height of the volume.

Step 6



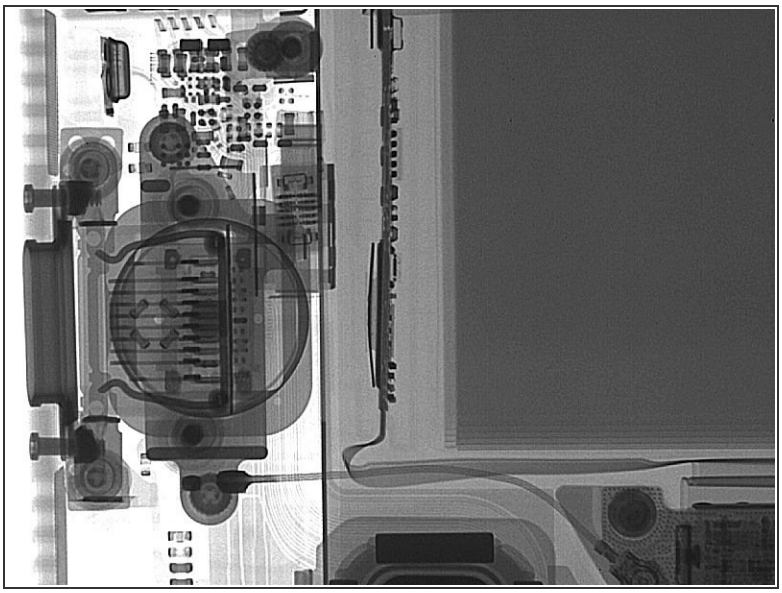
- Closer look... the iPhone 5s iSight Camera has 8 megapixels of fun, autofocus and auto HDR for photos, among other features.
- Size wise its not much different than the Camera on the iPhone 5.

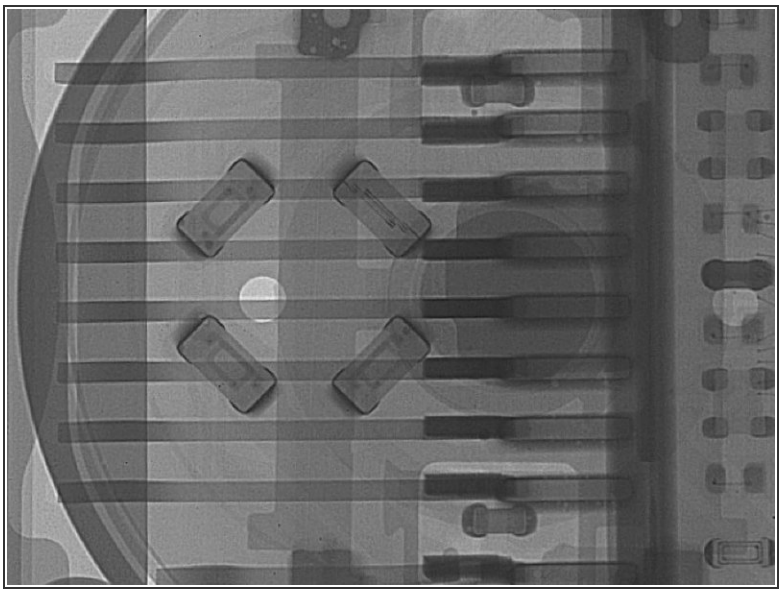
Step 7



- This corner shot of the iPhone 5S shows the standard 3.5mm audio jack. You can also see the corner of the Touch ID interface and supporting mechanics.

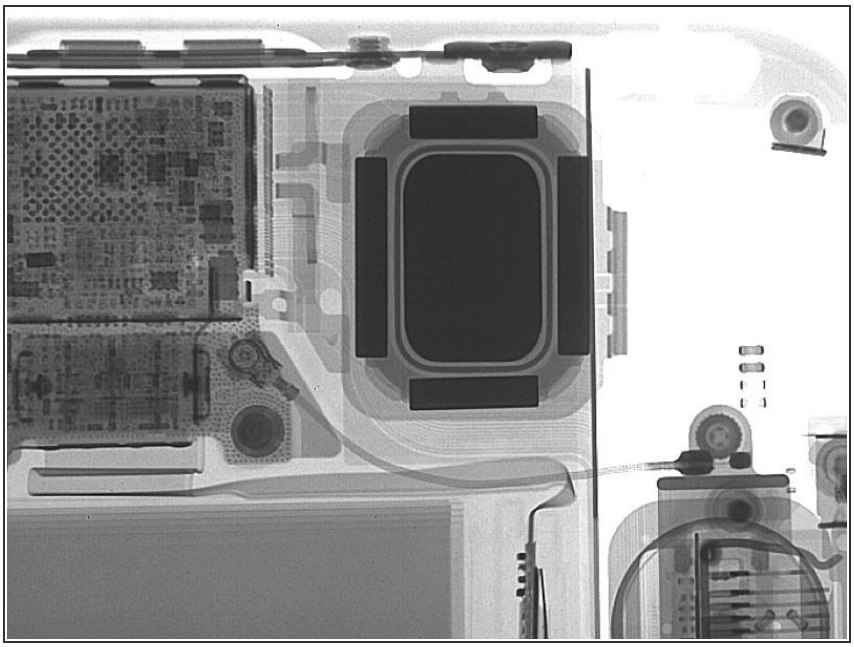
Step 8





- Here's a detail image of the Touch ID sensor. Note that it sits on top of the Lightning connector, that's why you see them overlaid in this x-ray image.

Step 9



- This corner of the iPhone 5S has not changed since the iPhone 5/4S. The large high performance speaker is located in the same place, and the antennae connections are very similar to previous models.

To reassemble your device, follow these instructions in reverse order.

This document was last generated on 2019-07-14 03:38:22 AM.