



# Kindle Voyage Teardown

Teardown of the Kindle Voyage on November 13, 2014.

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## INTRODUCTION

Look and be amazed! Amazon has added a new tablet to its e-reader lineup, and this one aims to perfect the reading experience. But can it beat Amazon's rocky repairability record? Join us on an incredible journey to the center of the Voyage, and find out just what's inside.

Read all about it! Tech and teardown talk can be found on [Facebook](#), [Instagram](#), and [Twitter](#)!

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### TOOLS:

- [Plastic Cards](#) (1)
  - [iFixit Opening Tools](#) (1)
  - [iOpener](#) (1)
  - [Jimmy](#) (1)
  - [iFixit Opening Picks set of 6](#) (1)
  - [Tweezers](#) (1)
  - [Phillips #00 Screwdriver](#) (1)
  - [Spudger](#) (1)
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## Step 1 — Kindle Voyage Teardown



- If you're looking for specs to blow your tablet-addled mind, look elsewhere. What we have here is an e-reader, and it does things its own way:
  - 6" display with Carta e-paper technology at a resolution of 300 ppi
  - 4 GB storage capacity
  - 802.11b/g/n Wi-Fi
  - Built-in light + adaptive light sensor
  - PagePress sensors with haptics

## Step 2



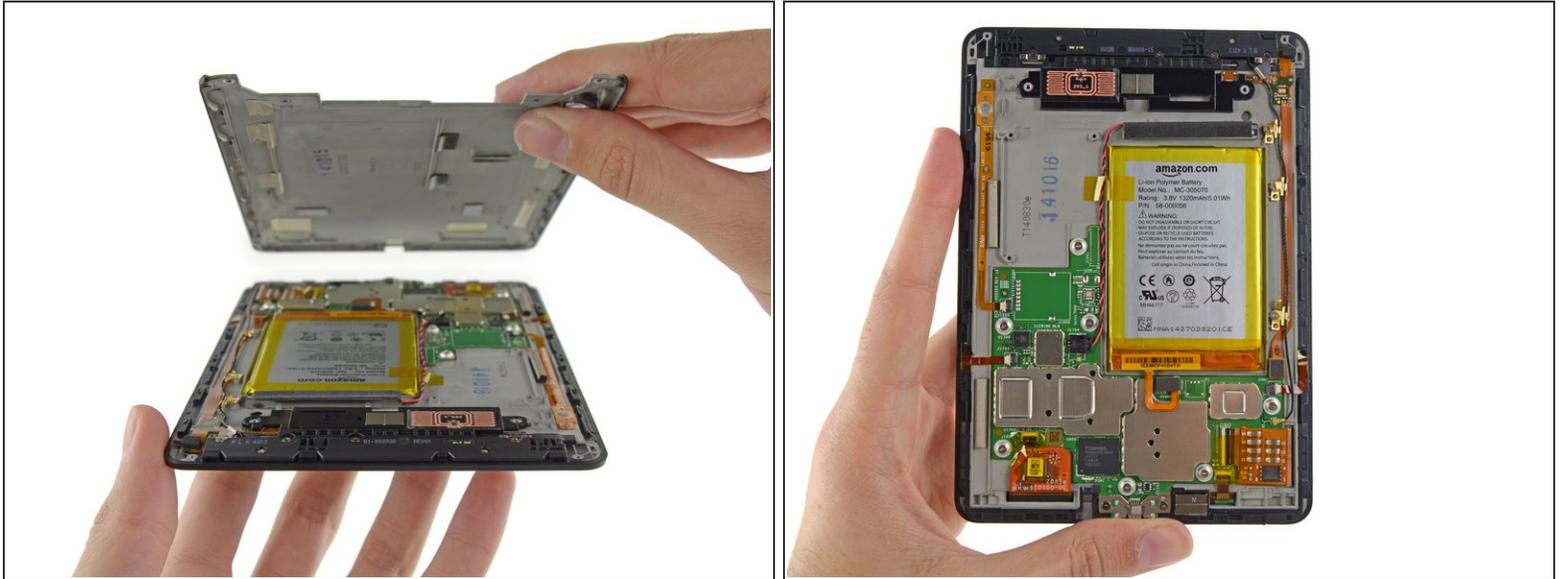
- Kindle Voyage with Apatosaurus (aka Brontosaurus) for scale.
- ① The [Apatosaurus](#) was one of the largest land animals known to have existed, with an average length of 23 m (75 ft) and a mass of at least 16 metric tons (18 short tons).
  - This one's [only a model](#).
- The ~~2001 Space~~ Voyage is branded with the model number NM460GZ.

### Step 3



- The Kindle Voyage proves to be a hybrid of Paperwhite and Fire parentage with its rear bezel access panel, revealing...
- ...some [screws](#) and some antenna components. Now to get the rest of the cover off.
- It's a sliiiiide! A slide-off cover, that is—there's not a lick of adhesive in sight after removing the top portion. Neat!

## Step 4



- We begin our journey to the center of the Voyage by removing the back cover, revealing a bevy of components.
- With so many new features over the Paperwhite and basic Kindle, things are a little more complicated inside, with plenty of ribbon cables and ZIF connections.

## Step 5



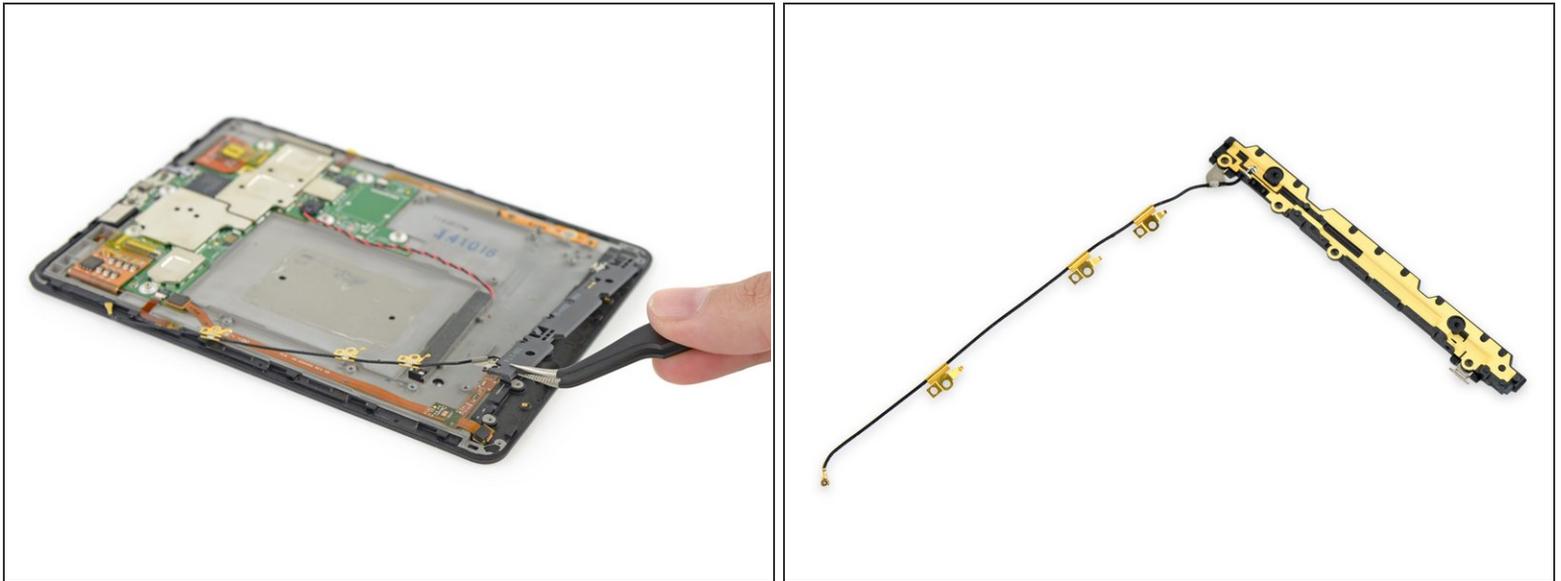
- How difficult is it to remove this component from the Kindle Voyage? So easy a caveman with a chunk of ferromagnetic material could do it.

## Step 6



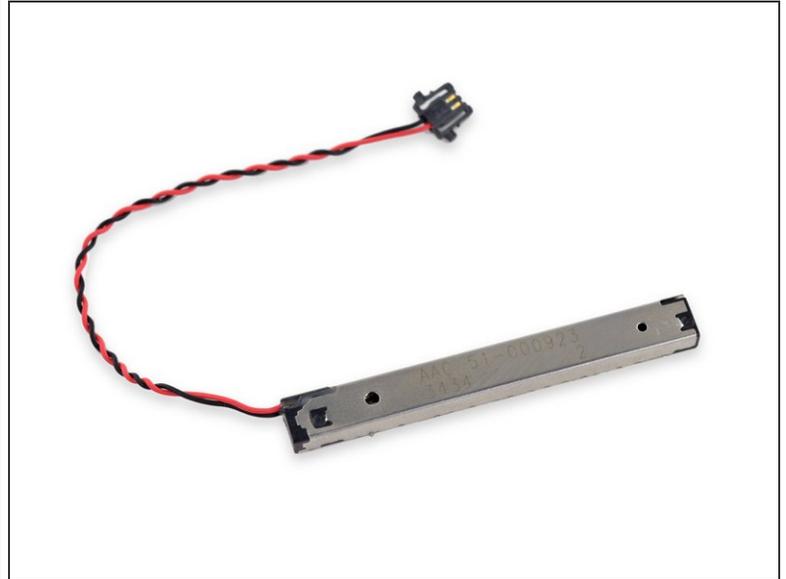
- It didn't take long to get to the heart of the Voyage. This reader is powered by a 3.8 V mixed metaphor battery rated at 1320 mAh.
  - We apply some oomph in the form of a [Plastic Card](#) to free the battery from its sticky patch.
- ⓘ Amazon boasts that its Voyage will last up to six weeks on a single charge. For comparison:
- The [Kindle \(7th Gen\)](#) claimed a useful life of up to four weeks from its 890 mAh unit.
  - The more versatile [Kindle HD 6](#)'s onboard reactor weighs in at a whopping 3400 mAh, but it's rated for just 8 hours of normal use.

## Step 7



- Seeing as the "Wi-Fi + Free 3G" Kindle Voyage—the one that lets you spend money on ebooks anywhere (for free!)—won't be available until next month, our model is Wi-Fi only.
- This makes identifying this large antenna bar fairly straightforward.
- Hello, Wi-Fi antenna.

## Step 8



- Having [Jimmy](#)'d our way this far, we take a stab at removing the vibrator.
- ⓘ When it's not being pulled apart for inspection, the vibrator works in tandem with the PagePress triggers built into the bezel.
  - Since the triggers themselves have no moving parts, the vibrator gives ~~taptic~~ haptic confirmation of all your page-turning commands.
  - After doing our IC identification homework, we can report that this is no ordinary oscillator or motor, but rather a piezo haptic vibrator, perhaps manufactured by [AAC Technologies](#)?

## Step 9



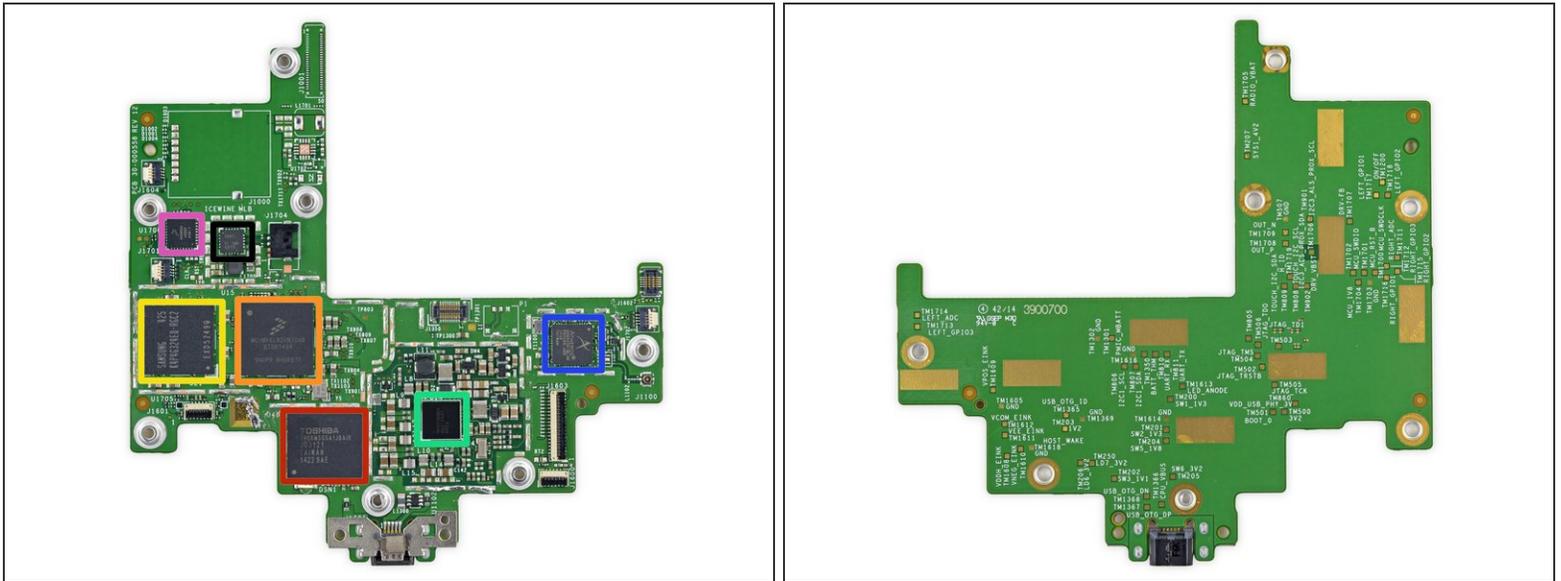
- What makes a Kindle Voyage a real trip and not just a paperweight?
- An ambient light sensor, for automatically adjusting the display brightness is a must.
- We found this sensor nestled within a socket on the display assembly, near the end of a long cable that connects to the backside of the motherboard.

## Step 10



- Release the latches, pop the ZIFs, and (gently) pull out some cables; let's get this motherboard out for its time in the spotlight.

## Step 11



- Let's take a look at the ICs that drive the Kindle Voyage:
  - Toshiba [THGBM5G5A1JBAIR](#) 32 Gb (4 GB) eMMC NAND Flash
  - Freescale Semiconductor [MCIMX6L8DVN10AB](#) Applications Processor
  - Samsung K4P4G324EQ-RGC2 4 Gb (512 MB) LPDDR2 SDRAM
  - Maxim Integrated [MAX77696A](#) Power Management Integrated Circuit (PMIC)
  - Atheros AR6803G-BL3B WLAN Controller
  - Freescale Semiconductor M05R5V 1N96F ACBIT
  - Texas Instruments [DRV2667](#) Piezo Haptic Driver

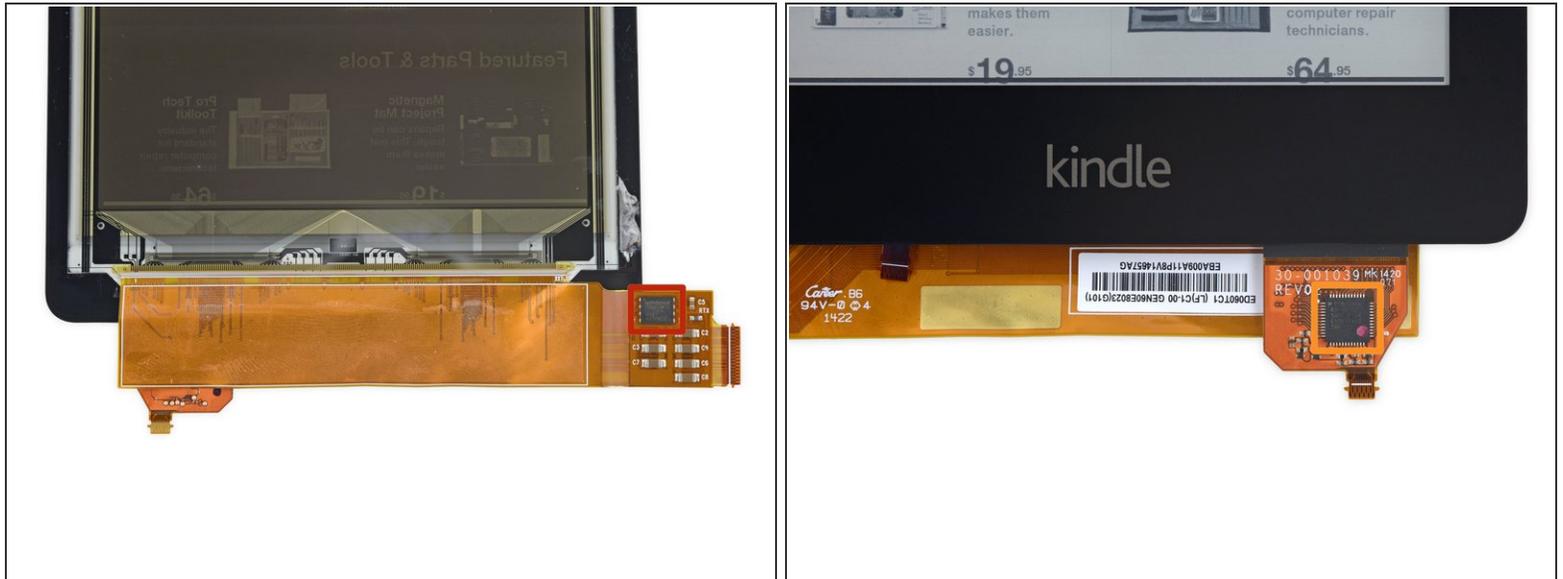
## Step 12



### [Meow-wow!](#)

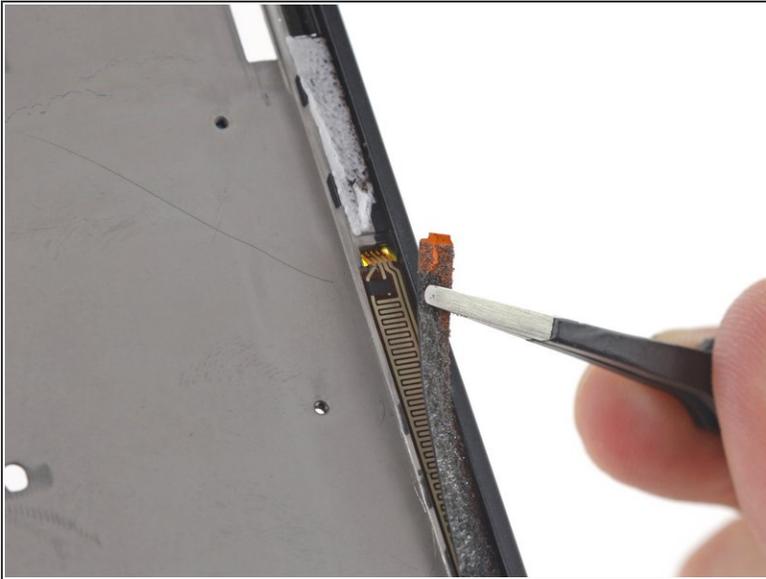
- The last of the Voyage's bonus features live under the display glass. After an off-screen [iOpener](#) application, we're ready to pry through some glue.
  - Thankfully, it's not the terrible tar we sometimes encounter. Combine this mild-mannered adhesive with thick, tough display glass and a rubbery bezel, and it's a pretty easy pry job.
- Look at that e-ink screen! Still displaying text like a chicken with its head cut off (and battery removed...)
- This is a pretty great illustration of why [e-paper](#) works so well in this application. Power is only required to change the image on the screen, not sustain it. Stare at each page as long as you like, Kindle don't care.

## Step 13



- We uncovered two hidden ICs along the bottom of the display assembly:
  - Winbond [25Q40BWIG](#) 4 Mb Serial Flash Memory With Dual and Quad SPI
  - Cypress Semiconductor CY8CTMA4 Touchscreen Controller

## Step 14



- As we continue to explore the Voyage, we come across the PagePress sensors. The sensors are held to the display assembly with some mild adhesive for good contact.
- i** What exactly is PagePress? Glad you asked.
- "PagePress is a custom-designed force sensor made of carbon and silver, which reacts to a subtle increase of pressure, triggers a page-turn, and provides a haptic response only your thumb can perceive."
  - Sounds like some kind of strain gauge implementation to us. A [strain gauge](#) is a component that changes resistivity when deformed, making for an excellent buttonless button.

## Step 15



## REPAIRABILITY SCORE:



- Kindle Voyage Repairability Score: **7 out of 10** (10 is easiest to repair).
- Several modular components can be replaced individually.
- Screws secure a slide-off rear case, simplifying opening procedure compared to other Kindles.
- Thanks to mild front panel adhesive, thick display glass, and a soft bezel, prying up the glass is fairly easy with the right tools.
- Glass strengthens the Kindle and protects the display, but is susceptible to cracking.
- Battery is easy to get to, but has stronger adhesive than is necessary.
- The front glass and e-ink display are fused together, increasing the cost of repairs.

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