



# Amazon Echo Show Teardown

Teardown of the Amazon Echo Show on June 28, 2017.

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## INTRODUCTION

[video: <https://www.youtube.com/watch?v=S2wRKVmq1rk>]

Is there an echo in here? Seems like Alexa's talking to us from a lot of devices now. The new Echo Show adds a screen to bring even more Alexa, and now [she watches you](#) while she listens. Creepy? Maybe. A little endearing? Okay yeah, a little. Hey Alexa, let's Drop In on another teardown!

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### TOOLS:

- [T5 Torx Screwdriver](#) (1)
  - [T6 Torx Screwdriver](#) (1)
  - [iOpener](#) (1)
  - [iFixit Opening Picks set of 6](#) (1)
  - [Plastic Cards](#) (1)
  - [Jimmy](#) (1)
  - [Tweezers](#) (1)
  - [Spudger](#) (1)
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## Step 1 — Amazon Echo Show Teardown



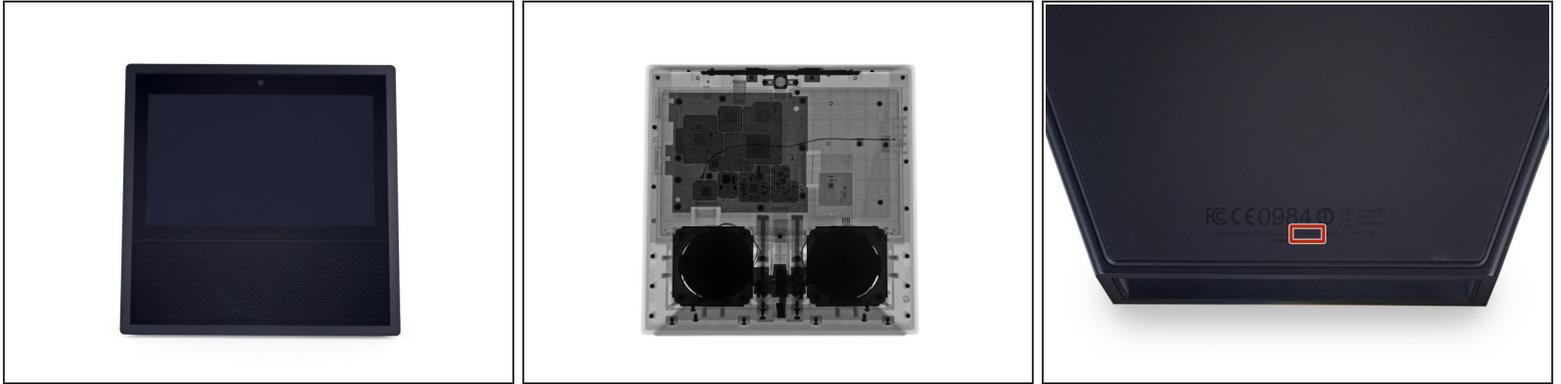
- Let's see if Amazon's newest Echo can Show us somethin' good. Here are the tech specs:
  - 7-inch touchscreen display with 1024 × 600 resolution
  - Dual 2-inch stereo speakers
  - Intel Atom x5-Z8350 (2M cache, up to 1.92 GHz) processor
  - 5 MP front-facing camera
  - 8-microphone array

## Step 2



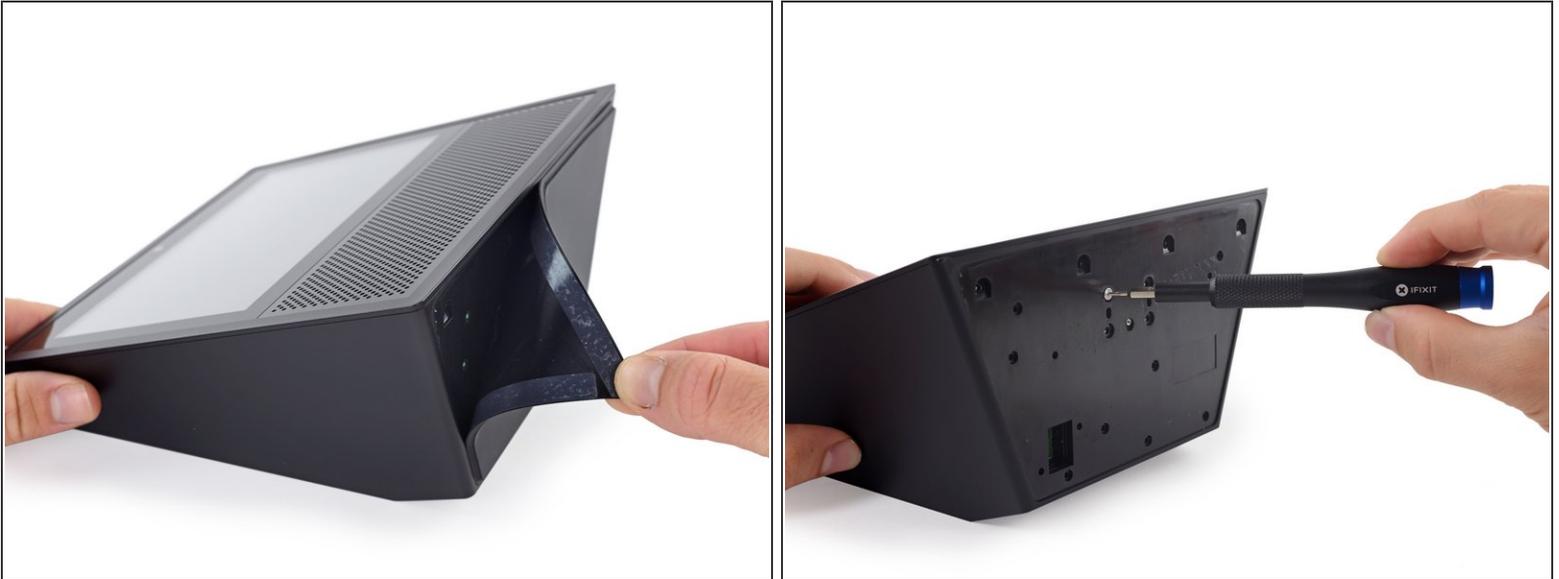
- The star of the Show is its 7-inch, 1024 × 600 touchscreen display.
- ⓘ That 170 PPI pixel density seems a little low by today's standards, but it's not so bad considering Amazon expects you to use this device from half a room away.
- Or maybe they just needed to get rid of some [Fire Tablet](#) displays...
- The back and top of the Show share some similarities with the old Echo devices: physical volume and microphone/camera on/off buttons.
- In a wild departure from the cylindrical Echo shapes of yore, the Show looks closer to [something out of Star Trek](#).
- ⓘ And a little like the [Chumby](#). You all remember the Chumby, right?

## Step 3



- After bringing the Show [around town](#), we [look right through it](#) to find—big ol' speakers and a circuit board.
  - ⓘ But no hints for opening, unfortunately ...
- The rubber foot holds FCC info, and seems like a [likely point of entry](#).
  - It also bears the model number MW46WB.

## Step 4



- So, like most Echo devices, we start from the bottom. After peeling up the taped-in rubber foot, we spy a handful of T5 Torx screws...
- But with all screws dispatched, there are no seams—we *seem* to be ... *screwed* ... for now.
- We immediately hunt for new ingress points.

## Step 5



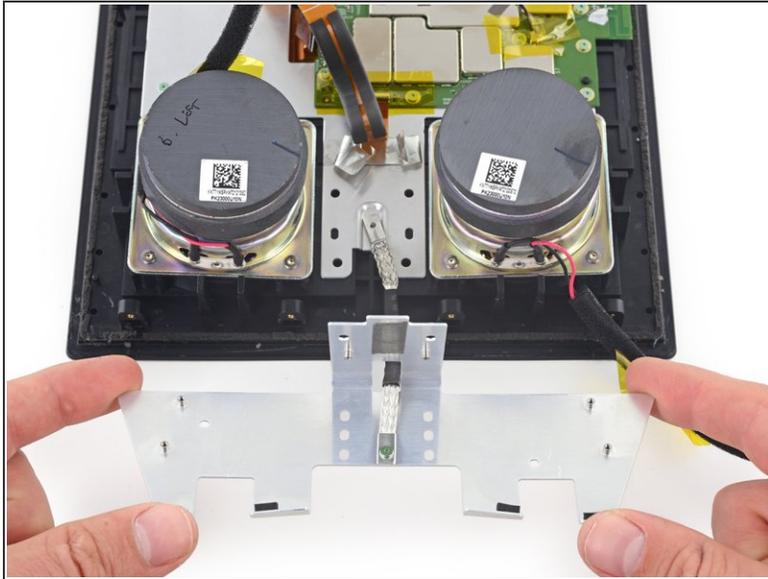
- Lacking any action on the foot, we start to pry around the display.
  - And then we keep prying.
  - ... and *prying* ...
- It turns out the multitude of screws at the bottom was a ~~red~~ [green](#) herring—the speaker grille is the real ingress point.
- Tucked under the grille, we find some sound-dampening fabric (just like the stuff rolled around the [original Echo](#)) and some more screws.
- But still no dice removing that front panel—time to get to work on what looks like the digitizer. [iOpener](#), engage!

## Step 6



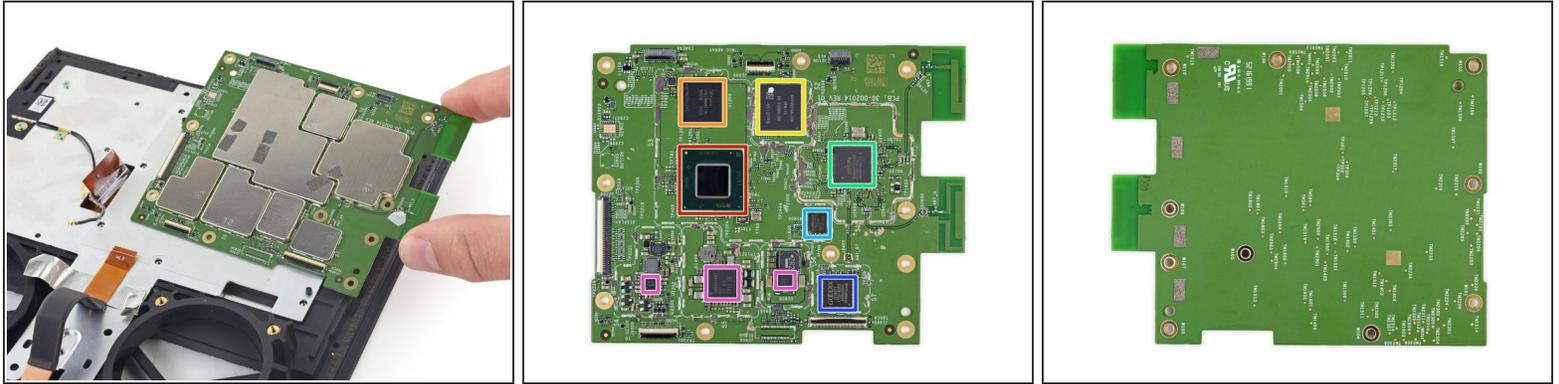
- We lift the digitizer to reveal ... more screws under the bezel! Unsurprisingly, the digitizer cable disappears into the frame, holding the digitizer captive for now.
- Fortunately we *can* free the front frame, under which Amazon hid some hefty speakers.
- Our hard work and early screw removal pay off! Finally, we get to see what this Echo has to Show for itself.

## Step 7



- Alexa's new form is powerful. How powerful? Well, the wall adapter outputs 15.0 VDC at 1.4 A, meaning there is 21 W driving Alexa ...
- Someone needs to pull Alexa back down to *earth*, and luckily we spot a burly braided cable grounding the Show.
- ⓘ 1.4 A is not a small amount of current, and a braided ground cable is a flexible solution to get Alexa's feet back on ground. It also has a large surface area, which can pick up and ground stray EMI.
- That juice is going somewhere, and it looks like those upgraded speakers are thirsty.
  - And check out those [magnets](#).

## Step 8



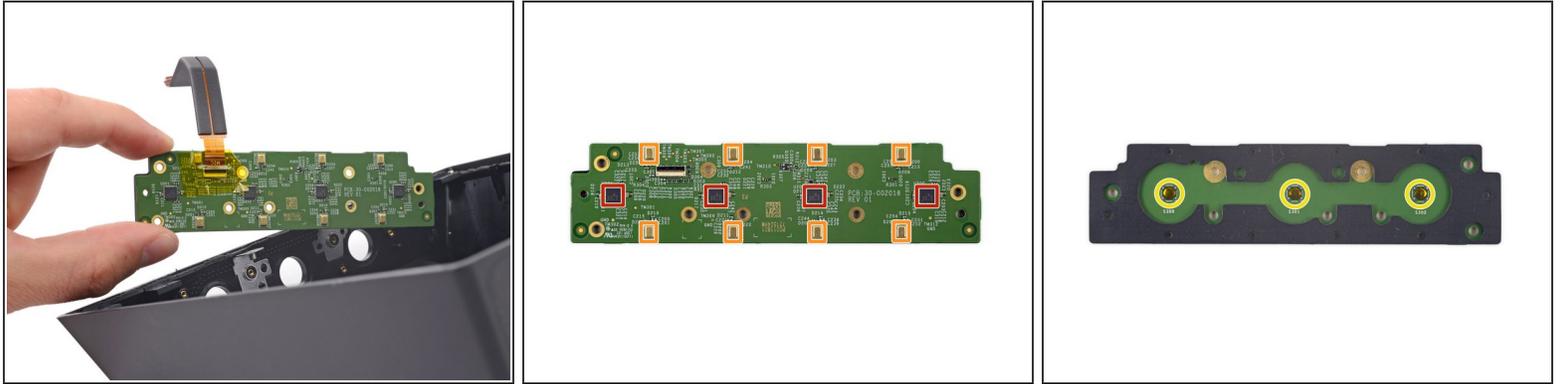
- Out comes the main board, hiding its chips under an inscrutable jigsaw puzzle of [EMI shields](#). After we pop the lids, it's time for Show and tell:
  - Intel [SR2KT](#) Atom x5-Z8350 Processor (2M Cache, up to 1.92 GHz)
  - SK Hynix H9CCNNNBKTMLBR-NTD 2 GB RAM
  - Sandisk [SDIN9DS2-8G](#) 8 GB NAND embedded flash drive
  - Cypress Semiconductor (formerly Broadcom) [BCM43570KFFBG](#) 5G Wi-Fi IEEE 802.11ac 2x2 MAC/baseband/radio with integrated Bluetooth 4.1 and EDR
  - Winbond [W25Q16FW](#) 1.8V 16 Mb serial flash memory
  - Goodix [GT9271](#) 10-point capacitive touch controller
  - Texas Instruments SND9039A2 power management, Monolithic Power Systems [MP8762](#) 10 A step-down converter, and Novatek NT50167 display power management

## Step 9



- Next we get to pop out the power supply board. We deal with so many mobile devices, it's almost novel to see this tiny li'l guy.
- Looks like a party with some [cans](#) and some chips:
  - Texas Instruments [TPA3118](#) 30-W stereo (BTL) class-D audio amplifier
  - Wolfson [WM8904G](#) ultra-low-power codec for portable audio applications
  - Rohm [BU4831F](#) 3.1 V voltage detector
  - Rohm [BU4813F](#) 1.3 V voltage detector
- There's also an array of contacts (accessible via the Show's rubber foot), likely for testing purposes.

## Step 10



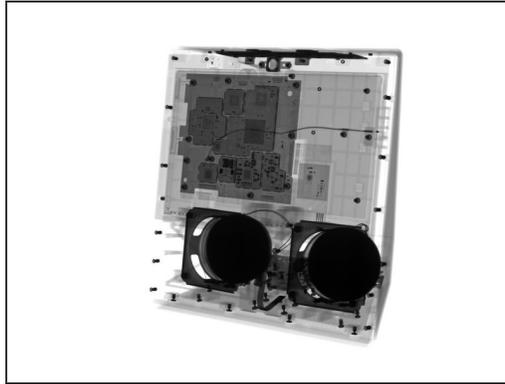
- We pull the final board from the top of the Show, and find the expected hardware—buttons, lots of microphones, and some [ADCs](#) to funnel your voice from the microphones to the CPU:
  - Texas Instruments [TLV320ADC3101](#) 92 dB SNR Low-Power Stereo ADC (x4) as seen in the [Echo](#) and [Echo Dot](#)
  - Knowles MEMS Microphone (x8)
  - Switch (x3)
- Fun fact: all that foam tape minimizes vibration noise so that Alexa still has a chance of hearing you during loud music sessions.

## Step 11



- Turning our attention to the "show" part of the Show, we easily pluck the 5-megapixel spy camera from the display assembly (after bending a bracket out of the way).
- The display itself is another matter. It's guarded by some impossibly tough foam tape that basically requires you to break the display rather than lift it out. So first we did the [former](#), then the latter.
- The panel is model TV070WSM-NMO, manufactured by BOE.
- ⓘ We half expected this display to be borrowed straight from the similarly-specced Kindle Fire, but it's not one we've seen before.
- A Richtek LED backlight driver sits on the flex cable.

## Step 12



- The Show is now an empty, echoing cave, its components laid bare. We're free!
- ⓘ tl;dr: Amazon wants as much data as they can possibly mine. Their solution is to make cheap products that are too convenient not to use, then start soaking up those keywords. Enjoy the convenience, but remember that you're the product. Oh, and don't bump this off the kitchen counter or it's curtains on this Show.
- Once again, thanks to our superpowered friends at [Creative Electron](#) for helping us see the unseen!

## Step 13 — Final Thoughts

### REPAIRABILITY SCORE:



- Amazon Echo Show Repairability Score: **4 out of 10** (10 is easiest to repair)
  - The Echo Show only uses standard T5 and T6 Torx screws.
  - While they may not get much wear, the most wear-prone components (buttons and power jack) are soldered to boards, complicating replacement.
  - The digitizer is not fused to the display, but must be pried up from tough adhesive to do any repair.
  - The display is adhered very tightly in the midframe, and is difficult to remove without damage.
  - Any repair is going to require cutting through and replacing lots of tough adhesive.