



Playdate Teardown

Panic, the company behind this yellow...

Written By: Jeff Suovanen



INTRODUCTION

[Panic](#), the company behind this yellow not-a-Game-Boy, say they made this quirky device “just for fun,” and it shows. From the 1-bit screen to its distinctive crank, the Playdate radiates novelty. We just hope it’s as much fun to tear down as it is to play!

Full disclosure: Our teardown unit came directly from Panic, who, refusing all manner of bribes, sent us a teardown unit for free. Unfortunately it didn’t come with any games, so a teardown was about all it was good for. Little did they know, teardown is our favorite game. (Okay, they probably did know that.)

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TOOLS:

[Goose](#) (1)

[Knife](#) (1)

[Flathead 4 mm Screwdriver](#) (1)

[iFixit Opening Picks \(Set of 6\)](#) (1)

[ESD Safe Blunt Nose Tweezers](#) (1)

[Phillips #0 Screwdriver](#) (1)

Step 1 — Playdate Teardown



- Some specs for you while we unbox the fun:
 - *Extremely high resolution* (400×240) display—2.7 inches at 173 ppi
 - 180 MHz ARM Cortex-M7F CPU
 - 16 MB of onboard memory
 - 4 GB flash storage
 - 2.4 GHz Wi-Fi (b/g/n), Bluetooth 4.2, USB-C, headphone jack
 - Mechanical crank because why not
- It's clear they haven't goosed the specs on this thing—but then, if you were obsessing over specs, you've already missed the point.

Step 2



- As per usual, we kick things off with a cranking good exploratory X-ray from [Creative Electron](#).
 - ① The big fuzzy rectangle at left looks like a battery. The castle turret at the top is a printed wireless antenna of some sort. The dark rectangular formation oughtta be a speaker. The crank is easy to spot. And those little dots? Solder balls, for the chips—sooooo many chips.
- Technically this shows everything inside, so... our job is done?

Step 3



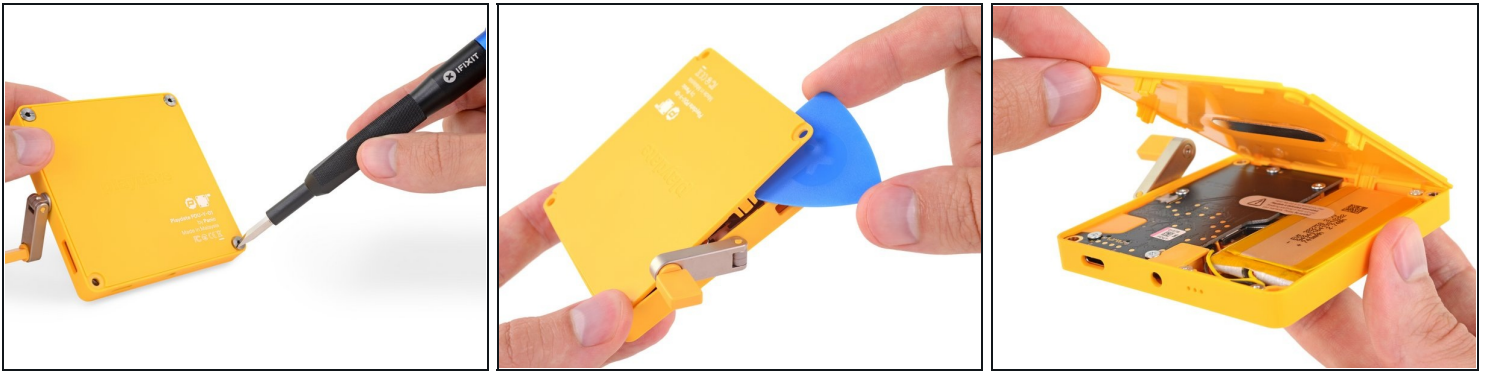
- Inside the crank handle cavity: some secret intel.
- ① Model number **PDU1-Y**—or is it [PDU-Y-01](#)? Either way, it's exactly what we expected.
- Our serial number is 1255. Who got the first 1,254 units? No idea.
 - Hopefully they didn't think to take it apart and put it on the internet. Seriously, who would do that?
 - *Answer:* someone not intimidated by these donut-shaped flathead screws. Mmm... donuts.
 - Hang tight while we noodle on a strategy for opening this thing. If we have to eat a dozen donuts in the process, that's a sacrifice we're prepared to make. Will that help? Somehow yes.

Step 4



- That yellow shade... it seems familiar, somehow.
- ① A quick dive into the old dresser drawer, and we recover this 23-year-old prize. It's a match! [1998](#), meet 2021. What a matchup.
- Things that are *not* a match:
 - Physical volume—the Playdate handily wins here. Is it even 1/4 the size? ...seriously, is it? We're not here to measure things for you.
 - Display quality—another win for the Playdate, provided spinach isn't your favorite color.
 - Crankiness—again, nod to the Playdate.
- *Take it apart already, we hear you say. As soon as we finish our spinach, you hear us say. And then you wait patiently for the rest of the teardown. Right? Hello?*

Step 5



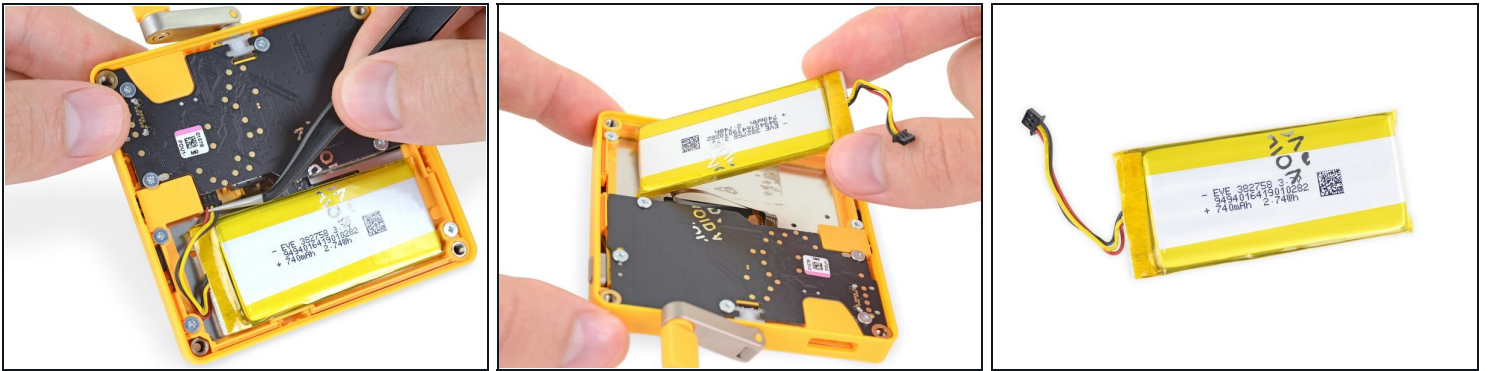
- In we go! We grab our big flathead driver for this most diminutive console, and twist away some screws.
- Next, a few plastic clips stand guard at the entry point. We're careful not to let any precious nostalgia escape while we wield our opening pick.
- First look inside reveals: Tidiness. Yellowness. And an easily-accessible battery, a.k.a. repair happiness.

Step 6



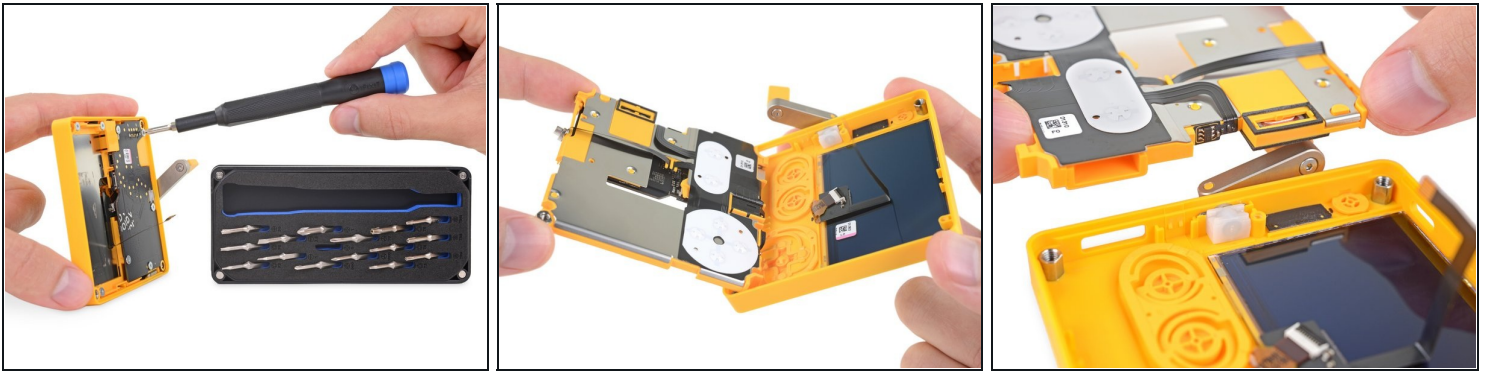
- Hold up—there's some sort of warranty sticker guarding this battery.
- Zoom and enhance?
- Oh, wait: *breaking* voids your warranty, not simply *opening*. A tip of the hat to the good sirs [Magnuson and Moss](#), and we carry on—carefully.

Step 7



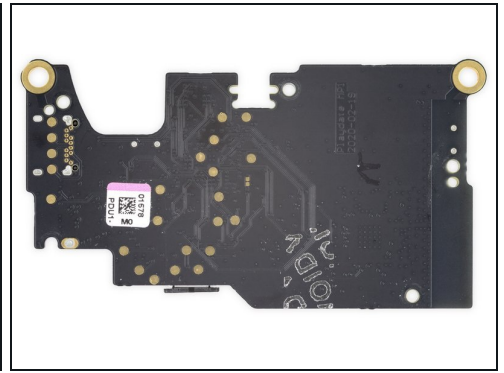
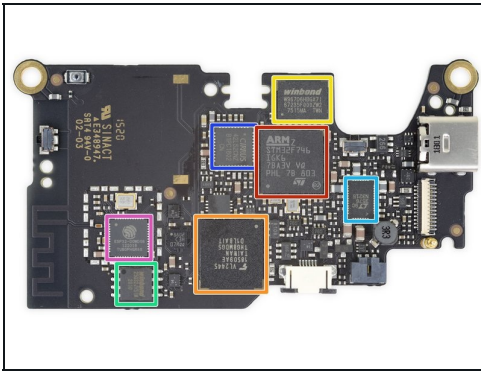
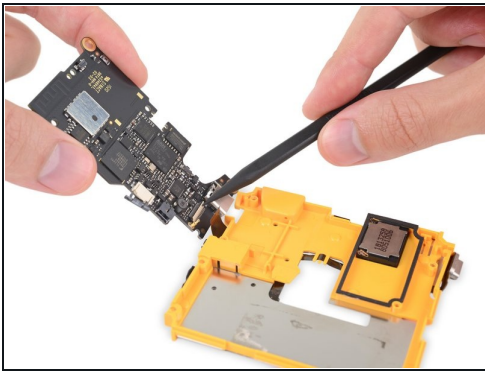
- Battery unpluggability: 8.5/10, mostly easy. Just make sure you don't poke anything flammable with your tweezers.
- The battery itself is mildly glued down. Be persuasive, but don't make it angry.
- Battery specs? It clocks in at 2.74 Wh (740 mAh @ 3.7V).
- That's about 25% of the capacity of an [iPhone 12](#), or:
 - 1.9% of a small car battery ([kind of](#))
 - Inside the range of the sort of "general purpose" AA battery that Game Boys ate for sport
 - Close in performance to a 500-pound [potato battery once driven around Portland, Ore.](#)

Step 8



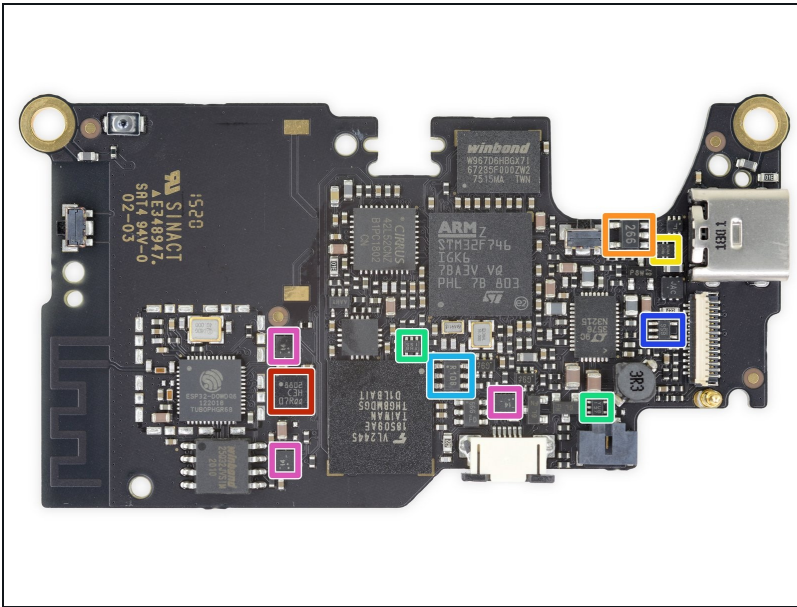
- With our minimalist [Minnow Driver Kit](#) applied to a minimalist device, we separate *pretty much everything* from *pretty much everything else*.
- Both the display and crank stay comfortably ensconced in the forward housing, along with some button covers.
- Everything else just flips out, provided you're deft with a spudger and can persuade a few small ribbon cables to stand aside.
- And here we get an early look at how the crank works. No gears! No funny business! Just a nice simple Hall-effect sensor and a ... thing ... enshrouded in white plastic. Important? We'll see.

Step 9



- More crank action in a minute, but first: Let's see what powers this pocketable piece of gaming goodness. The hidden side of the board contains:
 - STMicroelectronics [STM32F746IGK6](#), an [ARM Cortex-M7](#) based SoC
 - 4 GB of Kioxia (formerly Toshiba) [THGBMDG5D1LBAIT](#) eMMC NAND flash memory
 - 128 Mb of Winbond [W967D6HBG](#) low-power SRAM
 - 32 Mb of Winbond [W25Q32JV](#) serial NOR flash memory
 - Analog Devices (formerly Linear Technology) [LTC3576](#) power management IC
 - Cirrus Logic [CS42L52](#) audio codec w/ headphone/speaker amplifiers
 - Espressif Systems [ESP32-D0WDQ6](#) Wi-Fi and Bluetooth SoC

Step 10



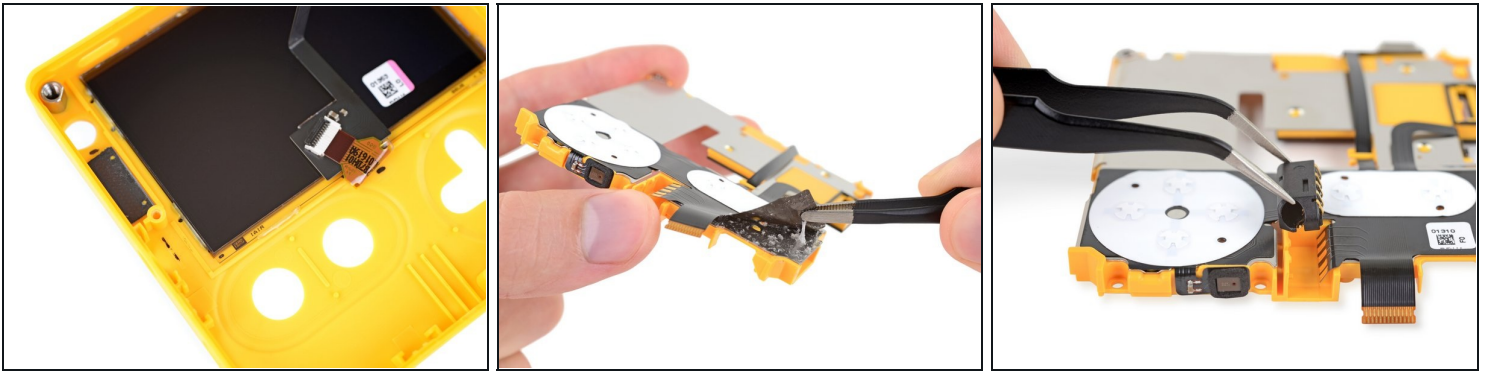
- This small board is packed full, so let's continue!
- STMicroelectronics [LIS3DH](#) 3-axis MEMS accelerometer
- Allegro MicroSystems [A1266](#) Hall-effect switch
- ON Semiconductor [FUSB301TMX](#) USB Type-C controller
- Rohm [BU4216FVE](#) and [BU4227FVE](#) 1.6 V and 2.7 V voltage detector
- Texas Instruments [REG710NA-5](#) 60 mA buck-boost charge pump
- Microchip (formerly Micrel) [MIC5365-3.3YC5](#) 150 mA / 3.3 V LDO regulator
- NXP Semiconductor [NTB0104](#) voltage level translator

Step 11



- Time to pull the pin on this crank.
- Out it comes. There's a cylindrical magnet embedded in the shaft. As it cranks, the rotating magnetic field hits the aforementioned [Hall-effect](#) sensor, which activates ... something, in your game.
 - One thing this crank won't do? [Drift](#). There's no wiper or spring or sensor surface to wear out. The design is simplicity itself. You might even say there's ... no cranky-panky.
- ① The Hall-effect sensor used here is an Infineon [TLV493D-A1B6](#).
- Elsewhere on the front side, the tiny mono speaker is adhered in place. Pretty easy to remove, but would be fussy to rework and replace.

Step 12



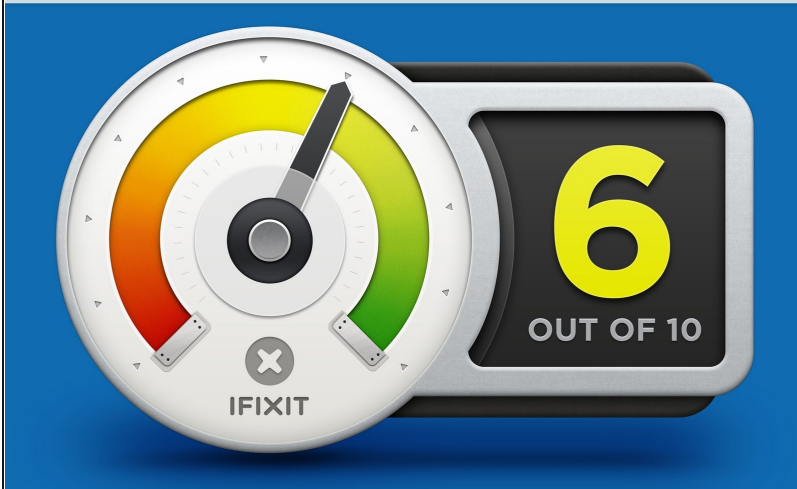
- Here's where our disassembly efforts get gummed up.
 - The display—rumored to be a [Sharp Memory LCD](#)—seems firmly glued to the front half of the plastic enclosure. If you need to replace your display, you'll probably need a whole new plastic face—we were not confident we could separate the screen without destroying it. Probably not expensive, but not ideal.
 - Meanwhile, the buttons and other various I/O live on this sprawling flexible printed circuit, which is glued to the midframe. We started to un-glue it before realizing this wasn't a good, or reversible, idea.
 - One *huge* bright spot, though, is this 100% modular headphone jack. Is that considered *retro* now? Whatever the case, we're big fans.
- ① A Knowles [SPH1642HT5H-1](#) MEMS microphone can be found near the headphone jack, too!

Step 13



- Does it go back together and still work? Indeed it does. That's a good sign. Stay tuned for a video with proof of life, and then we'll tear it down all over again.
- ① Our repairability scoring model isn't well-calibrated for the Playdate (although we'll give it a go). It exists in a category all its own, and, like the device itself, we dug in mostly for fun.
- As you can likely tell, however, getting inside and getting some parts out isn't too painful.
- Speaking of parts: Panic developed this little gadget in collaboration with Teenage Engineering. Hey, [we know them](#)!

REPAIRABILITY SCORE:



- The Playdate earns a **6 out of 10** on our repairability scale (10 is the easiest to repair):
 - A big flathead screwdriver and an opening pick will get you inside.
 - You can twirl away all the internal (Pozidriv) screws with a basic Phillips driver.
 - The battery is immediately accessible and only lightly adhered in place.
 - The headphone jack is completely modular, and the crank design is simple and serviceable.
 - You can swap the display, but only if you replace the entire front case.
 - All of the controls are aggregated onto a single FPC—easy to swap, but a bit wasteful if only one thing breaks.
 - The USB-C port is soldered to the main board.