



Atari 2600 Teardown

We took apart the Atari 2600, Atari's console from the 70s.

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INTRODUCTION

Welcome to day three of our [week of game console teardowns](#). So far we've taken apart the [Magnavox Odyssey 100](#) and the [RCA Studio II](#); the Atari 2600 is next! We [partnered with PC World](#) for this teardown to bring you a peek into another staple of game console history.

Originally labeled as the Video Computer System (VCS), the Atari 2600 was released in 1977. By that time, microprocessor-based hardware had been popularized with the Fairchild Channel F, and the VCS was Atari's first foray into that technology.

The system was originally released with all six switches on the front of the console, however, the console was redesigned in 1980 with only four of the switches on the front, and the other two on the back. The console featured here is a post-1980 model.

TOOLS:

- [Phillips #1 Screwdriver \(1\)](#)

Step 1 — Atari 2600 Teardown



- Atari 2600, with AC adapter and iconic joystick controller.
- Does the 2600 have a hardwood finish? You are correct sir!
- Video game consoles these days may not have a sense of home decor, but [some computer companies](#) still believe in the aesthetics of wood paneling.
- At its release, the 2600 sold for \$199. In today's coin, that's \$696. In comparison, the launch model of [PlayStation 3](#) cost only \$599. Prices are coming down!
- As soon as users figured out that the Atari 2600 could play more games [than just Pong](#), the 2600 became massively successful. It went from selling 250,000 consoles in 1977 to 1 million units in 1979.

Step 2



- From its release in 1977 until 1983, the Atari 2600 was officially called the Video Computer System, in response to Fairchild Semiconductor's Video Entertainment System. The console was later renamed after its model number, CX2600.
- Instead of following the trend of building a limited number of games into the system like the [Magnavox Odyssey 100](#), the Atari 2600 used removable cartridges to store games like [Space invaders](#), [Pac-Man](#) and [Pitfall!!](#)
- Each player could select the difficulty of the game they were playing by simply flipping a switch from "A" to "B". Which one was harder is anyone's guess.

Step 3



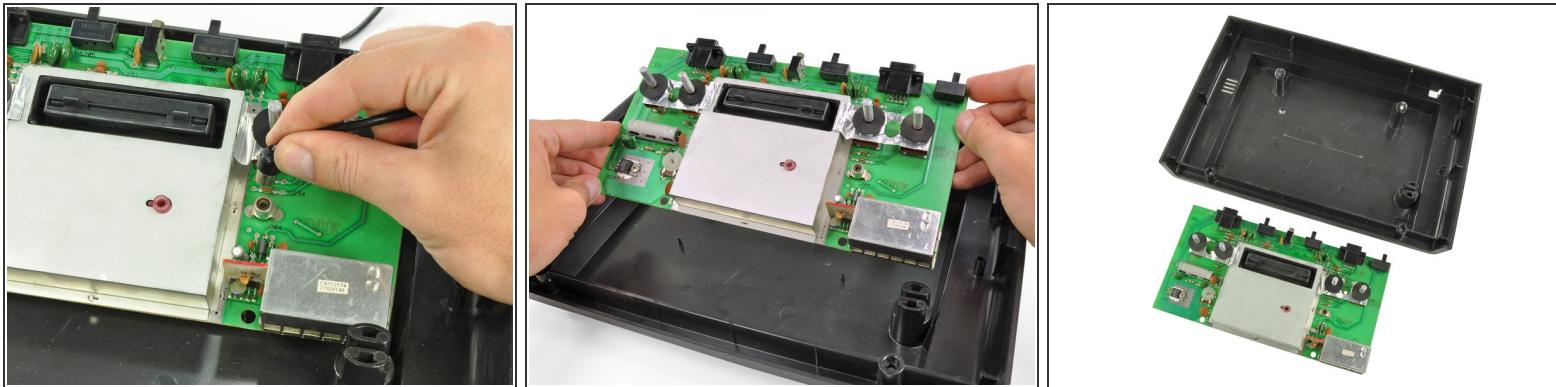
- There are four screws holding the upper and lower case together.
- Hmm, these screws in the back are at an odd angle: almost 30 degrees off of vertical! Strange.
- With such a large console, there must be a ton of awesome components inside...

Step 4



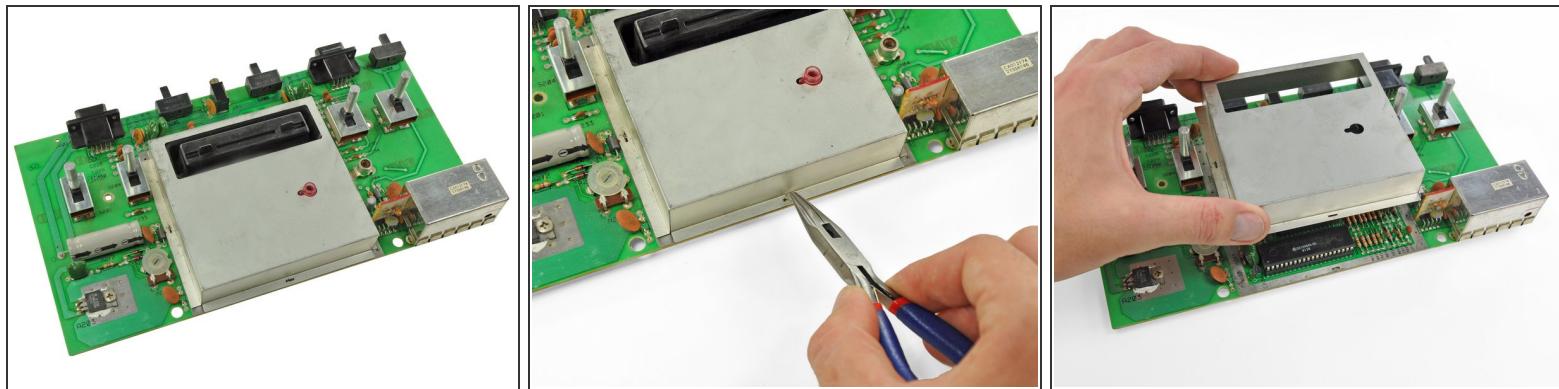
- ...Or not. Seriously? That's it? The case design team must have wanted to give lots of breathing room to the motherboard team, just in case. (Actually this is the third version of the internal hardware, the first took up much more of the case.)
- [Jay Miner](#) was able to integrate the display and sound chip into a single IC, thereby reducing the footprint of the motherboard, but the case size still seems rather hyperbolic.
- With a design that is unseen in just about any other electronic device, the motherboard is propped up and sits at an angle of 30 degrees inside the Atari. Now those case screws make sense!

Step 5



- Finally, cables that are not soldered to the board! (Take note, [Studio II](#).) The RCA cable is easily removed.
- The motherboard easily lifts out, as there are no additional screws or clips holding it in place. The only thing securing it down were the angled screws we removed from the outer case.
- The motherboard measures 9.75" x 5.25" and the lower case measures 13.75" x 9.75".
- The case of the 2600 is 2.6 times larger than the motherboard!

Step 6



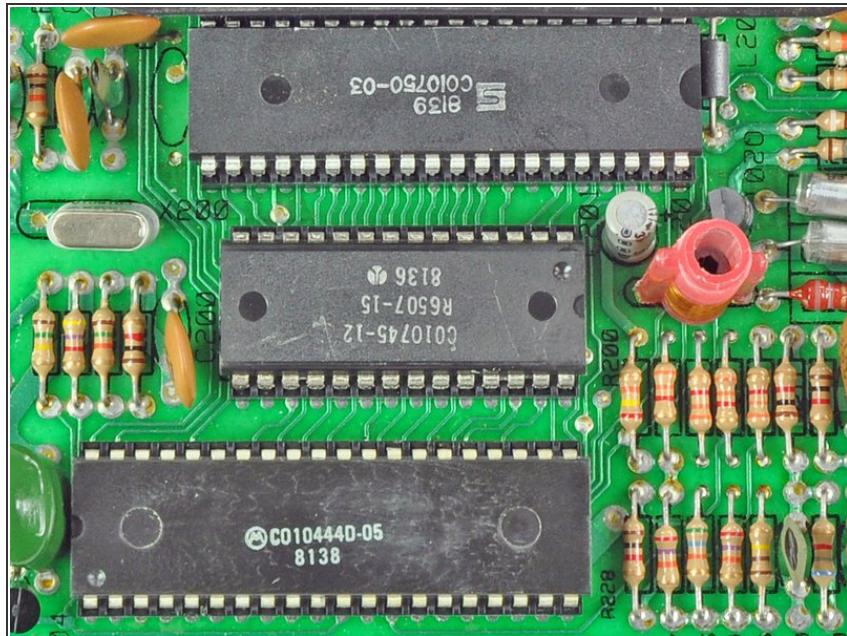
- The motherboard of the 2600 is dominated by an ominous metal box, likely the EMI shield covering the ICs.
- Our efforts to access the brain of the Atari are temporarily thwarted by four metal tabs.
 - A few short twists with pliers and the EMI shield lifts free.
- Atari gets a +1 on repairability for not soldering the shield to the motherboard, as [some recent manufacturers](#) have done.

Step 7



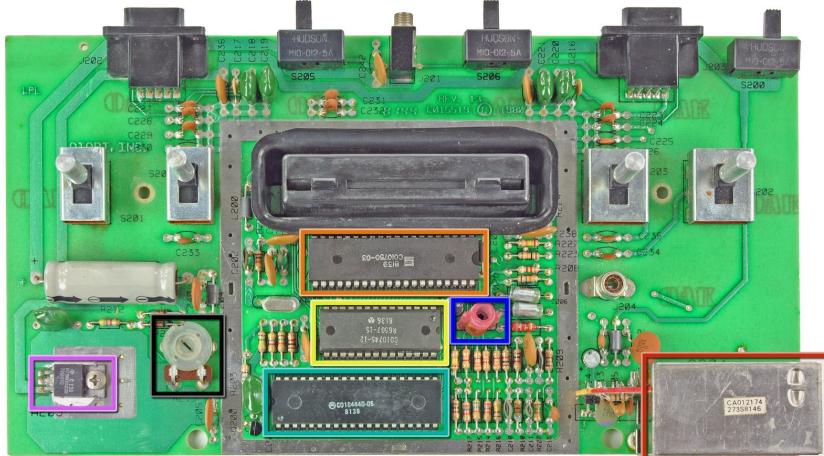
- Brains!
- The Atari 2600 boasts:
 - 1.19MHz 8-bit processor
 - 128 bytes RAM
 - 192 x 160 pixel resolution
 - 128 colors, with max 4 colors per line
 - 2 channel mono sound
- Unlike most earlier consoles -- where the games were stored on internal chips -- the Atari 2600 stored games in Read Only Memory ([ROM](#)) chips housed in external cartridges. This allowed for a potentially infinite number of playable games for the console.

Step 8



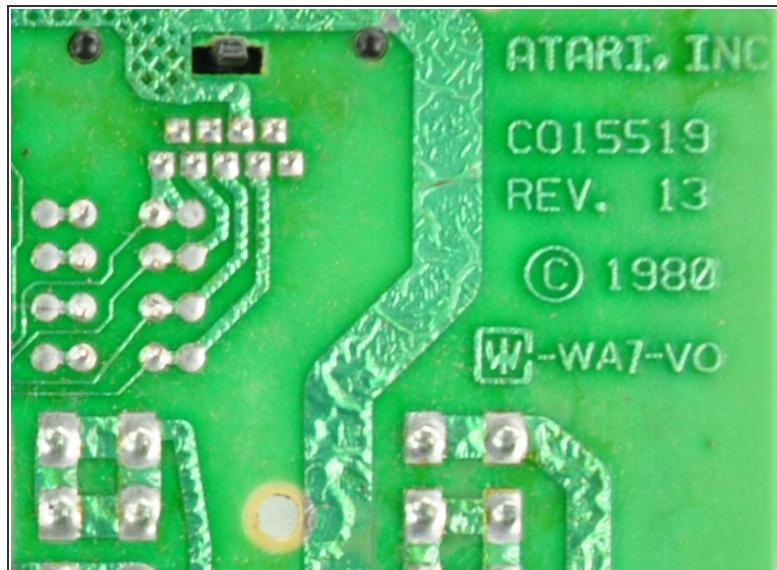
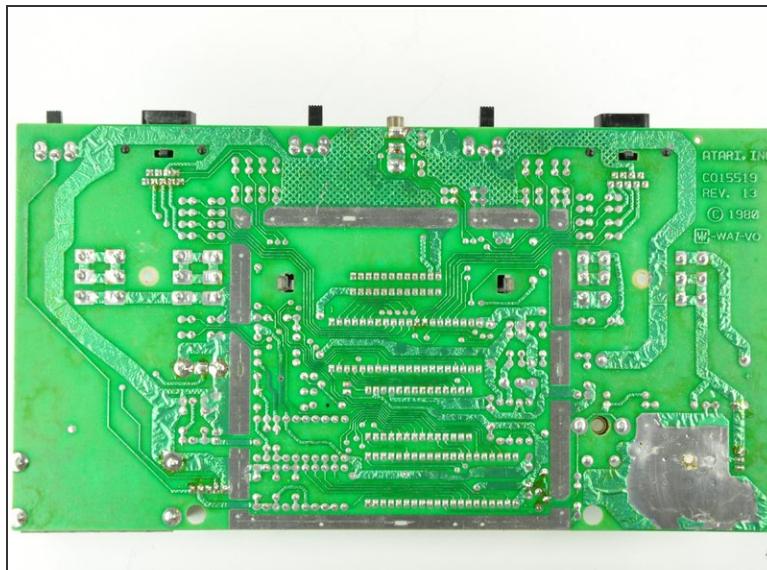
- The top two chips are the 6532 **Ram-I/O-Timer (RIOT)** chip and MOS Technology's 6507 CPU (a slimmer version of the more popular 6502). By the current revision, they were manufactured by Synertek and Rockwell, respectively.
- Atari's custom chip, the **Television Interface Adapter (TIA)** is the moneymaker of the 2600, as it allowed for multiple colors, increased graphic capabilities, and sound.
- Because memory was so expensive during the 2600's design, the video processor has no external RAM. As a result the CPU must send video data to the TIA one line of video at a time.
- There are six components of video that the TIA can create: The playing field, Two sprites (8 pixel lines), a "ball" (single pixel), and two "missiles" (two pixel lines). Combinations of these elements allowed for the complex video games witnessed in the 2600.

Step 9



- With the EMI shield removed, all the components of the motherboard are visible.
- Color tint adjustment
- Sound tuner
- RF modulator
- Cyan Engineering TIA custom chip (manufactured by Motorola)
- MOS Technology 6532 RIOT (manufactured by Synertek)
- MOS Technology 6507 CPU (manufactured by Rockwell)
- Voltage regulator (manufactured by Texas Instruments)

Step 10



- The back of the Atari 2600 Motherboard has exactly nothing interesting on it, except a great appreciation for through-hole soldering and hand drawn circuits.
- This model was revision 13. How lucky!

Step 11



- Behold the Atari in all five of its parts!
- We give the Atari 2600 a big plus for repairability. Every component is attached via through-hole solder, so replacing a burnt out resistor or IC is quite feasible.
- We're sad to say that we don't have parts for the Atari 2600, but we do have a brand new [game console parts store](#) to help keep your (slightly more modern) consoles running.
- Keep an eye on our [teardown](#) page or [blog](#) for a detailed look at another retro game console tomorrow!

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