



Xbox Series X Teardown

This is it, folks—the new generation of...

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INTRODUCTION

This is it, folks—the new generation of consoles arrives this week, starting with the Xbox Series X. Buried in a blizzard of buzzwords like “teraflops,” “true 4K”, and “ray tracing” is a new device—Microsoft’s statement on gaming for the next several years. It’s time to see what Redmond put out and what holds it together. It’s teardown time.

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TOOLS:

[Xbox Toolkit](#) (1)

[TR8 Torx Security Screwdriver](#) (1)

[Spudger](#) (1)

[Tweezers](#) (1)

Step 1 — Xbox Series X Teardown



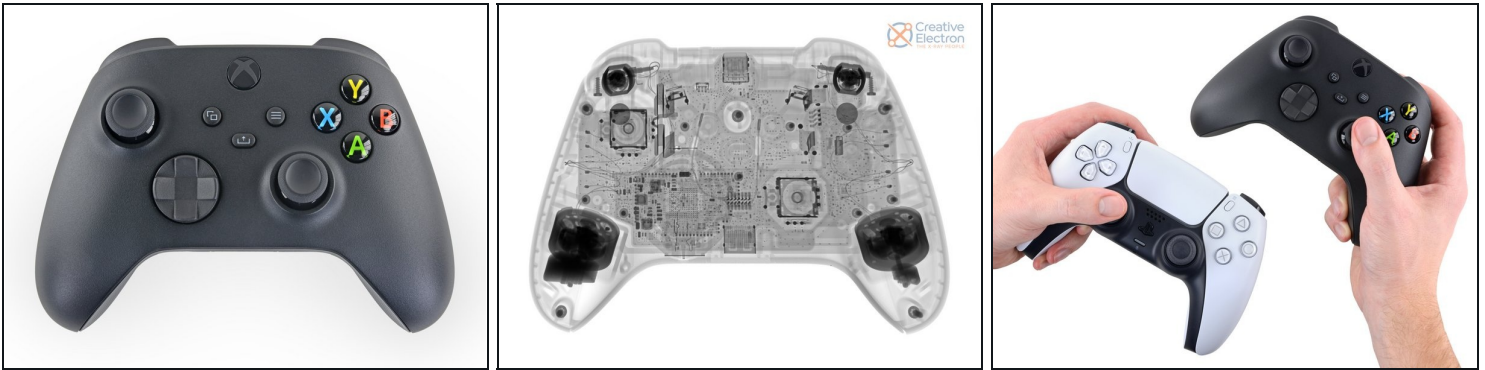
- The name might not be [all that different from the last gen](#), but everything else is. Let's look at the spec sheet:
 - AMD custom 8-core 3.8 GHz (3.66 GHz with SMT) Zen 2 CPU
 - AMD custom RDNA 2 GPU (1825 MHz with 52 compute units)
 - 16 GB GDDR6 RAM
 - 1 TB of SSD storage (with an optional 1 TB expansion card)
 - HDMI 2.1 connectivity with support for 8K video at 60 Hz, or 4K at 120 Hz
 - 4K UHD Blu-ray drive
 - Next-gen Velocity Architecture

Step 2



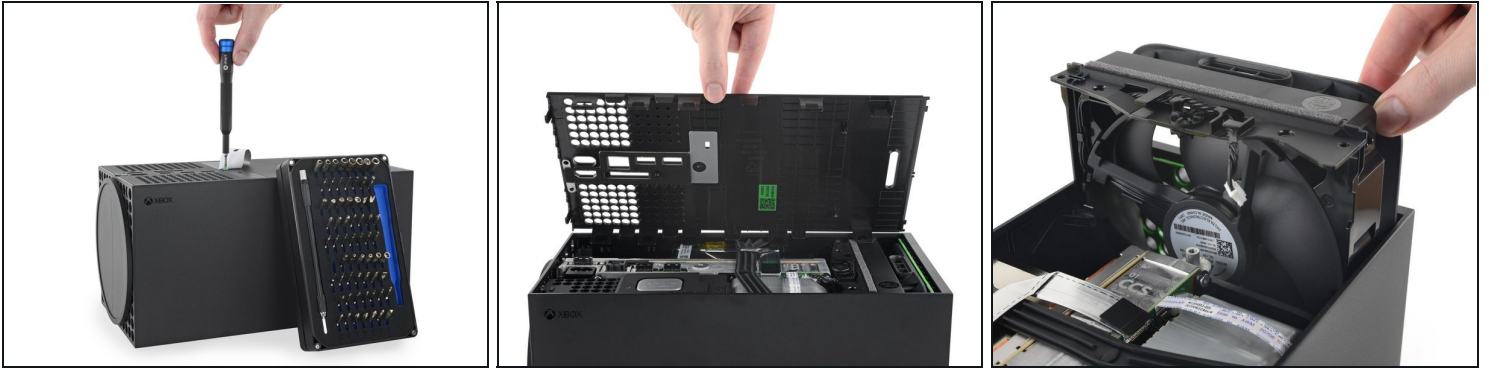
- Slim is no longer in—this year's flagship Xbox is rocking a fuller figure and, judging by that huge grille, packing some serious cooling.
 - The Series X has a smaller footprint than the [One X](#), even if you lay it on its side. But it's *60% larger* by volume—let's hope your entertainment cabinet can adapt.
 - More grilles grace the back of the console, along with the usual ports and a new storage expansion slot.
 - In an excellent accessibility move, the ports come with some tactile identification in the form of tiny [raised dots](#), making the finding-and-plugging process easier not just for the sight impaired, but anyone trying to reach into their TV cabinet without turning the whole console around.
- ① We're not tearing down the Series S today, but we have some nifty X-rays of that sibling console incoming! Stay tuned.

Step 3



- The new Xbox controller looks much like [the last one](#), save for a new share button, an upgraded D-pad, and a USB-C charging port.
- We're not dismantling this thing just yet, what with a whole console to tear apart—but our pals at [Creative Electron](#) provide a different kind of inside look.
 - With X-ray vision, you can see the four vibration motors (two in the handles, and two near the triggers), the metal joystick hardware, and all the beautiful cables and circuits doing the connecting.
- Compare this sameness to Sony's new [DualSense controller](#), which is different from its predecessor in almost every way.
 - ① That may seem disappointing for Xbox fans, but at least these controllers are cross-compatible with Microsoft's previous-gen consoles.
- And despite its flashy new design, the DualSense now shares a number of similarities with Xbox controllers. Maybe Microsoft and Sony are finally converging on the perfect controller shape?

Step 4



- Two bright green T8 screws suggest an official Xbox welcome into the machine, and yet those screws are hidden under stickers and a trap door. Microsoft, do you want us to get in or not?
- Regardless, it won't stop anyone armed with our [Mako driver kit](#). Spin the driver, pop a few clips, and you're in. So it's user *accessible*, but not User Accessible.
- We've got our crosshairs dialed in. Primary removal target? The beefy 130 mm fan. It's pretty get-at-able for cleaning—a big plus. If your X stands up tall, this is upward exhaust—so hopefully not many dust bunnies will nest there.
- Speaking of big fans, Microsoft went out of their way to [hide Master Chief](#) in here. A welcome Easter egg!

Step 5



- You *could* remove this friendly Seattle Frisbee from the bottom just for a quick toss, but we're not here to play around. There are, in fact, more screws hidden underneath.
 - ① We *wish* we could have left this alone, because removing it took some tedious internal unclipping.
- The optical drive comes out next. And much to our amazement, it's the familiar old drive returning from the [Xbox One S](#) and Xbox One X—same model number and all!
 - ① Exciting? Well, yes and no—but mostly, no. Our tests suggest the optical drive's internal circuit board is paired to your console's motherboard, which means no easy replacements if the drive goes kaput.
- That said—just like the One S and One X—if you can de-solder the board from your original optical drive and transplant it into a new drive, you're back in business.
- In any case, one of these chips might be responsible for the intimate motherboard/optical-board bond:
 - Microsoft MS0DDDSP03 ARM—probably the optical drive controller
 - Texas Instruments [TPIC2050](#) 9 channel motor/laser driver

Step 6



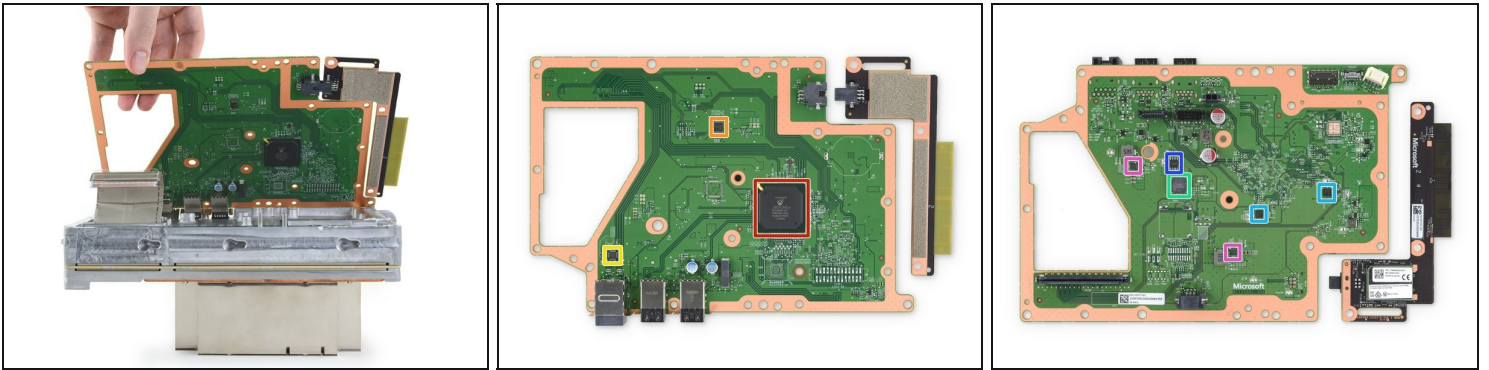
- With the disc drive out, the remaining innards are contained within this massive assembly, which is mostly just heat management strapped to some boards. Teardown complete? [*No. I think we're just getting started.*](#)
- If you're wondering about the black rubber strap, its primary purpose seems to be *isolation*—from vibration, and noise. This extra bit of cushioning helps prevent any harshness from disturbing your gaming.
- ① There are a few convenient labels here: "center chassis," "PSU," and "AC cable routing." These are slightly helpful for reassembly, but not exactly repair instructions.
- Microsoft didn't waste any space inside this thing—check out how much volume is dedicated to the heatsink. Thermal design is a big part of any console creation, and it's clear the Series X is built to [run cool and quiet](#).
- Mounted up front is one of two antenna boards inside the tower. The redundancy might serve to ensure a solid connection in either of the console's two orientations: tower mode, and *awkward* mode.

Step 7



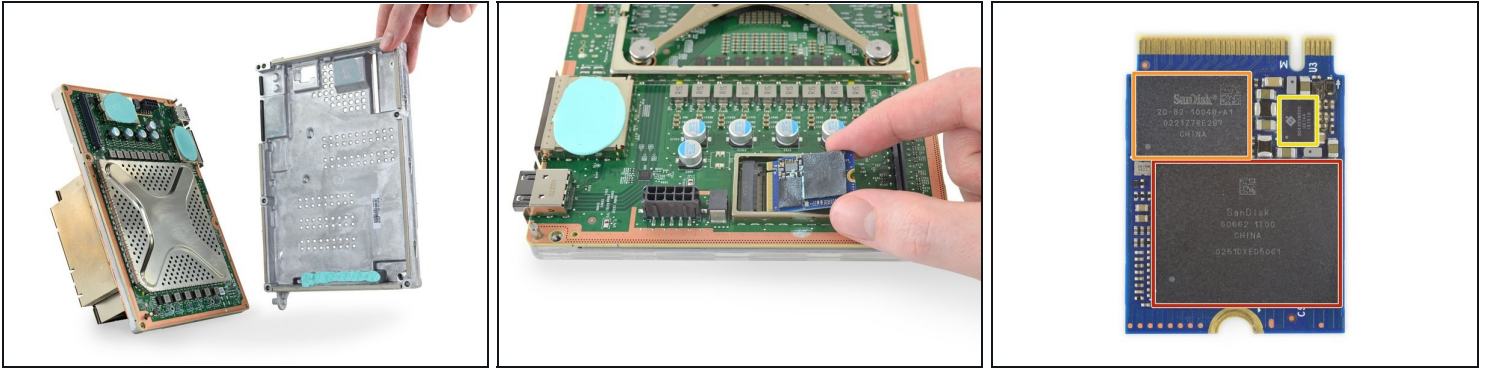
- Moving along to a box within the box, we lift the power supply away from the main assembly.
- This PSU's primary rail outputs up to 21.25 amps at 12 volts, which equates to 255 juicy watts.
 - ① Add the peripheral 60W output, and you get a total of 315 watts. That's quite a bit higher than the [One X](#)'s 245-watt power supply, but still less than the optical-drive-having PS5's 350-watt unit.
 - ☑ Why does the PS5 have a significantly beefier PSU? Check back in a short while for our [PS5 teardown](#) to find out!
- How well does this power brick stack with its contemporaries? We asked power adapter expert [Ken Shirriff of Righto.com](#):
 - *Overall, it looks like a compact, high-quality power supply. They're not cutting corners to save costs. That said, the power supply doesn't reach Apple's level of density and complexity.*
 - The power supply uses pricier but longer-lasting polymer capacitors instead of electrolytic ones to filter the 12V output.
 - ① It does warn you to operate it [below 2,000m](#)—so maybe don't take it to Santa Fe, NM.

Step 8



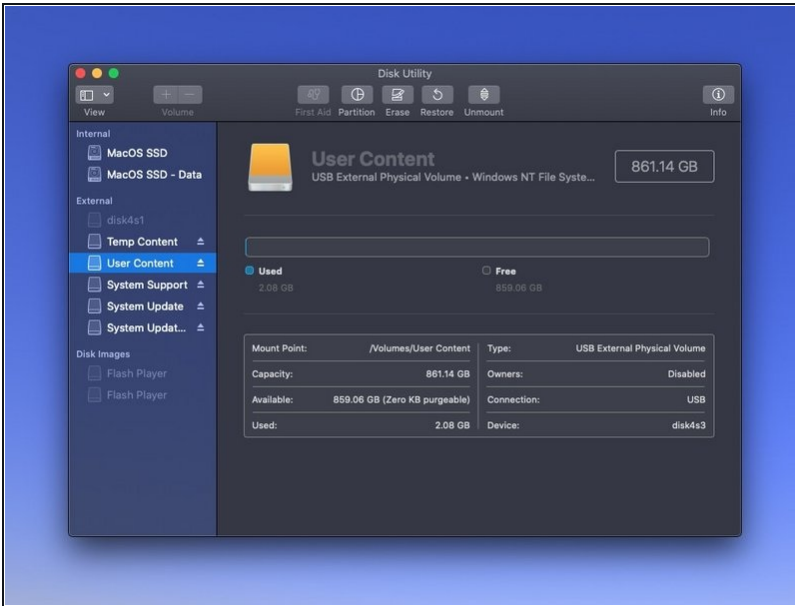
- The Series X packs in a board sandwich, but unlike the [iPhone X](#), this isn't to save space, but to make it. The aluminum block in the middle helps direct air between the boards and cool these hot boys. Here's what's on the first board:
 - Microsoft M1139994-001 T6WD5XBG-0004 Southbridge I/O controller
 - Texas Instruments [LM339A](#) quad differential comparator
 - Realtek RTL8111HM gigabit ethernet controller
 - CT08E 2020F1—possibly a Challenge Electronics sound transducer
 - ON Semiconductor [NCP186AMN080TBG](#) 1 A / adj. low dropout linear regulator
 - Nuvoton ISD8104SYI 2W Class AB audio amplifier
 - Richtek [RT6256BHGQUF](#) and [RT6256CHGQUF](#) synchronous step-down converter w/ LDO

Step 9



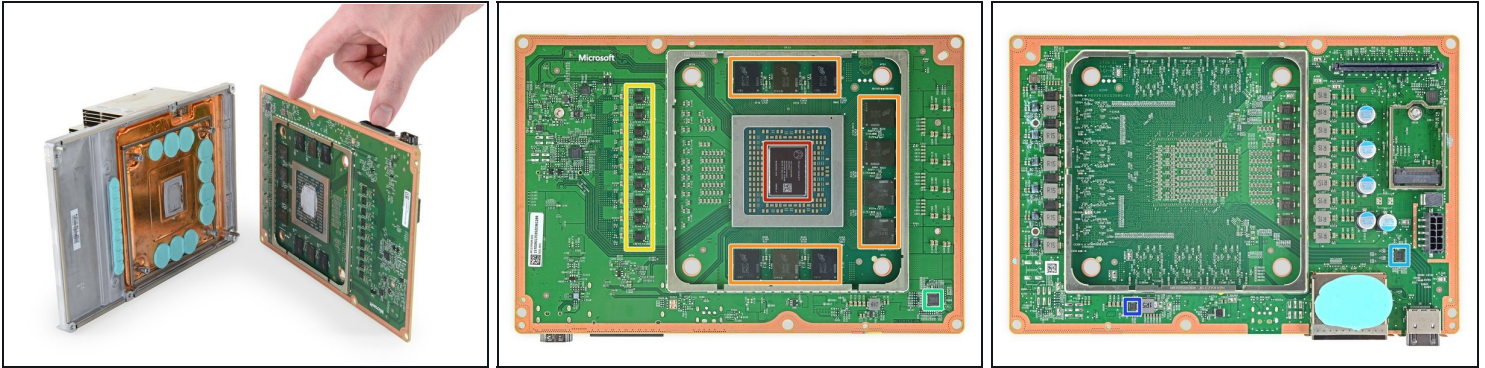
- Next, the meat of this board sandwich—the aluminum center chassis.
 - Its main purpose is to soak up High-Performance Gaming Heat™ (hence the bright minty thermal compound for the SSD and storage expansion slot).
- Speaking of storage: the Series X uses an m.2 2230 NVMe SSD, namely a custom 1 TB SN530 by Western Digital. We [heard it's super-fast PCIe Gen 4.0](#), too—this is high-end stuff!
 - ☑ Its nice to see Microsoft using a replaceable drive here, even if software barriers prevent *you* from doing the replacing.
- Let's take a closer look at the bits that give this SSD its oomph (ignoring a [pretty boring back side](#)):
 - SanDisk 60662 1T00 1TB NAND Flash Memory
 - SanDisk 20-82-10048-A1 NVMe SSD Controller
 - Qorvo (formerly Active-Semi) 90430VM330 Power Management IC

Step 10



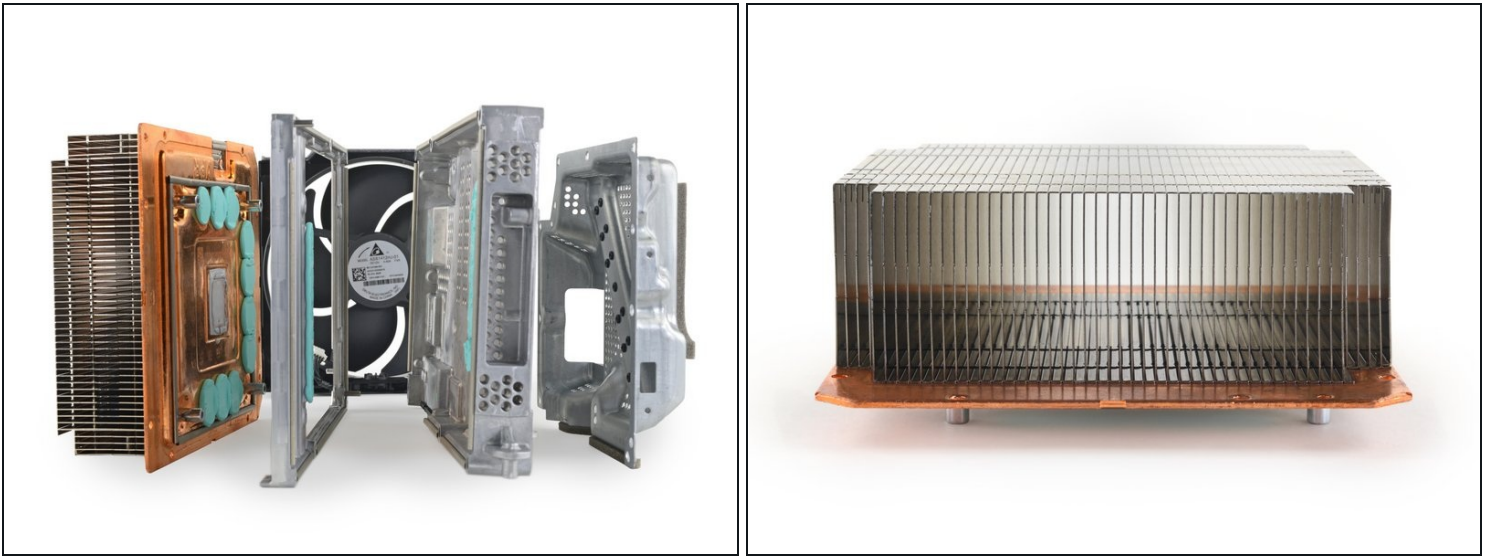
- Since this SSD comes in a standard m.2 form factor, we popped it into our desktop workstation for a peek at its contents.
- ★ In fact, it's strikingly similar to drives we've found in [certain other](#) recent Microsoft devices.
- If you were expecting it to be partitioned a lot like the [hard drives found in prior Xboxes](#), you're way ahead of us.
- ❗ Even though the SSD itself is fairly standard, if past experience is any guide, you'd better plan on some serious headaches if you ever need to replace or upgrade it in the future. Will it even work at all? All we know is our gut says *maybe*.
- ★ **Update:** For more on what our gut says, check out our detailed writeup on this little SSD: [Can DIY Storage Save You Money on the Series X? Probably Not.](#)

Step 11



- Peeling the final layers off this tasty thermal parfait we free the final board from the heat sink assembly, finding more ~~tooth~~ thermal compound and yet more chips:
 - "Project Scarlett" 100-000000388 SoC (includes 8-core AMD Zen 2 CPU + AMD RDNA 2 GPU)
 - Micron [D9WCW](#) 1GB and Micron [D9WZX](#) 2GB, for a total of 16 GB of GDDR6 SGRAM (Super-Great Synchronous Graphics RAM)
 - Monolithic Power Systems [MP86965](#) Power Phase Modules w/ MOSFET
 - Monolithic Power Systems [MP2926](#) Multi-Phase Controller w/ PMBus Interface
 - ① The Master Chief
 - ON Semiconductor NB7NQ621M 12 Gbps HDMI/DisplayPort Level Shifter/Linear Redriver
 - Texas Instruments TPS568230 Synchronous Step-Down Regulator

Step 12



- With the motherboards gone, we take a moment to admire the full cooling system. What a *cool* cookie sandwich.
 - ① The mint green cream filling is a bunch of thermal compound, which help dissipate that Gaming Heat™.
- On the left: Fins pull heat from the copper vapor chamber to be wicked away by cool air, pulled in through the bottom of the console by the fan.
- Next up—along with the copper plate, this metal frame acts as an EM shield. It also transfers heat away from the hot-tempered voltage regulator modules via thermal pad.
- The "CCS" (that's "Center Chassis") provides rigidity, aids in shielding, sinks heat, and maximizes board cooling.
- Finally on the far right, a Faraday-cage-like EM shield protects the other motherboard while allowing air to cycle through.

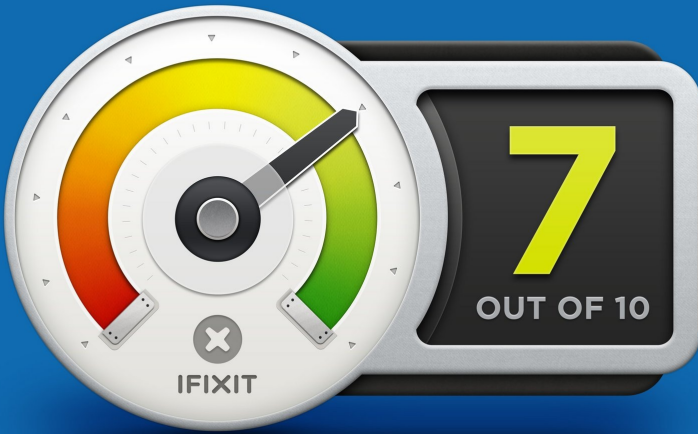
Step 13



- This may be Microsoft's ultimate gaming machine, but by volume it almost feels like an air conditioner with a graphics card. Cool stuff.
- A relatively modular and repair-friendly design is partly overshadowed by some software barriers. Our tests indicate that both optical drive and SSD repairs will be problematic at best—which could be an issue if you want this thing to play games, or boot up.
- We're delighted to have two Master Chiefs living inside our Halo machine, but how will this tower of terror fare in the repair arena? Scroll down to read the verdict.

Step 14 — Final Thoughts

REPAIRABILITY SCORE:



- The Xbox Series X earns a **7 out of 10** on our repairability scale (10 is easiest to repair):
 - Very few tools are needed to completely disassemble the console.
 - All screws are standard T8 Torx fasteners.
 - Once inside, the modular design allows for easy fan, optical drive, PSU, and wireless board replacements.
 - The SSD is a modular, off-the-shelf part, but requires quite a bit of disassembly to access.
 - Some critical component repairs are complicated by software locks.