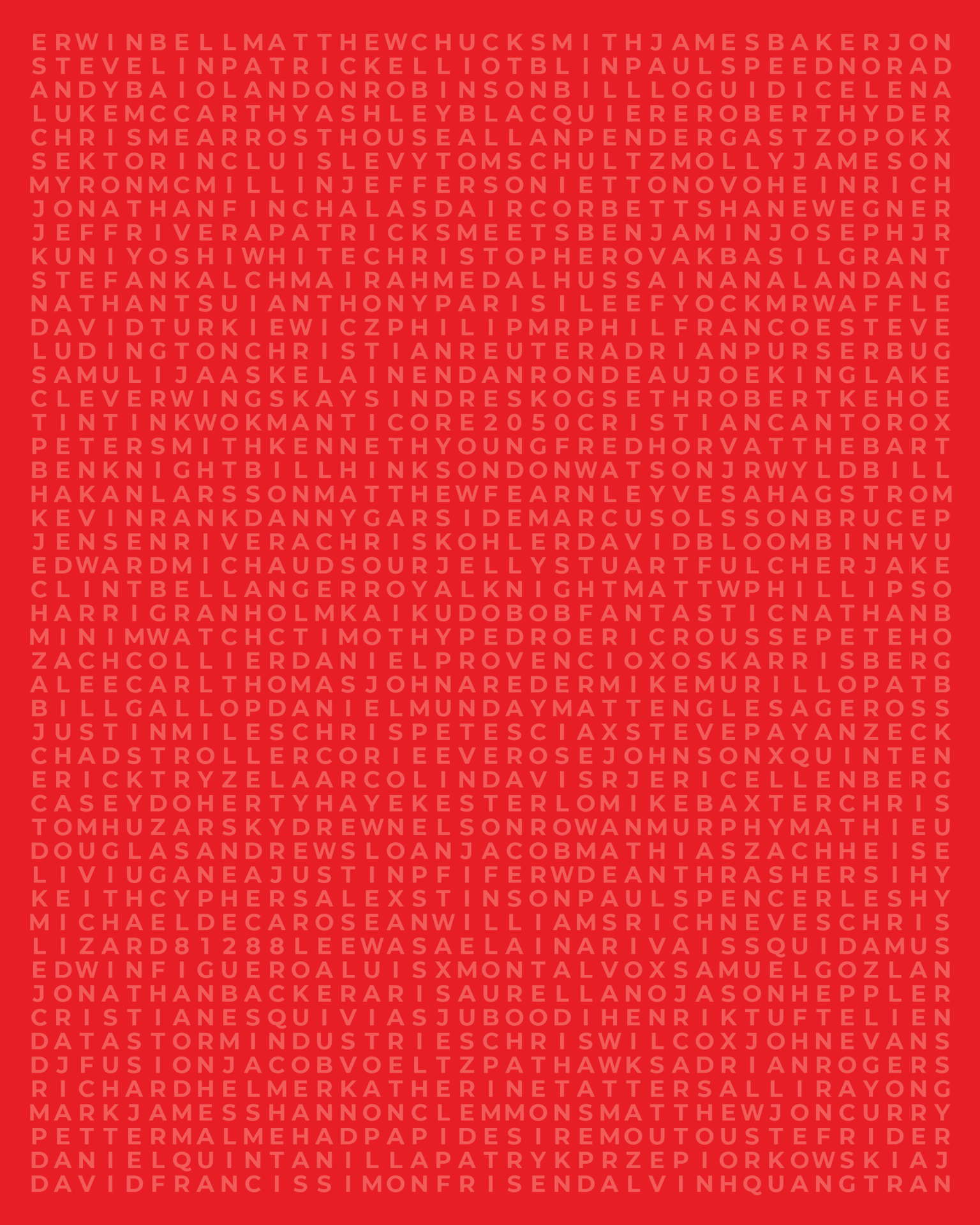
THE GAME CONSOLE

A Photographic History from Atari to Xbox

Evan Amos

no starch press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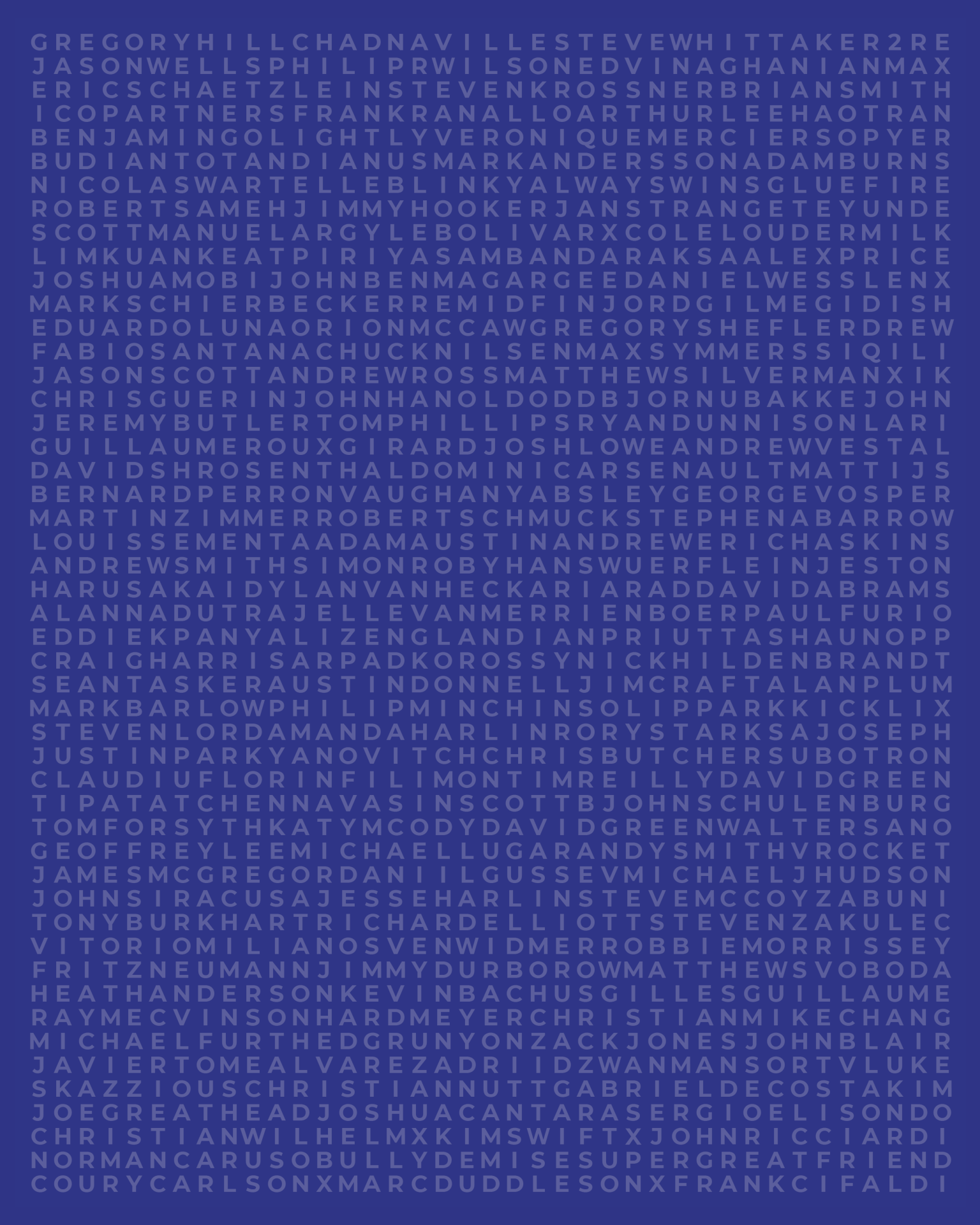
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Evan Amos

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To Aaron

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Thank you to all of the people whose names appear on the beginning and end pages of this book, which are Kickstarter backers or various others who have helped.

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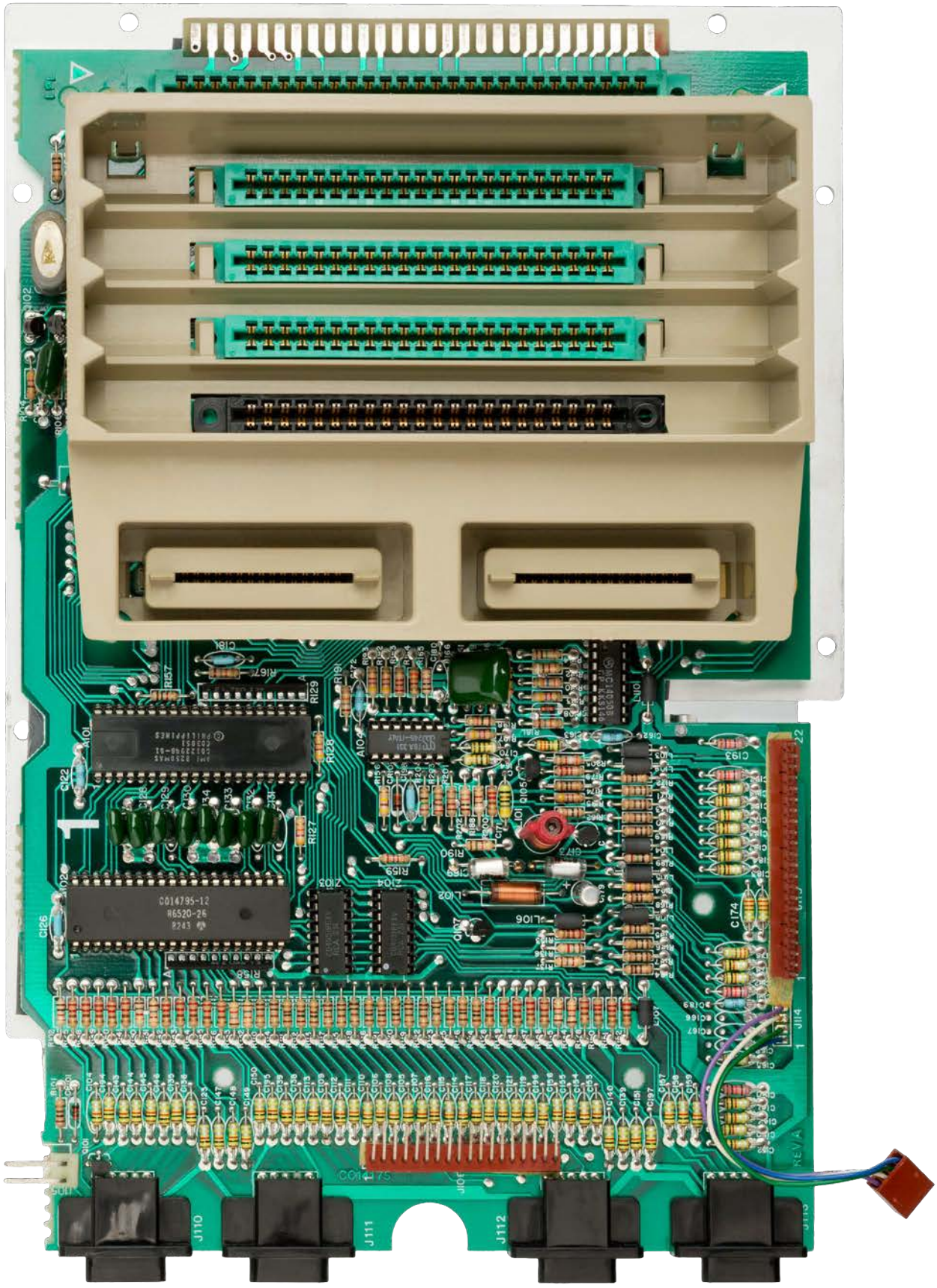
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Introduction

It all started with Wikipedia.

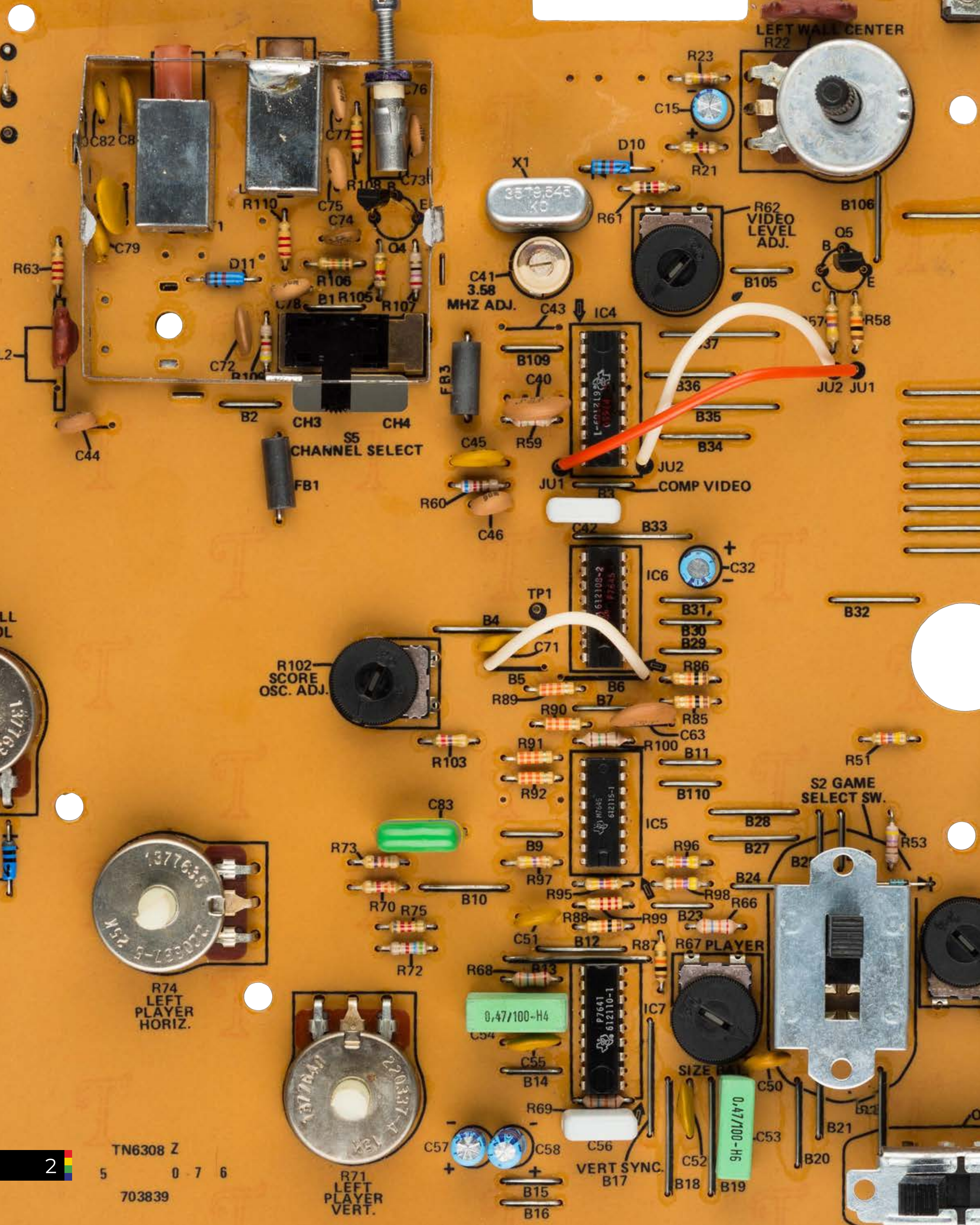
This online encyclopedia that anyone can contribute to is a weakness of mine. I can lose hours reading on the site and following page links, going from an article about an old movie to an entry about obscure film formats, then to a list of films that are forever lost. The site also helped foster my passion for video games, a love affair that began when I was six years old and received an NES for Christmas. In Wikipedia, I found a source of knowledge and discovery for many systems I'd never heard of, and I wanted to know more about all of them. I loved the site, but there was something that always bothered me about it: the photos.

There are many reasons for the often-poor photography on Wikipedia, but the most common is due to licensing. Wikipedia requires that photos on the site be under a free license, which prevents people from just grabbing copyrighted photos from around the web and placing them in articles. Wikipedia's own editors have to take on the job, and most are ill-equipped to do so. I'd been a hobbyist photographer for years, and one day I decided that I'd just replace these bad photos in video game articles myself. I transitioned from avid reader to prolific contributor, taking and uploading hundreds of photos of video game hardware to gaming and console articles.

Cleaning up these console entries with quality photos became addicting, and I wanted to do as many as I could. After I had photographed all of the things I owned, I reached out to local collectors. After photographing everything they owned, I reached out to the world. I started a Kickstarter to help buy systems so that I could photograph them, take them apart, create comprehensive galleries, and share and preserve these video game consoles. The Kickstarter was a success and helped me raise enough money to buy many of the consoles that you'll see in this book. The help and contributions from people who believed in my work was humbling, and I can't thank my supporters enough.

This book is a culmination of the work that I started on Wikipedia. It is the result of countless hours of taking and editing photos, scouring eBay listings for rare items, and searching through old newspapers, magazines, and books for the stories behind the consoles. It's my attempt to provide a brief look at the comprehensive history of the home video game market, and not just those that everyone knows, but the ones many never knew existed. I've also included a few hybrid computer-consoles, but for the most part excluded computers and focused on home consoles for reasons of space. From beautifully designed consoles to bizarre-looking controllers, and from beloved successes to massive failures that bankrupted companies, let's not let this history fade away.

Atari 800 motherboard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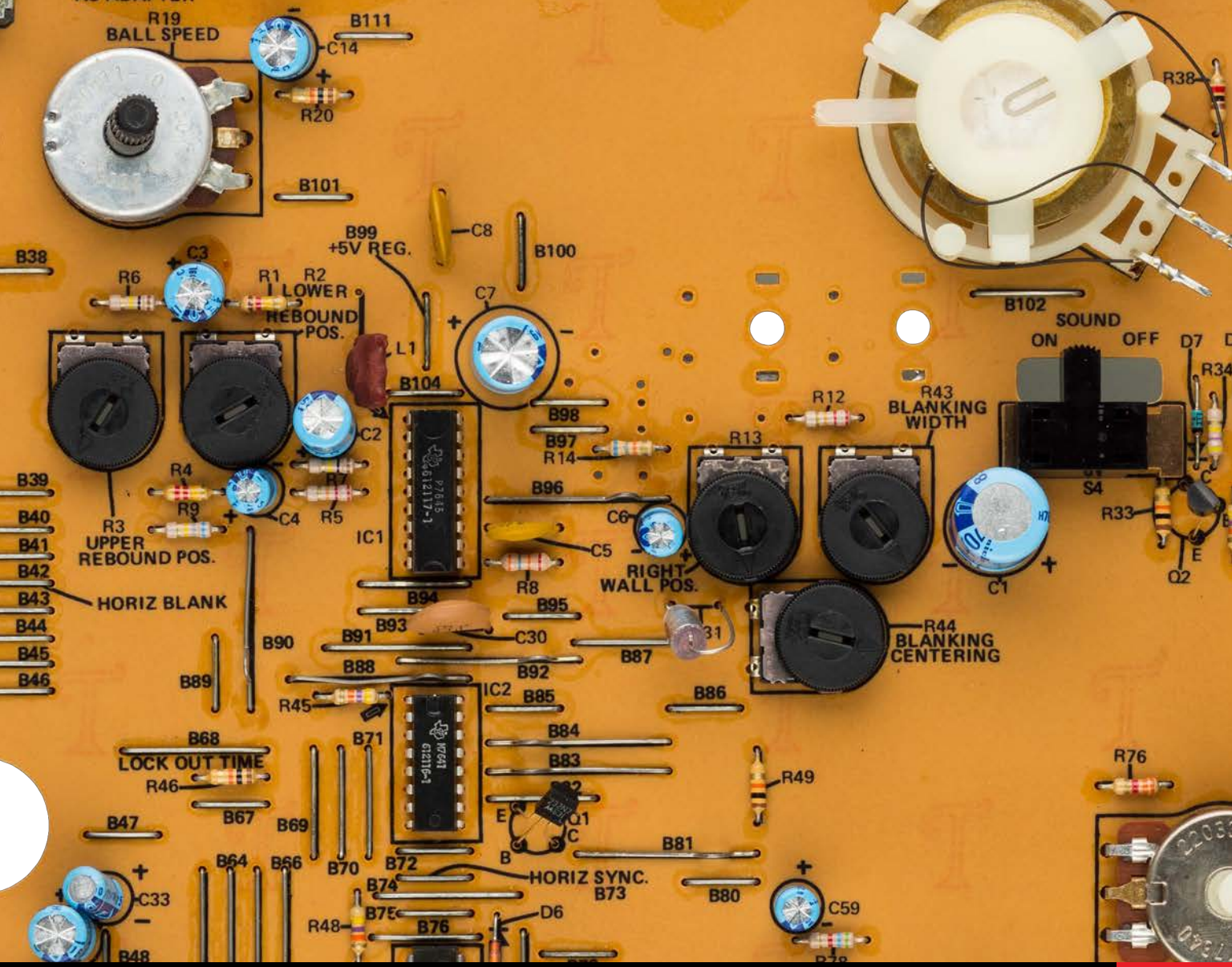


1st Generation

Long before *Pong*, the idea of using an electronic display to provide interactive entertainment could be seen in research laboratories and colleges across the US. One of the earliest examples comes from 1958, when a researcher at Brookhaven Laboratories repurposed one of its analog computers and built handheld controllers to simulate a tennis match. Later, other early games such as *Spacewar!* (1962) appeared at the Massachusetts Institute of Technology, which required the use of a large and expensive computer. Video games didn't hit the mainstream until 1972 with the release of the Magnavox Odyssey and the arcade hit *Pong*. This new form of entertainment fascinated young people and began a craze that would become a multibillion-dollar industry.

Magnavox Odyssey 500 series motherboard

Magnavox Odyssey (1972)

SPECS		
	Launch price: $99	**RAM:** None
	Processor: None	**Optional accessory:** Light gun
	Power: 6 C batteries or optional AC adapter	**Systems sold:** 330,000+

The Magnavox Odyssey was the world's first consumer device that let people play interactive games on their television. Limited by the era's primitive technology, the Odyssey's games were played with white squares and lines that players could move around on a black background. The system's standout game was a simple two-player version of tennis, which was the direct inspiration for *Pong*. While *Pong*, not the Odyssey, would begin the video game craze, the system is an amazing achievement for its time and set the stage for the modern age of video games and consoles.

Planning and design for the Odyssey began as far back as 1966.

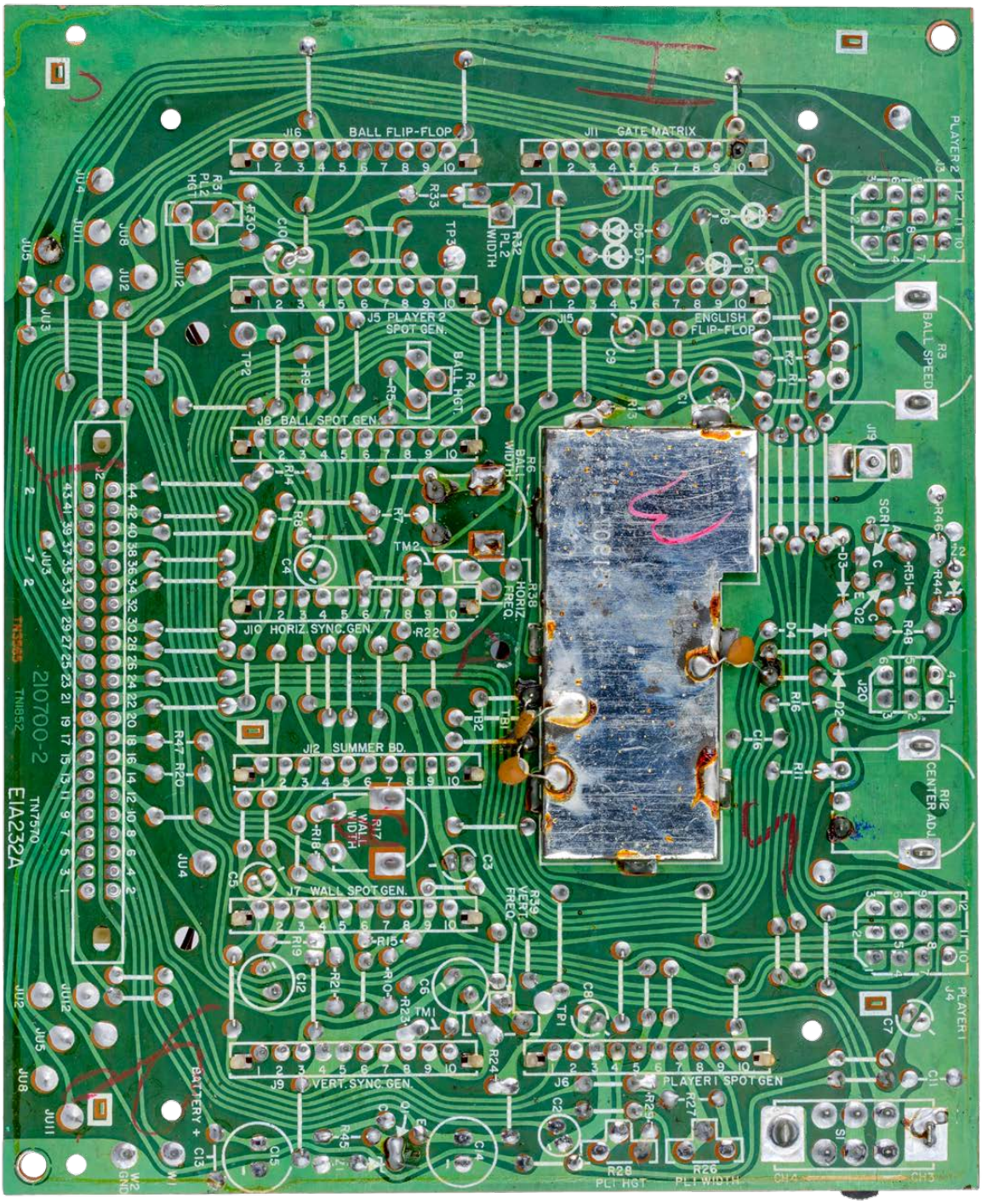
Color overlays came in two sizes, 18” and 23”, and attached to the TV screen through static cling.

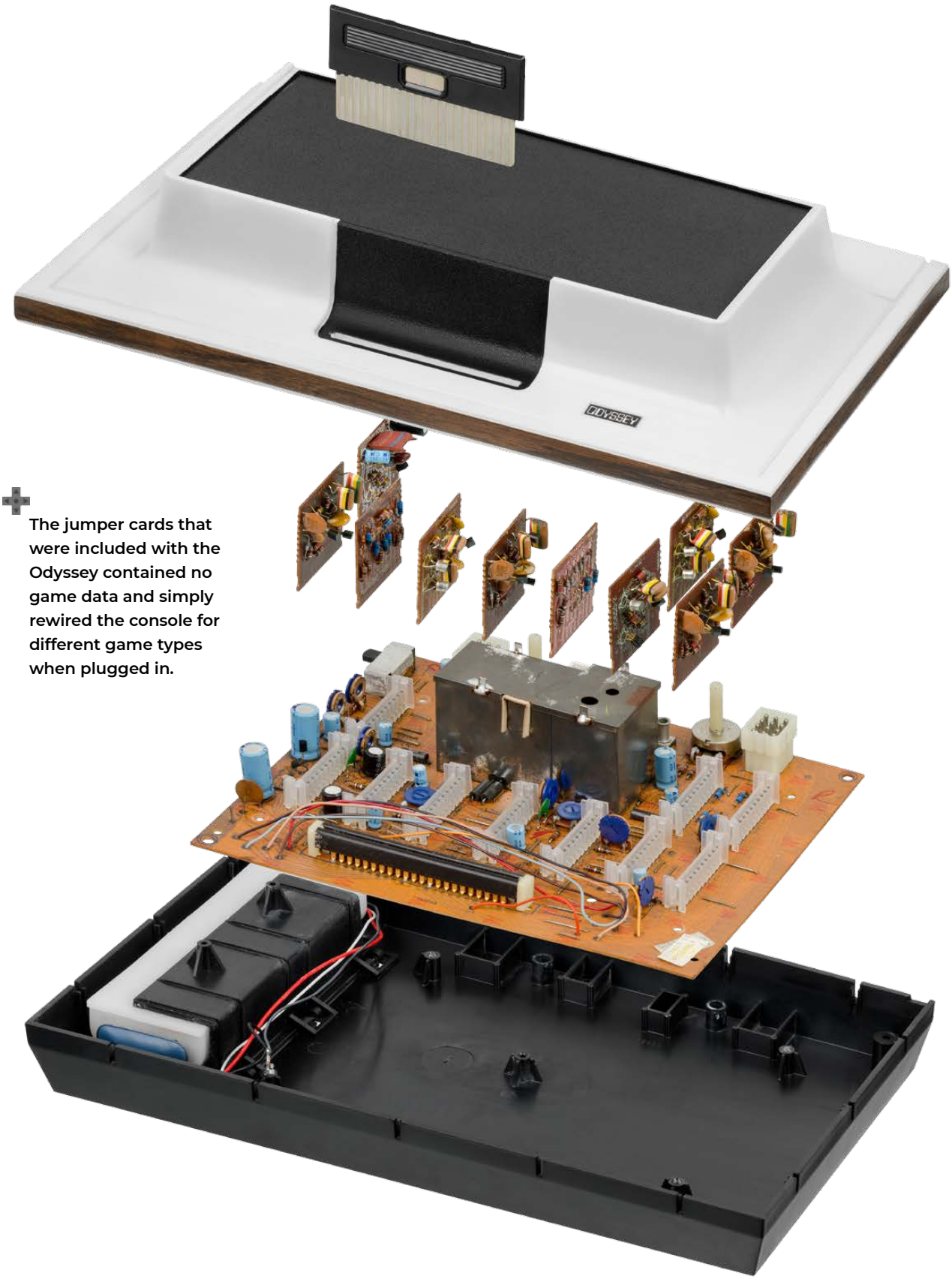
Pack-In Accessories

Magnavox compensated for the Odyssey’s extremely basic, freeform gameplay with pack-ins to enhance the experience. Each system came with color screen overlays, six jumper cards, poker chips, play money, dice, and various game boards and cards. These items allowed for 12 different games to be played out of the box.

Inside the Odyssey

The Magnavox Odyssey doesn't contain a single integrated circuit but is instead made entirely from capacitors, resistors, transistors, and diodes. The Odyssey's object physics and onscreen graphics generation are handled through 10 daughtercards attached to the system's motherboard.



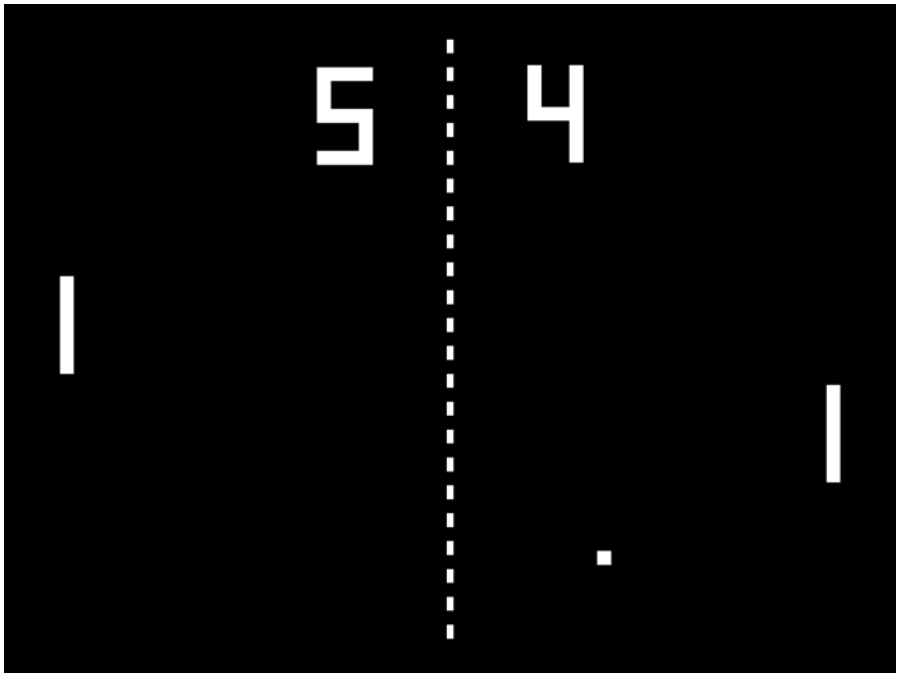


The jumper cards that were included with the Odyssey contained no game data and simply rewired the console for different game types when plugged in.

Pong Consoles (1975+)

SPECS		
	***Pong* creator:** Allan Alcorn	**Coleco Telstar models:** 14
	Year of creation: 1972	**Atari *Pong* models:** 8
	Magnavox Odyssey series models: 8	**Total *Pong* models:** 300+

Atari's first product was *Pong*, an unofficial arcade cabinet adaptation of the Magnavox Odyssey's electronic tennis game. Atari's version greatly improved upon the original, adding a score tracker, sound, and more refined gameplay. *Pong* became a smash hit in arcades, which led Atari to partner with Sears to bring out a home version, released in 1975 as the Sears Tele-Games *Pong*. The home version also became a huge hit, and its success led to numerous *Pong* clones and helped to spark the rise of the video game industry.



Nintendo TV-Games

Pong wasn't just a phenomenon in the US; it also took off in Japan and Europe, where local companies produced their own *Pong* consoles. In Japan, one of the most popular *Pong* systems came from the company Nintendo, a longtime toymaker that had begun branching out into video games. Its Color TV-Games line of systems included two *Pong* consoles, a *Breakout* clone, a racing game, and a computer that played the strategy game *Othello*.

The Color TV-Game 15 offered 15 variations of *Pong* and retailed for ¥15,000 in 1977.

The 2000 was the first Odyssey to offer a single-player mode for *Pong*.

The Telstar line included models with color graphics, light guns, and even a cartridge-based system.

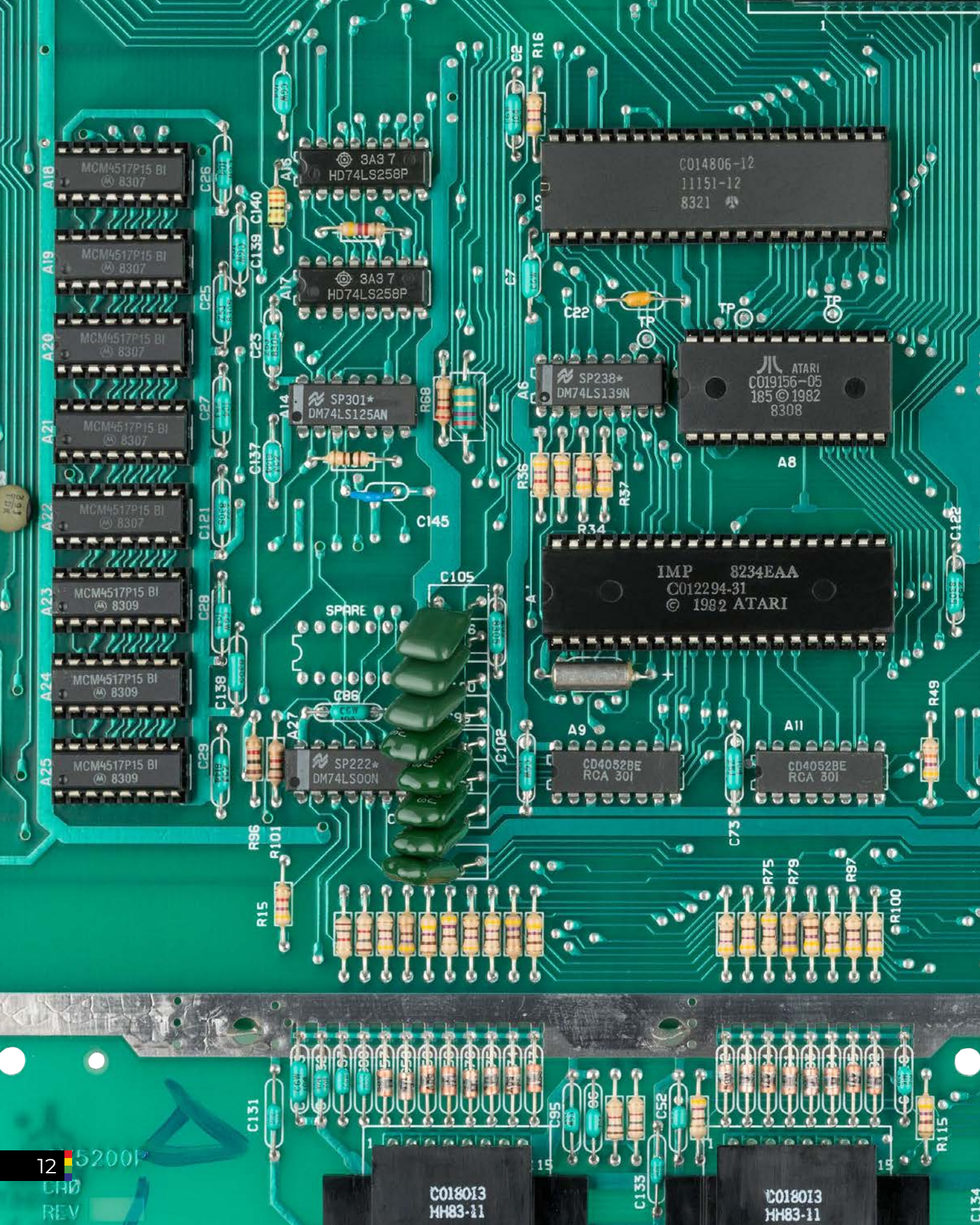
The Coleco Telstar and Odyssey Series

By 1975, Magnavox had discontinued the original Odyssey and began producing a series of streamlined Odyssey systems. Some of these dedicated *Pong* consoles (like the Odyssey 2000 above) used the General Instruments AY-3-8500, a "*Pong* on a chip" that incorporated all of the logic and circuits for *Pong* into one integrated circuit. The first to use this chip was Coleco, a toymaker whose line of Telstar systems would become one of the best-selling series of *Pong* consoles.

The Crash of 1977

The simplicity of the "*Pong* on a chip" integrated circuit opened the floodgates for electronics manufacturers to produce their own *Pong* consoles. *Pong* was so popular and so easy to produce that, by 1977, the market was flooded with nearly identical systems. When consumer fatigue set in and the systems stopped selling, companies dumped their *Pong* consoles and left the industry. The result was the first market crash and the end of the *Pong* era. Luckily, a new generation of gaming consoles had begun to emerge that would quickly revitalize the industry.

The Montiverdi TV Sports was another uninspired *Pong* console that offered a standard variety of *Pong* game modes as well as light-gun shooting.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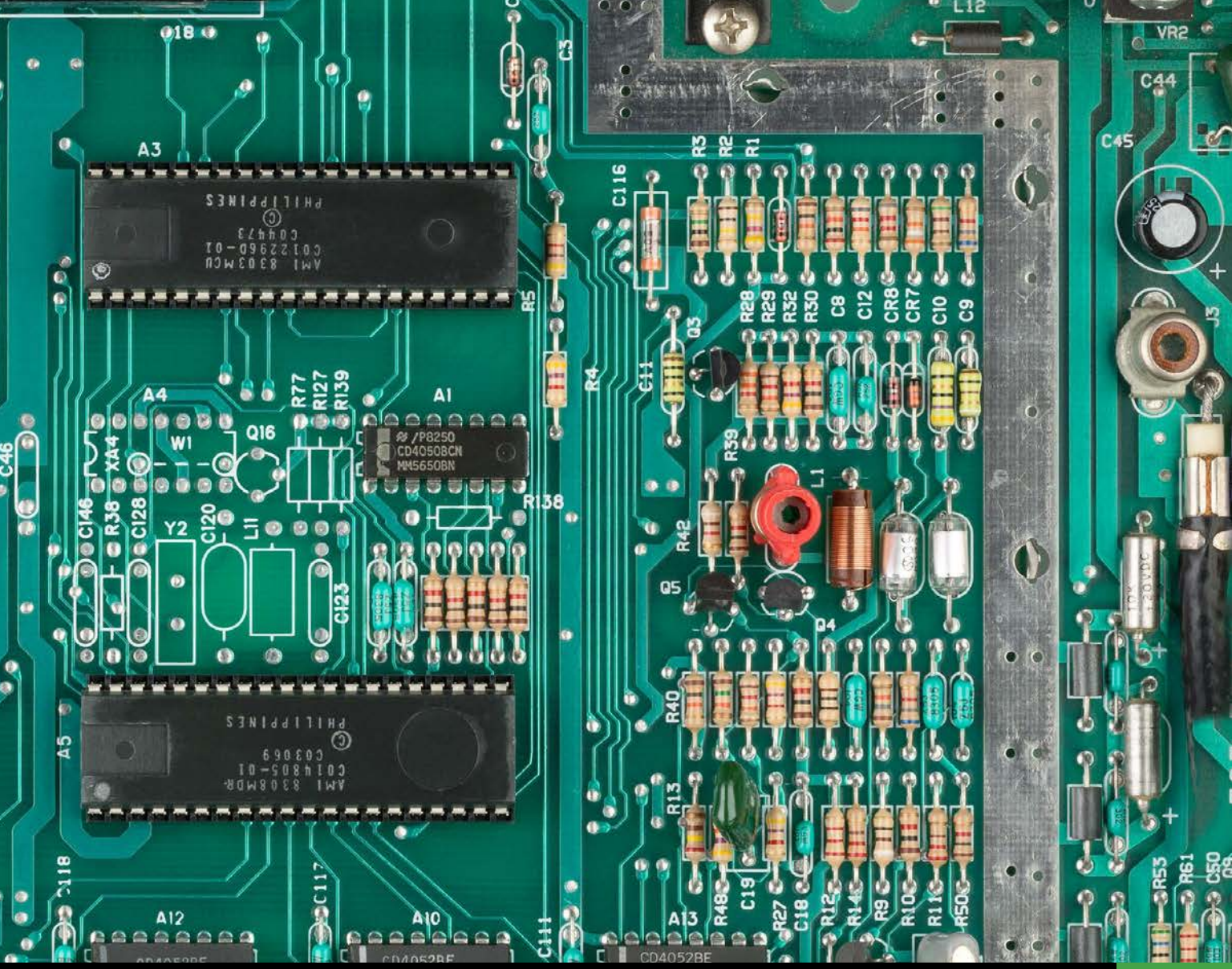


2nd Generation

Technological innovations led to more dynamic video game experiences in the second generation; new microprocessors that ran code from ROM cartridges meant one console could play a theoretically limitless variety of games. While these new consoles took off in homes, people also flocked to arcades to play games that had unmatched graphics, sound, and gameplay. Sales of video games and hardware grew tremendously in a very short period of time, which caused a gold-rush effect that brought in a multitude of different manufacturers and developers to the low-entry market. This golden age would not last long, however; the influx of competing companies laid the groundwork for the biggest disaster the video game industry has ever seen.

Atari 5200 motherboard

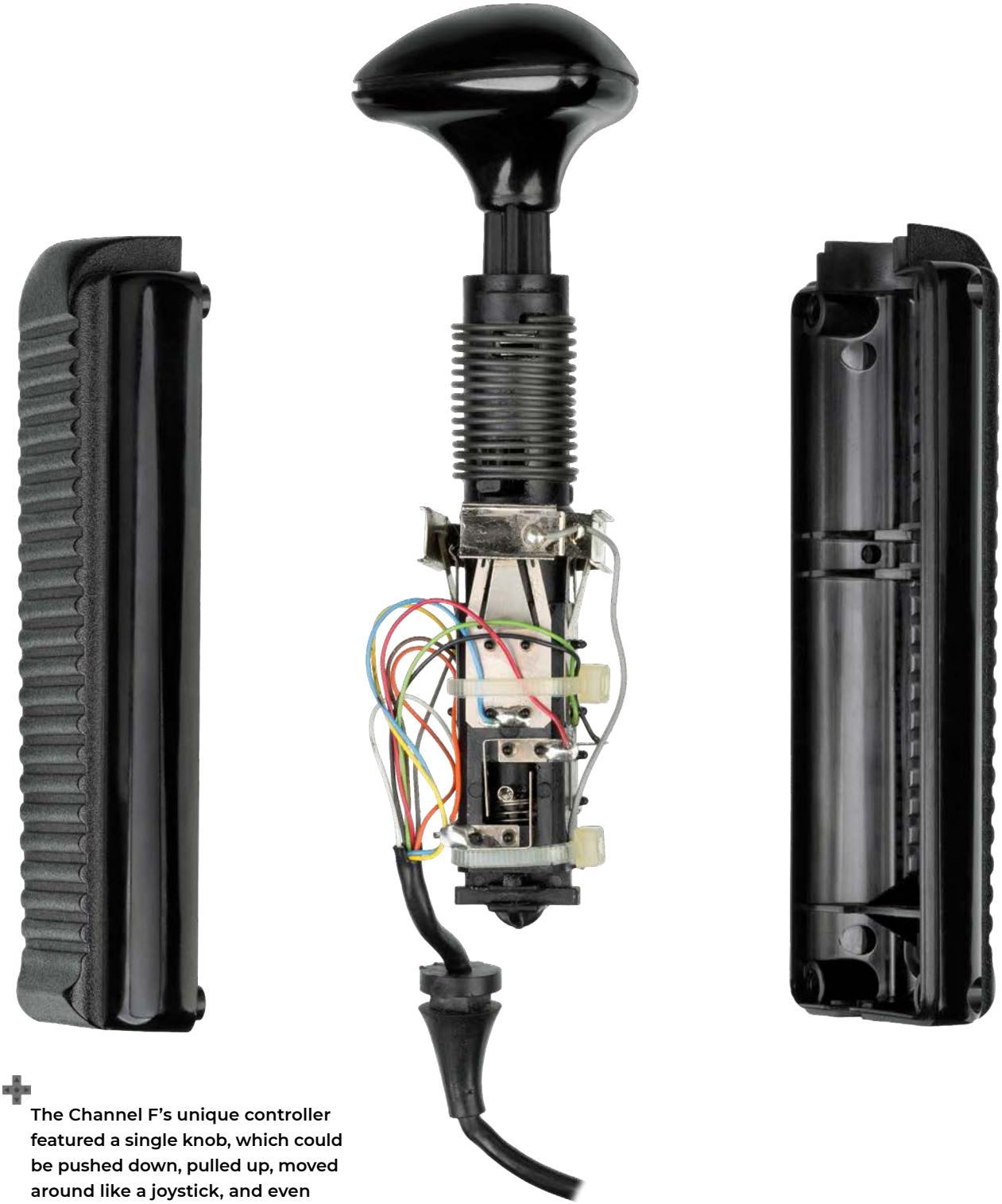
Fairchild Channel F (1976)

SPECS		
	Launch price: $169	**RAM:** 64 bytes
	Processor: Fairchild F8 at 1.79 MHz	**VRAM:** 2 KB
	Colors: 8	**Games released:** 26

The Channel F was the first true video game console, as it was the first to use removable, programmable media in conjunction with a microprocessor. Built by Fairchild Semiconductor, the console was seen as a platform to directly sell its 8-bit microprocessor in the emerging games industry. On release, the Channel F was a step up from dedicated *Pong* consoles but never quite caught on due to Fairchild's poor understanding of the gaming and retail markets. The Channel F lacked the action games of its later rival, the Atari 2600, and when console's sales stagnated, Fairchild pulled out after two years on the market.

The Channel F had two built-in games: *Hockey* and *Tennis*.

The original Channel F played game sounds via a built-in speaker, rather than through the TV.



The Channel F's unique controller featured a single knob, which could be pushed down, pulled up, moved around like a joystick, and even rotated like a paddle.

Zircon International took over selling the Channel F in 1979 and released the console's final six games.

Channel F System II

Fairchild decided to withdraw from the game industry in 1978, shortly after it had completed a remodeled Channel F. This new streamlined version, the System II, now played sound through the TV speaker and had controllers that could be removed. The system and Fairchild's entire Channel F inventory were sold to Zircon International in 1979, which continued to sell the system until the video game crash.

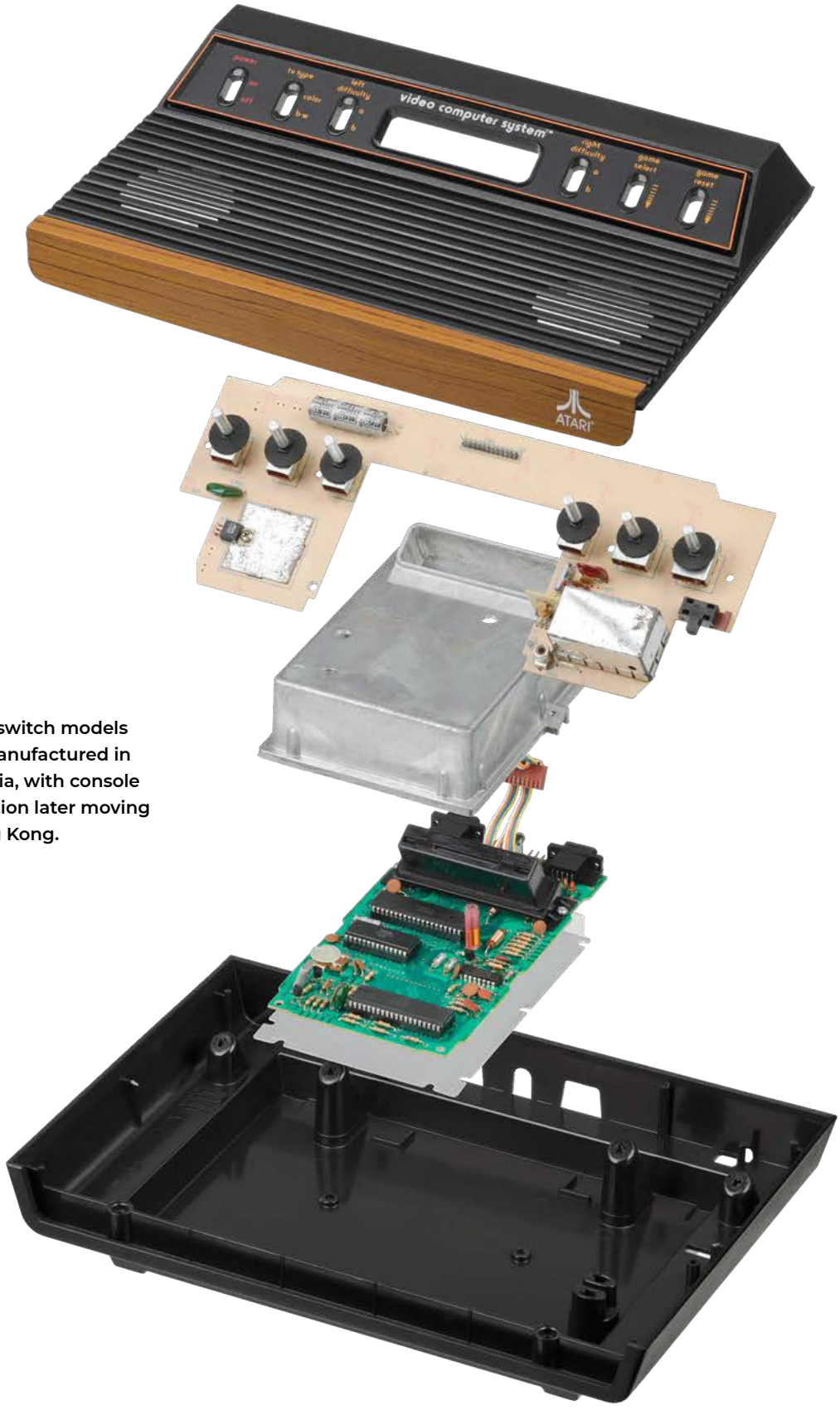
Atari 2600 (1977)

SPECS

Launch price: $169–$199	**RAM:** 128 bytes
Processor: MOS 6507 at 1.19 MHz	**Colors:** 128
Coprocessor: Custom Atari "TIA"	**Games released:** 450+

The 2600 was Atari's first cartridge-based system and follow-up to a line of dedicated *Pong* consoles. Design of the Atari 2600 began in the mid '70s and was limited by component costs that led to severe RAM restrictions. The resulting quirky hardware required a variety of tricks, exploits, and workarounds to fully use, but Atari's young and enthusiastic programmers were up to the task. These unique and action-oriented games wowed players, and later, exclusive arcade ports and the advent of third-party games pushed the 2600 far ahead of the competition. The console defined the 2nd generation and remains one of the most iconic systems of all time.

Originally launched as the Atari Video Computer System (VCS), the console was rebranded as the 2600 in 1982.



Early 6-switch models were manufactured in California, with console production later moving to Hong Kong.

Atari 2600 Console Variations

Atari released multiple hardware revisions and variants of the 2600 over its lifetime. The rebranded Video Arcade variants were created specifically for Sears' Tele-Games line, while others (Atari's 4-switch models) were the result of economization and the streamlining of internal components. The final remodel came in 1986 with the 2600 Jr, a drastically smaller model that sold for less than $50.

The Atari 2700's wedge design would later be used as the basis for the Atari 5200.

Atari 2700 Prototype

The Atari 2700 was an unreleased 2600 variant that replaced its toggle switches with touch-sensitive controls and added radio frequency (RF) wireless capabilites. The updated wireless controllers ran off a single 9V battery and featured joysticks that could be twisted like paddles. Though the system was fully designed and ready for production, it was canceled after testing raised concerns about the 2700's RF signal strength and its ability to affect nearby consoles and wireless devices.

Magnavox Odyssey² (1978)

SPECS		
	Launch price: $179	**RAM:** 64 bytes
	Processor: Intel 8048 at 1.79 MHz	**VRAM:** 128 bytes
	Coprocessor: Intel P8245	**Accessories:** Speech synthesis add-on

The Odyssey² was the cartridge-based successor to Magnavox's original Odyssey. The system was unique for its built-in membrane keyboard, which, though underutilized, provided the Odyssey² with more functionality than most other consoles. However, the Odyssey² lacked the third-party support of its competitors, and many games looked incredibly similar due to the reuse of art assets that were built into the system. Sales for the console were modest (if far behind the 2600 and Intellivision), but the Odyssey line would end in 1984 when Magnavox pulled out of the industry following the video game crash.

In Europe, the system was sold under Philips as the Videopac G7000.

Despite its enormous size, the Odyssey² is almost completely empty inside.

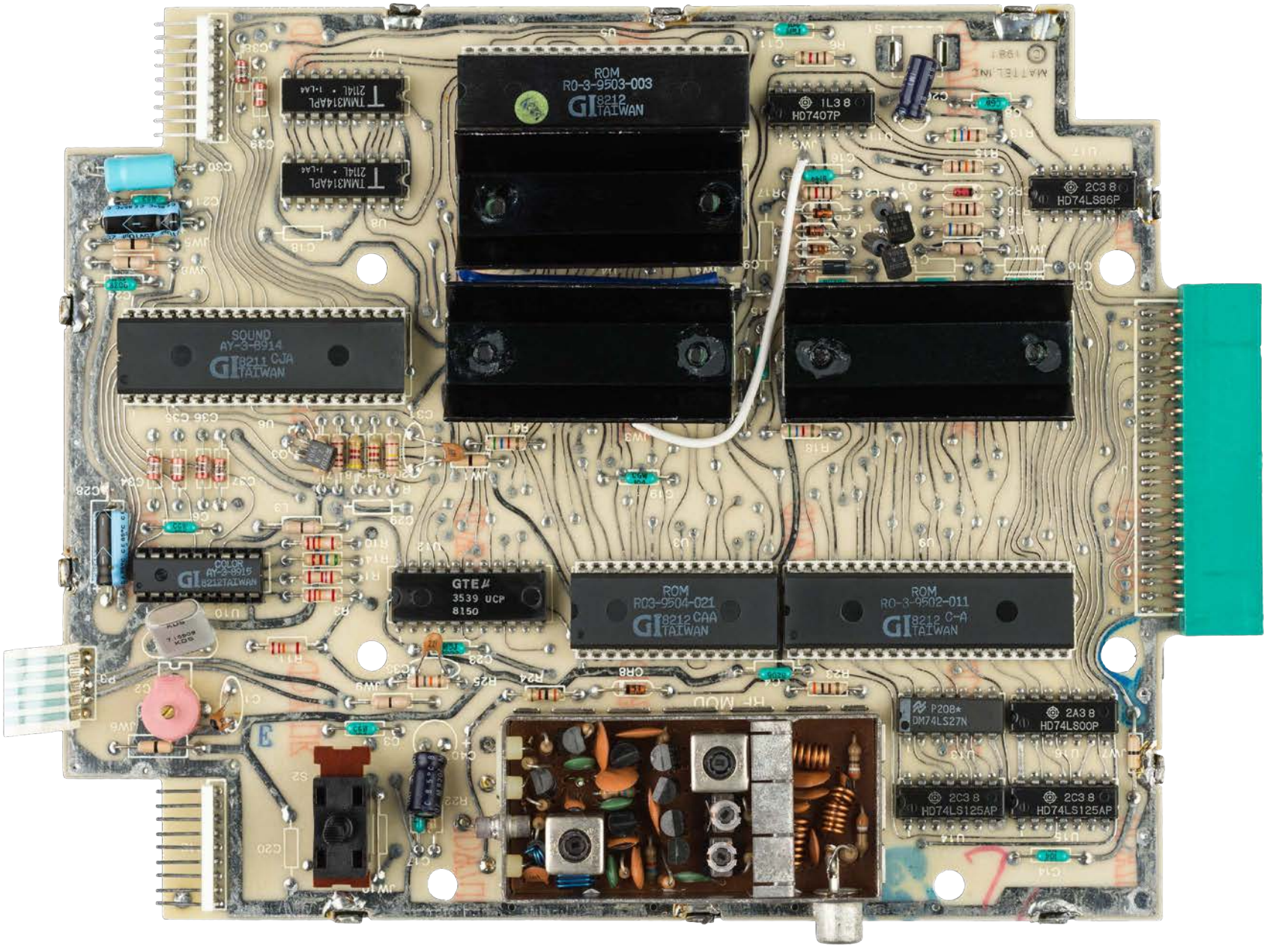
Intellivision (1980)

SPECS

Launch price: $269–$299	**Colors:** 16
Processor: General Instrument CP1610 at 0.895 MHz	**RAM:** 1,456 bytes
Coprocessor: General Instrument AY-3-8900	**Systems sold:** 3+ million

The Intellivision was a console created by the toy company Mattel that acted as a sophisticated and more expensive alternative to the Atari 2600. Mattel highlighted the differences between these two consoles with an aggressive ad campaign, directly comparing the Intellivision's superior sound and more detailed graphics to the 2600's. These ads, along with a strong library of sports and strategy titles, positioned the Intellivision as Atari's main rival. Mattel's game console chipped away at the 2600's market share, and while not able to truly compete with the juggernaut Atari, the Intellivision beat other systems to come in second place.

The Intellivision was test marketed in 1979 and released nationwide in 1980.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3539 UCP
8150
ROM
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DM74LS27N
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2C3 8
HD74LS125AP
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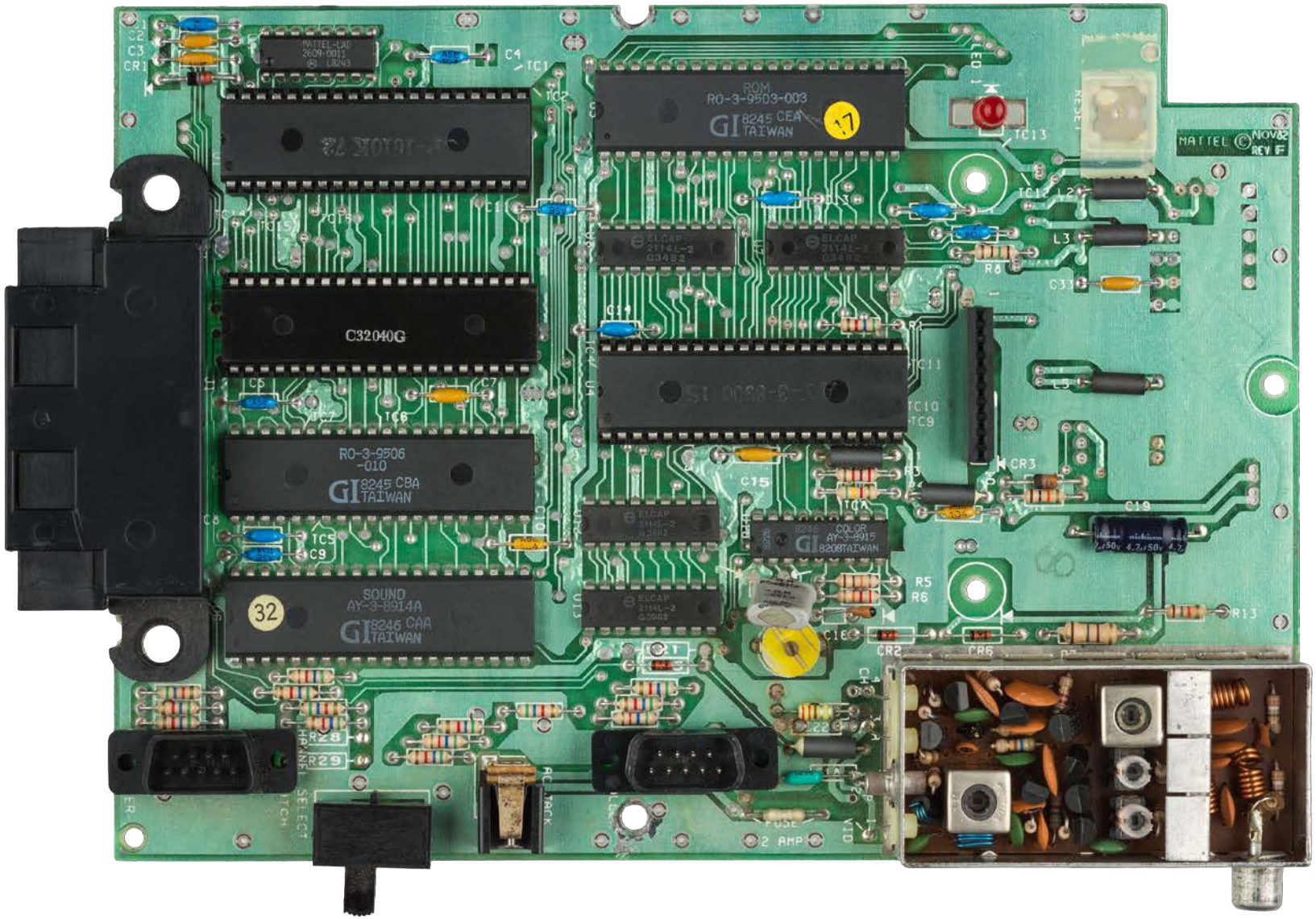
HD74LS125AP

Intellivision II and Mattel's Fate

In early 1983, Mattel released the updated Intellivision II, a more modern-looking and smaller redesign of the original Intellivision that featured removable controllers and an external power supply. Months after the console's release, the industry was hit by the video game crash, which caused considerable damage to Mattel's gaming division. Even after dramatic price cuts, layoffs, and internal restructuring, Mattel suffered hundreds of millions in losses by the end of 1983, which led the company to sell off the Intellivision line and quit the gaming industry.

Add-ons for the Intellivision included a voice-synthesis module, a modem, a music keyboard, a computer keyboard expansion and even an adapter that played Atari 2600 games.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32
COLOR
AY-3-8915
GI 8208TAIWAN
MATTEL ©NOV
REV F
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2 AMP

Commodore 64 (1982)

SPECS		
	Launch price: $595	**RAM:** 64 KB
	Processor: MOS 6510 at 1 MHz	**Colors:** 16
	Coprocessors: Custom MOS VIC-II and SID	**Successor:** Commodore 128

The Commodore 64, released as a follow-up to the popular VIC-20, was a powerful and capable computer that debuted at a relatively low price. It featured 64 KB of memory, an improved version of the 6502 processor, and custom MOS chips for graphics and sound. The computer was well-received at launch and gained a considerable following for its prowess as a gaming system. Subsequent price cuts, wide retail availability, features more advanced than other computers, and the system's popularity as a gaming platform made the Commodore 64 a hit, and it went on to become the best-selling computer of all time.

As the owner of the chip manufacturer MOS, Commodore had easy access to low-cost, custom chips.

The Commodore 64C was a remodeled Commodore 64 in a slimmer case.

The C64 Games System (1990) was a stripped down, cartridge-only version of the Commodore 64 that was meant to appeal to the console market.

Commodore 64C and C64 Games System

The Commodore 64's incredible popularity kept the computer in production for over a decade, with the Commodore 64 receiving multiple updates and spin-offs. The C64's iconic breadbox design was modernized in 1987 with the Commodore 64C. Three years later, Commodore tried to repackage the C64 as a game console. Only released in Europe, the C64 Games System flopped because it offered nothing to people who already owned the computer. Console gamers weren't interested, and the system was discontinued in less than a year.

Vectrex (1982)

SPECS		
	Launch price: $199	**RAM:** 1 KB
	Processor: Motorola 68A09 at 1.6 MHz	**Colors:** Black and white
	Sound: General Instrument AY-3-8912	**Built-in game:** *Mine Storm*

The Vectrex was an unusual game console that featured a built-in 9-inch television screen. The system's dedicated screen was necessary for rendering the Vectrex's vector graphics, which displayed smooth white lines against a black background and were seen in arcade games like *Battlezone* and *Asteroids*. The result was unique compared to conventional sprite-based graphics but was limited to black and white, which the Vectrex tried to remedy with color screen overlays. Like other consoles released on the eve of the 1983 video game crash, the Vectrex was short-lived, and the system was discontinued by 1984.

The Vectrex's controller stored away under the screen when not in use.

The Vectrex used a standard black-and-white television tube that was modded for vector graphics.

ColecoVision (1982)

SPECS		
	Launch price: $179–$199	**RAM:** 1 KB
	Processor: Zilog Z80A at 3.58 MHz	**VRAM:** 16 KB
	Coprocessor: Texas Instruments TMS9928A	**Pack-in game:** *Donkey Kong*

Four years after the *Pong* crash had ended Coleco's run of Telstar systems, the company returned to the TV gaming market with the ColecoVision. The new console had graphics far beyond older systems like the 2600 and Intellivision, and each system included a high-quality port of *Donkey Kong*, one of the year's hottest arcade games. The combination quickly established the ColecoVision as a must-have system, and sales took off despite looming market troubles. By early 1984, however, the market had collapsed, and Coleco was forced to discontinue the system in 1985. Later troubles would end the company altogether in 1988.

The ColecoVision sold over 2 million systems in its short time on the market.

With a Z80A CPU and an advanced video processor, the ColecoVision's performance was more comparable to early third-generation consoles.

Coleco's Expansion Module #1 was a self-contained Atari 2600 hardware clone that let users play their 2600 games through their ColecoVision.

ColecoVision Expansion Module #1

Though it may seem crazy today, both Coleco and Mattel released add-ons that allowed users to play Atari 2600 games through their systems. At the time, Atari compatibility was seen as positive, given the 2600's massive success and large game library. Coleco's Expansion Module #1 used off-the-shelf parts to re-create the console, and Coleco even released its own stand-alone 2600 clone, the Gemini, in 1983.

The ColecoVision controllers could support number-pad overlays, which slid in through a small slit on the side.

Atari 5200 (1982)

SPECS		
	Launch price: $199–$249	**RAM:** 16 KB
	Processor: Custom MOS 6502 at 1.79 MHz	**Colors:** 256
	Coprocessors: Custom “ANTIC,” “POKEY,” and “GTIA”	**Project codename:** Pam

The Atari 5200 was a slightly modified version of Atari’s 400/800 computer line that was repackaged as a game console. Despite the system’s impressive graphics and the backing of the world’s largest game company, the 5200 was ultimately a troubled console that failed to achieve the success of its predecessor, the 2600.

The console’s release into an overcrowded market on the brink of collapse and Atari’s continued focus on the still-popular 2600 contributed to the console’s lackluster performance. After the video game crash of 1983 left Atari in shambles, the company ended support for the fledgling console in 1984.

Rather than being a true successor to the 2600, Atari’s 5200 served as a premium companion, offering higher quality versions of many 2600 games.

The Atari 5200—one of the largest consoles ever made—included built-in controller storage.

Atari 5200 Trak-Ball Controller

The trackball was an alternative control scheme that was used by a handful of 1980s arcade games such as *Centipede* and *Missile Command*. Many 2nd and 3rd generation home consoles had their own trackball controllers, though none were as large or excessive as the 5200's official Trak-Ball Controller.

The 5200's noncentering, analog joystick was fragile, a poor fit for many games, and almost universally disliked.

RCA Studio II (1977)

SPECS		
	Launch price: $149	**RAM:** 512 bytes
	Processor: RCA 1802 at 1.78 MHz	**Colors:** Black and white
	Sound: Built-in speaker	**Games released:** 11

The Studio II was the second console to use cartridges and the first and only system released by RCA. The console was based off a low-cost consumer computer concept that RCA developed in the early 1970s, which was later updated into a game and educational system. However, its origins left the Studio II with an outdated design that was built around black-and-white graphics and keypad-based controls. The Studio II lacked the color graphics and fun action games of other new cartridge systems and even felt less advanced than some *Pong* consoles. After a year of incredibly low sales, RCA discontinued the Studio II and pulled out of the gaming market.

The RCA Studio II came with five built-in games: *Addition*, *Bowling*, *Freeway*, *Doodle*, and *Patterns*.

Coleco Telstar Arcade (1977)

Launch price: $99	**Accessories:** Handheld paddle controllers
Processor: MOS MPS-7600 (on cartridge)	**Color:** 4
Sound: Built-in speaker	**Games released:** 4

SPECS

The Telstar Arcade was a spin-off of Coleco's line of dedicated *Pong* Telstar systems. The console combined *Pong*, shooting, and racing into a single triangular case and could offer multiple game variations with its use of interchangeable cartridges. Each cartridge contained an advanced version of the *Pong*-on-a-chip integrated circuit and could run custom code that allowed for unique games using a pool of fixed assets. However, the Telstar Arcade offered little value over much cheaper *Pong* consoles, and was outclassed by the new Channel F and Atari 2600. Coleco phased out the Telstar Arcade after just a year of sluggish sales.

Before making video games, Coleco produced leather goods, toys, and plastic pools.

Bally Professional Arcade (1978)

SPECS		
	Launch price: $299	**RAM:** 4 KB
	Processor: Zilog Z80 at 1.789 MHz	**Controller ports:** 4
	Built-in games: *Gunfight*, *Checkmate*, and *Scribbler*	**Games released:** 28 (official)

The Professional Arcade was the first and only console by Bally, an amusement company known for its pinball and slot machines. The system was more expensive than competing consoles but offered the ability to create and save BASIC programs onto cassettes with an inexpensive adapter. This feature produced a small, dedicated fan community of programmers who created and traded their own games. However, high failure rates, poor retail presence, and limited advertising led to low sales, which resulted in Bally selling the system and its rights to Astrovision in 1980, which also had little success with the console.

The Professional Arcade was also known as the rebranded Astrocade.

APF MP1000 (1978)

Launch price: $169	**RAM:** 1 KB
Processor: Motorola 6800 at 0.89 MHz	**Games released:** 12
Colors: 64	**Built-in game:** *Rocket Patrol*

SPECS

The MP1000 was a cartridge-based game console released by APF Electronics, a company known for its line of successful *Pong* consoles. APF's newest system was not as well received, and limited distribution paired with a small library of lackluster games led to meager sales. APF then tried marketing the system to small businesses as a low-cost computer solution (when paired with a keyboard add-on), which was capable of running BASIC programs and business management software. However, few companies took a computer attached to a game console seriously, and worsening sales would lead APF to cease operations in 1981.

APF Electronics also produced stereos and calculators.

VideoBrain (1978)

SPECS		
	Launch price: $499	**RAM:** 1 KB
	Processor: Fairchild F8 at 1.79 MHz	**Colors:** 16
	Manufacturer: Umtech Incorporated	**Built-in programs:** Clock, alarm, text, and color

The VideoBrain was one of the very first home computers and was unique for its simplified user interface and focus on video games. The computer prominently used ROM cartridges, which could instantly load and run programs versus floppy disks. The VideoBrain also shipped with two joysticks and a game out of the box, and it had a small library of entertainment and educational titles. However, due to its poor retail presence, limited advertising, and a home computer market that valued the wide support and versatility of computers like the Apple II and TRS-80, the VideoBrain flopped and was discontinued about a year after release.

Designed by a former Fairchild engineer, the VideoBrain used the same F8 processor as the Channel F.

Interton VC 4000 (1978)

Launch price: 500 DM (Deutsche Marks)	**RAM:** 37 bytes
Processor: Signetics 2650A at 0.887 MHz	**Colors:** 8
Coprocessor: Signetics 2636N	**Games released:** 35+

SPECS

The VC 4000 was a European console that was released by the German company Interton and was the first in a series of clone consoles released by multiple companies throughout Europe and Asia. The system was based on Philips' line of Signetics chips, and it used a ready-made console design that was available to other manufacturers and as a "build it yourself" computer kit. The VC 4000 and its clones had a small, redundant game library made of play-alikes of popular games and arcade titles. The systems failed to make a lasting impact on the market, and most were abandoned after their release.

Some VC 4000 clones include the Grundig Super Play 4000, Hanimex HMG-1292, and Acetronic MPU 1000.

Microvision (1979)

SPECS		
	Launch price: $45	**RAM:** 64 bytes
	Processor: Intel 8021 or TI TMS1100 (on cartridge)	**Sound:** Piezo beeper
	Power: Two 9V batteries (one in later models)	**Pack-in game:** *Block Buster*

The Microvision was the world's first portable, cartridge-based game console. Built by the toy and board game company Milton Bradley, the Microvision was an ambitious idea that was held back by available technology. Due to limitations with available battery-powered processors and liquid crystal displays, the Microvision could only support a screen resolution of 16 by 16 pixels. Nevertheless, expectations for a handheld device at the time were low, and the widely available system sold modestly. Sales and support for the Microvision wound down over the next two years, and Milton Bradley discontinued the system in 1981.

The Microvision's game cartridges covered most of the system itself.

Atari 800 (1979)

Launch price: $999	**RAM:** 8 KB to 48 KB
Processor: MOS 6502 at 1.79 MHz	**Colors:** CTIA: 128, GTIA: 256
Coprocessors: Custom “ANTIC,” “POKEY,” and “CTIA/GTIA”	**Successors:** XL and XE series

SPECS

The Atari 800 was the first in a line of 8-bit home computers created by the gaming company Atari. Like the VideoBrain, Atari’s 8-bit computers mainly offered its first-party programs and games on cartridges, though floppy disk and cassette drives were also available. With superior graphics, sound, and gaming support compared to contemporary computers, Atari’s 8-bit line earned the reputation as hobbyist computers that played games rather than as serious business machines. When the Commodore 64 arrived and established itself as a premiere gaming platform, Atari’s computer growth stagnated and would eventually slide into irrelevancy.

The Atari 800 offered two cartridge slots and four controller ports.

Nintendo Game & Watch (1980+)

SPECS		
	Silver/Gold/Widescreen models: 26	**Panorama Screen models:** 6
	Multi Screen models: 15	**Micro VS. System models:** 3
	Table Top models: 4	**Crystal Screen models:** 3

The Game & Watch series was a collection of more than 50 dedicated handheld and tabletop games that Nintendo produced over a 10-year period. The series was a clever reworking of pocket calculator technology, which used flickering, fixed graphics to give the illusion of movement. The devices were cheap, low powered, and drastically smaller than previous LED-based handhelds, and the design was quickly imitated by rival companies such as Epoch. Nintendo continually innovated with the series, from dual-screened systems to large tabletops with color graphics, but Nintendo eventually moved its attention to the creation of a cartridge-based handheld in the late '80s.

The Game & Watch series was the birthplace of the D-pad, first seen in the 1982 game *Donkey Kong* (top right).

Entex Select-A-Game (1981)

Launch price: $59	**Power:** 4 C batteries
Processor: Hitachi HD38800 (on cartridge)	**Resolution:** 7 × 16 VFD array
Screen type: Vacuum fluorescent display	**Pack-in game:** *Space Invader 2*

SPECS

The Select-A-Game was a portable game console from Entex, an American toy company known for its dedicated handheld and tabletop gaming systems in the early '80s. Unlike those single-game devices, the Select-A-Game offered a variety of titles through interchangeable cartridges.

Like many other Entex sports handhelds, the Select-A-Game had dual controls that allowed two players to go head to head in most games. The system was short-lived; it was out less than a year before Entex stopped production on additional games and a larger tabletop version.

Only six games were released for the Select-A-Game: *Baseball 4*, *Pinball*, *Pac-Man 2*, *Football 4*, *Basketball 3*, and *Space Invader 2*.

Epoch Cassette Vision (1981)

SPECS		
	Launch price: ¥13,500	**Games released:** 11
	Processor: NEC D777C (on cartridge)	**Accessories:** Light gun
	Resolution: 54 × 62 pixels	**Colors:** 8

The Cassette Vision was a game console released exclusively in Japan by the toy company Epoch. Similar to the Telstar Arcade, the Cassette Vision placed its user controls on the system itself and used its game cartridges to hold the system's main processor. Graphics for the Cassette Vision were primitive and outdated, with low-resolution visuals that resembled early second-generation game systems and advanced *Pong* consoles. Despite this, the inexpensive Cassette Vision and its small library of games sold well, as did a cost-reduced mini version of the system that came out in 1983.

Epoch was a Japanese company most well known in the United States for its LCD handheld systems in the early '80s.

VTech CreatiVision (1982)

Launch price: AU$295	**RAM:** 1 KB
Processor: Rockwell 6502 at 2 MHz	**VRAM:** 16 KB
Resolution: 256 × 192 pixels	**Colors:** 16

SPECS

The CreatiVision was a hybrid computer and game console that was released by VTech in Europe, Asia, and Australia. While the system had decent hardware and gaming performance, the CreatiVision failed to stand out among a plethora of dedicated computers and consoles, and it would later be outclassed by new products like the Commodore 64. The CreatiVision also suffered from a small, redundant game library comprised of clones of popular games. After the CreatiVision's underwhelming sales, VTech abandoned the hybrid system to focus on dedicated computers and edutainment consoles.

The CreatiVision sold under a number of different names around the world. In Australia, it was known as the Dick Smith Wizzard.

Entex Adventure Vision (1982)

SPECS

Launch price: $79	**Power:** 4 D batteries, optional AC adapter
Processor: Intel 8048 at 0.733 MHz	**Pack-in game:** *Defender*
Resolution: 150 × 40 LED array	**Other games:** *Super Cobra*, *Turtles*, *Space Force*

The Adventure Vision was a cartridge-based tabletop console from the American toy company Entex. The system's unique display used a strip of 40 red LEDs that were reflected onto a mirror oscillating at high speed, which gave the illusion of a full 150-by-40 dot image shown at 15 frames a second. This design gave the Adventure Vision a dramatic resolution boost over comparable dedicated LED devices but also made the system difficult to play in bright environments. Ultimately, the Adventure Vision was ignored by most consumers and only sold a small amount of units before the video game crash put Entex out of business.

The Adventure Vision is one of the rarest consoles for collectors, easily selling for more than $1,000 at auction.

Emerson Arcadia 2001 (1982)

Launch price: $99	**RAM:** 1 KB
Processor: Signetics 2650A	**Colors:** 8
Coprocessor: Signetics 2637N	**Games released:** 24

SPECS

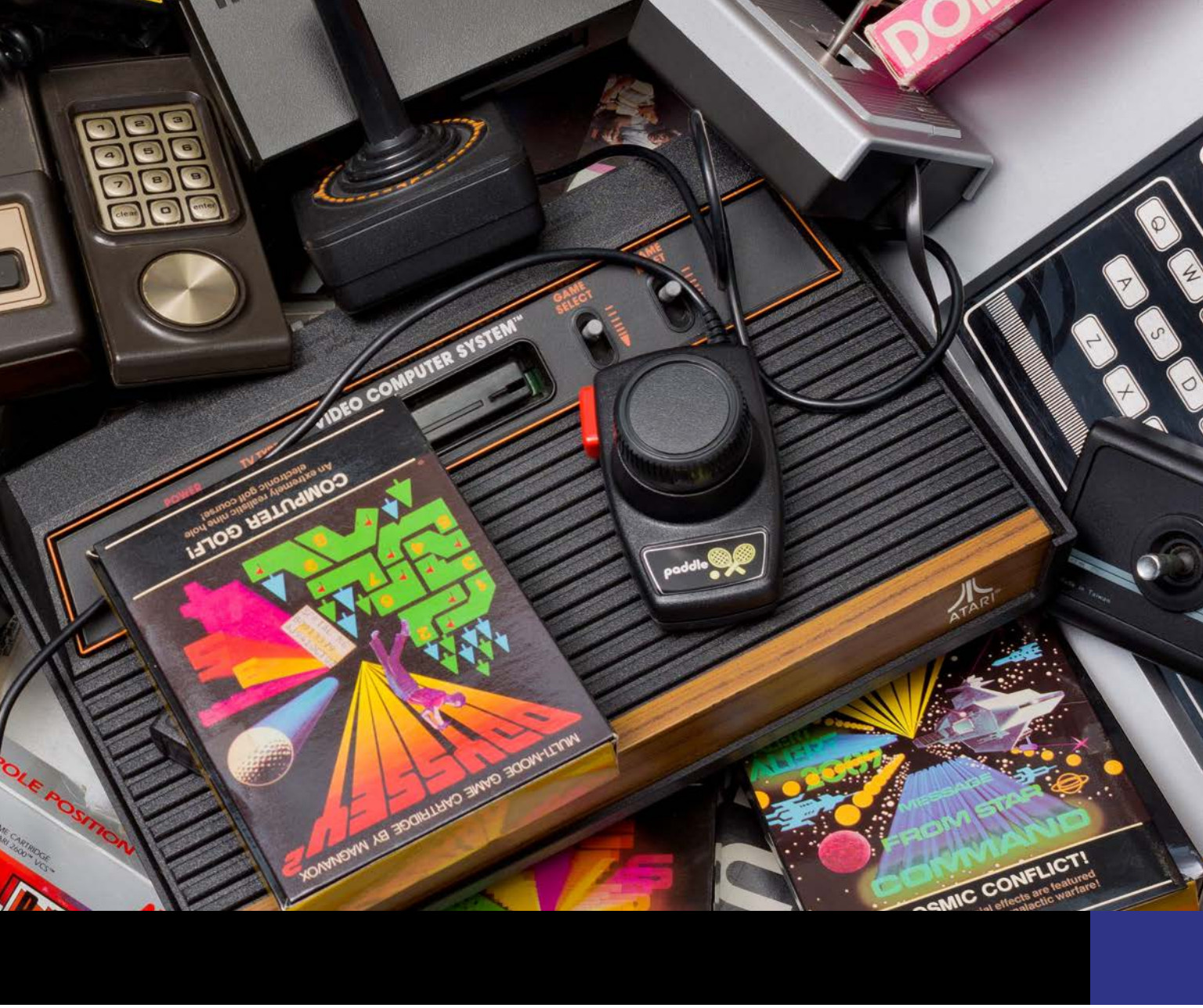
The Arcadia 2001 was a console distributed by the electronics company Emerson in the United States. Like the Interton VC 4000, the Arcadia 2001 was the beginning of a line of European and Asian clone consoles based around Philips' Signetics chips, though this series had more RAM and a slightly better video processor. With its late 1982 release, the Arcadia 2001 presented an outdated and uninspired experience as new, powerful systems like the Atari 5200 and ColecoVision were coming out. In this heavily competitive market, the Arcadia 2001 went unnoticed, and Emerson quickly dumped the system and left the gaming market altogether.

Other systems in the Arcadia 2001 clone family include the Schmid TVG 2000, Tchibo Tele Fever, and Tunix Home Arcade.

The Video Game Crash

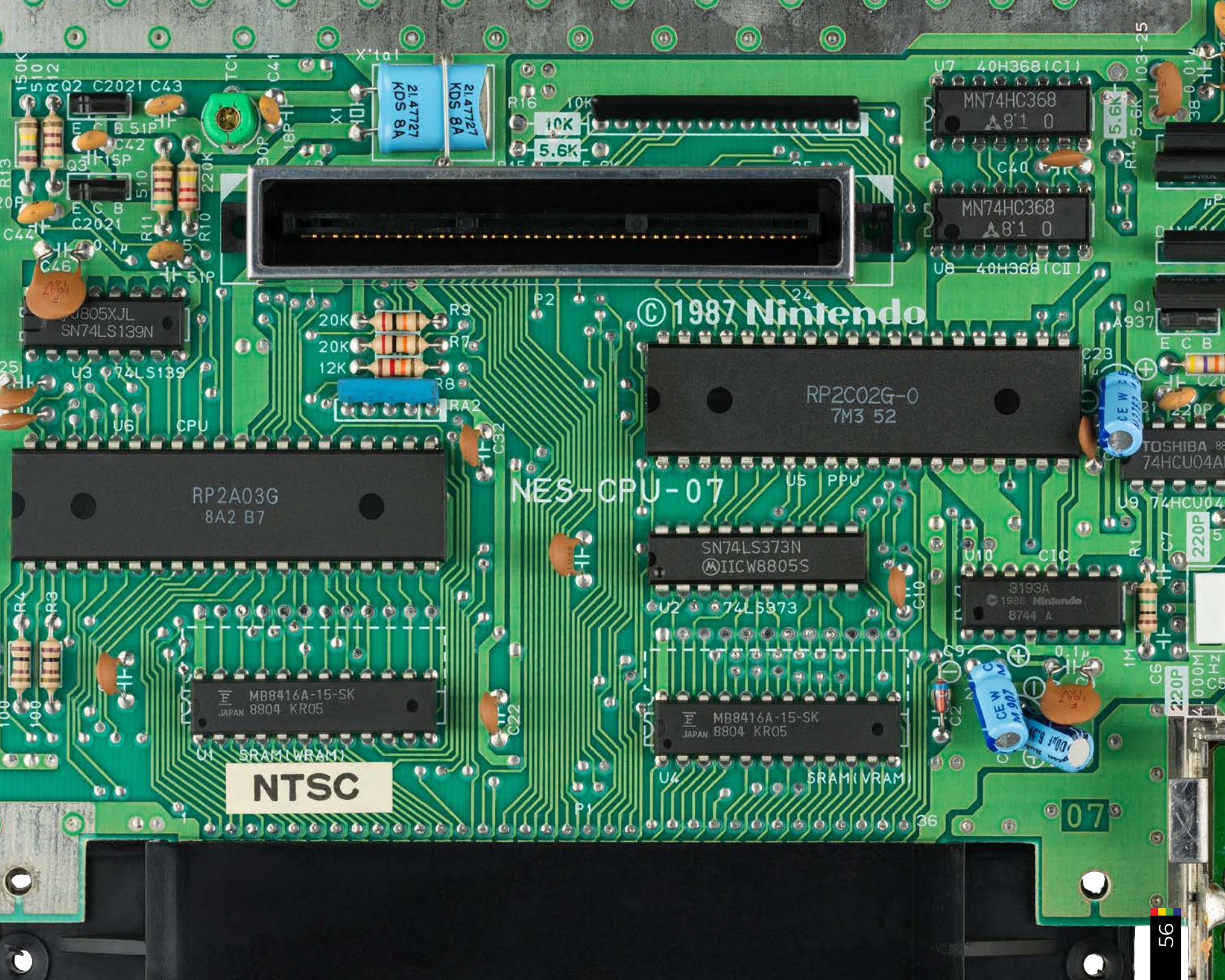
In 1982, the American gaming market was overtaken by severe overcrowding. The multitude of consoles and game publishers trying to chase Atari's success resulted in consumer confusion and a market flooded with low-quality games. Consumers were unsure of which systems to get and what games to buy, and many games they did buy were poorly made or not fun. Worse, even official and high-profile Atari games, such as *Pac-Man* and *E.T.* for the 2600, were critical and commercial disasters, souring the public perception of video games in general.

By the 1982 holiday season, the gaming market was completely oversaturated, and demand for games plummeted. This was disastrous for companies that had overproduced for Christmas based on the previous year's sales, and many companies were forced to exit the market and dump their products en masse. Retailers, stuck



with an excess of games and hardware, drastically cut prices to move product. These low prices caused a death spiral; companies still in the market could not compete or stay profitable, which led them to exit the market and dump their products as well.

The fallout was severe; it took just a few months for America's hottest industry to become a wasteland. Third-party game publishers that survived moved to making computer games. Mattel and Magnavox discontinued their consoles and closed their video game divisions. Coleco moved away from video games to focus on its toy and computer lines. Atari went through multiple restructurings before being sold to new owners in 1984, and it would never recapture the success it had in its glory days. With the American leaders gone, the door was left open for Japanese companies to come in and claim the industry.


©1987 Nintendo
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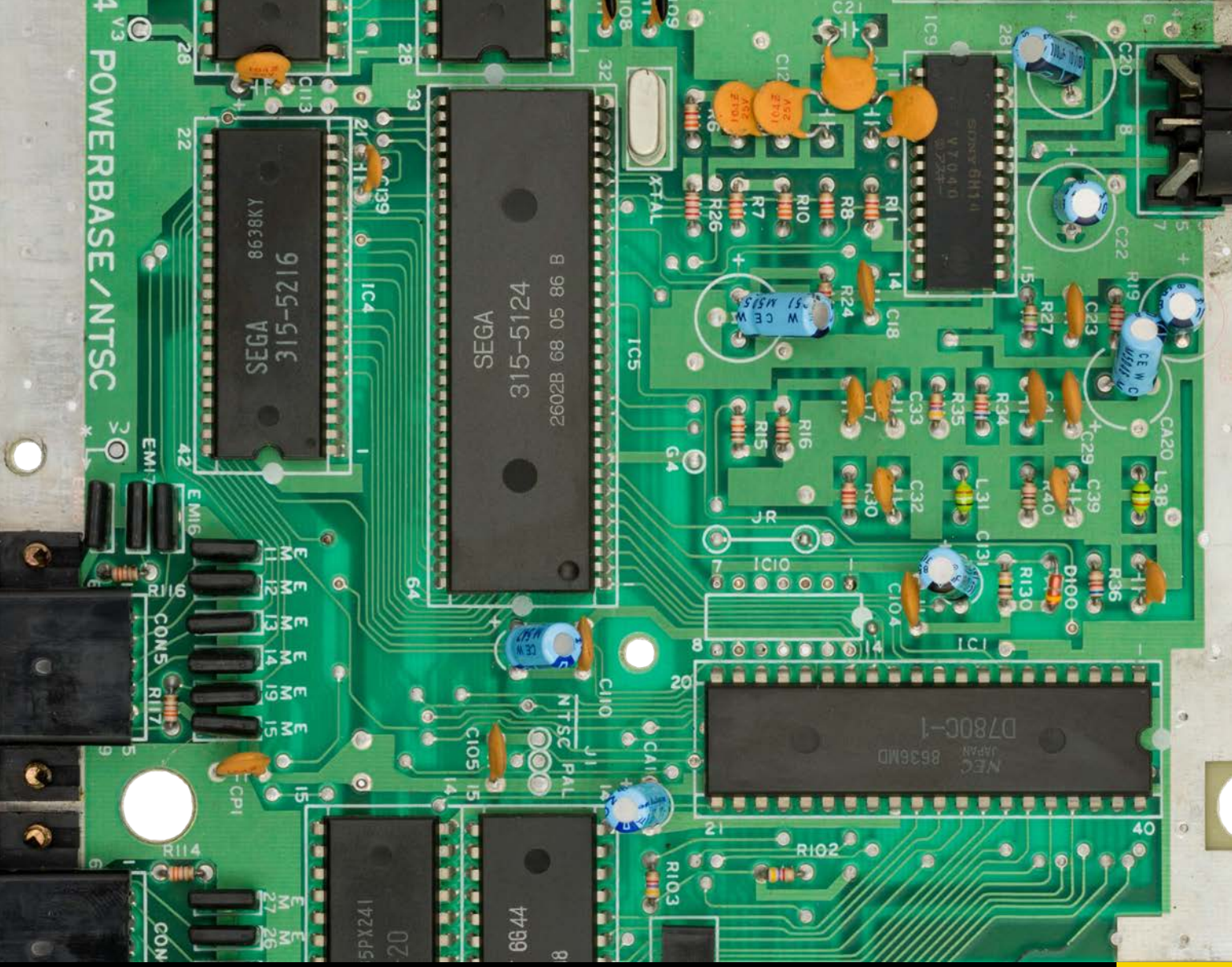


3rd Generation

Though the American gaming market was in shambles, in Japan, local companies created their own thriving industry with original games and systems. Leading the Japanese console market was Nintendo, which brought its Famicom to the United States as the Nintendo Entertainment System (NES) in late 1985. The American gaming market was still dead following the crash, but Nintendo built interest in its NES console with original games such as *Super Mario Bros.* and *The Legend of Zelda*. Fueled by word of mouth, hit games from Japanese developers, and a legion of young fans, the NES created a phenomenon that revitalized the gaming market. From there, Nintendo and other Japanese developers like Capcom and Konami took the industry to new highs, making Japan the new leader of console gaming.

(opposite) NES motherboard, (above) Sega Master System motherboard

Sega SG-1000 (1983)

SPECS		
	Launch price: ¥15,000	**RAM:** 1 KB
	Processor: NEC 780C at 3.58 MHz	**VRAM:** 16 KB
	Colors: 16	**Games released:** 70+

The SG-1000 was the first console from Sega, a Japanese amusement company known for its video arcade games. Released primarily in Japan, the SG-1000 started a new console generation that offered more complex video games with larger, more colorful, and more detailed sprite graphics. Sega's system faced heavy competition from Japan's burgeoning console market, and it was ultimately overshadowed by Nintendo's new system, the Famicom. Though the SG-1000 wasn't a complete failure, Sega continually modified and updated the system to remain competitive, eventually rereleasing it as the revamped Master System for its worldwide debut.

Sega began as an American business called Service Games that distributed slot machines and electro-mechanical arcade cabinets to US military bases in the 1940s.

In 1984, Sega also released a keyboard add-on for the SG-1000, which allowed for BASIC programming and limited computer functionality.

Sega SG-1000 Mark II

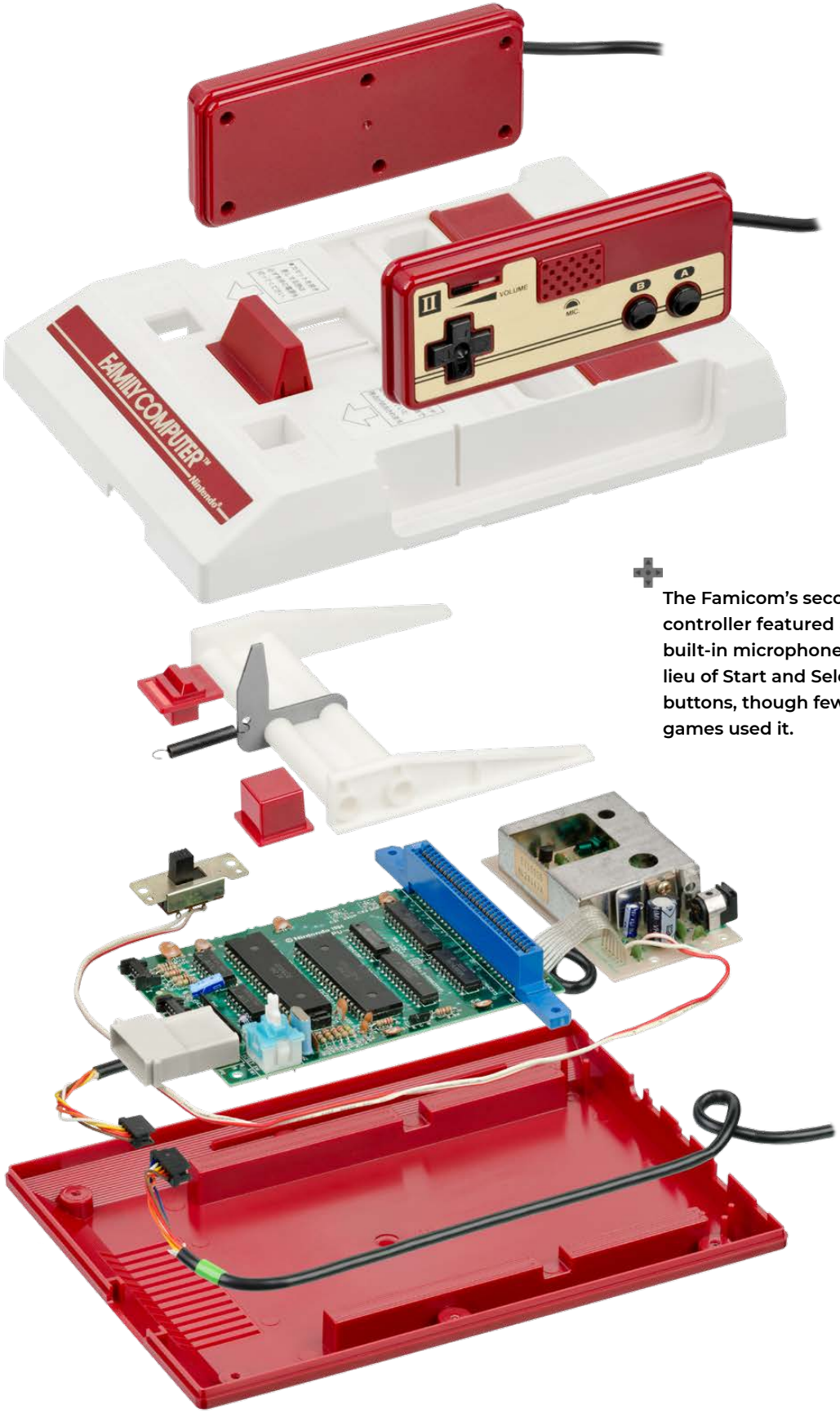
After the SG-1000's lukewarm reception, Sega rapidly redeveloped the console and released the Mark II just a year later. The console was the same internally but featured a new aesthetic and tweaks such as a front-facing expansion port and a detachable player-one controller. The Mark II also copied some of the Famicom's design, replacing the joystick with joypads that stored on the console's sides.

Nintendo Famicom (1983)

SPECS		
	Launch price: ¥14,800	**RAM:** 2 KB
	Processor: Custom Ricoh 2A03 at 1.79 MHz	**VRAM:** 2 KB
	Colors: 54	**Games released:** 1,000+

The Famicom, short for Family Computer, was Nintendo's first game console and released exclusively in Japan. Despite heavy competition from other new 8-bit consoles and computers, the Famicom stood out with a strong lineup of first-party games and an innovative controller. By 1985, the console had completely dominated the market, and third-party developers were willing to sign restrictive exclusivity agreements just to get their games on the system. With runaway success in Japan and a library of exclusive hit titles, Nintendo geared up to release the system worldwide, which would kickstart a new era of console gaming.

The Famicom's hardwired controllers had a cable length of only 30 inches.



The Famicom's second controller featured a built-in microphone in lieu of Start and Select buttons, though few games used it.

Famicom Disk System

Nintendo produced various add-ons for the Famicom that were exclusive to Japan, including a modem, 3D glasses, and a keyboard attachment for programming in BASIC. Another exclusive attachment was the Disk System, which made games available on rewritable, proprietary floppy disks. This allowed for game saving in titles like *Metroid* and *The Legend of Zelda* or for buying inexpensive games through disk-writing kiosks. Players bought a blank disk that could be inserted into the kiosk and, for a small fee, would get a complete game written onto it.

The Disk System featured enhanced sound hardware, and disk games such as *The Legend of Zelda* have different soundtracks compared to their international cartridge versions.

The Twin Famicom line was released in both red and black case colors.

Sharp Twin Famicom

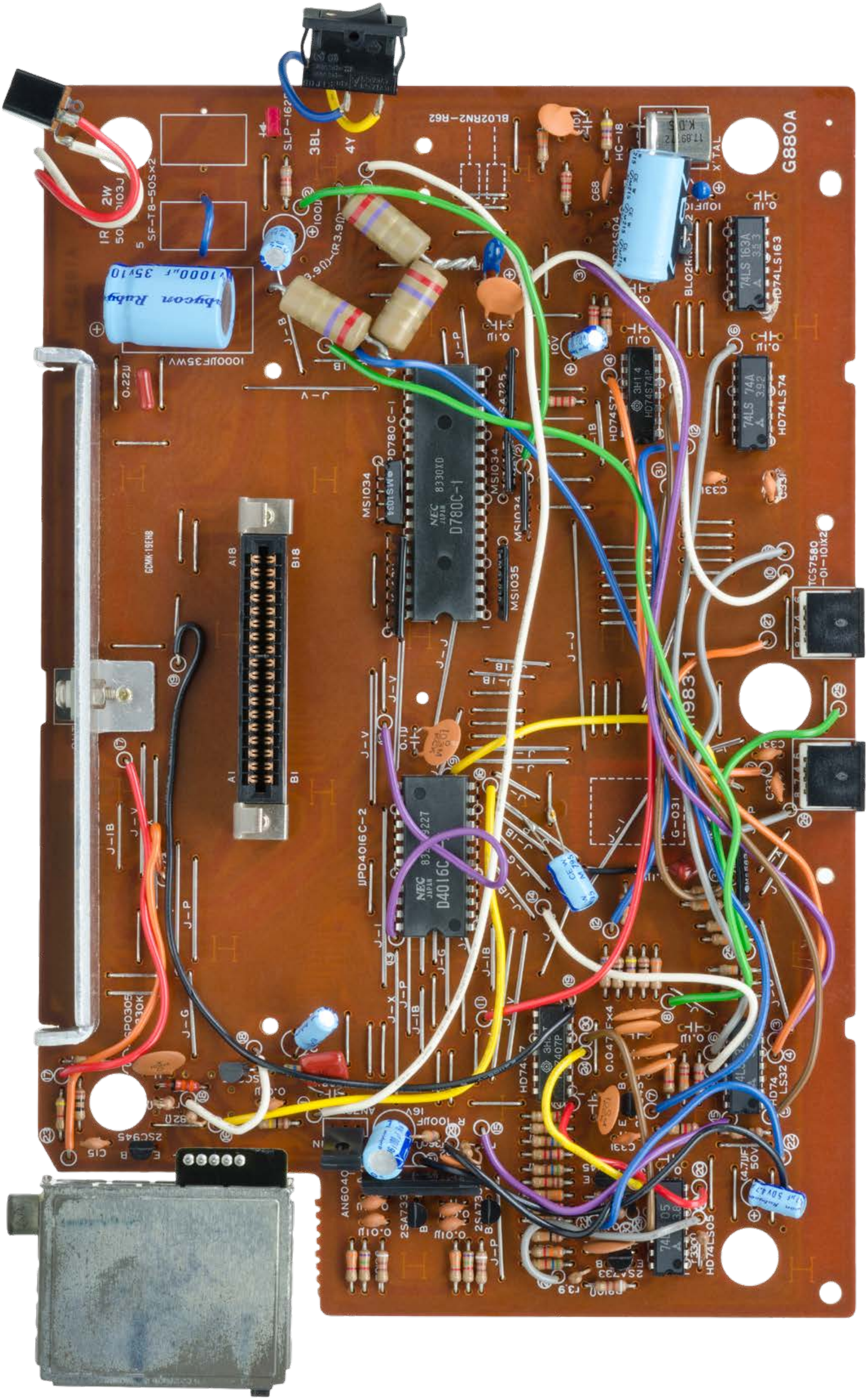
Sharp, the Japanese electronics company, had worked with Nintendo since the 1960s as a components supplier. That relationship expanded into hardware licensee in the 1980s, when Sharp produced a few unique model variants of the Famicom. One was a Sharp television with a Famicom built in, while the Twin Famicom line combined the Famicom Disk System and console into a single unit.

Casio PV-1000 (1984)

SPECS		
	Launch price: ¥14,800	**RAM:** 2 KB
	Processor: NEC D780C-1 at 3.58 MHz	**A/V out:** RF only
	Colors: 8	**Games released:** 13–15

The PV-1000 was the first home console from Casio, a Japanese electronics company known for producing calculators, watches, and dedicated LCD handheld games. Released exclusively in Japan, the PV-1000 was another console based on a clone of the Zilog Z80 processor (the SG-1000 and Super Cassette Vision were also Z80 based) but actually had worse performance compared to other systems. The graphical and sound quality of the PV-1000 were more akin to a 2nd generation console, with few colors and harsh, grating music. The PV-1000 sold poorly and Casio discontinued the system mere months after its release.

The Casio PV-1000 launched alongside the PV-2000, an 8-bit computer that wasn't cartridge compatible.

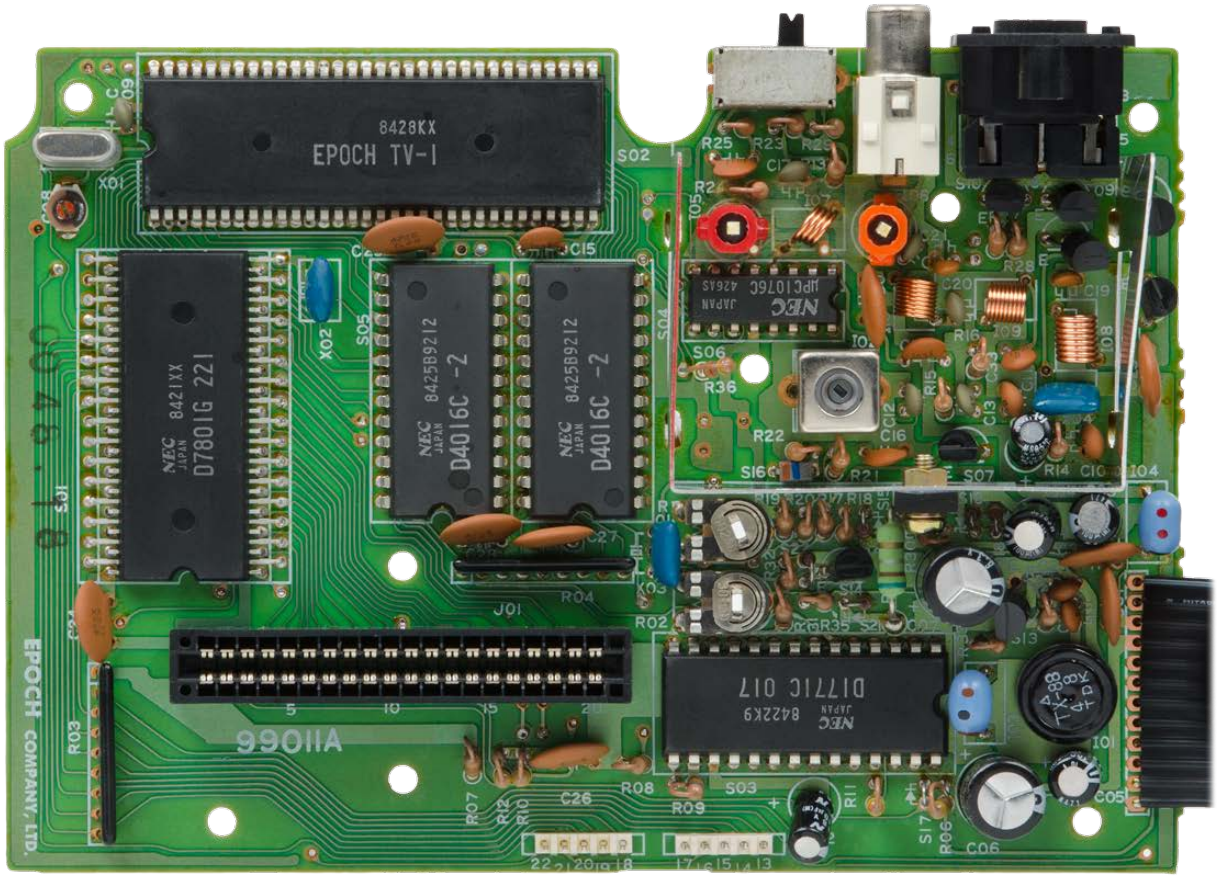

G880A
NEC
D780C-1
D4016C
74LS 163A
HD74LS163
74LS 74A
HD74LS74
1983

Super Cassette Vision (1984)

SPECS		
	Launch price: ¥14,800	**RAM:** 128 bytes
	Processor: NEC D7801G at 3.58 MHz	**VRAM:** 4 KB
	Colors: 16	**Games released:** 30

The Super Cassette Vision was the follow-up to the Cassette Vision, a successful 1981 console by Epoch that had been quickly eclipsed by a new wave of 3rd generation systems in Japan. The new "super" console was updated with a microprocessor-based design that brought it to parity with other systems. However, despite exclusive games based on popular anime series such as *Doraemon* and *Lupin the 3rd*, the Super Cassette Vision fizzled out in the crowded Japanese market. By 1987, Epoch had quit the home console industry to focus on producing games for other systems.

The console also had a small release in France, where it was rebranded as the Yeno Super Cassette Vision.



RGB Video Out

The Super Cassette Vision was the first home gaming console to offer native RGB video out. This connection split the video into individual red, green, and blue signals and offered a vastly sharper and cleaner picture than the then-standard RF video. The standard is highly appreciated by current retro games enthusiasts who play on professional video monitors or use external scalers to play on modern TVs.

Nintendo Entertainment System (1985)

SPECS		
	Launch price: $179 (deluxe set)	**RAM:** 2 KB
	Processor: Custom Ricoh 2A03 at 1.79 MHz	**VRAM:** 2 KB
	Colors: 54	**Games released:** 700+

The Nintendo Entertainment System (NES) was a remodeled Famicom that Nintendo brought to the United States in late 1985. The console entered a dormant market that still hadn't recovered following the 1983 crash, but the NES quickly established itself through fun and unique games. With incredibly strong first-party titles, a large library of exclusive third-party games, and highly marketable mascot characters, Nintendo's system created a phenomenon that revived the industry. The NES sold more than 30 million systems in the US alone and brought the console market to new highs that established Nintendo and Japan as the new leaders of gaming.

Nintendo's iconic controller was quickly copied by competitors and marked the end of the joystick era.

R.O.B.

Retailers were still cautious toward video games when Nintendo brought its game console to North America. To help alleviate retailers' fears, Nintendo packaged every NES with R.O.B. (Robotic Operating Buddy). The simple motorized robot was meant to entice children and to present the NES as a toy, but retailers were still unconvinced.

It wasn't until Nintendo test-marketed the system that it proved the NES would sell and that video games were still a viable market. Eventually, as the NES took off, R.O.B. became more and more unnecessary, which led Nintendo to debundle it from the console. By 1988, R.O.B. had been phased out altogether.

Only two games were made that used R.O.B.: *Gyromite* and *Stack-Up*.

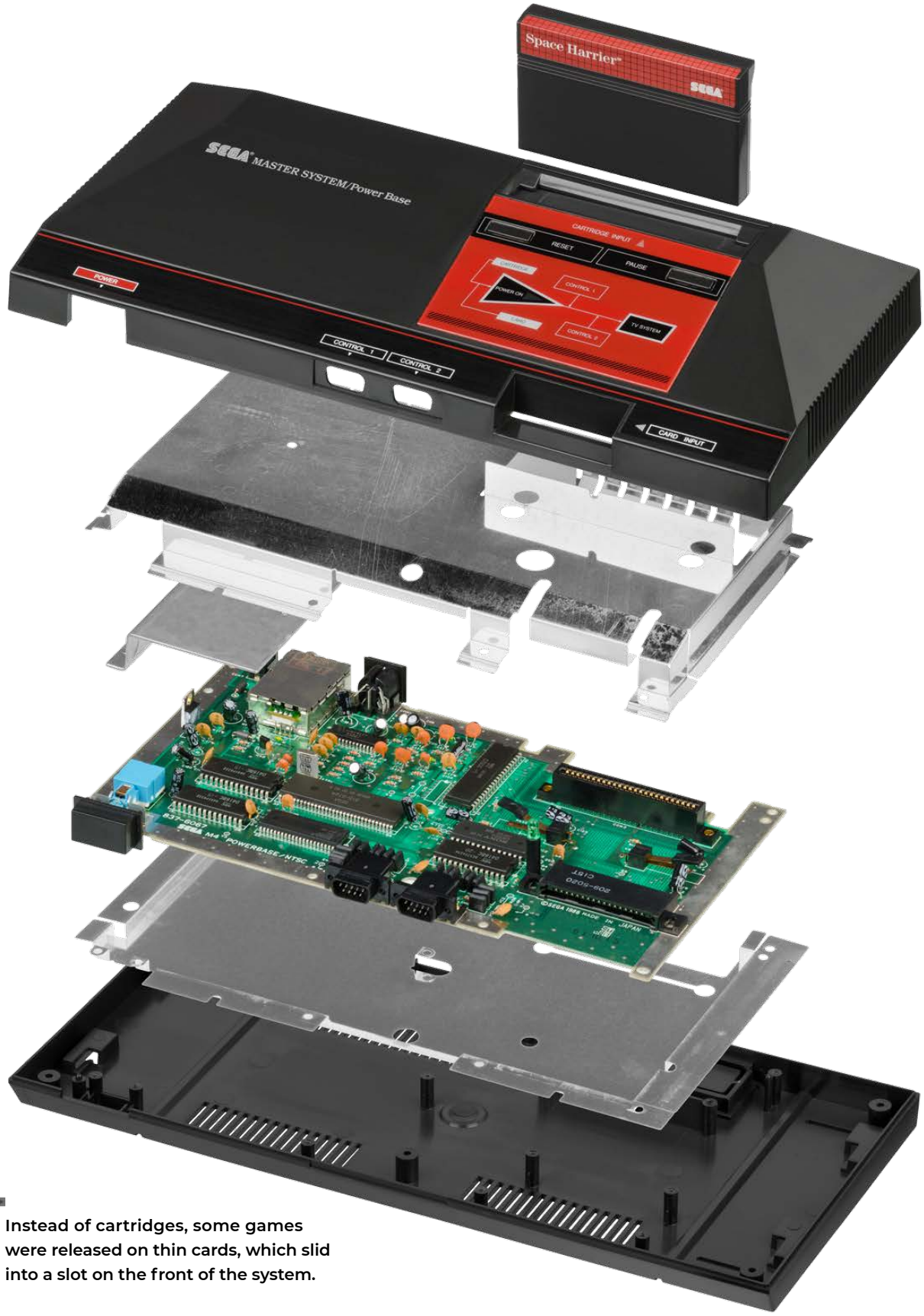
In the US, many NES consoles came with the Zapper light gun and the game *Duck Hunt*. The Zapper would later be changed to orange in 1988 to accommodate new laws regulating the appearance of toy guns.

Sega Master System (1986)

SPECS		
	Launch price: $129	**RAM:** 8 KB
	Processor: NEC 780C at 3.58 MHz	**VRAM:** 16 KB
	Colors: 64	**Games released:** 340+

The Master System was Sega's remodeled and enhanced rerelease of the SG-1000 console for the worldwide market. Now with more RAM and an upgraded video processor, the Master System offered better graphics than its main rival, the NES/Famicom. Though it was technically superior and offered a competitive game library with exclusive Sega titles, the Master System couldn't break into the Nintendo-dominated North American and Japanese markets. However, the console took off in Europe and South America (where Nintendo was weak) and outsold the NES to become the generation's console leader in those territories.

The Master System was based off the Japanese Sega Mark III, Sega's third revision of the SG-1000 console.



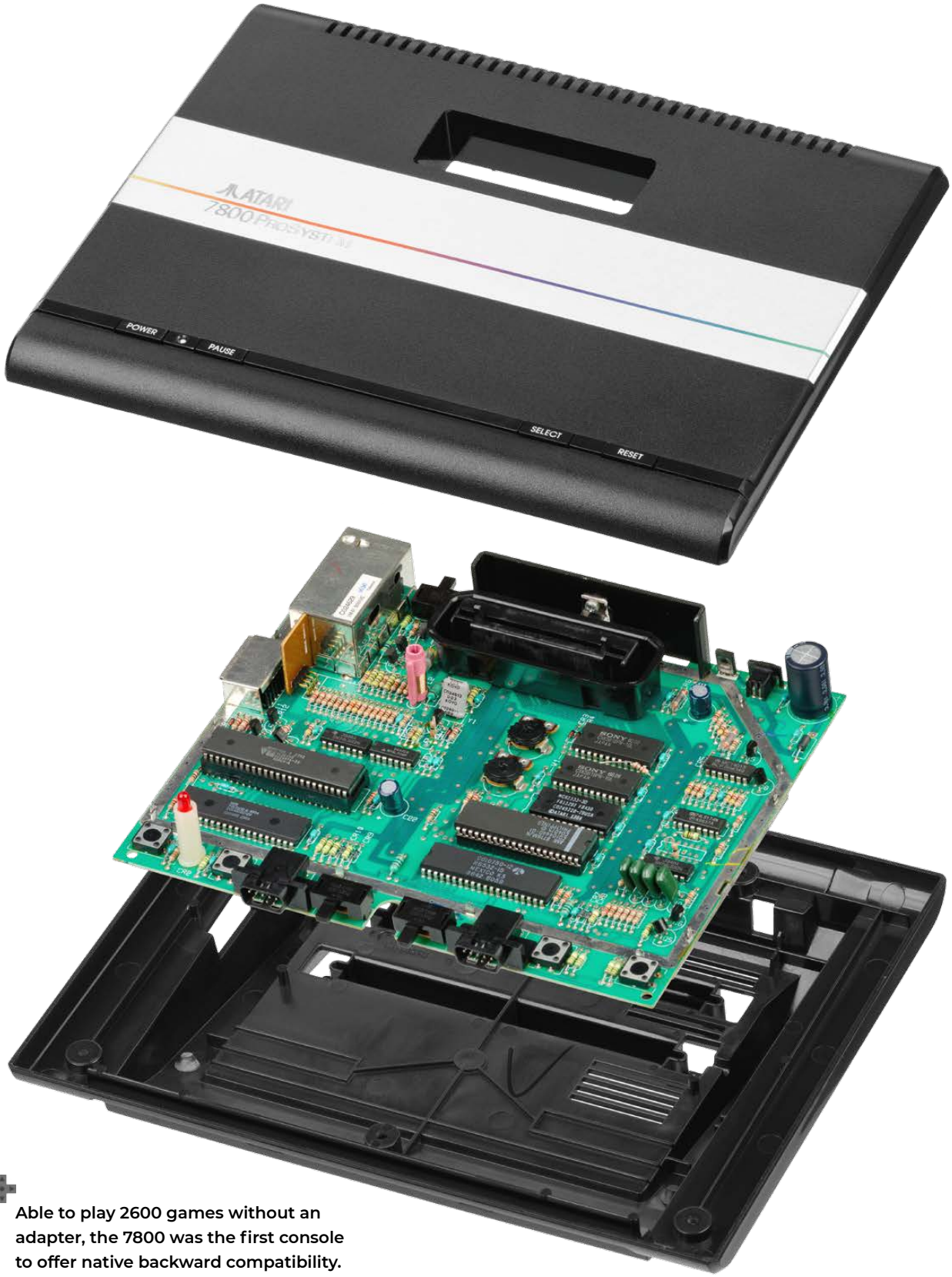
Instead of cartridges, some games were released on thin cards, which slid into a slot on the front of the system.

Atari 7800 (1986)

SPECS		
	Launch price: $79	**RAM:** 4 KB
	Processor: Custom MOS 6502C at 1.79 MHz	**Colors:** 256
	Coprocessors: Custom Atari “MARIA” and “TIA”	**Games released:** 59

The 7800 was Atari’s third console and was originally meant for release in 1984 as a hurried successor to the troubled 5200. However, multiple issues caused the completed system to get shelved, and the 7800 wouldn’t see a release until mid-1986. When it did launch, Atari was unprepared to compete with Nintendo, and the 7800 failed to attract fans with its small game library filled with rehashed arcade ports. Ultimately, poor support from a weakened Atari, a lack of third-party titles, and the extreme popularity of the Nintendo’s NES console pushed the Atari 7800 to a distant second place in the United States.

Atari later made joypad controllers similar to the NES for the 7800, which came standard in European systems.



Able to play 2600 games without an adapter, the 7800 was the first console to offer native backward compatibility.

Game Pocket Computer (1984)

SPECS		
	Launch price: ¥12,000	**RAM:** 2 KB
	Processor: NEC D78C06 at 6 MHz	**Resolution:** 75 × 64 pixels
	Power: 4 AA batteries	**Games released:** 5

The Game Pocket Computer, the first true handheld console, was released by Epoch exclusively in Japan in 1984. Unlike the Microvision or Select-A-Game systems that placed their processors in their game cartridges, the Game Pocket Computer had a built-in microprocessor and ran game code from interchangeable ROM carts. The system featured a black-and-white, 75-by-64 pixel LCD screen, which provided more fidelity and more dynamic games than previous handhelds. However, Epoch's Game Pocket Computer failed to catch on with Japanese gamers, and the handheld was discontinued after releasing only five games.

The Epoch Game Pocket Computer came with a sliding tile puzzle game and a paint program built into the system.

RDI Halcyon (1985)

Launch price: $2,195	**Media:** LaserDiscs
Processor: Zilog Z80	**Alternate controls:** Voice command
Coprocessor: Votrax speech synthesizer	**Games completed:** 2

SPECS

The RDI Halcyon was an unreleased game console that was the brainchild of Rick Dyer, a zealous inventor and game maker. Dyer wanted to create a lushly animated and epic fantasy game called *Shadoan*, but first he created a smaller scale spin-off. That game, *Dragon's Lair*, was a hugely successful LaserDisc-based arcade game and gave Dyer the capital he needed to create his own LaserDisc system that would realize his full-length *Shadoan* game. The console was incredibly ambitious and expensive to make, and only a few systems were manufactured before bankruptcy shut down Dyer's company just prior to the console's release.

The RDI Halcyon was featured as a prize on the game show *Sale of the Century* in 1985.

Action Max (1987)

SPECS

Launch price: $69	**Unreleased game:** *Fright Night*
Video: No video out	**Pack-in game:** *Sonic Fury*
Power: 4 C batteries or optional AC adapter	**Games released:** 5

The Action Max was a light-gun-based quasi console created by the American toy maker Worlds of Wonder. The system did not run games itself but instead worked in conjunction with a VCR that played VHS-tape movie "games" that contained on-rails, light-gun-shooting segments. The Action Max itself registered if a shot hit or missed and would display a player's score. This setup was incredibly limited, as onscreen gameplay never varied, no matter how well or poorly the player performed. The Action Max was only on the market briefly before Worlds of Wonder declared bankruptcy, which effectively ended the console and sent it to the clearance shelf.

The red Score Signal receiver attached to the TV screen via a suction cup and would flash when a target was hit.

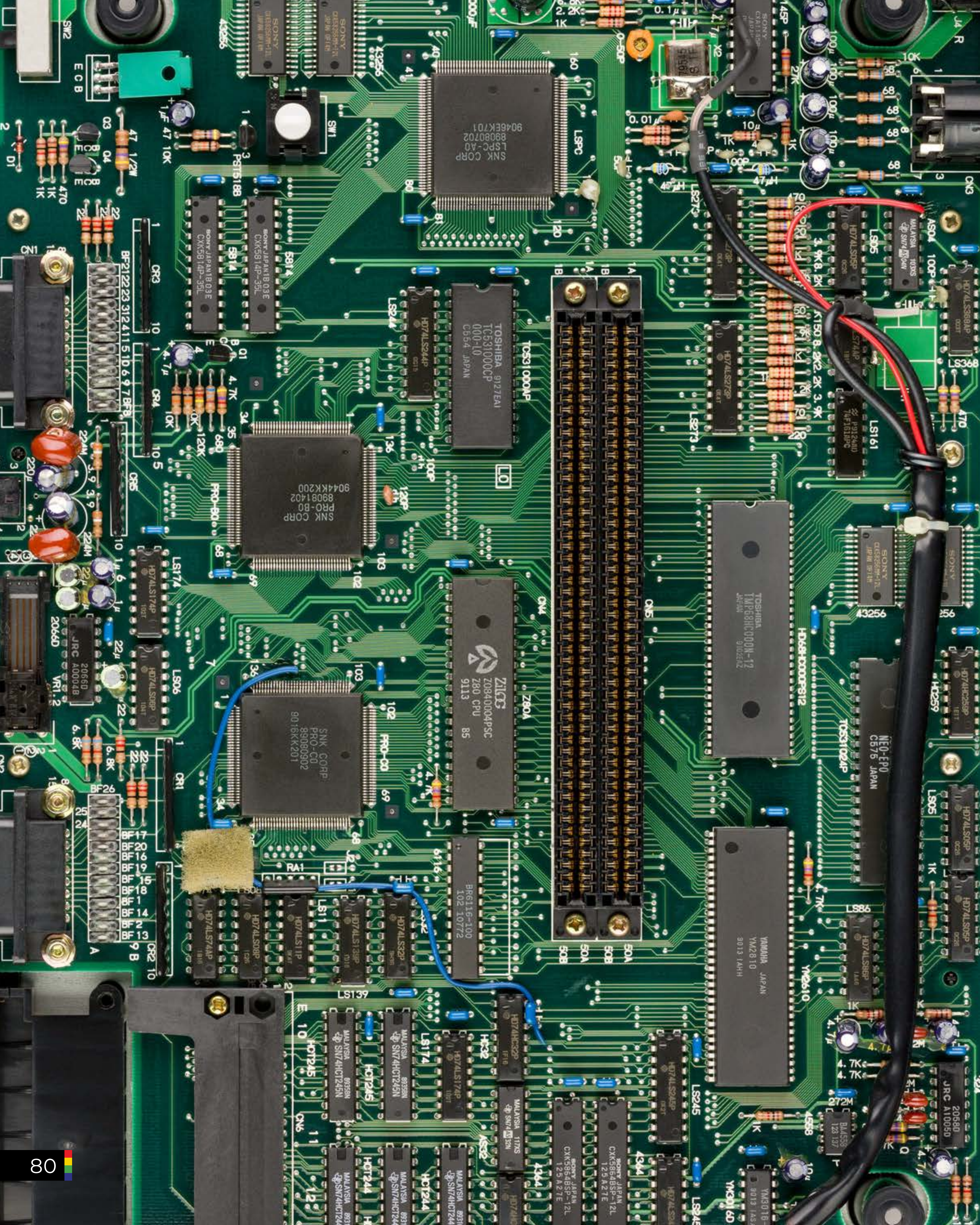
VTech Socrates (1988)

Launch price: $129	**Alternate name:** Prof. Weiss-Alles
Processor: Zilog Z80	**Wireless mode:** Infrared
Power: 6 D batteries or optional AC adapter	**Games released:** 8

SPECS

The Socrates was an edutainment console from VTech, a company then known for its electronic learning products. While VTech's other educational devices were inexpensive, faux computers, the Socrates was more like a gaming console and had a small library of learning games that taught spelling, math, and basic logic. At launch, the system was more expensive than consoles from Nintendo, Sega, and Atari, and it suffered from slowdown that caused long pauses between actions. Sales of the system were below VTech's expectations, but the Socrates lingered on the market for the next few years before being phased out by the mid '90s.

Optional accessories for the Socrates included a touch tablet, a mouse, and a speech synthesis cartridge.


SNK CORP
LSPC-A0
SNK CORP
PRO-B0
SNK CORP
PRO-C0
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TC531000CP
ZILOG
Z80 CPU
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YAMAHA
YM2610
NEO-E0
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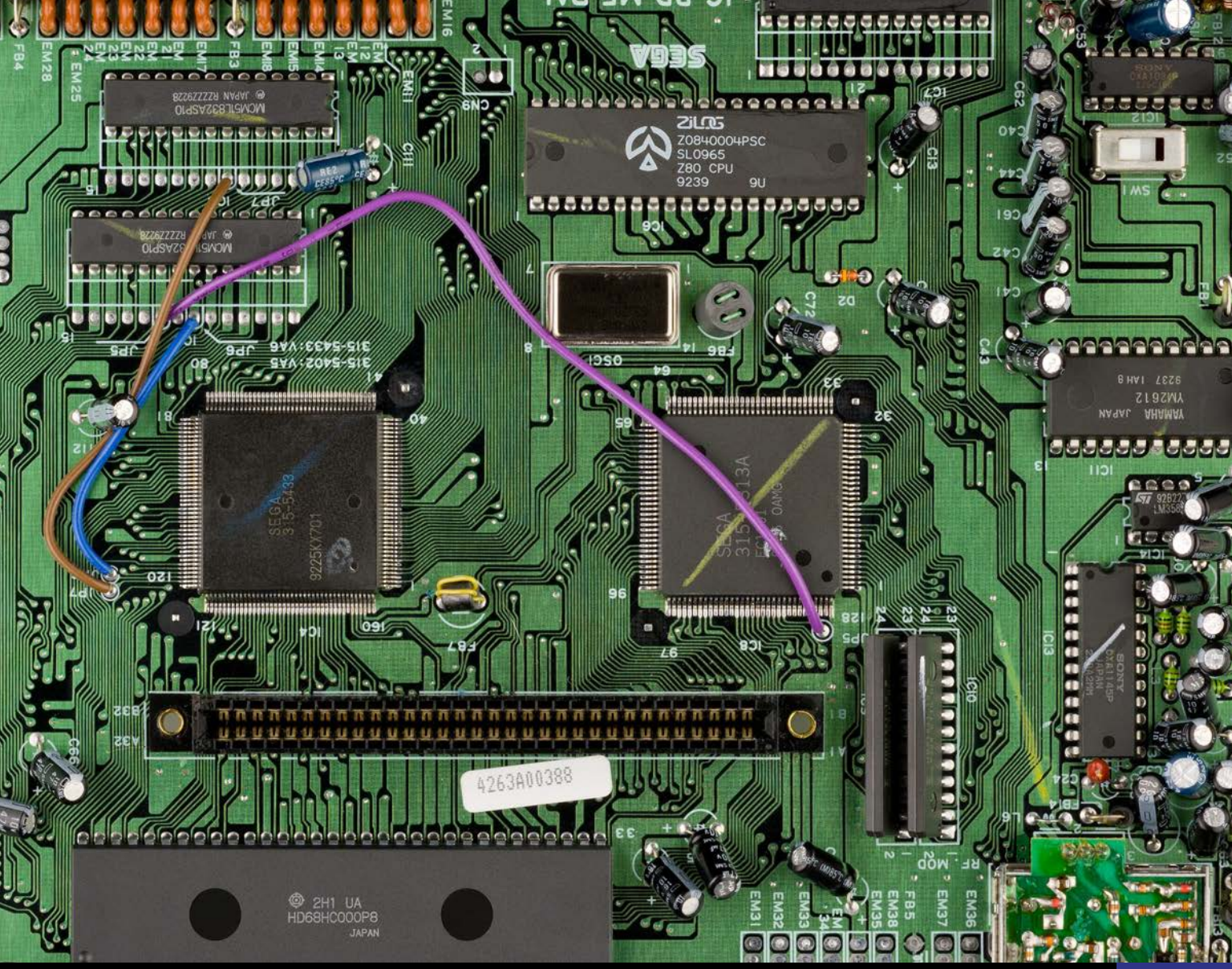

4th Generation

Game consoles moved to 16-bit processors in the fourth generation, as new systems with more colorful and detailed 2D sprite graphics battled it out. In the US, Nintendo's market dominance was challenged by Sega, whose Genesis system became a best seller thanks to a highly effective advertising campaign and a string of exclusive, hit games. Other systems did not fare as well: NEC's TurboGrafx-16 failed to connect with American audiences, and a wave of expensive multimedia systems such as the Philips CD-i and Commodore CDTV sold poorly. Finally, the fourth generation also saw the emergence of multiple handheld consoles, with Nintendo's simple, monochrome Game Boy beating out high-end color systems from Atari and Sega to become the platform leader.

(opposite) Neo Geo AES motherboard, (above) Sega Mega Drive motherboard

NEC PC Engine (1987)

SPECS		
	Launch price: ¥24,800	**RAM:** 8 KB
	Processor: Hu6280 at 1.79 or 7.16 MHz	**VRAM:** 64 KB
	Coprocessors: HuC6260 and HuC6270	**Colors:** 512

The fourth generation of game consoles began with the PC Engine, the first home gaming console to use 16-bit graphics. With an 8-bit CPU, it was not a true 16-bit system, but its colorful, lush visuals were an improvement over older 8-bit consoles. The PC Engine was developed through a partnership between the electronics giant NEC and the video game developer Hudson Soft. With popular and exclusive games from Hudson Soft and ports of arcade titles that older systems couldn't handle, the tiny PC Engine built a sizable following in Japan, becoming the country's second-best-selling console of that era.

The PC Engine didn't use standard game cartridges but instead played games from slim data cards.

PC Engine Models and Variants

The PC Engine had numerous models, add-ons, and redesigns. The base model alone spawned two variants, the Core Grafx series, that featured minor board changes and the addition of a multi-A/V out port. Other variations included a model with a built-in flip-up screen, a battery-powered portable unit, systems with built-in CD drives, and a high-end model called the SuperGrafx. This variant had extra memory and better graphics capability, though only seven games were ever released for it.

Atari XE Game System (1987)

SPECS		
	Launch price: $159	**RAM:** 64 KB
	Processor: Custom 6502C at 1.79 MHz	**VRAM:** 16 KB
	Coprocessors: Custom “GTIA,” “ANTIC,” and “POKEY”	**Colors:** 256

The Atari XE Game System (XEGS) was a repackaged and consolized version of Atari’s 65XE computer, itself an updated model of the 1978 Atari 800. Unlike the Atari 5200 (also based on the Atari 8-bit computer line), the XEGS was directly compatible with many Atari computer games and peripherals. However, few unique games were developed for the system, as most of the XEGS’s library was relabeled, older game stock. With little advertising and stale games, the XEGS failed to make an impact against the NES and eventually disappeared from the market.

The Atari XEGS came with the built-in game *Missile Command*.

The Mirai mockup is currently in the collection of the Videogame History Museum in Frisco, Texas.

Atari Mirai

The Atari Mirai is a mysterious case mockup that fell into the hands of a private collector following Atari's demise. Little is known about the system other than it was created in the late '80s and uses the same design scheme as the Atari XE Game System. Most theories for its purpose revolve around the Mirai's massive cartridge slot, with some speculating it was a possible collaboration with the Japanese arcade game company SNK to bring its Neo Geo MVS system to the American home market.

Sega Mega Drive (1988)

SPECS		
	Launch price: ¥21,000	**RAM:** 64 KB (68000) + 8 KB (Z80)
	Processor: Motorola 68000 at 7.6 MHz	**VRAM:** 64 KB
	Coprocessor: Zilog Z80 at 3.58 MHz	**Colors:** 512

The Mega Drive was Sega's follow-up to its 8-bit SG-1000 and Master System console line. The Mega Drive's hardware was similar to Sega's System 16 arcade boards, utilizing a 16-bit Motorola 68000 for its main CPU and a Zilog Z80 to handle sound. In Japan, the Mega Drive struggled against Nintendo and NEC's new PC Engine, a console that became the preferred 16-bit system for arcade and action games. In Europe, where the Mega Drive launched in 1990, Sega continued its domination of the market, thanks to strong support from Western developers.

Sega's 16-bit system was named the Genesis in North America, but most of the world knew it as the Mega Drive.

The Mega Drive's Z80 coprocessor made it backward compatible with the Sega Master System.

Sega Genesis (1989)

SPECS		
	Launch price: $189	**Best-selling game:** *Sonic the Hedgehog*
	Pack-in game: *Altered Beast* (original release)	**Systems sold:** 30+ million (worldwide)
	Ad slogan: "Genesis Does What Nintendon't"	**Games released:** 900+ (worldwide)

The Genesis was a rebranded Mega Drive console for the North American market. After the failure of the Master System in the Nintendo-dominated United States, Sega poured its resources into an edgy and aggressive marketing campaign for the Genesis, using ads to directly attack and ridicule Nintendo. The ads were an incredible success, and combined with exclusive sports and action games (such as *Sonic the Hedgehog*) that led the Genesis to massive sales. The Genesis sold more than 20 million consoles in the United States alone, ending Nintendo's undisputed reign and becoming Sega's best-selling system ever.

This smaller and sleeker Genesis redesign debuted in 1993.

The Genesis controller was natively compatible with the Atari 2600.

Sega CD and JVC X'Eye

Released in the United States in 1992, the Sega CD was a CD add-on for the Genesis. The drive added an extra Motorola 68000 processor, support for CD-quality sound, and the ability to play full-motion video (FMV). However, due to the console's limited ability to simultaneously display different colors, the FMV often appeared grainy, small, and low quality. Despite the popularity of the Genesis, the Sega CD never achieved major success due to its high cost ($299 at launch) and the poor reception of many of its FMV-based games.

The Sega CD's lack of copy protection meant it could play burned discs without modification.

Sega partnered with the electronics manufacturer JVC to produce the X'Eye, a Genesis with a built-in CD drive and karaoke capability.

The 32X launched at $159 and sold for as little as $19 after it was discontinued.

Following the 32X's failure, Sega scrapped plans for an all-in-one Genesis/32X console, the Neptune, seen here as a prototype.

Sega 32X

The 32X was a Genesis add-on released in late 1994 that was intended to extend the life of the 16-bit Genesis as the industry transitioned to 32-bit systems. Based on twin 32-bit processors, the 32X provided enhanced graphics and 3D capability for less than the cost of a newer system.

Though the 32X had strong initial sales and hype, its rushed release resulted in underwhelming games that led to a steep sales decline. After third-party support dried up, Sega dropped the 32X in early 1996 to focus on its new Saturn console.

NEC TurboGrafx-16 (1989)

SPECS		
	Launch price: $199	**RAM:** 8 KB
	Processor: Hu6280 at 1.79 or 7.16 MHz	**VRAM:** 64 KB
	Coprocessors: HuC6260 and HuC6270	**Colors:** 512

The TurboGrafx-16 was a rebranded and redesigned PC Engine that NEC released for the North American market. Though the PC Engine had been popular in Japan, the TurboGrafx-16 faced stiff competition from the reigning NES and the newly released Sega Genesis. Sega pulled ahead with savvy marketing and impressive action, sports, and arcade games. With weak advertising, little third-party support, and a poorly received pack-in game (*Keith Courage in Alpha Zones*), the TurboGrafx-16 would end up a distant third behind Sega and Nintendo and dashed NEC's hopes for success outside of Japan.

Only a fraction of Japanese PC Engine games were localized for the TurboGrafx-16.

The TurboGrafx-16's detachable CD drive could be used as a portable music player.

The TurboDuo is a rare and expensive collector's item, but today many systems need repair due to leaking capacitors.

TurboGrafx-CD and TurboDuo

The TurboGrafx-16 was the first American console that could play CD games when paired with an optional CD drive. However, the add-on's high price—$399 when it launched in 1990—led to low sales. In late 1992, a streamlined, all-in-one version called the TurboDuo was released for just $299. However, the new system did little to help the console's reception, and NEC phased out US support in 1994.

Nintendo Game Boy (1989)

SPECS		
	Launch price: $89	**RAM:** 8 KB
	Processor: Sharp LR35902 at 4.19 MHz	**VRAM:** 8 KB
	Resolution: 160 × 144 pixels	**Games released:** 1,000+

The Game Boy was the first portable console from Nintendo. Created around strict requirements for cost and power consumption, the Game Boy was a marvel of modest engineering. Its older processor and olive-colored monochrome screen paled in comparison to the high-end, full-color handhelds from Sega and Atari, but the Game Boy cost much less and had four times the battery life. Backed by hit Nintendo games and a large library of third-party titles, the Game Boy came to dominate the handheld gaming market for over a decade. With more than 115 million Game Boys sold, it remains one of the best-selling systems ever released.

The Game Boy could run for about 15 to 20 hours on four AA batteries.


Nintendo GAME BOY™
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Game Boy Pocket

The Game Boy Pocket was an updated Game Boy that was considerably smaller and could play games for more than 10 hours with just two AAA batteries. Released in 1996, the Pocket came at a time when other systems would have released a successor, but the limitations of current LCD technology (plus the Game Boy's complete dominance of the handheld market) led Nintendo to stay with the Game Boy's cheap and simple design for a few more years.

In 1995 Nintendo released five new Game Boy case colors: black, red, yellow, green, and clear.

The Game Boy Camera's built-in software had minigames and photo editing capabilities, and it could even create short animated movies.

Game Boy Camera and Printer

The Game Boy Camera, released in 1998, was an official accessory that allowed you to take digital photos with your Game Boy. Created when digital imaging was in its infancy, the Game Boy Camera was only capable of taking low-resolution black-and-white photos. The camera could also be paired with an optional thermal printer, which allowed photos to be printed and made into stickers.

Atari Lynx (1989)

SPECS		
	Launch price: $179	**RAM:** 64 KB
	Processors: Custom “Mikey” and “Suzy”	**Colors:** 4,096
	Resolution: 160 × 102 pixels	**Pack-in game:** *California Games*

The Atari Lynx was a powerful handheld console that featured a full-color, backlit screen. Compared to Nintendo’s simple, monochrome Game Boy, the Lynx was an upscale portable that offered a console-like experience on the go. However, the Lynx’s backlit screen rapidly consumed batteries, and like other post-crash Atari systems, the Lynx suffered from poor advertising, limited retail presence, little third-party support, and game droughts. The Lynx quickly fell behind the Game Boy in sales and was later replaced by the Sega Game Gear as the preferred color handheld console, shunting the Lynx to a distant third place.

The Lynx could run for about 3 to 5 hours off of six AA batteries.

In 1991, Atari released an updated Lynx with a smaller body and other minor improvements.

Neo Geo AES (1990)

SPECS		
	Launch price: $649	**RAM:** 64 KB
	Processor: Motorola 68000 at 12 MHz	**VRAM:** 84 KB
	Coprocessor: Zilog Z80 at 4 MHz	**Colors:** 65,536

In 1989, the Japanese gaming company SNK produced the Multi Video System (MVS), a video arcade platform capable of holding multiple games in a single cabinet through the use of large, interchangeable game cartridges. In 1990, SNK produced the Neo Geo AES, a console version of the MVS designed for the home market. The powerful system brought the quality of arcade gaming to the living room, but that quality came at a high price: its massive game cartridges cost around $200 to $300 each. While expensive, the AES was meant for the enthusiast and rental markets and today is seen as a holy grail for die-hard fans of SNK arcade games.

The Neo Geo AES was the first console to feature a memory card slot, which used cards capable of holding up to 2 KB of save data.

Neo Geo CD

The AES's costly game cartridges kept the console inaccessible to most people, which prompted SNK to release the Neo Geo CD in 1994. Built from the same hardware as the AES, the new console played more affordable CD versions of cartridge games. However, the system's single-speed CD drive and the need to load large amounts of data into the console's RAM resulted in long loading times, drawing criticism for repetitive 20 to 40 second pauses. The console was also limited to 2D sprites, which couldn't compete with the 3D graphics of the PlayStation and Saturn. With niche appeal and low sales, the Neo Geo CD would be SNK's last home console.

SNK released multiple Neo Geo CD models. The last model, the CDZ, featured a double-speed CD drive.

Sega Game Gear (1990)

SPECS		
	Launch price: $159	**RAM:** 8 KB
	Processor: Zilog Z80 at 3.58 MHz	**VRAM:** 16 KB
	Resolution: 160 × 144 pixels	**Games released:** 350+

The Game Gear was a handheld gaming console from Sega that had a full-color, backlit screen. Essentially a portable Master System with more color capability, the Game Gear was Sega's attempt to enter the burgeoning handheld console market. While the Game Gear was similar to the Atari Lynx in power and design, Sega's console outsold and surpassed the Lynx thanks to better marketing and portable versions of hit games such as *Sonic the Hedgehog*. While it never came close to overtaking the Game Boy and struggled in later years, the Game Gear was the only system that really challenged the Game Boy's market dominance.

The Game Gear's fluorescent tube backlight could consume six AA batteries in only 3 to 5 hours.

Sega also sold an optional TV tuner for the Game Gear that allowed for external video or TV watching.

Super Famicom (1990)

SPECS

Launch price: ¥25,000	**RAM:** 128 KB
Processor: Custom 65C816 at 3.58 MHz	**VRAM:** 64 KB
Colors: 32,786	**Systems sold:** 41+ million (worldwide)

The Super Famicom was the 16-bit successor to Nintendo's immensely popular Famicom/NES console. Nintendo's market domination in Japan and the US allowed the company to take its time developing its new system, and the Super Famicom came out years after its 16-bit rivals, the Sega Mega Drive and PC Engine. On its release, the Super Famicom had advanced graphic techniques and richer sound than its competitors, and also launched with the hit game *Super Mario World*. Quality first-party titles, combined with third-party exclusive games series such as *Dragon Quest* and *Final Fantasy*, led Nintendo to dominate the 4th generation in Japan.

While the American Super Nintendo had its own unique look, the rest of the world used the more rounded Japanese case design.

The Super Famicom's controller was the first to include shoulder buttons.

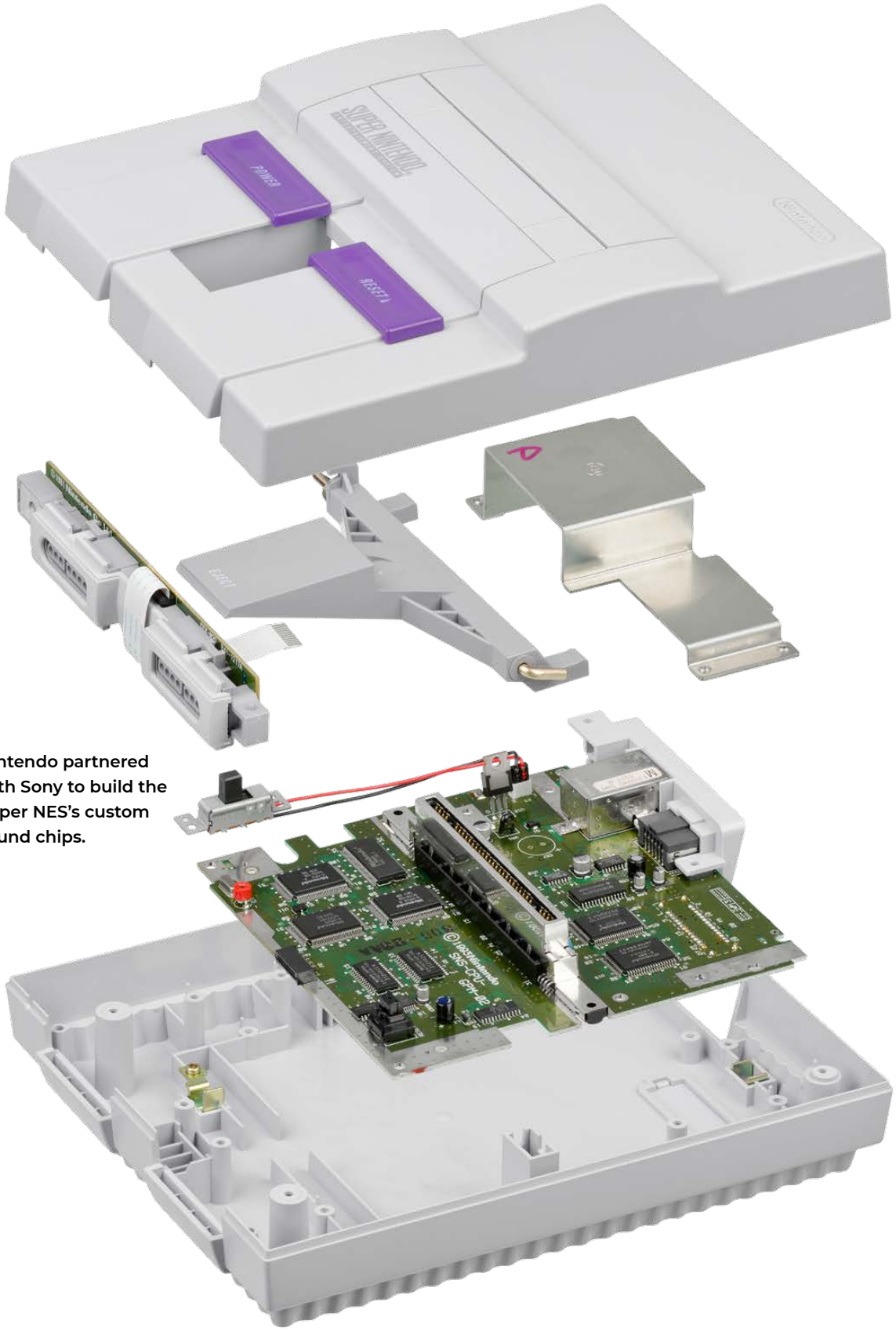
Super NES (1991)

SPECS

Launch price: $199	**Canceled accessory:** CD-ROM drive add-on
Best-selling game: *Super Mario World*	**Video out:** Composite, S-Video, RGB
Last official release: *Frogger* (1998)	**Official light gun:** Super Scope

The Super Nintendo Entertainment System (NES) was what Nintendo's 16-bit Super Famicom was known as in the rest of the world. In the US, the Super NES launched as the Sega Genesis was rapidly gaining ground against Nintendo, which spurred a fierce console war between the two systems. The Super NES sold neck and neck with the Genesis, but it wasn't until the release of the massive hit *Donkey Kong Country* that the Super NES pulled ahead. Nintendo carried that momentum in its later years as the Genesis wore down and ultimately became the best-selling 16-bit console in the United States by the end of the generation.

The Super NES had a game library of more than 700 titles, and there were more than 1,700 games released worldwide.



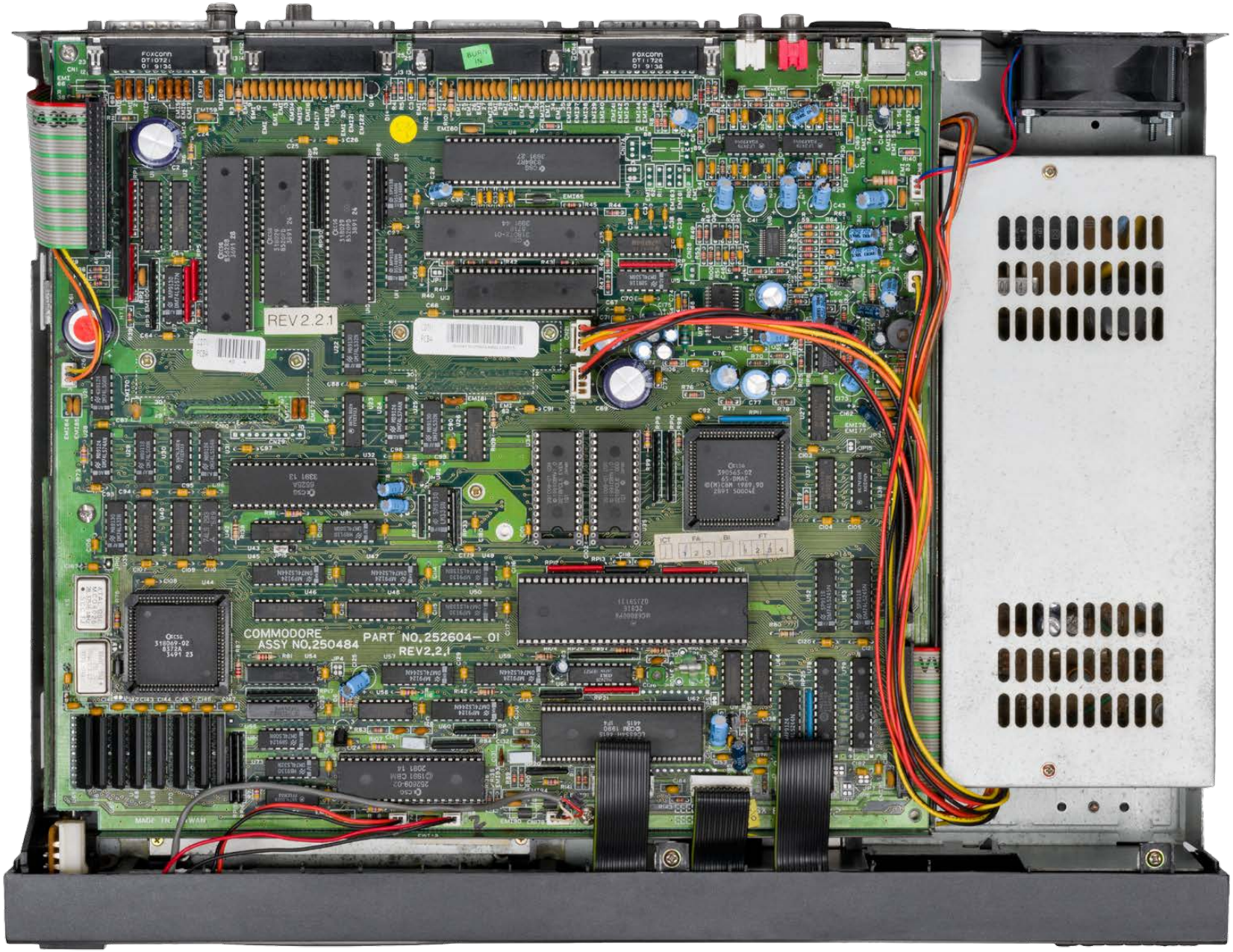
Nintendo partnered with Sony to build the Super NES's custom sound chips.

Commodore CDTV (1991)

SPECS		
	Launch price: $999	**RAM:** 1 MB
	Processor: Motorola 68000 at 7.16 MHz (NTSC)	**Operating system:** AmigaOS 1.3
	Media: Caddy-based 1X CD-ROM drive	**Colors:** 4,096

The Commodore CDTV was a repackaged Amiga 500 computer that included a built-in CD drive, and was the start of a wave of advanced, CD-based multimedia machines. As the CD took off, the electronics industry envisioned a device that turned the living room television into a media hub, where families could learn, listen to music, play games, or watch movies. However, the technology was expensive, and most consumers would have rather invested that money into a computer that was far more versatile. The CDTV, with its incredibly high price, failed almost instantly and was an early casualty of the multimedia format.

With an optional floppy drive, keyboard, mouse, and other accessories, the CDTV could be used as a standard computer.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Philips CD-i (1991)

SPECS		
	Launch price: $800 to $1,000	**RAM:** 1 MB
	Processor: Motorola 68070 at 15 MHz	**Operating system:** CD-RTOS
	Media: 1X CD-ROM drive	**Models released:** 20+

The CD-i was a CD-based hardware standard and multimedia format created by Philips that played on a variety of dedicated machines. The CD-i platform was designed to be a media hub that allowed users to play games, watch digital videos, listen to music, or use educational software on their TVs. Unfortunately, the machines were too expensive, the games were not fun, video CDs failed to catch on, and people preferred to use stereos and computers for music and software. It is most well known today for its bad *Zelda* and *Mario* games, an unexpected result of a failed partnership between Philips and Nintendo to bring a CD add-on to the Super NES.

The CD-i's optional MPEG digital video cartridge was necessary for playing video CDs and most FMV games.

CD-i Models and Variants

Philips and manufacturing partners such as Sony and Goldstar produced a variety of CD-i models, including portable units, heavy-duty business systems, and even a TV with a built-in player. Philips attempted to make the CD-i the standard multimedia format for consumer and professional environments, but adoption rates were low. Despite the early '90s hype for multimedia TV machines, the systems were a massive flop, and heavy losses from poor sales led Philips to abandon the CD-i format in 1996.

The massive 910 model was the first CD-i player released.

The 450 was a later CD-i model that more closely resembled a video game console.

Memorex VIS (1992)

SPECS		
	Launch price: $699	**RAM:** 1 MB
	Processor: Intel 286 at 12 MHz	**Video out:** Composite, S-Video
	Media: 1X CD-ROM drive	**Operating system:** Modular Windows

The Memorex Video Information System (VIS) was a CD-based multimedia device created by the Tandy Corporation and sold exclusively through the US electronics store Radio Shack. Based off a modified version of Windows 3.1, the VIS was a stripped-down x86 computer designed to run off a television. Its software library consisted mostly of educational titles for children and a few ports of DOS games such as *Sherlock Holmes, Consulting Detective*. The system, which was seen as expensive, limited, and not very fun, was a sales disaster for Tandy, which ended support for the VIS in 1994 and sold its remaining stock to a liquidation company.

Less than two years after its debut, the VIS could be bought for $99 in a bundle that came with 30 software titles.


CLASS 1
LASER PRODUCT
PRODUIT LASER
CATÉGORIE 1
CAUTION: INVISIBLE LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM.
ATTENTION: RADIATION DU FAISCEAU LASER INVISIBLE EN CAS D'OUVERTURE. EVITER TOUTE EXPOSITION AUX RAYONS.
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View-Master Interactive Vision (1989)

SPECS		
	Launch price: $120	**A/V in:** RF, composite video, mono sound
	Video processor: Texas Instruments TMS9918	**A/V out:** RF only
	Manufacturer: View-Master Ideal Group	**Games released:** 7

The View-Master Interactive Vision was a VHS-based edutainment console designed for young children. The Interactive Vision worked in conjunction with a VCR and offered limited interactivity with a small library of VHS games. The system overlaid simple graphics over a VHS tape as it played, offering either story choices or brief action games, and gave the illusion of different outcomes by switching between one of two audio tracks encoded on the tape. Ultimately, the Interactive Vision's high price relative to consoles like the NES and its limited replayability led to the system being discontinued within a year.

The Interactive Vision came packaged with either *Let's Learn to Play Together* or *Disney's Cartoon Arcade*.

Gamate (1990)

Launch price: $69	**RAM:** 1 KB
Processor: NCR 65CX02 at 2.22 MHz	**VRAM:** 8 KB
Resolution: 160 × 150 pixels	**Pack-in game:** *Cube-up* (*Tetris* clone)

SPECS

The Gamate is a handheld gaming console developed by the Taiwanese company Bit Corporation. The system was the first in a series of low-cost Game Boy knockoffs that came out of East Asia in the early '90s, each of which had its own game library of clones of other system's popular titles. While the Gamate was offered worldwide (in the United States it was through the mail-order company Alston Information Research), its actual impact was limited and short-lived. The Gamate, like the other Game Boy knockoffs, was dumped on the market with little advertising or support and disappeared a few years after its release.

Like the PC Engine, the Gamate used thin game cards instead of cartridges.

Amstrad GX4000 (1990)

SPECS		
	Launch price: £99	**RAM:** 64 KB
	Processor: Zilog Z80A at 4 MHz	**VRAM:** 16 KB
	Colors: 4,096	**Games released:** 25+

The GX4000 was a European-exclusive game console released by the British electronics company Amstrad. The system was a rebranded and consolized version of an Amstrad CPC, a line of 8-bit computers that were popular in Europe in the '80s. By the early '90s, however, these and other 8-bit computers were being succeeded by game consoles and 16-bit computers. Amstrad attempted to revitalize its CPC series with the GX4000 in 1990, but the system failed almost immediately, as it was redundant to CPC owners and console gamers weren't interested. Just months after the system's debut, the GX4000 and the CPC line were discontinued.

The Amstrad GX4000 is one of the worst-selling consoles ever, with only around 15,000 systems sold in Europe.

Watara Supervision (1992)

Launch price: $49	**RAM:** 8 KB
Processor: WDC 65C02 at 4 MHz	**VRAM:** 8 KB
Resolution: 160 × 160 pixels	**Pack-in game:** *Crystball* (*Breakout* clone)

SPECS

The Watara Supervision was one of the handful of Game Boy knockoffs that appeared out of East Asia in the early '90s. Developed in Hong Kong and released worldwide under a variety of distributors and names, the Supervision attempted to undercut the Game Boy by offering a similar experience for less money. However, the handheld had little advertising and relied on local—rather than national—retail distribution, which meant few were even aware of the system. With almost no third-party support and an underwhelming game library composed of inferior clones of other titles, the Supervision eventually disappeared from the market.

Most Supervisions came with a tilting screen, though a Game Boy brick-style model was also available.

Mega Duck (1993)

SPECS		
	Launch price: ~€60	**RAM:** 8 KB
	Processor: LR35902/Z80 at 4.19 MHz	**VRAM:** 8 KB
	Resolution: 160 × 144 pixels	**Pack-in game:** *Brickwall*

The Mega Duck was a handheld console developed by the Hong Kong electronics company Welback Holdings and was distributed by multiple companies throughout Europe and South America. The system was yet another Game Boy knockoff like the Gamate and Supervision, though the Mega Duck was almost a complete clone of the Game Boy in terms of specs. Games for the system were mostly clones of other games, and its library of around two dozen titles was created by Taiwanese developers. Dumped onto the market with little acclaim, the system had almost no lasting impact after its demise.

In South America, the Mega Duck was sold under the Cougar Boy branding.

Pioneer LaserActive (1993)

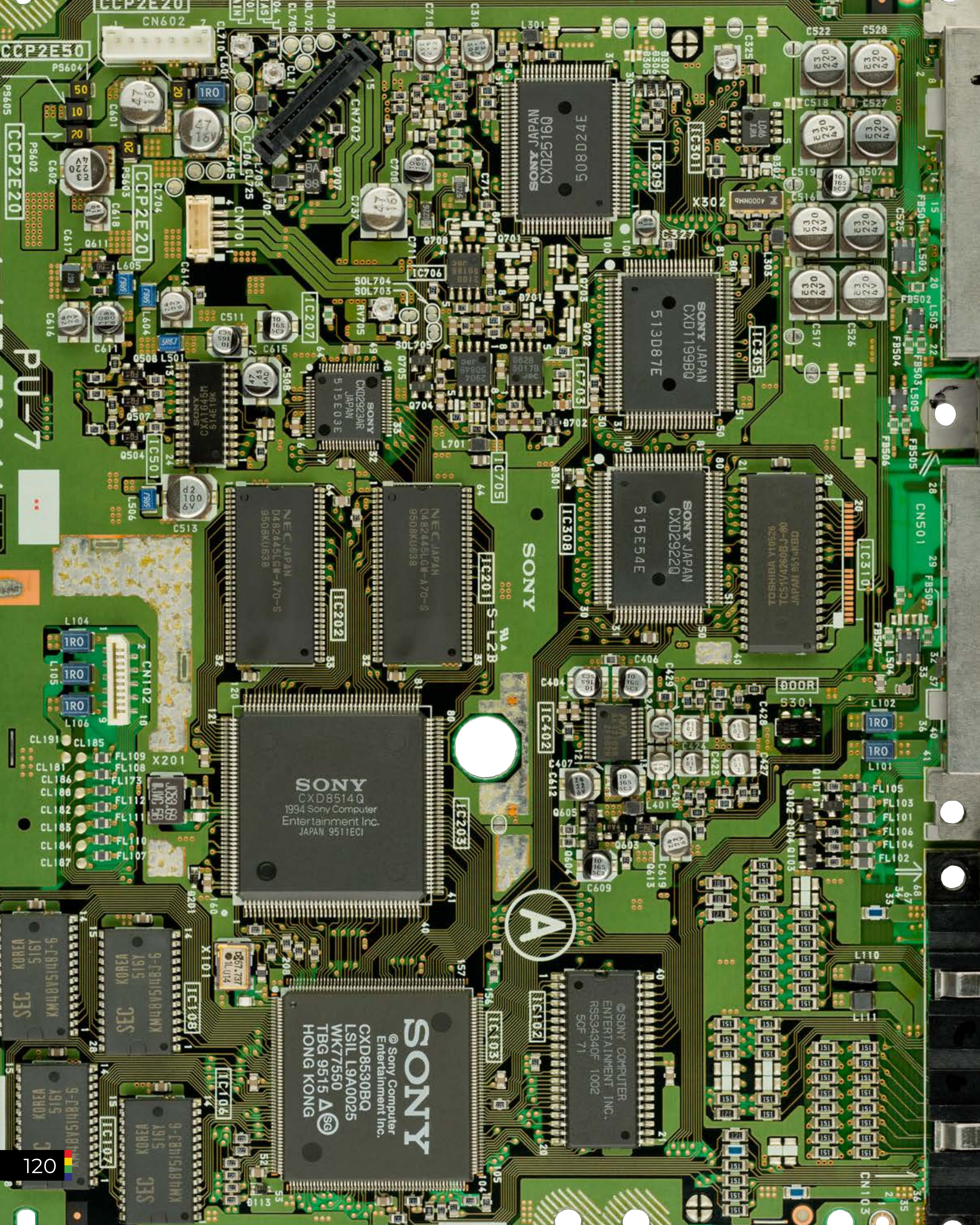
Launch price: $970	**Video out:** Composite
Console expansion price: $600 each	**Number of LaserDisc games:** 31
Karaoke expansion price: $350	**Rare accessory:** 3D goggles

SPECS

The LaserActive was a CD and LaserDisc player that also had the unique ability to become a game console when paired with optional expansions. With either a TurboGrafx-16 or Sega Genesis expansion installed, the LaserActive could play regular console games, CD games, and even a small library of exclusive LaserDisc games.

The LaserActive was an ambitious attempt to create a universal media machine, but it was also prohibitively expensive—a fully kitted system cost well over $2,000—and thus sold poorly. With low sales and little consumer interest, Pioneer abandoned the LaserActive and left the video game market.

Most LaserActive console expansions no longer work due to leaking capacitors.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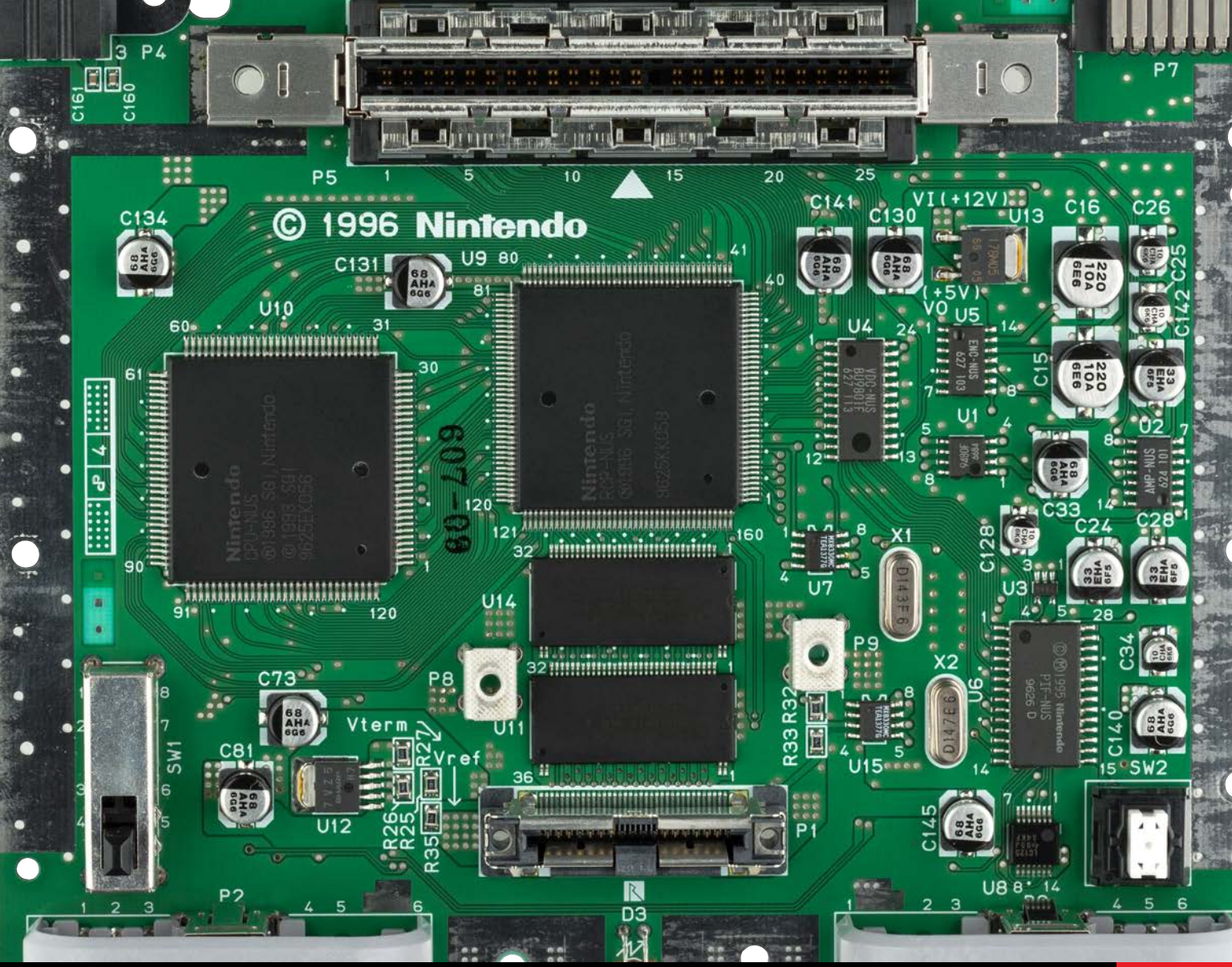


5th Generation

The video gaming industry underwent a massive transition in the fifth console generation as technology rapidly evolved and market players rose and fell. Optical media overtook cartridges due to their low cost and spacious storage capacity, while powerful and custom processors moved games from 2D to 3D. The era also saw a major exodus of hardware manufacturers such as Commodore, Atari, NEC, and 3DO, who dropped out or closed down due to poor sales of their systems. Finally, Sega and Nintendo were reduced to secondary players by Sony, a newcomer that crashed into the market with a well-marketed and developer-friendly console that would become one of the best-selling systems of all time.

(opposite) Sony PlayStation motherboard, (above) Nintendo 64 motherboard

3DO (1993)

SPECS		
	Launch price: $699	**RAM:** 2 MB
	Processor: ARM60 RISC at 12.5 MHz	**VRAM:** 1 MB
	Media: 2X CD-ROM drive	**Internal memory:** 32 KB

The American-designed 3DO console was one of the first 32-bit systems ever released. In an unusual and ultimately disastrous move, the 3DO Company designed the console as a hardware standard that it licensed to foreign manufacturers to build and sell, mirroring the production model of VCRs, televisions, and CD players. To make a profit, third-party manufacturers had to sell 3DOs at a high price (console makers usually sell their systems at a loss or cost), making the 3DO much more expensive than other systems. The high price, heavy competition, and a spotty game library filled with FMV titles led to tepid sales, and the 3DO was discontinued in 1996.

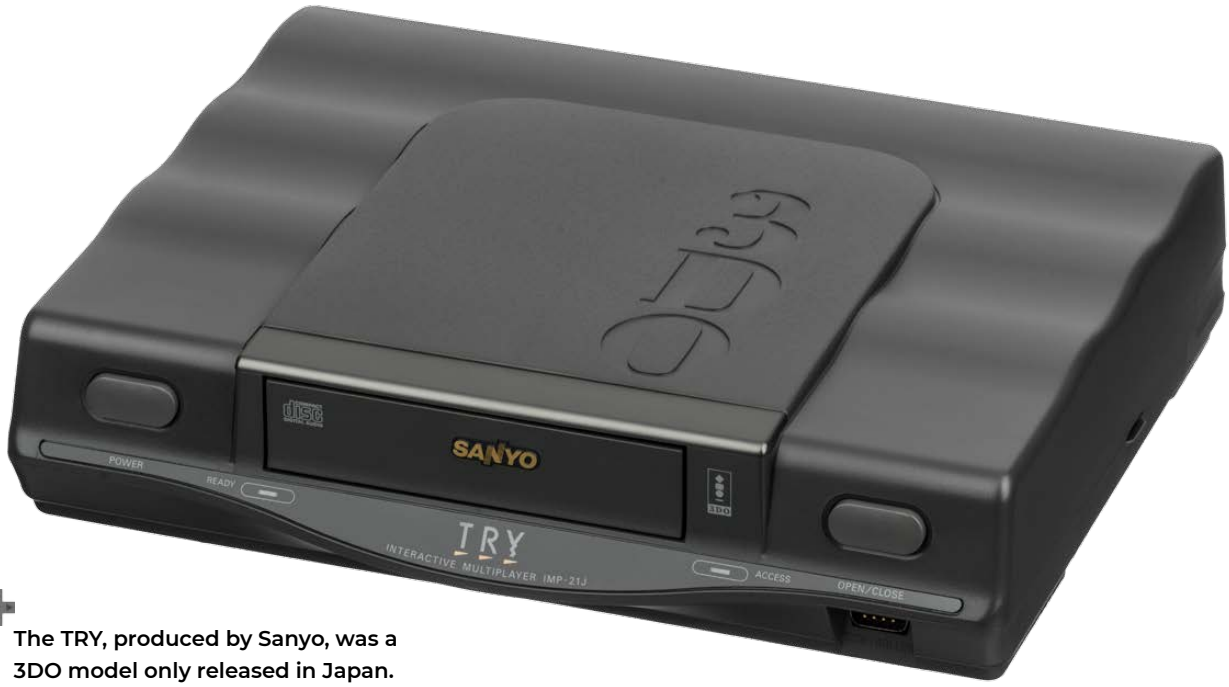
The Panasonic FZ-1, the first 3DO model, dropped from $699 to $299 in less than two years in an effort to bolster sales.

The Korean company Goldstar was the only manufacturer besides Panasonic to release a 3DO console in the United States.

Variant Models

The 3DO Company was led by Trip Hawkins, the founder of the software giant Electronic Arts, who used his industry connections to create hype for the 3DO platform and sign up electronics manufacturers to build the console. While plenty of companies initially pledged to support the 3DO and create and distribute the system, most held back from fully committing due to their hesitation to enter the highly competitive and unpredictable console market. When the flagship 3DO model struggled at launch, most of these manufacturers dropped out completely, meaning that only a fraction of the proposed systems were actually released.

The Panasonic FZ-10, released in 1994, was a cost-reduced update of the FZ-1 and featured a top-loading CD tray.



The TRY, produced by Sanyo, was a 3DO model only released in Japan.

3DO systems featured an expansion slot that could be outfitted with an MPEG video decoder.

Atari Jaguar (1993)

SPECS		
	Launch price: $249	**RAM:** 2 MB
	Processors: Custom “Tom” and “Jerry” both at 26.6 MHz	**Games released:** ~80
	Coprocessor: Motorola 68000 at 13.3 MHz	**Canceled accessory:** VR headset

The Jaguar was Atari’s last console and the true successor to its 1986 Atari 7800. A powerful but deeply flawed system, the cartridge-based Jaguar had a complicated and difficult-to-use multiprocessor architecture. The console had all of the failings of other postcrash Atari systems—a small game library, inadequate advertising, and little third-party support—which all added to Atari’s long-tarnished reputation that kept developers, consumers, and retailers away. The Jaguar flopped, and even after multiple price cuts, the console sold fewer than 150,000 systems after three years, a far cry from Atari’s glory days with the 2600.

The Jaguar was Atari’s last chance at staying afloat after being squeezed out of the computer industry in the early ‘90s.

The Jaguar was manufactured in North Carolina by IBM.

Jaguar CD

Before the Jaguar launched in late 1993, Atari announced a CD drive add-on for the system that was soon to follow. After many delays, the Jaguar CD finally released in September of 1995. By then the Jaguar was dead in the water, and the release of the CD drive after the Sega Saturn and Sony PlayStation had already come out proved futile. The Jaguar CD was available for a short time before Atari quit the industry and ceased operations.

The Atari Jaguar CD drive used a custom authoring format that could hold up to 790 MB of data per disc.

Some Jaguar games came with overlays that could be fitted over the controller's number pad.

Sega Saturn (1994)

SPECS		
	Launch price: $399	**RAM:** 2 MB (expandable)
	Processor: Two Hitachi SH-2 CPUs at 28.6 MHz	**VRAM:** 1.5 MB
	Media: 2X CD-ROM drive	**Internal memory:** 32 KB

The Japanese arcade scene was thriving in the fall of 1994 when Sega, known for its arcade hits, launched the Saturn console. In Japan, the Saturn received a positive reception for its exclusive ports of Sega's 3D arcade games such as *Virtua Fighter*, *Daytona USA*, and *Virtua Cop*. The Saturn would also become the system of choice for 2D fighting games, as the console's architecture was more suited to them than the PlayStation's. The Saturn was a hit with Japan's hard-core gaming crowd, which gave Sega its first successful console in Japan. However, this success wouldn't repeat itself overseas, and the Saturn's failure abroad would severely hurt Sega.

The 32-bit Saturn was a complex console that was powered by eight different processors.

The American Saturn controller was bulky and poorly received, and it was eventually replaced by the Japanese version.

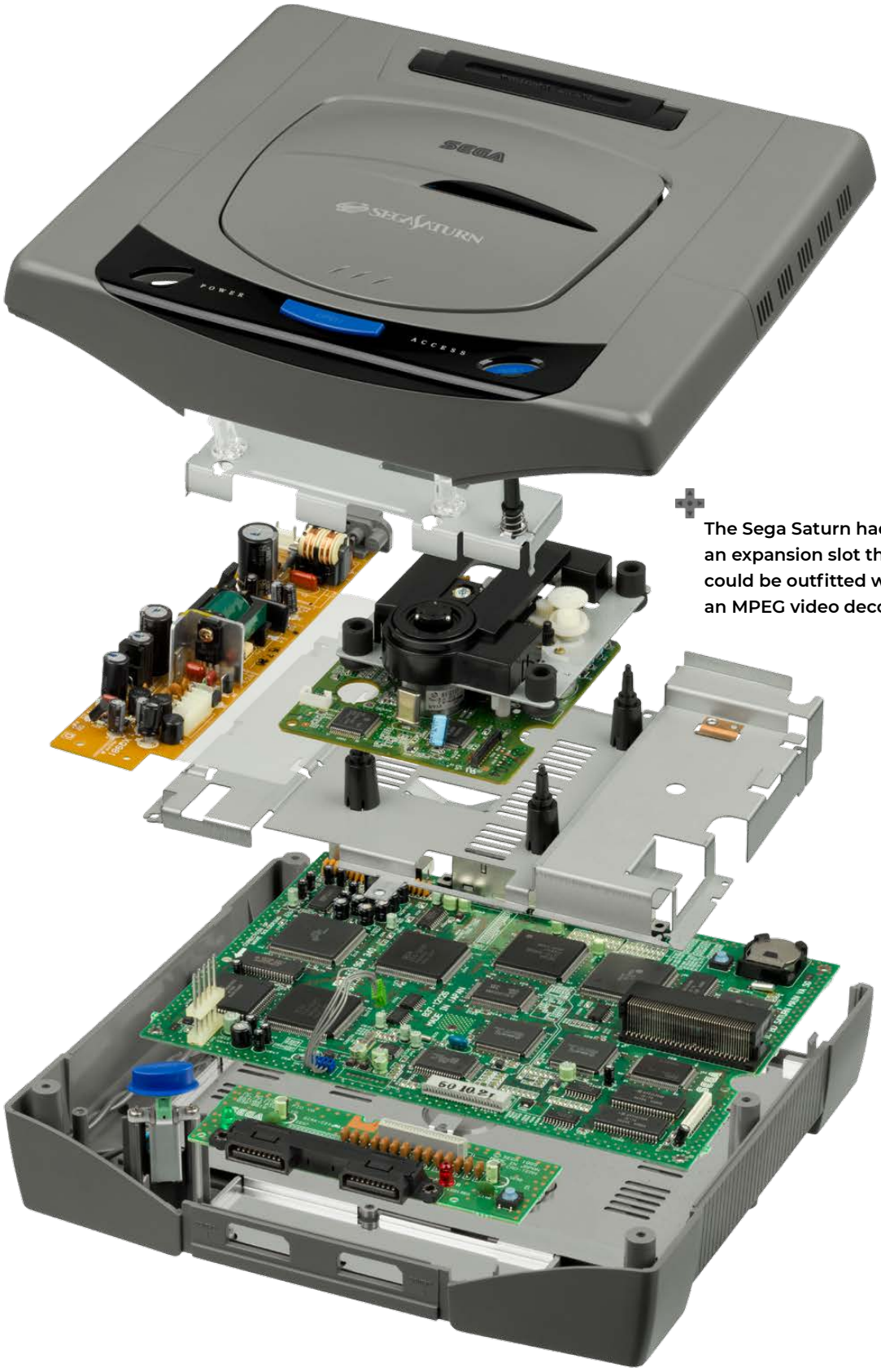
Sega Saturn in the United States

When Sony announced the PlayStation's US launch price as $299, Sega made the snap decision to surprise release its $399 Saturn early to undercut Sony. The now-infamous move resulted in confusion and anger from retailers and developers, who were unprepared for this early release. Early adopters had to wait months for new games and felt cheated by the Saturn's $100 price drop shortly after the PlayStation released. Additionally, third-party support dwindled, as developers abandoned the Saturn and its difficult architecture for the PlayStation. Sales cooled rapidly in the next year, and Sega lost the huge US market share it had gained with the Genesis.

NetLink Modem and Internet Capability

Console modems produced in partnerships with local telecoms had existed as far back as the Intellivision. These devices offered some kind of internet access or service that was usually limited, experimental, or short-lived. The Sega Saturn was one of the first consoles to offer a full internet experience with its optional NetLink adapter. This 28.8 Kbps modem let users browse the web, send emails, and play five supported games against other NetLink owners.

Before the NetLink, Sega's Genesis console had two different modems used for either game downloads (Sega Channel) or head-to-head play (XBAND).



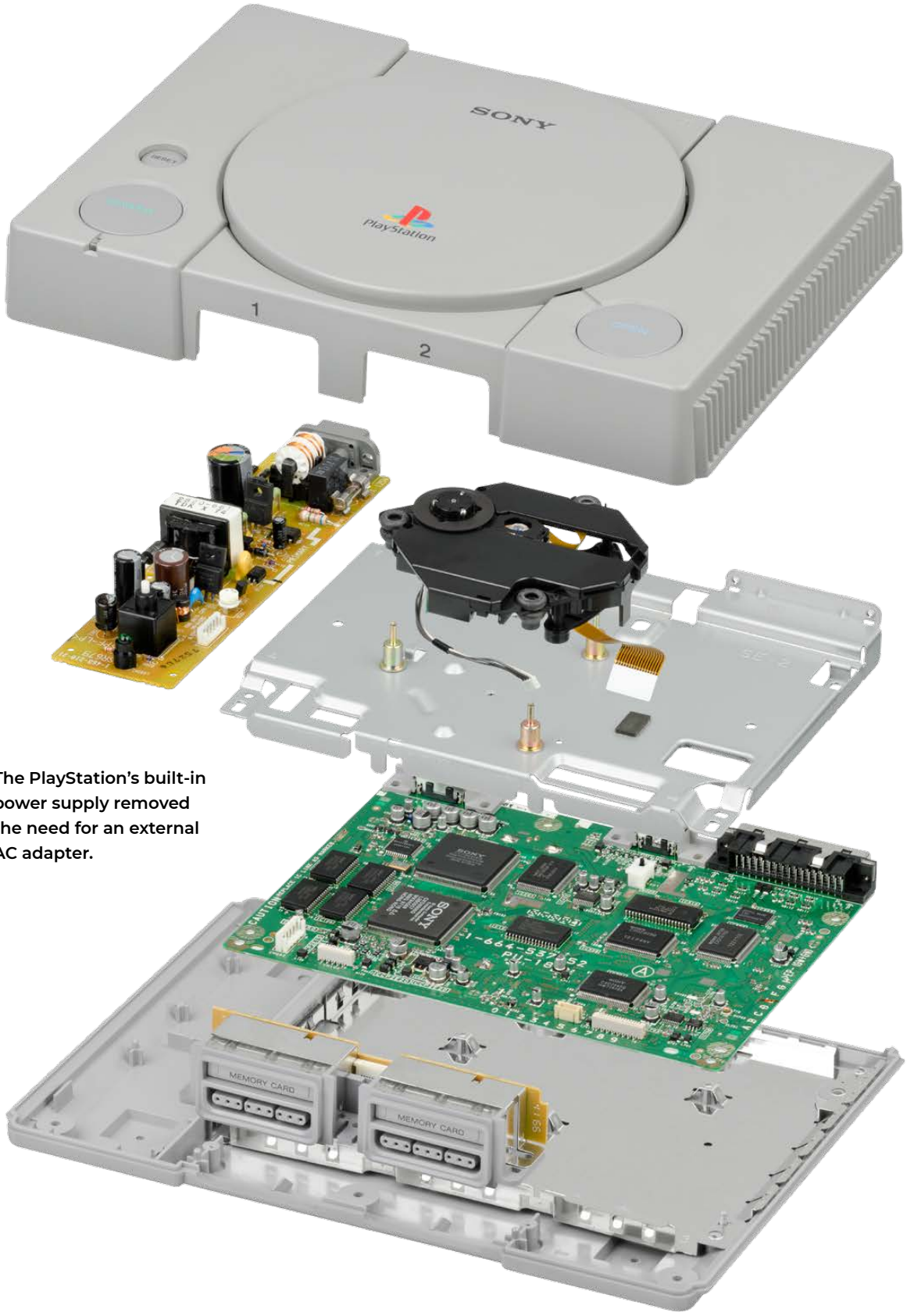
The Sega Saturn had an expansion slot that could be outfitted with an MPEG video decoder.

Sony PlayStation (1994)

SPECS		
	Launch price: $299	**RAM:** 2 MB
	Processor: LSI/MIPS R300A at 33.8 MHz	**VRAM:** 1 MB
	Media: 2X CD-ROM drive	**Systems sold:** 100+ million

The PlayStation was a 32-bit console from Sony, the major Japanese electronics manufacturer. Sony put its vast resources behind the PlayStation and launched its debut system with a huge marketing campaign and a diverse lineup of games. The PlayStation and its impressive 3D graphics quickly established Sony as a major player in the console market. The system also greatly benefitted from the mistakes made by Sega and Nintendo, whose difficult-to-program consoles drove third-party developers right to Sony. The result was a massive game library that helped to make the PlayStation one of the best-selling consoles of all time.

The PlayStation has one of console gaming's largest game libraries, with more than 2,400 titles.

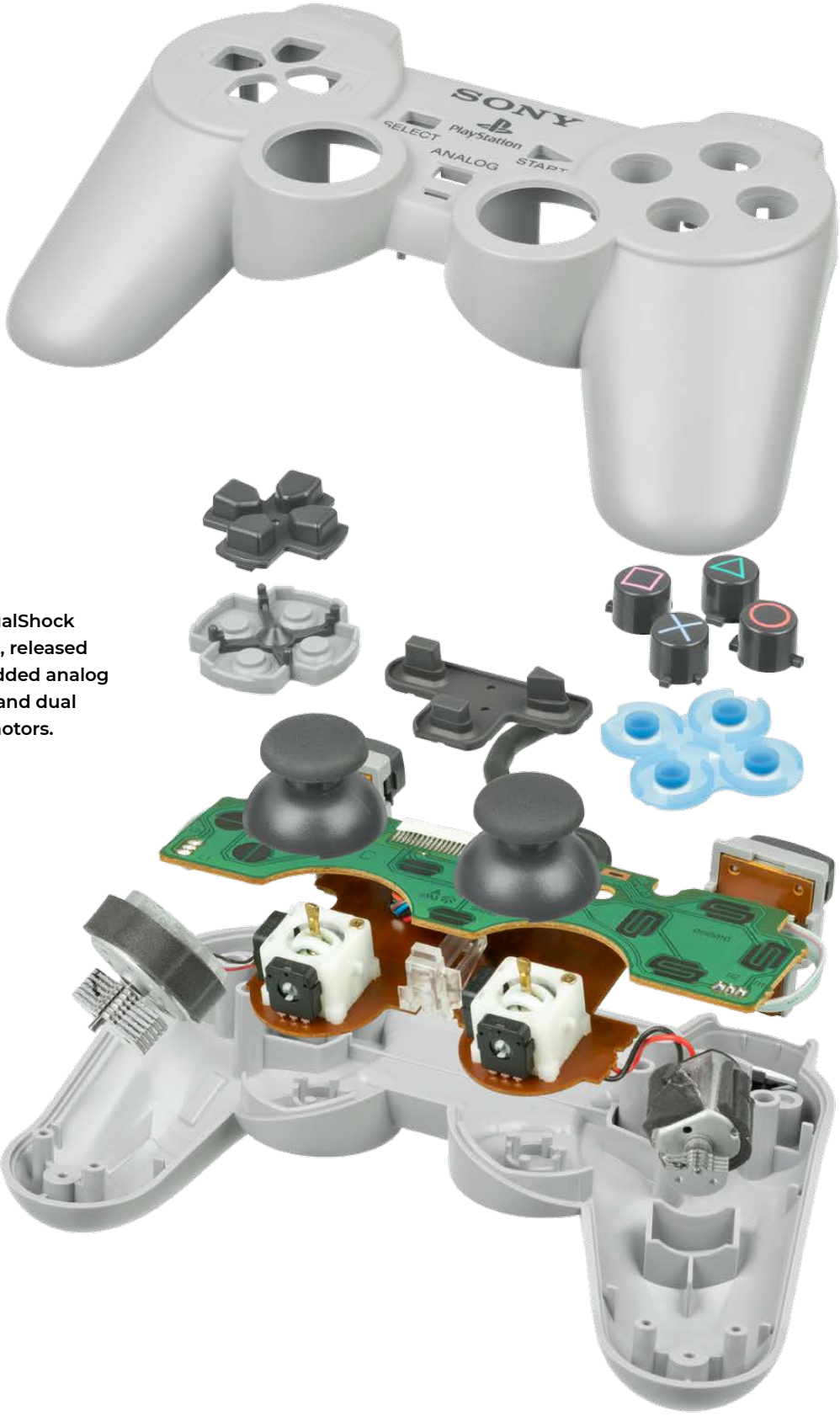


The PlayStation's built-in power supply removed the need for an external AC adapter.

The PocketStation (right) was a Japanese-exclusive memory card that could play games on its tiny LCD screen.

Memory Cards

The CD provided game developers with cheap, high-capacity media but also removed the onboard save function that was common in many cartridge games. While systems like the Saturn, 3DO, and Sega CD relied on internal memory to save game progress, Sony chose an external memory card scheme for its PlayStation console. After the PlayStation's immense success, these simple and swappable memory cards became the standard for later 6th generation consoles.



Sony's DualShock controller, released in 1997, added analog joysticks and dual rumble motors.

PSone

In 2000, Sony updated the PlayStation with a new model called the PSone. Its revamped design was drastically smaller and lighter than the original and could be paired with an optional LCD screen for a semiportable experience. In the United States, it released at just $99 alongside Sony's new PlayStation 2. Even though it competed with next-generation consoles, the inexpensive PSone, with its large back catalog of hit games, was a massive success, selling over 28 million systems worldwide.

Sony's official 5-inch LCD screen add-on cost $129 at launch or sold bundled with the PSone for $199.

The PlayStation's parallel port was mainly used by third-party cheat devices like the GameShark.

PlayStation Console Revisions

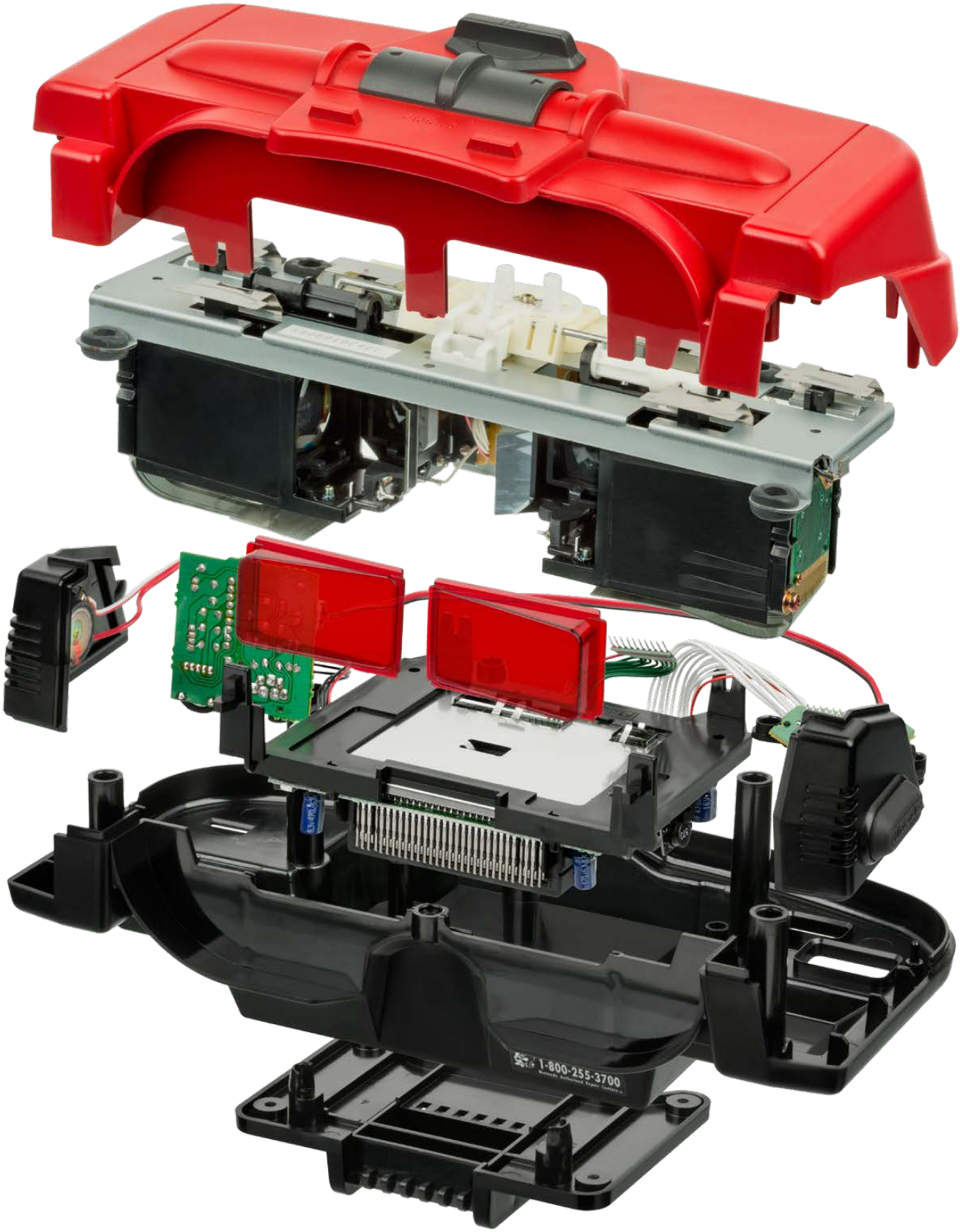
Sony has continuously revised its game consoles and handhelds to make them smaller, cheaper, and more reliable. Some systems also became more streamlined as rarely used features were phased out over time. This can be seen on the original PlayStation, whose A/V jacks, parallel port, and serial port disappeared over its lifetime.

Nintendo Virtual Boy (1995)

SPECS		
	Launch price: $179	**RAM:** 1 MB
	Processor: NEC V810 at 20 MHz	**Resolution:** 384 × 224 LED array
	Power: 6 AA batteries or optional AC adapter	**Games released:** 22

The Virtual Boy was a semiportable console from Nintendo that featured a monochrome, stereoscopic 3D display made from red LEDs. While originally envisioned as a wearable visor with head tracking, various technological compromises and limitations instead reduced the system to an awkward tabletop experience. The Virtual Boy received a tepid reception at launch, with game reviewers criticizing the system's cost, gimmicky nature, and headache-inducing display. After just a few months of slow sales—even after price cuts—Nintendo discontinued the console, making it one of the company's rare flops.

The Virtual Boy used high-speed, oscillating mirrors to project an image into each eye.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Tiger R-Zone (1995)

SPECS		
	Launch price: $29	**Game size:** 2 KB to 4 KB
	Processor: Sharp SM51X series (on cartridge, can vary)	**Color:** Black and white
	Power: 4 AAA batteries (headset and X.P.G.)	**Games released:** < 30

Tiger Electronics was an American toy company well-known in the '80s and '90s for its handheld LCD games. In 1995, Tiger reworked its handheld games into the R-Zone, which put the LCD screen into a swappable cartridge. The launch system was a virtual-reality-inspired headset that projected the cartridge's LCD screen onto a small eye visor. The result was hard to see, awkward to play, and not much fun. Even with a low price and a variety of games based on franchises such as *Batman*, *Star Wars*, and *Mortal Kombat*, the R-Zone sold poorly, and the system was discontinued after two years on the market.

Tiger Electronics was a master of the quick turnaround, churning out cheap LCD games based on popular movies, TV shows, and console video games.

A small light bulb in the R-Zone X.P.G. projected the cartridge's LCD screen onto a red mirror instead of a visor, though the result was still awkward to see and play.

Variant R-Zone Models

The original R-Zone's headset design was gimmicky and difficult to use, which Tiger remedied by releasing a variety of more conventional R-Zone players. The Xtreme Pocket Gamer (X.P.G.) was a handheld system that projected the LCD cartridge onto a red mirror. The SuperScreen was a tabletop player that used a light bulb to project the game's LCD onto a large screen. The rarest R-Zone model was the DataZone, a data organizer for teens that had a slot for inserting R-Zone cartridges.

Nintendo 64 (1996)

SPECS		
	Launch price: $199	**RAM:** 4.5 MB (upgradeable)
	CPU: NEC/MIPS 4300i at 93.75 MHz	**Game ROM size:** 4 MB to 64 MB
	GPU: Custom “Reality Coprocessor” at 62.5 MHz	**Games released:** 380+

The fifth generation’s last home console, the Nintendo 64 (N64) was a cartridge-based 64-bit system with advanced 3D graphics. Its late entry was the result of multiple delays, which gave Sony’s popular PlayStation a massive lead over Nintendo. After the console launched, it struggled to attract third-party developers, which were put off by the console’s expensive cartridges and difficult architecture. Though this former market leader lost its top spot to Sony, massive critical and commercial hits like *Super Mario 64* and *The Legend of Zelda: Ocarina of Time* helped the system sell a respectable 30+ million consoles worldwide.

The Nintendo 64’s costly cartridges were on average around $20 more expensive than the PlayStation’s or Saturn’s CD games.

The Nintendo 64 could be upgraded with an additional 4 MB of RAM via an expansion pack (shown in red).

Nintendo 64 Controllers and Expansion Paks

The Nintendo 64's unusual multiprong controller could be held multiple ways for different play setups, though in reality few games ever used the D-pad. An expansion port underneath the controller supported memory cards, an adapter for Game Boy cartridges, and the Rumble Pak: a motor that vibrated in sync with onscreen action.

The Nintendo 64 controller's analog thumb stick was made from plastic parts that would grind away and become loose over time.

Nintendo 64DD

The 64DD was a magnetic disk drive add-on that promised more storage, a real-time clock, and disks that were rewritable. The system would have its own unique disk games (Zelda 64 was proposed as the flagship title) or could have disks that worked with cartridge games to add extra content. However, despite being announced before the Nintendo 64 was even launched, the 64DD was delayed for three years due to numerous problems, and most of its proposed games had to be canceled or ported to cartridge. After a small, Japan-only release in 1999, Nintendo quietly dropped the add-on, which had fewer than 10 games made for it.

Most 64DDs were bundled with a modem and a subscription to an online web-browsing service called Randnet.

iQue Player

The “Devine Gaming Machine” (commonly referred to as the iQue Player) was an N64 developed for the Chinese market in partnership with the Chinese company iQue. The console’s hardware was all contained within the controller, and games were stored on a removable flash drive. New games could be bought and loaded onto the flash drive through kiosks or an online PC store.

Neo Geo Pocket (1998)

SPECS		
	Launch price: $69	**RAM:** 12 KB
	Processor: TLCS-900H at 6.144 MHz	**Resolution:** 160× 152 pixels
	Coprocessor: Z80 at 3.072 MHz	**Games released:** 9 (original), 80+ (color)

The Neo Geo Pocket was a 16-bit portable console from SNK that was released primarily for the Japanese market. The Pocket was a modest monochrome system that was inspired by the Game Boy and featured simple versions of popular SNK arcade games. After its release, the Pocket faced heavy competition from the new Game Boy Color and WonderSwan handhelds, which prompted SNK to quickly release a new color version of the system in 1999. However, this did little to boost sales, as the Game Boy continued its market domination and the WonderSwan secured important third-party support, putting the Neo Geo Pocket in third place.

While the original Pocket stayed in Japan, the later color version of the handheld was released worldwide in 1999, where it had little success.

The Neo Geo Pocket Color could display up to 146 colors at once, far more than the 8 shades of gray of the original.

Game Boy Color (1998)

SPECS		
	Launch price: $69	**RAM:** 32 KB
	Processor: Sharp LR35902 at 4.19 or 8.39 MHz	**VRAM:** 16 KB
	Resolution: 160 × 144 pixels	**Colors:** 32,768

The Game Boy Color was an enhanced and revamped Game Boy that featured color graphics and updated specs. The new Color system had a nonbacklit color screen, a faster processor, more memory, and a built-in infrared port for game linking. The new system was fully backward compatible with regular Game Boy games and also played its own library of enhanced titles. While not a true generational leap over the previous Game Boy, the system was a phenomenal hit, in part because of the massive success of Nintendo's new *Pokémon* games, which gave the Game Boy platform a second wind almost 10 years after its initial release.

The Game Boy Color was the king of battery life, capable of running for more than 30 hours with just two AA batteries.


GAME BOY COLOR
Nintendo
CGB-CPU-02

WonderSwan (1999)

SPECS		
	Launch price: ¥4,800	**RAM:** 16 KB (original), 64 KB (Color)
	Processor: NEC V20 at 3.072 MHz	**Resolution:** 224 × 144 pixels
	Games released: 100+ (original), 90+ (Color)	**Systems sold:** 3.5 million

The WonderSwan was a 16-bit monochrome handheld console conceived by Gunpei Yokoi, the former Nintendo engineer that had created the Game Boy. Yokoi's new company, Koto Laboratory, produced toys, electronic games, and the WonderSwan. The system was picked up by Bandai and released exclusively in Japan in 1999. The WonderSwan, like the Game Boy, was an extremely battery-efficient system that could run for more than two dozen hours off a single AA battery. It also had a quirky dual-control method that meant the system could be played either vertically or horizontally, which was useful for the WonderSwan's puzzle games.

Gunpei Yokoi died tragically in an auto-related accident in 1997, missing the launch of the system he helped design.

The WonderSwan Color and SwanCrystal were capable of displaying up to 241 different colors at the same time.

Square brought *Final Fantasy* and other RPGs to the WonderSwan Color starting in 2000, which were a huge sales boost for the system.

WonderSwan Color and SwanCrystal

The WonderSwan's biggest challenge was coming out a few months after the release of the Game Boy Color, which made color graphics the new standard on handhelds. Bandai reacted by releasing a new color version of the handheld, the WonderSwan Color, just a year after the original. Overall, the WonderSwan series was a modest success, thanks to a selection of quality, exclusive games from third parties, but the system wasn't able to take on the juggernaut Nintendo. In 2002, Bandai released a final version with an improved color screen, the SwanCrystal, but discontinued the console the next year.

FM Towns Marty (1993)

SPECS		
	Launch price: ¥98,000	**RAM:** 2 MB
	Processor: AMD 386SX at 16 MHz	**VRAM:** 640 KB
	Media: 1X CD-ROM drive, 3.5-inch floppy drive, PCMCIA	**Video out:** Composite, S-Video

The FM Towns Marty was a stripped-down computer and console hybrid released exclusively in Japan by Fujitsu. The Marty was based off the FM Towns, a Japanese computer series introduced in 1989 that had a proprietary operating system and a CD drive built into every unit. The x86 computers were considered multimedia powerhouses but were expensive and only attracted a niche following with their high-quality arcade ports and creative software. When the console version hit the Japanese market in 1993, the Marty's high price and limited functionality led to low sales, and the system was discontinued in just two years.

Fujitsu also released an updated Marty II model in 1994, which was cheaper and came in dark gray.

Amiga CD32 (1993)

Launch price: $399	**RAM:** 2 MB
Processor: Motorola 68EC020 at 14 MHz	**Operating system:** AmigaOS 3.1
Media: 2X CD-ROM drive	**Video out:** RF, Composite, S-Video

SPECS

The Amiga CD32 was another attempt by Commodore to repackage its 32-bit Amiga computer line into a multimedia games machine. After the failure of its CDTV just two years prior, Commodore was quick to turn around another Amiga-based system. The new CD32 was much cheaper than the CDTV and it had better specs and a clearer focus on gaming. However, as IBM PCs began to overtake the computer market in the early '90s, Commodore's standing and influence quickly diminished, which, along with other major issues, forced Commodore to declare bankruptcy and close down just months after the CD32's release.

The CD32's rear expansion bay could be outfitted with an optional MPEG video decoder.

Bandai Playdia (1994)

SPECS		
	Launch price: ¥24,800	**RAM:** 256 KB
	Processor: Toshiba TMP87C800F at 8 MHz	**Video out:** Composite
	Coprocessor: Asahi Kasei AK8000	**Games released:** 33

The Playdia was a CD-based console that was created by the Japanese toy company Bandai. Released exclusively in Japan, the Playdia was a nontraditional system designed for children and families. More like a video player than a games console, the system could only play FMV titles with limited interaction. Most of its games were educational and based on popular Bandai properties such as *Sailor Moon*, *Gundam*, and *Dragon Ball Z*. On release, the Playdia was a flop and was seen as too expensive for its limited and shallow games. The system, which received no third-party support, was discontinued after two years.

Before the Playdia, Bandai produced Pong consoles and LCD handhelds.

NEC PC-FX (1994)

Launch price: ¥49,800	**RAM:** 2 MB
Processor: NEC V810 at 21.5 MHz	**VRAM:** 1.25 MB
Media: 2X CD-ROM drive	**Games released:** 62

SPECS

The PC-FX was NEC's long-awaited 32-bit successor to the PC Engine and was released exclusively in Japan alongside the Saturn and PlayStation. However, unlike those consoles, the PC-FX was incapable of rendering polygonal 3D graphics and instead focused on 2D sprites and full-motion video. It was a fatal mistake for the system and caused the expensive PC-FX to look underpowered and less exciting than its rivals. Former PC Engine fans flocked to new systems, and after the console placed a distant fourth to the Saturn, PlayStation, and N64, NEC dropped out of the console market entirely.

Anime games with lots of FMV cutscenes made up most of the PC-FX's small library.

Super A'can (1995)

SPECS		
	Launch price: NT$2,900	**RAM:** 64 KB
	Processor: Motorola 68000 at 10.7 MHz	**VRAM:** 128 KB
	Coprocessors: Custom UM6618 and UM6619	**Games released:** 12

The Super A'can was a cartridge-based, 16-bit console that was released exclusively in Taiwan. The system was designed by a subsidiary of the Taiwanese semiconductor manufacturer UMC, a company known for producing chips for console clones and bootleg games. UMC designed the custom sound and graphics chips for the console, which were paired with a standard 68000 CPU. The result was an average and outdated 16-bit console that was released alongside new, cutting-edge 32-bit systems and the mature 16-bit Super Famicom and Mega Drive. At launch, the Super A'can was a massive flop, and the system was discontinued just months after its debut.

Plans for a 32X-style enhancement and a CD drive were announced at launch but were never released.

Casio Loopy (1995)

Launch price: ¥25,000	**RAM:** 512 KB
Processor: Hitachi SH7021 at 20 MHz	**Video out:** Composite
Coprocessors: NEC CDT109 & Casio RH-7500	**Games released:** 10

SPECS

Twelve years after producing the PV-1000, Casio returned to the home game console market with the Loopy, the first system developed for and marketed at girls. The Japan-exclusive, cartridge-based console played simple games with 2D graphics, but its standout feature was a built-in printer. The thermal printer could make color stickers using specially treated paper cartridges, and the Loopy's small library of dress-up and romance games all revolved around printing stickers. Users could also make their own custom stickers with an optional accessory that imported video from a TV, VCR, or camcorder.

Around the time of the Loopy's release in Japan, new photo booths that printed on stickers were becoming popular.

Apple Pippin (1996)

SPECS		
	Launch price: $599	**RAM:** 6 MB (expandable)
	Processor: Motorola PowerPC 603 at 66 MHz	**Operating system:** Mac OS 7.5.2
	Media: 4X CD-ROM drive	**Onboard storage:** 128 KB

The Pippin was a hybrid computer and game console platform created by Apple Computer and built and distributed by Bandai. Apple designed the platform to expand its Mac operating system to the multimedia box and video game markets, but it left almost all aspects of its rollout to Bandai, which built the system, produced games, and handled its advertising. At launch, the system was an immediate disaster due to the Pippin's high price, small game library, limited computer functionality, and sparse retail availability. With abysmal sales in the United States and Japan, Bandai incurred heavy losses that almost crippled the company.

The Pippin's lack of a hard drive meant its operating system had to be stored on every CD and loaded at the console's startup.

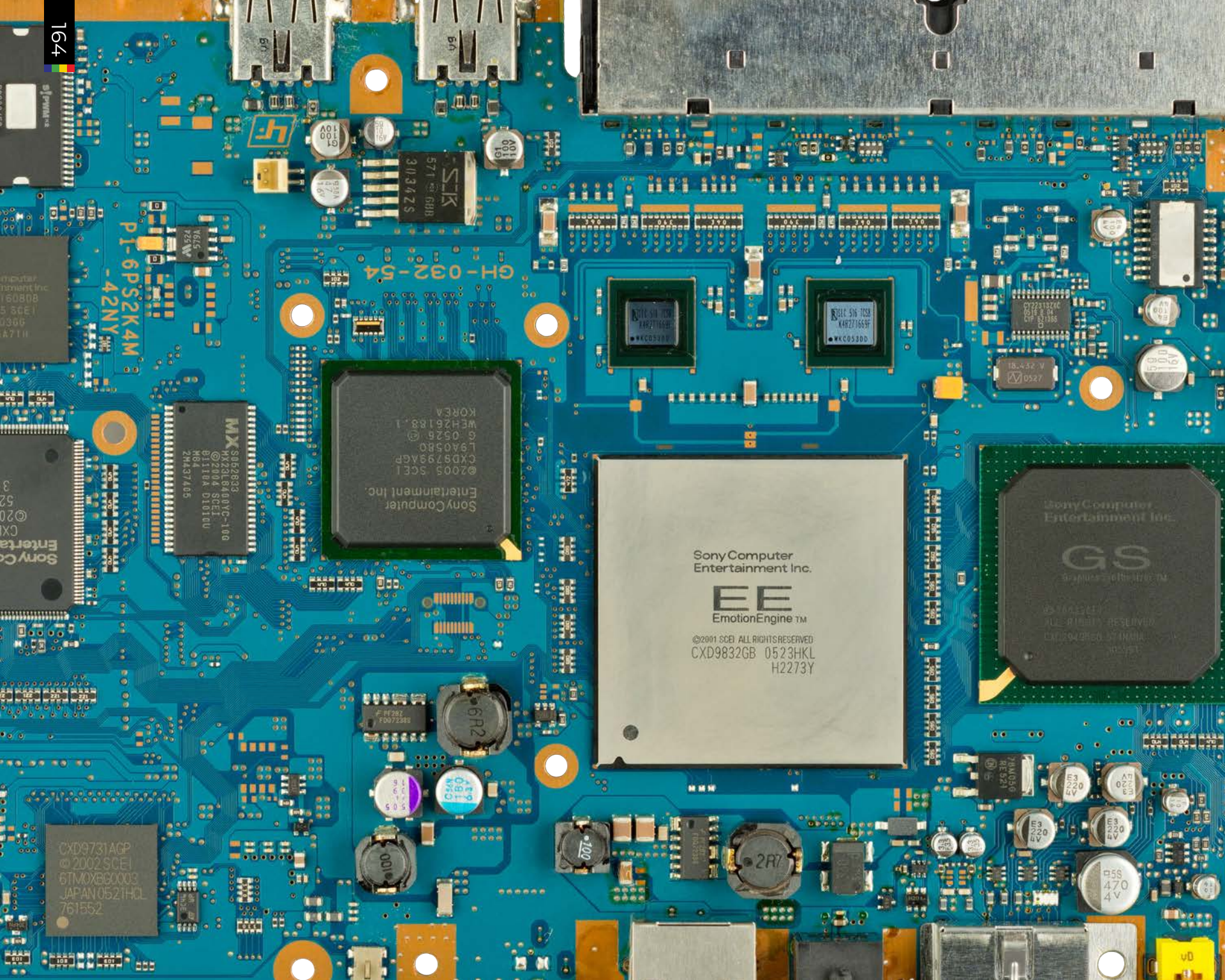
Tiger Game.com (1997)

Launch price: $69.99	**Optional add-on:** 14.4 Kbps modem
Processor: Sharp SM8521	**Resolution:** 200 × 160 pixels
Power: 4 AA batteries	**Games released:** 20

SPECS

Tiger Electronics followed up its failed R-Zone line with the Game.com: a low-priced handheld with black-and-white graphics powered by an 8-bit processor. The Game.com featured a touchscreen and stylus, and it had PDA functionality like a built-in calendar, phone book, and calculator. The system had a small library of games, and though that list included impressive-sounding titles like *Resident Evil 2*, most were low-effort ports with bad gameplay and choppy framerates. Tiger released a smaller and streamlined version of the Game.com a year after the original, but with low sales, the handheld was eventually discontinued in 1999.

The Game.com could access the internet with an optional modem but was limited to email and text-based browsing.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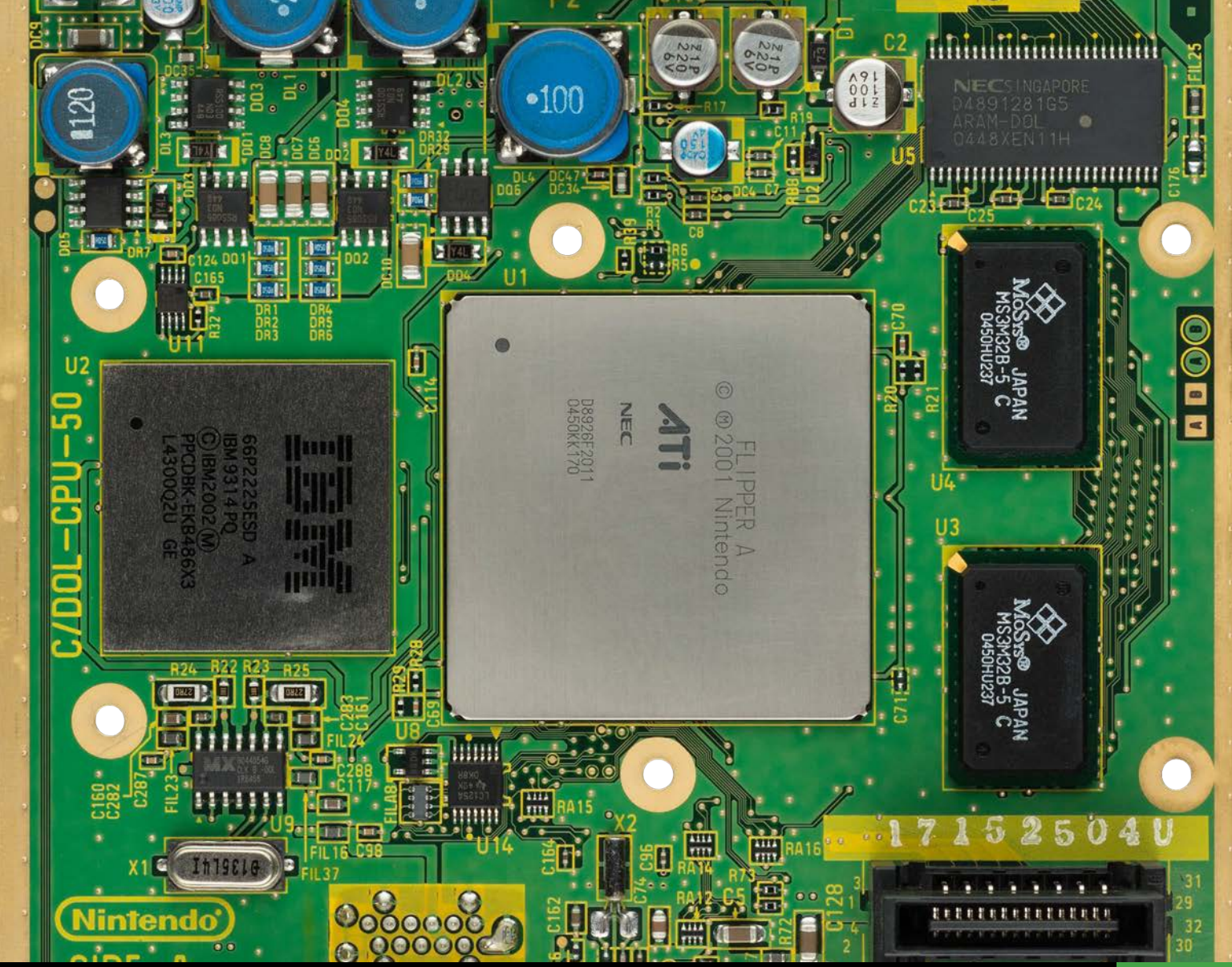


6th Generation

The sixth generation of game consoles was dominated by Sony, whose PlayStation 2 surpassed the immense success of the original PlayStation and vastly outsold its competitors to become the best-selling system of all time. Fighting for second place were Sega, Nintendo, and Microsoft, a newcomer that endured heavy financial losses to establish its Xbox console. Sega also suffered heavy financial losses after a series of failures that culminated with the Dreamcast, and the company was forced to abandon the console market to become a third-party game developer. As for Nintendo, its GameCube struggled to stand out against Sony's PlayStation 2 and Microsoft's Xbox, which led the company to abandon direct competition and instead turn to new ideas and audiences as it moved into the next generation.

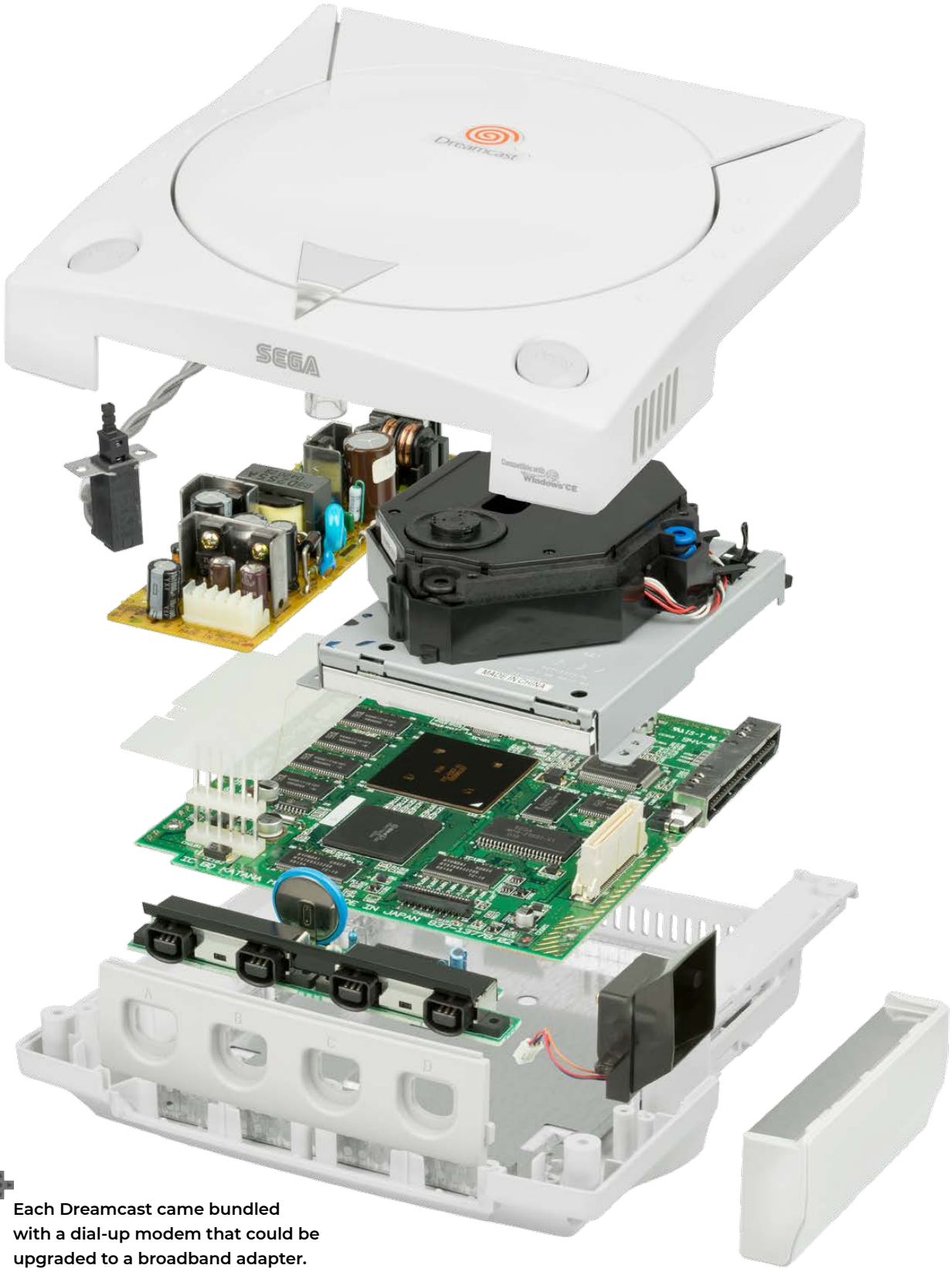
(opposite) PlayStation 2 Slim motherboard, (above) GameCube motherboard

Sega Dreamcast (1998)

SPECS		
	Launch price: $199	**RAM:** 16 MB
	CPU: Hitachi SH-4 RISC at 200 MHz	**VRAM:** 8 MB
	GPU: NEC PowerVR2 at 100 MHz	**Systems sold:** 9+ million

After the failure of its Saturn console, Sega lost much of its fanbase to the PlayStation. With the company hemorrhaging money, Sega could ill afford another failure. Its next console, the Dreamcast, would be a last-ditch effort to regain lost market share and return to profitability. At launch, the system and its games were well received, but the Dreamcast was not the massive hit Sega needed to keep itself afloat. After disappointing sales in the 2000 holiday season, Sega announced it was leaving the hardware business to become a software developer and publisher for other systems.

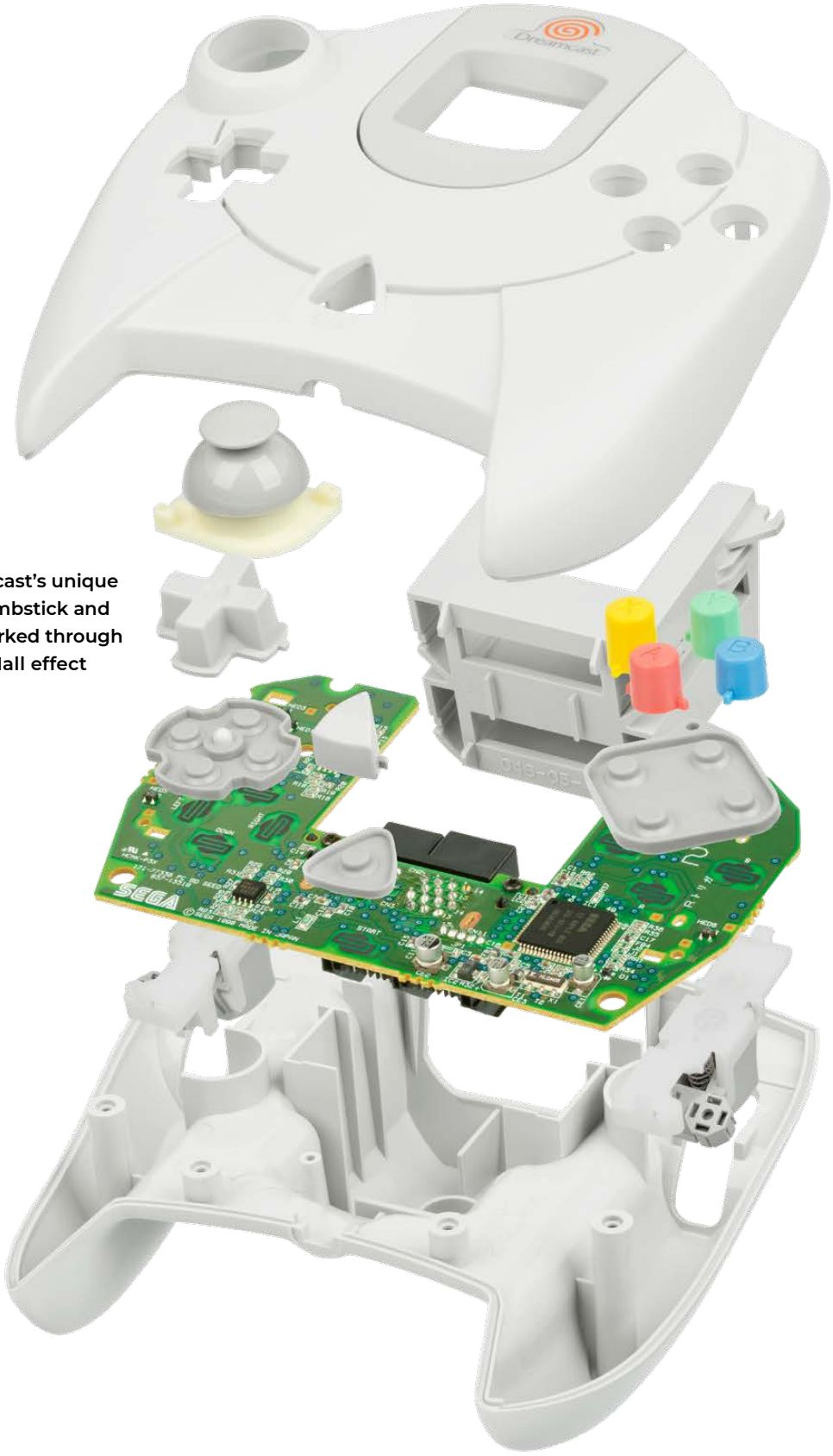
The Dreamcast's proprietary optical format, GD-ROM, could hold 1.2 GB of data per disc.



Each Dreamcast came bundled with a dial-up modem that could be upgraded to a broadband adapter.

Visual Memory Units

The Dreamcast's bulky controller housed two expansion slots that could be used for memory cards, a rumble pack, or a microphone. The memory card, called the Visual Memory Unit (VMU), was far more advanced than the N64's and incorporated a screen and controls for use independent of the console. On their own, users could manage and transfer saves or play mini-games downloaded from select titles like *Sonic Adventure*. When slotted into the controller, the screen could display information such as character health.



The Dreamcast's unique analog thumbstick and triggers worked through magnetic Hall effect sensors.

Sony PlayStation 2 (2000)

SPECS		
	Launch price: $299	**RAM:** 32 MB
	CPU: Custom “Emotion Engine” at 295 MHz	**Games released:** 2,400+
	GPU: Custom “Graphics Synthesizer” at 147 MHz	**Systems sold:** 155+ million

As the best-selling video game console of all time, the PlayStation 2 dominated the gaming market, selling more than 155 million systems worldwide. The success of the original PlayStation helped build hype for the PS2, and the console sold out quickly to massive crowds at launch. With strong third-party support and an extensive library of critically acclaimed games, the PS2 pushed the Sega Dreamcast out of the market and shrugged off competition from Nintendo’s GameCube and Microsoft’s Xbox. The console would remain popular throughout the decade, with slimmer, redesigned models selling well even years after the release of the PlayStation 3.

The PS2 was backward compatible with the original PlayStation’s games, controllers, and memory cards.

The PS2 remote control was an optional $20 accessory that made watching movies much easier.

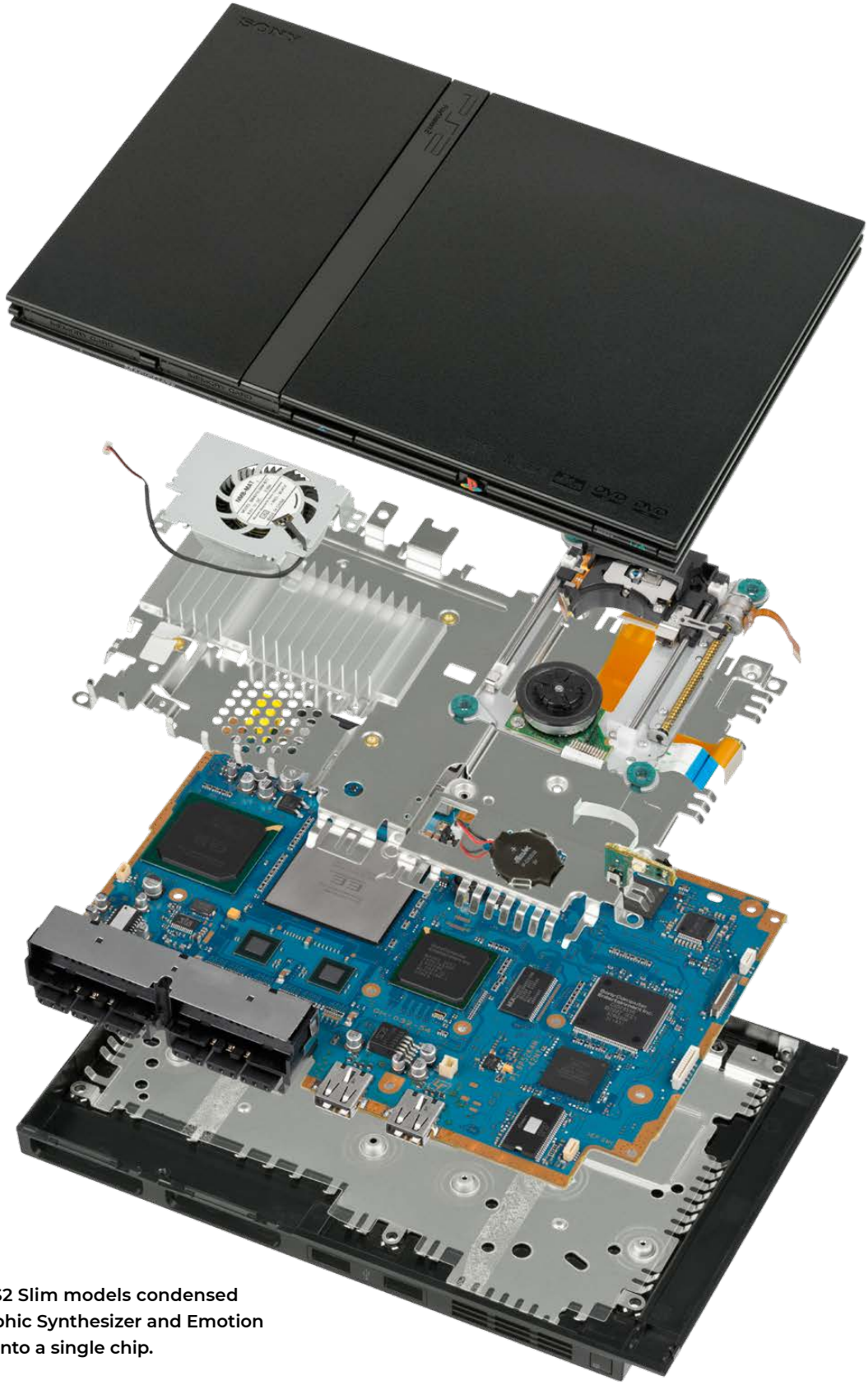
DVD Movie Playback

At the time of the PlayStation 2's release, DVD players were still relatively new and expensive. Sony's ability to offer a gaming console that could also play DVD movies (at a cost not much higher than that of stand-alone DVD players) was a big selling point for the system. For many gamers, the PS2 was their first and primary DVD player.

The PS2 Slim series had built-in infrared sensors for DVD remotes and a broadband adapter for online gaming.

PlayStation 2 Slim Series

Continuing the tradition that began with the original PlayStation, Sony updated its PlayStation 2 console in 2004 with a much smaller and more power-efficient design. Dubbed the "Slim," this new PlayStation 2 (above right) offered a dramatic reduction in size and weight, partly achieved through externalizing the power supply. Another redesign, released in 2007 (above left), shrunk the internal components enough to incorporate the power supply into the console and eliminate the external power supply entirely.



Later PS2 Slim models condensed the Graphic Synthesizer and Emotion Engine into a single chip.

Game Boy Advance (2001)

SPECS		
	Launch price: $99	**Colors:** 32,768
	Processor: ARM7TDMI at 16.8 MHz	**Resolution:** 240 × 160 pixels
	Power: 2 AA batteries (original model)	**Systems sold:** 80+ million

It took 12 years for Nintendo to create a true successor to its massively popular Game Boy handheld console. Released in 2001, the Game Boy Advance (GBA) improved on the original Game Boy with a 32-bit processor, new shoulder buttons, and a larger color screen. With an impressive game library that had strong third-party support and first-party best sellers like *Pokémon* and *Mario Kart*, the Advance became another hit for Nintendo, selling more than 80 million units in just six years. One major flaw of the handheld, however, was its nonbacklit screen, which was difficult to see without direct light and would be fixed in later redesigns.

The Game Boy Advance was backward compatible with original Game Boy games, doubling its total game library.

Game Boy Advance SP and Micro

Two years after the launch of the Game Boy Advance, Nintendo updated the handheld with a clamshell design and released it as the Game Boy Advance SP. Almost half the size of the original, the SP had a built-in, rechargeable battery and frontlit LCD screen. In 2005, Nintendo released the Game Boy Micro, a short-lived variant that was drastically smaller than the original and featured interchangeable faceplates.

An updated version of the SP was released in 2005 that replaced the frontlit screen with a more vibrant and brighter backlit one.

Game Boy Advance e-Reader

With the e-Reader accessory, GBA users could unlock games and features through collectible cards. Players could load early NES-era games such as *Balloon Fight*, *Tennis*, and *Urban Champion* by buying card packs and scanning specialized barcodes printed on the card's edge.

The e-Reader came bundled with sample cards that included a full version of the Game & Watch game *Manhole*.

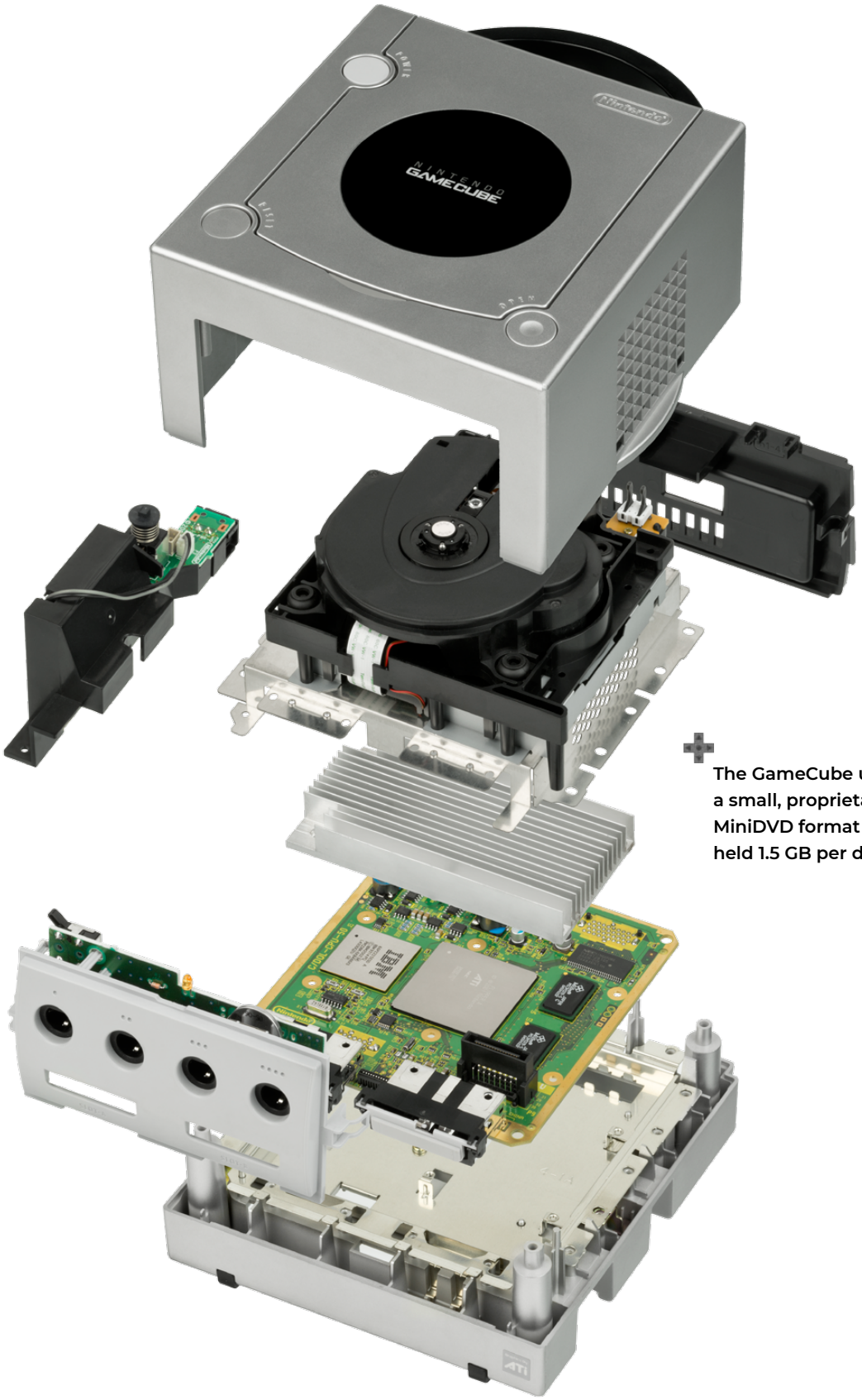

GAME BOY ADVANCE
CPU AGB
AGB-CPU-02

Nintendo GameCube (2001)

SPECS		
	Launch price: $199	**RAM:** 24 MB
	CPU: Custom PowerPC “Gekko” at 485 MHz	**Games released:** 650+
	GPU: Custom ATI “Flipper” at 162 MHz	**Systems sold:** 21+ million

Nintendo’s small but capable GameCube entered a fiercely competitive market in 2001, facing off against the established PS2 and the well-funded upstart Xbox. The GameCube emphasized fun, had quality graphics, and was backed by popular Nintendo franchises, but it suffered from a kid-friendly image that kept some older gamers away. However, Nintendo fans appreciated its strong library of first-party titles and a handful of third-party standouts such as *Resident Evil 4*. Despite its loyal fanbase, the system only sold a little more than 21 million units in its lifetime, far less than previous Nintendo consoles.

The GameCube’s best-selling title is *Super Smash Bros. Melee*, which sold more than 7 milliion copies worldwide.



The GameCube used a small, proprietary MiniDVD format that held 1.5 GB per disc.

Panasonic Q

A major criticism of the GameCube was its inability to play DVD movies, a feature offered by its main rivals, the PlayStation 2 and Xbox. Nintendo nixed movie playback to avoid paying DVD-licensing fees, and DVDs couldn't even fit into the system due to the small-disc format chosen to combat piracy. However, a GameCube that could play DVD movies did exist, but it was only released in Japan. Produced by Panasonic and featuring a steel chassis with direct audio/video outputs, the simply named Q was not a big seller and was discontinued in 2003.

At the time of the Panasonic Q's release, an American gamer could expect to pay $400 to $500 for an imported, region-modded system.


NINTENDO
GAMECUBE
MITSUMI
UP
LEFT
RIGHT
DOWN

Microsoft Xbox (2001)

SPECS		
	Launch price: $299	**RAM:** 64 MB
	CPU: Custom Intel Pentium III at 733 MHz	**Games released:** 1,000+
	GPU: Custom Nvidia XGPU at 233 MHz	**Systems sold:** 24+ million

The massive success of Sony's PlayStation had caught the attention of software giant Microsoft, which began development of its own console in the late '90s. The result was the Xbox, a powerhouse system that had more features and better graphics than both the PlayStation 2 and Nintendo GameCube. Microsoft took on heavy losses to get a foothold into the market, paying for exclusive titles and pushing a massive advertising campaigns while also selling the system at a loss. Microsoft's aggressive strategy worked, and while not as popular as the PS2, the Xbox beat out the veteran Nintendo for a second-place finish, largely due to its performance in the United States.

The Xbox had a built-in broadband adapter for local network and online gaming.

With its PC-based processor and built-in hard drive, the Xbox's hardware strongly resembled a home computer.

After its poor reception, the original Xbox controller was replaced by a smaller variant in 2002.

The Xbox controller featured two expansion slots that could hold memory cards or a chat headset adapter.

Nokia N-Gage (2003)

SPECS		
	Launch price: $299	**Resolution:** 176 × 208 pixels
	Processor: ARM9 at 104 MHz	**Colors:** 4,096
	Media: MMC memory card	**Games released:** 50+

The N-Gage was a hybrid cell phone and handheld gaming console created by the mobile giant Nokia. At launch, the system was largely panned by reviewers, who criticized the N-Gage's awkward design, short battery life, and vertically oriented screen, which was ill-suited for most games. Sales of the N-Gage were far below Nokia's expectations, as most gamers ignored the system in favor of dedicated handheld consoles such as the Game Boy Advance. Price drops and a 2004 remodel that fixed some of the system's design issues did little to help increase sales, leaving Nokia to discontinue the N-Gage in 2006.

In 2008, the N-Gage was revived as a digital-download gaming platform for select Nokia phones, but the service was discontinued by 2009.


NOKIA
N-GAGE
EN

Nuon (2000)

SPECS		
	Launch price: $350	**Notable feature:** Built-in audio visualizer
	Processor: Custom quad-core “Aries” chip	**Preproduction code name:** Project X
	Manufacturers: Toshiba, Samsung, and RCA	**Total games:** 8

The Nuon was a short-lived, hybrid DVD player and video game platform released by VM Labs in 2000. The Nuon was based on a custom chip built by VM Labs that replaced the standard video decoder found in most DVD players and greatly improved the players’ capabilities. Installing a Nuon chip turned a DVD player into a video game console, with 3D graphics on par with the Nintendo 64. However, most electronics manufacturers weren’t interested due to the increased costs, and only a few Nuon models were produced. After the release of a handful of poorly received games, VM Labs filed for bankruptcy in late 2001.

There are only four DVDs that use the Nuon’s enhanced abilites: *Bedazzled*, *Dr. Dolittle 2*, *Planet of the Apes (2001)*, and *The Adventures of Buckaroo Banzai Across the 8th Dimension.*

Zodiac (2003)

SPECS

Launch price: $299 (32 MB), $399 (128 MB)	**Connectivity:** Infrared and Bluetooth
CPU: Motorola ARM9 at 200 MHz	**Resolution:** 480 × 320 pixels
GPU: ATI Imageon W4200	**Expansion:** Dual SD card slots

The Zodiac was a high-end, adult-oriented handheld console that was released by Tapwave in late 2003. Based on Palm OS, the operating system that ran personal digital assistants (PDAs), the Zodiac was a hybrid device that combined a gaming handheld with PDA functionality. Press and reviews were positive at launch, with critics praising the system's large color screen and multimedia capabilities. However, the Zodiac suffered from low retail presence and consumer awareness. When Sony unveiled its PlayStation Portable in 2004, what little interest there was in the Zodiac disappeared, and Tapwave discontinued the handheld just two years after its release.

The Zodiac had a small library of exclusive titles and could also play Palm OS 5 applications and games.

VTech V.Smile (2004)

SPECS		
	Launch price: $59	**Accessories:** Microphone, touch tablet, keyboard
	Processor: Suntech SPG2XX	**A/V out:** Hard-wired composite video and stereo
	Power supply: 3 C batteries	**Pack-in game:** *Alphabet Park*

More than a decade after its 1988 Socrates edutainment system, VTech released the V.Smile children's game console in 2004. Rounded and colorful, the V.Smile system appealed to parents looking to give their young kids a cheaper and safer console than the more grown-up PlayStation 2 or Xbox. It featured inexpensive, simple games with cartoony 2D graphics, basic gameplay, and educational elements such as counting and spelling. The series was popular enough that the V.Smile line was expanded with variant consoles, including the portable V.Smile Pocket series in 2005 and the motion-controller-based V-Motion in 2008.

The top of the V.Smile contains a storage compartment for holding extra game cartridges.

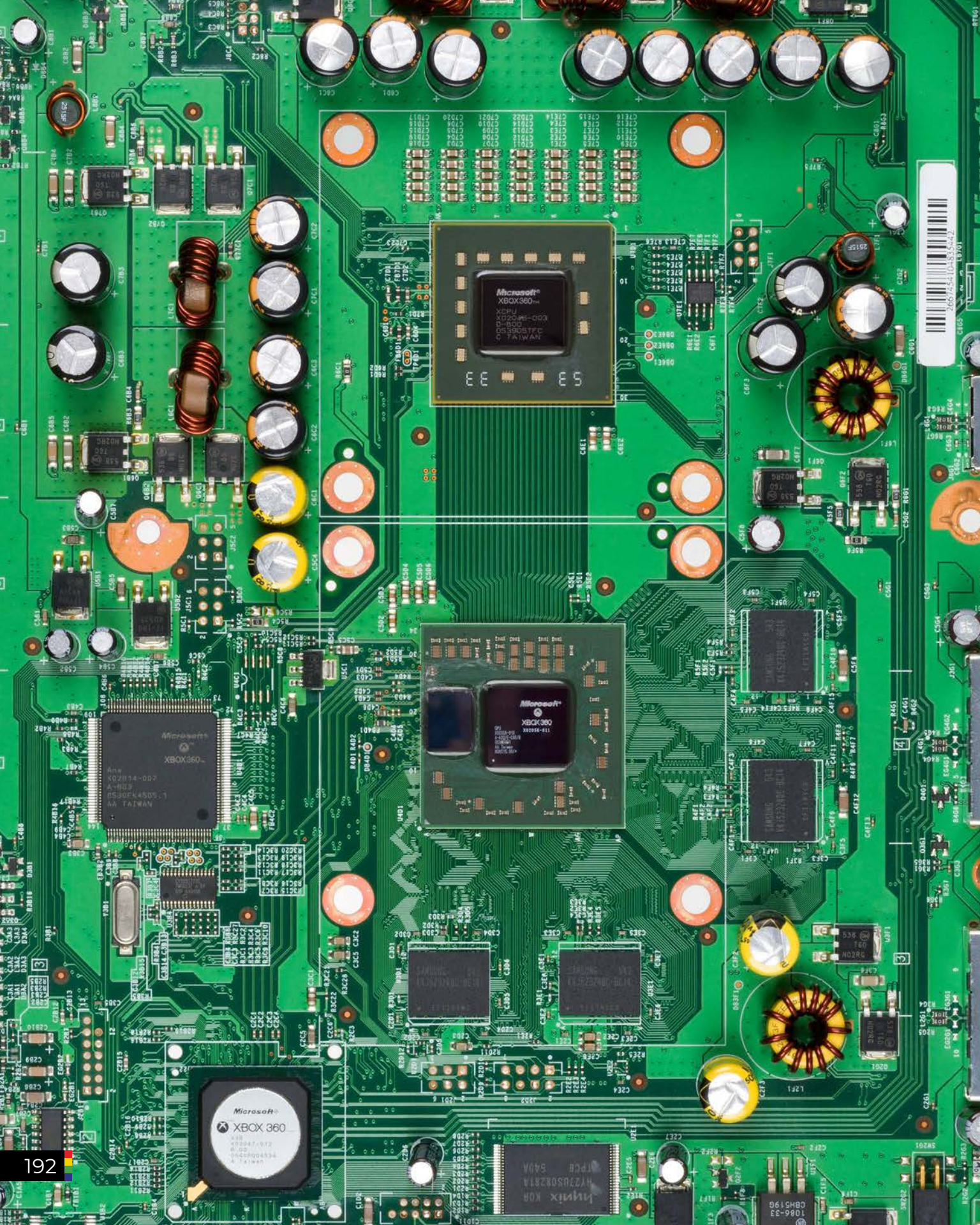
XaviXPORT (2004)

Launch price: $79	**Video out:** Composite
Processor: Custom SuperXaviX (on cartridge)	**Notable feature:** A/V passthrough
Celebrity endorsement: Jackie Chan	**Games released:** 10+

SPECS

The XaviXPORT was a console based on motion-controlled sports games that released two years before Nintendo's *Wii Sports* would popularize the idea. The console used infrared motion tracking and plastic wireless controllers shaped like real sports equipment to create physically interactive, living room versions of tennis, bowling, boxing, fishing, and baseball. Though it followed the same general idea as *Wii Sports*, the XaviXPORT only had 2D graphics and its inaccurate controls made gameplay frustrating. Due to low retail presence and poor marketing from its Japanese creator SSD Company Limited, the system went by largely unnoticed.

Similar to *Wii Fit*, the XaviXPORT had an optional weight scale that tracked a user's weight loss and offered exercise routines.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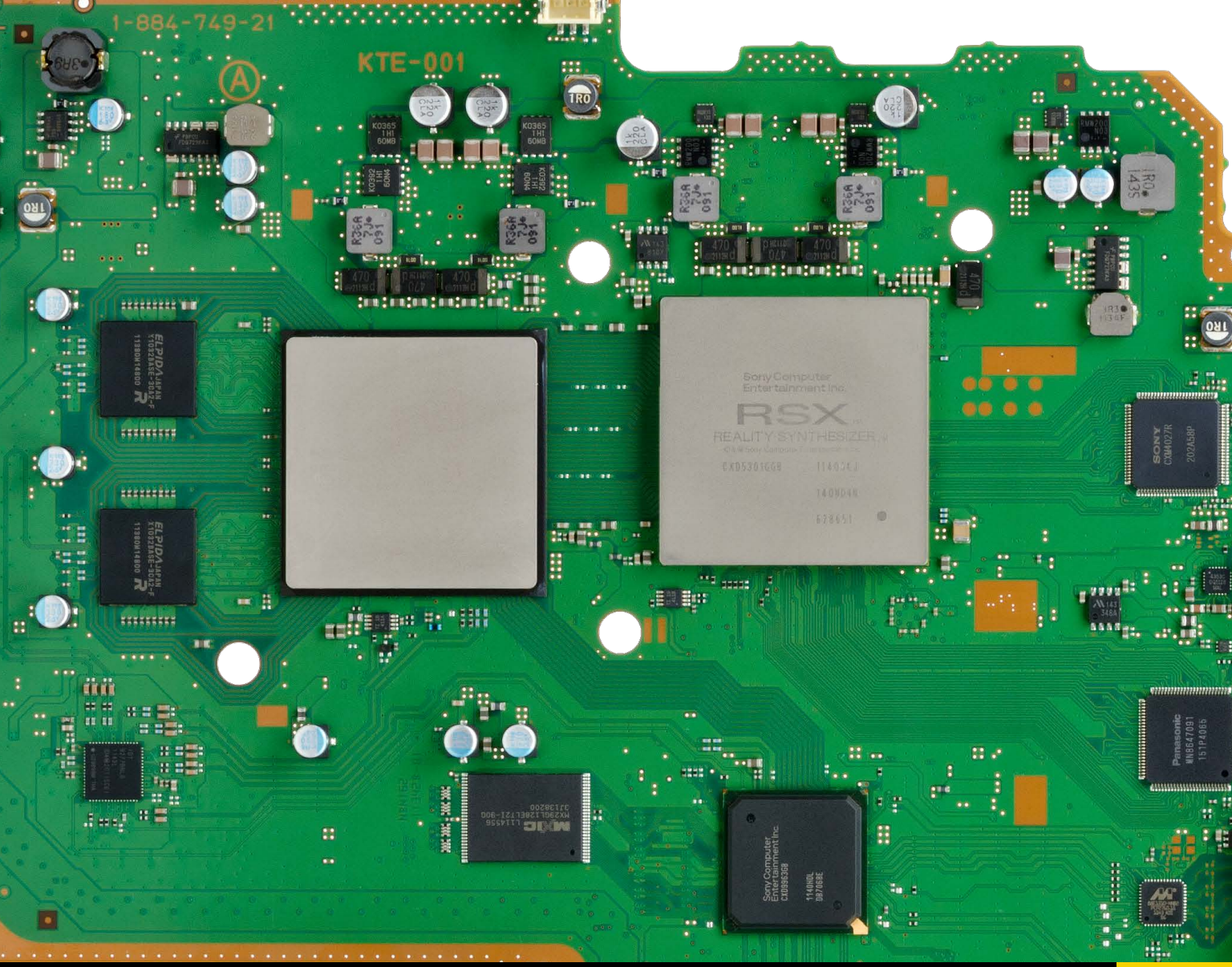

7th Generation

The seventh generation of consoles was dominated by just three major players—Microsoft, Sony, and Nintendo—as gaming moved into the high definition and online era. Cutting-edge, multicore processors in Sony and Microsoft's consoles offered impressive graphics on new HD televisions, while Nintendo found incredible success with an unorthodox, motion-controlled console and a dual-screened handheld.

The world became more connected with the widespread adoption of high-speed internet, which brought online gaming, digital distribution, and media streaming to the forefront. Finally, the gaming market opened up with the introduction of smart phones and tablets, which produced a new platform for quick, simple games that appealed to people of all ages.

(opposite) Xbox 360 motherboard, (above) PlayStation 3 Slim motherboard

Sony PlayStation Portable (2004)

SPECS		
	Launch price: $249	**RAM:** 32 MB (64 MB in later models)
	Processors: Custom “Allegrex” and “Media Engine”	**Resolution:** 480 × 272 pixels
	CPU: MIPS R4000 at 222 MHz (up to 333 MHz)	**Systems sold:** 80+ million

The PlayStation Portable (PSP), Sony’s first handheld console, was a high-end device that offered advanced 3D graphics, web browsing, and multimedia playback. Featuring powerful custom processors and a miniature optical drive whose discs could hold up to 1.8 GB of data, the PSP was a massive leap in capability over previous handheld systems. The PSP was a hit with older gamers, who appreciated portable versions of popular console games such as *Grand Theft Auto*, *God of War*, and *Monster Hunter*. The PlayStation Portable sold more than 80 million systems worldwide, becoming the best-selling non-Nintendo handheld ever released.

PSP games and media could also be stored on internal memory cards, with digital content available through a dedicated online store.

PSP Go

The PSP Go was a 2009 variant model that removed the optical drive in favor of 16 GB of internal flash memory. Only able to play games bought digitally, the system was seen as limited and too expensive at $250. After poor sales, Sony discontinued the PSP Go in 2011.

Nintendo DS (2004)

SPECS		
	Launch price: $149	**Connectivity:** Built-in 802.11b Wi-Fi
	Processors: Dual ARM7 and ARM9	**Resolution:** Two 256 × 192 pixel screens
	RAM: 4 MB (16 MB on DSi and DSi XL)	**Systems sold:** 154+ million

Nintendo's Game Boy Advance was just two years old when Sony unveiled its upcoming PlayStation Portable, and the announcement put pressure on Nintendo to compete with its own advanced, 3D handheld. Nintendo responded with the DS: a dual-screened system that, while not as powerful as the PSP, was cheaper and had an intriguing design that featured a stylus-based touchscreen. The system drew in a large audience of casual gamers, who responded to its unique titles such as *Brain Age* and *Nintendogs*. The DS was an unexpected smash hit and would become Nintendo's best-selling system of all time.

The DS and DS Lite both had a second cartridge slot that provided backward compatibility with Game Boy Advance games.


X
Y
A
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START
SELECT

DS Lite and DSi Models

In 2006, Nintendo replaced the original DS with the slimmer, lighter, and brighter DS Lite (previous page). The DS series was updated again in 2008 with the release of the DSi (opposite), which added a faster processor, more RAM, 256 MB of internal memory, an SD card slot, two cameras, and its own online game store. The final DS model was the 2009 DSi XL (top, in green), a super-sized model with larger screens.


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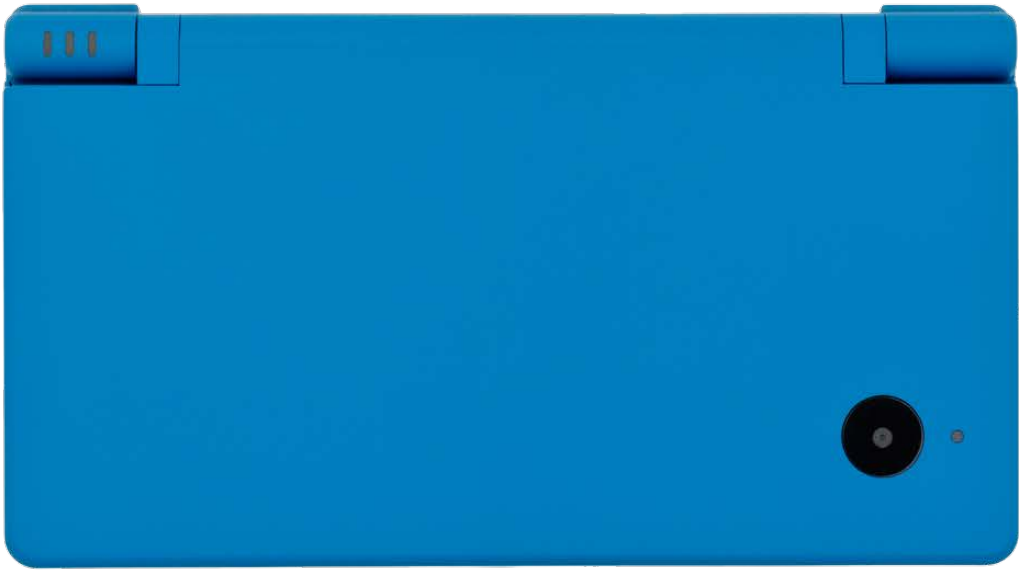
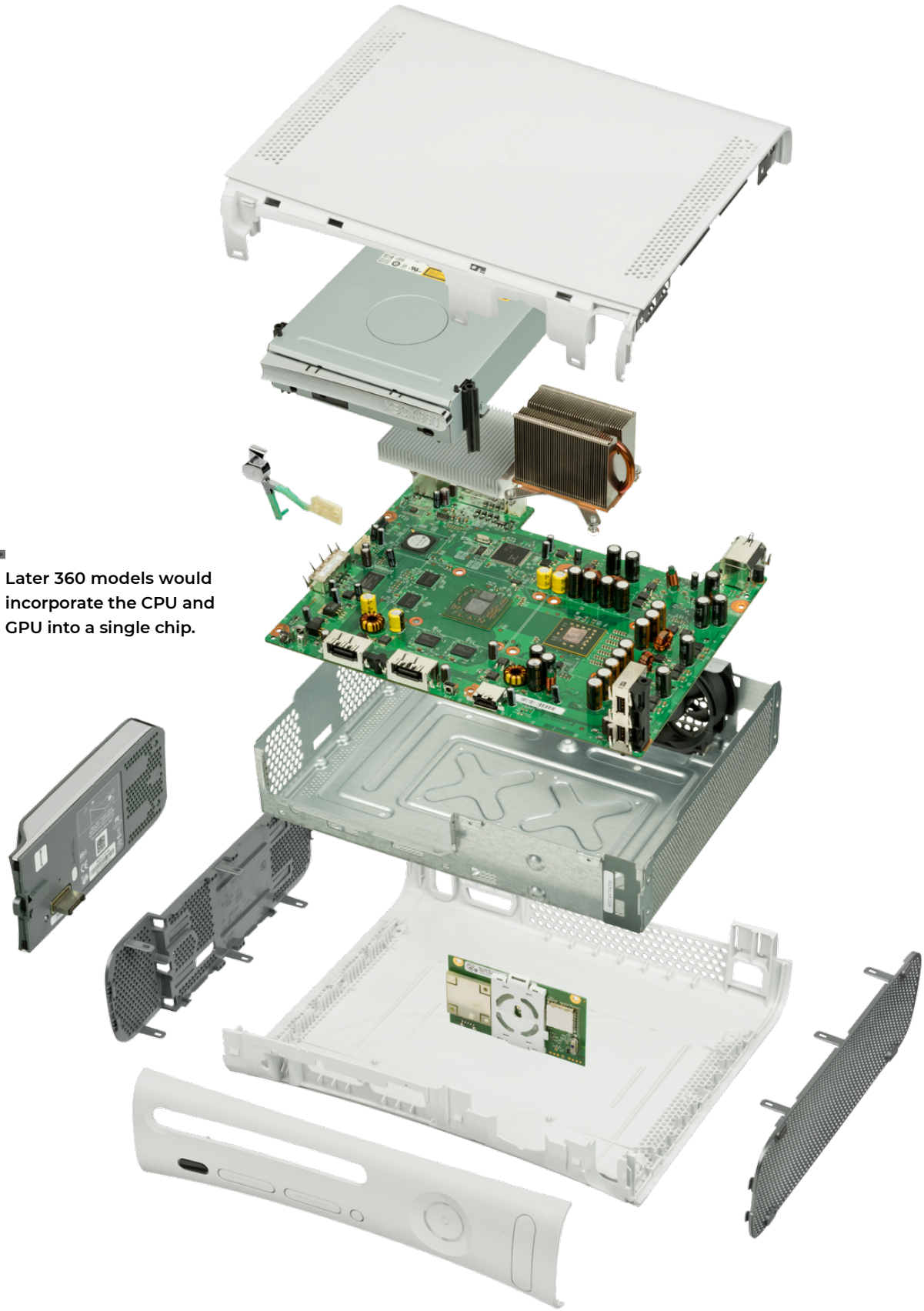


Microsoft Xbox 360 (2005)

SPECS		
	Launch price: $299 (no hard drive), $399 (20 GB)	**RAM:** 512 MB
	CPU: Triple-core IBM “Xenon” at 3.2 GHz	**Games released:** 1,100+ (retail)
	GPU: ATI “Xenos” at 500 MHz	**Systems sold:** 84+ million

Microsoft pushed console gaming into a new era with the Xbox 360, a system whose HD graphics rivaled high-end PCs at the time of its release. Designed for the broadband age, the 360 focused heavily on online gaming and redefined the modern console with new features such as a digital marketplace and in-game achievements. With a year’s lead, a lower price, and generally better multiplatform game performance than the PlayStation 3, the 360 established Microsoft as a major contender that could go toe to toe with Sony. The console would sell more than 84 million units worldwide and become one of the best-selling systems of all time.

Early 360s frequently suffered hardware issues that led to system failure, with bricked consoles displaying the infamous “red ring of death.”



Later 360 models would incorporate the CPU and GPU into a single chip.

Xbox 360 Models and Revisions

Released in 2007, the Xbox Elite had a 120 GB hard drive and added an HDMI port that became standard on subsequent models; this version sold for a premium at $479.

The Xbox 360 S was a lighter and more power-efficient redesign from 2010 that added built-in Wi-Fi support.

The 2013 E model was a cosmetic redesign of the S that paired with the newly announced Xbox One console.

The Xbox 360 HD DVD drive retailed for $199 and came with a remote and an HD DVD copy of *King Kong (2005)*.

HD DVD Drive

A new format war began in 2006 with the introduction of HD DVD and Blu-ray, each a high-density optical disc standard capable of storing both data and high-definition movies. Sony backed Blu-ray and used the format for its PlayStation 3, while Microsoft backed HD DVD and released an external drive for movie playback on the Xbox 360. The HD DVD drive was discontinued in 2008, however, when Blu-ray won the format war and the HD DVD standard was abandoned.

Kinect

In 2010, Microsoft released the Kinect: a motion-based controller for the 360 that tracked a player's body and voice with an array of cameras and sensors to control onscreen action. While it was popular with casual party games like the *Just Dance* series, the Kinect was criticized for its lack of feedback, input lag, poor tracking, and need for a large, open area to use. As the Kinect's novelty faded, so did game and developer support, and despite a second push with an updated model for the Xbox One console in 2013, Microsoft ended the Kinect line in 2017.

The Kinect launched with the new 360 S remodel, which included a dedicated Kinect connector port.

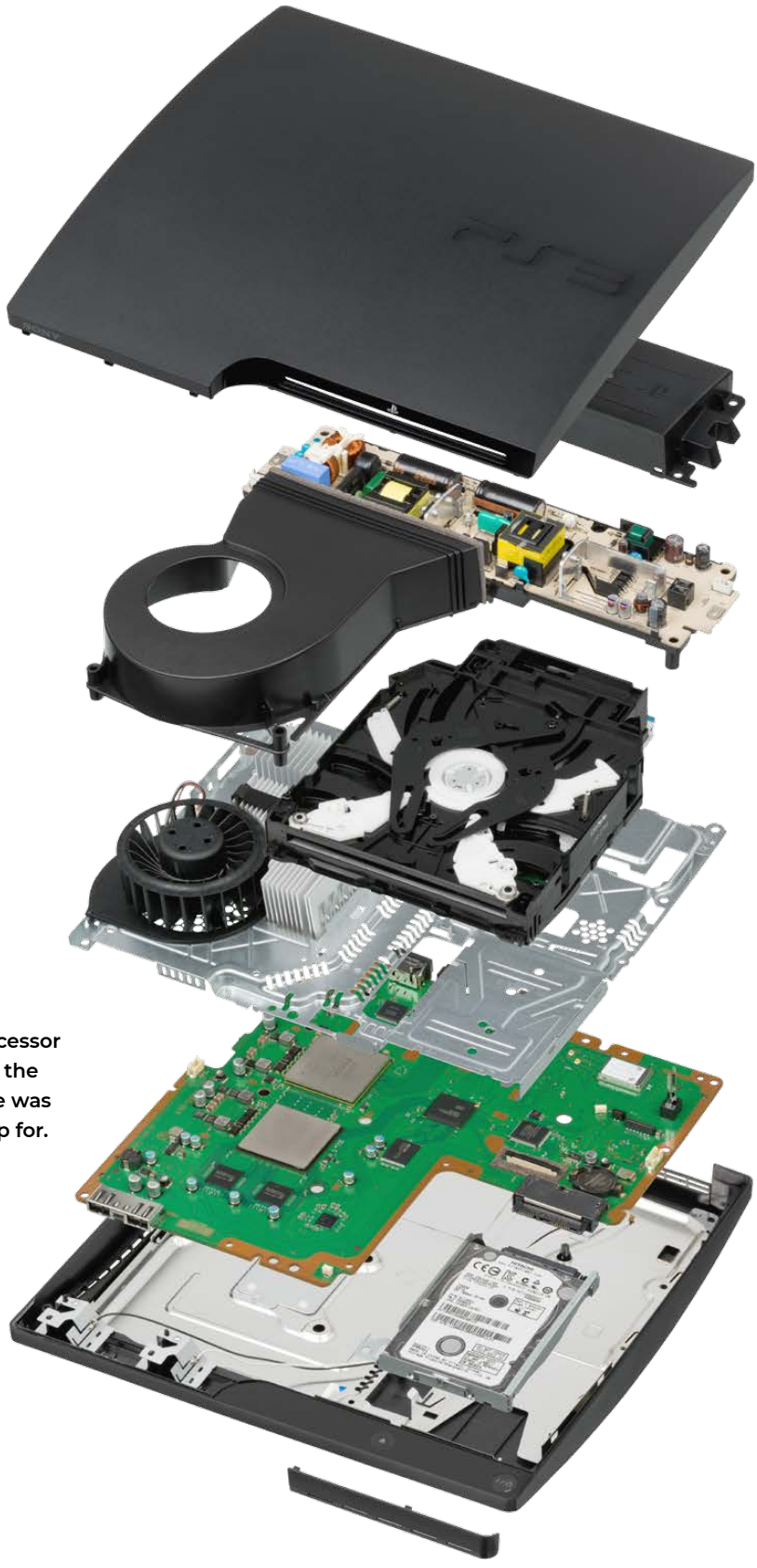
The wired 360 controller was natively supported by Windows, making it popular for PC gaming.

Sony PlayStation 3 (2006)

SPECS		
	Launch price: $499 (20 GB), $599 (60 GB)	**RAM:** 256 MB
	CPU: Custom “Cell” at 3.2 GHz	**VRAM:** 256 MB
	GPU: Custom “Reality Synthesizer” at 530 MHz	**Systems sold:** 80+ million

The success of Sony’s PS and PS2 consoles led to high excitement for its next system, the PlayStation 3, but many consumers were put off by its high launch price. The system’s cost—$599 for the most expensive model—was the result of a feature-packed design that included an expensive Blu-ray drive and Cell processor. Production issues, strong competition, and demand that was lower than expected led the PS3 to a shaky first year of sales, but as assembly costs dropped, corresponding price cuts helped the system rebuild momentum. The console battled neck and neck with the Xbox 360 for second place in console sales—with the Wii topping the list—and would finish strong with more than 80 million systems sold.

A reduction in weight, size, and assembly costs allowed the PS3 Slim (pictured) to release at just $299.



The PS3's Cell processor was powerful, but the chip's architecture was difficult to develop for.

PlayStation 3 Models and Revisions

The original PlayStation 3 (later referred to as the “phat” or “fat”) was bulky, heavy, and expensive. Later models dropped built-in features such as PS2 backward compatibility and memory card readers to keep costs down, while new redesigns reduced size and weight. The final PS3 redesign, the Super Slim model, further reduced costs with a cheaper top-loading Blu-ray drive.

The original PS3 could install Linux as an alternate operating system, but this option was removed after an exploit that allowed for piracy was found.

The 2012 Super Slim model sold with either a 250 or 500 GB hard drive or 12 GB of built-in flash memory.

The wireless DualShock 3 added analog triggers and (rarely used) motion-sensing technology.

PlayStation Move

The PlayStation Move was a motion-based controller platform for the PS3 that was released in 2010. The Move controller used various sensors and an external camera to track its position in 3D space, which made it more precise than the Wii Remote. While praised by critics for its responsiveness, few games could meaningfully incorporate the Move into their design, and support for the controller waned over time. The Move would later get a second wind in 2016, when the controller was adapted for the PlayStation 4's virtual reality platform.

The PlayStation Move's flagship game was *Sports Champions*, a not-so-subtle take on *Wii Sports*.

One of the best uses of the PS Move was as a light gun; optional attachments could transform the Move into a pistol or a rifle.

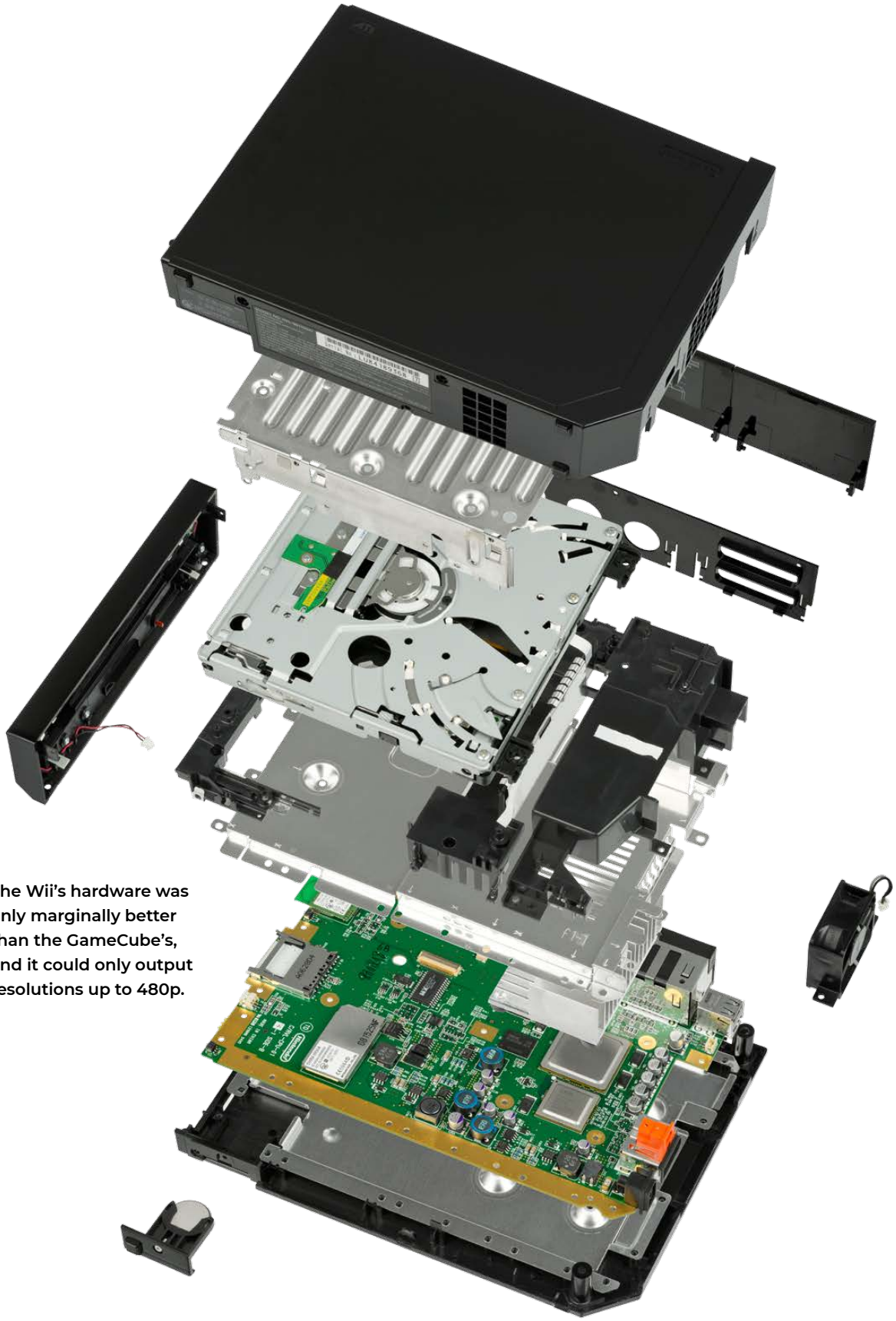
Nintendo Wii (2006)

SPECS		
	Launch price: $249	**RAM:** 88 MB
	CPU: Custom PowerPC “Broadway” at 729 MHz	**Internal storage:** 512 MB
	GPU: Custom ATI “Hollywood” at 243 MHz	**Systems sold:** 100+ million

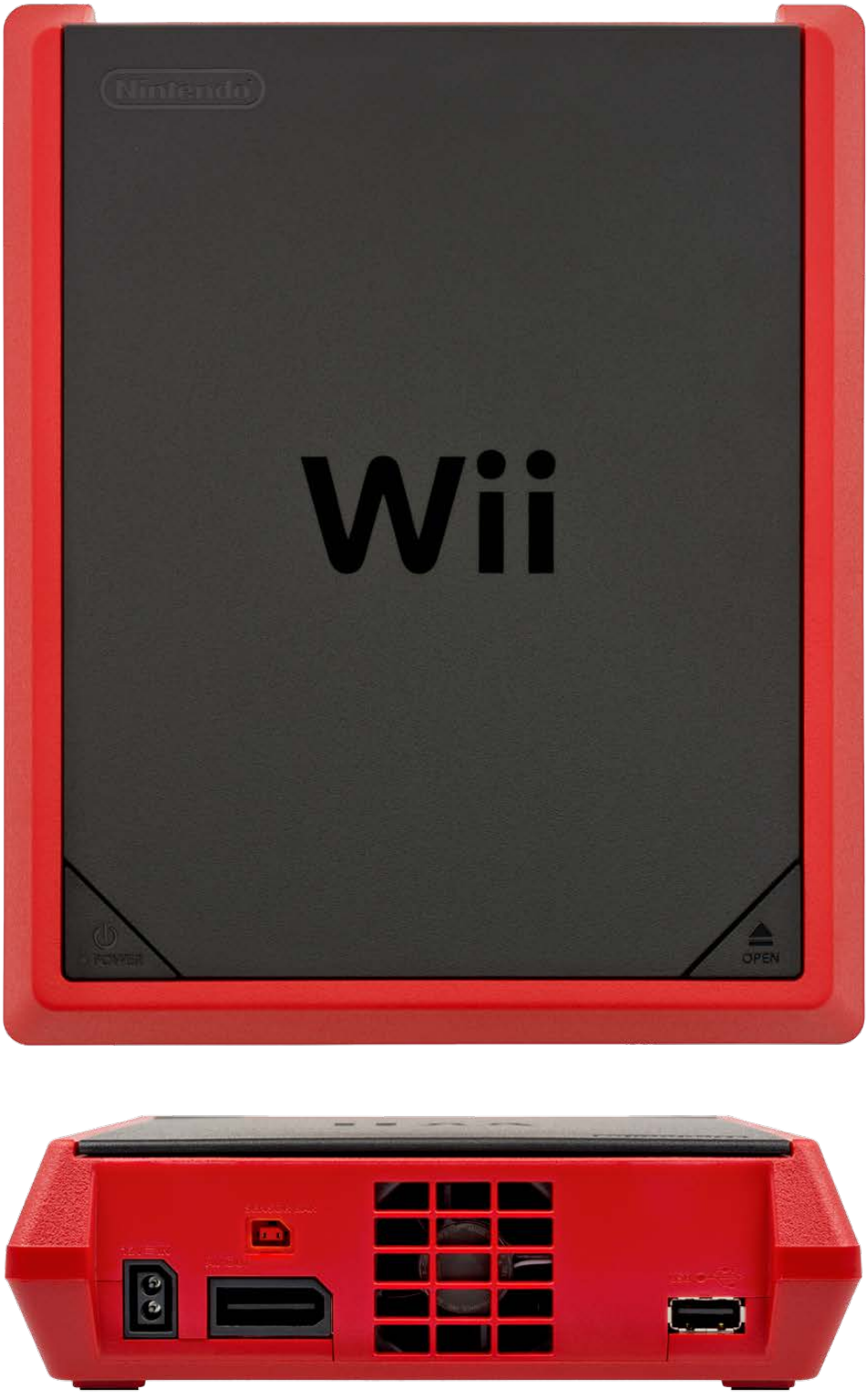
In the seventh game console generation, Nintendo abandoned direct competition with Microsoft and Sony’s systems and instead released the Wii: a non-HD console that focused on casual gaming. Based around a unique, remote-shaped controller that tracked motion, the Wii encouraged gamers to play with physical movement.

Its pack-in game, *Wii Sports*, used the controller to mimic activities such as bowling and tennis, and the title became a hit with gamers and nongamers alike. *Wii Sports* began a phenomenon that widely expanded Nintendo’s audience and provided Nintendo with its best-selling home console ever.

The Wii’s Virtual Console offered digital versions of games from the NES, SNES, and N64 eras.



The Wii's hardware was only marginally better than the GameCube's, and it could only output resolutions up to 480p.



The Wii Mini was a $99 remodel from 2012 that removed Virtual Console and internet support.

Wii Remote

The Wii Remote's nontraditional design set it apart from other console controllers, and its similarity to a TV remote made it easy for nongamers to try the system. An expansion port on the controller's base could attach to a "nunchuck" controller for most games or to a traditional controller that was required for many Virtual Console titles.

Wii Fit and Balance Board

The Wii Balance Board was an advanced weight scale that came bundled with the *Wii Fit* fitness software. *Wii Fit* used the board to track a user's center of balance during Yoga-inspired exercises. The exercise and weight-loss platform was a hit with the casual market, selling more than 20 million units worldwide.

The Wii Remote's infrared sensor and accelerometers sensed and tracked a user's motion; later models added a gyroscope to improve accuracy.

Gizmondo (2005)

SPECS		
	Launch price: $399	**RAM:** 64 MB
	CPU: Samsung ARM9 at 400 MHz	**Resolution:** 320 × 240 pixels
	GPU: Nvidia GoForce 3D 4500	**Media:** SD cards

The Gizmondo was a Windows CE-based handheld system that was developed by Tiger Telematics (not to be confused with Tiger Electronics). Advertised with the slogan "I can do anything," the Gizmondo had advanced non-game functions such as GPS tracking, a built-in VGA camera, web browsing, and mulitmedia playback.

The expensive system had limited retail availability, however, and was mainly available through mall kiosks and a single flagship store in London. The handheld's abysmal sales, estimated to be around 25,000 units in total, contributed to Tiger Telematics declaring bankruptcy only a few months after the Gizmondo's debut.

The Gizmondo could send and receive SMS texts but could not make or receive phone calls.

Game Wave (2005)

Launch price: $99	**Players:** Up to six	SPECS
Processor: Mediamatics 8611	**Video out:** Composite, S-Video	
Coprocessor: Altera Max II CPLD	**Pack-in game:** *4 Degrees, Vol. 1*	

The Game Wave was a game console and DVD player hybrid created by ZAPiT Games. More of a DVD player than a game console, the system's limited functionality restricted most of its gameplay to static, menu-based screens and pre-rendered video sequences. The Game Wave used this setup for simple multiplayer trivia, casino, and puzzle games, which supported up to six players at once using the system's remote-shaped controllers. ZAPiT aimed the system toward the casual and family friendly crowd, but poor marketing and limited retail presence meant few knew the console existed, which led to the system's demise in 2009.

The Game Wave is the only game console to have been developed in Canada.

HyperScan (2006)

SPECS		
	Launch price: $69	**Media:** CD-ROM drive
	Processor: Sunplus SPG290	**A/V out:** Hard-wired composite video and stereo
	RAM: 16 MB	**Games released:** 5

The HyperScan was an inexpensive game console for kids from American toymaker Mattel—the company's first system since the Intellivison. The HyperScan's games relied on collectible cards embedded with RFID chips that sold in booster packs of six for $9.99. These cards, when scanned into the console, unlocked game content such as characters and abilities. Though the idea was innovative, the HyperScan suffered from outdated 2D graphics and a small library of bad, clunky games, and consequently it flopped at release. Within just months, the console was discontinued and dumped into clearance bins.

The HyperScan's games locked content behind collectible cards to encourage buying booster packs; one fighting game shipped with 18 of its 20 characters locked behind optional card purchases.

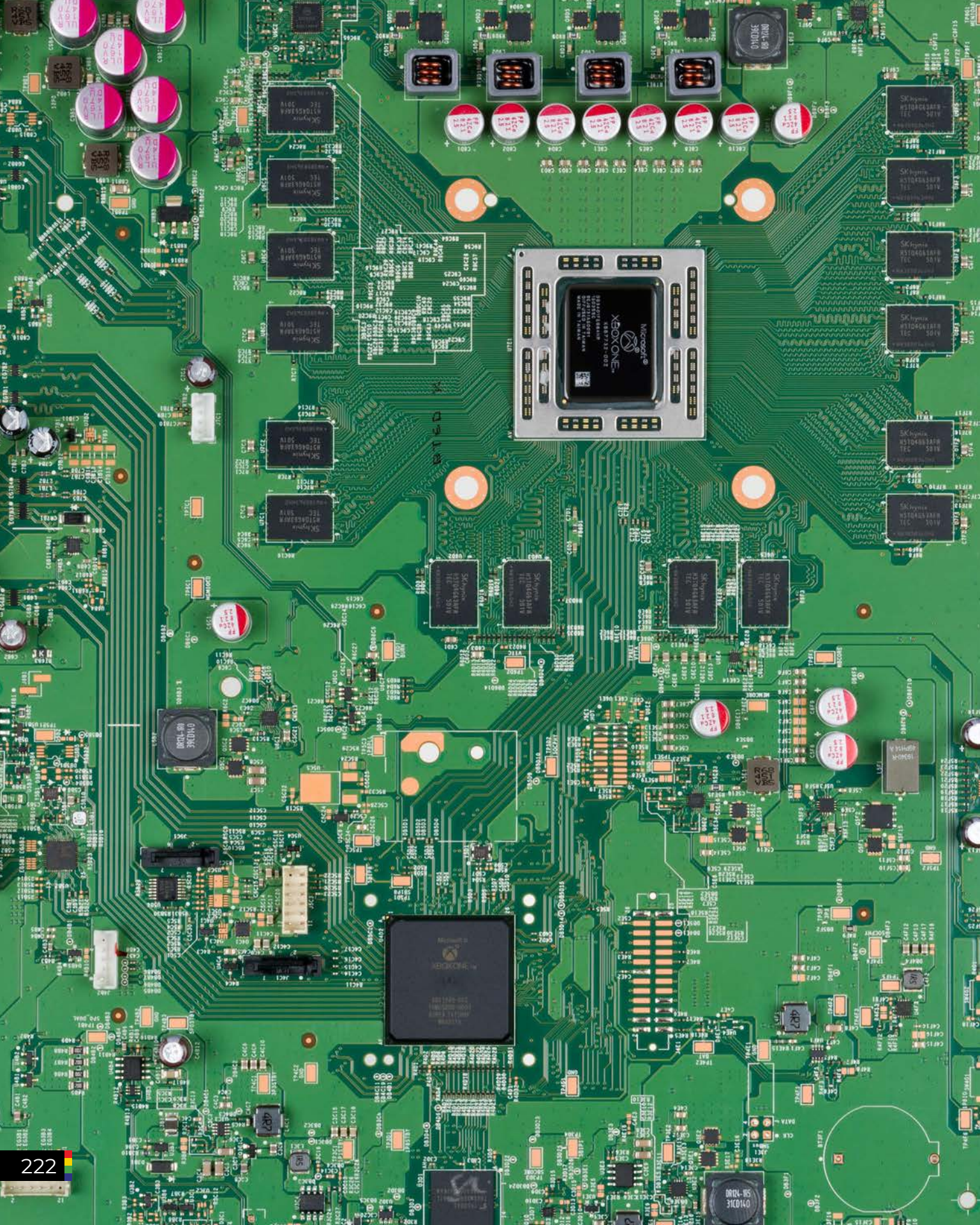
VTech V.Flash (2006)

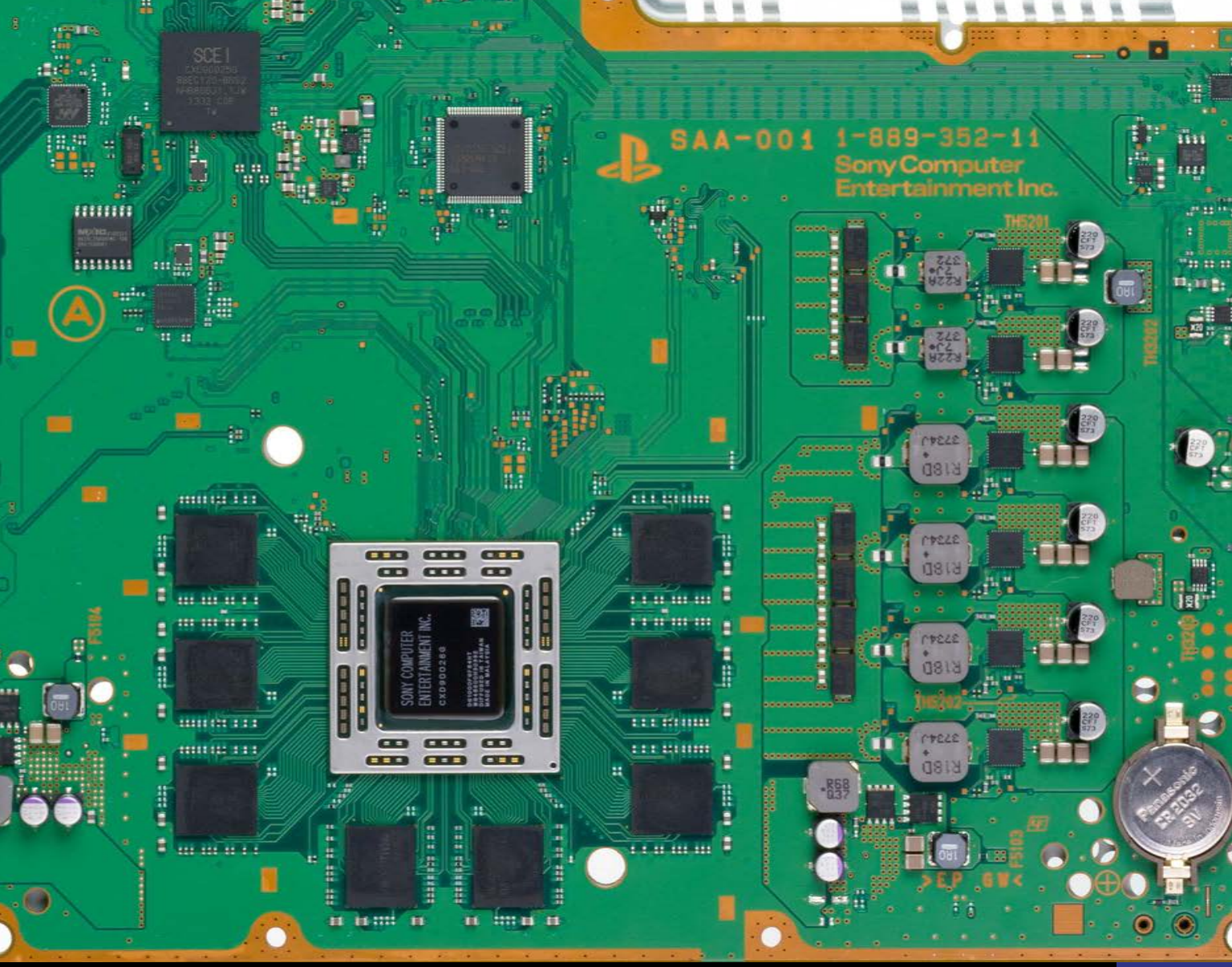
Launch price: $99	**Processor:** LSI Logic "Zevio 1020" SOC at 150 MHz
Media: Caddy-based CD-ROM drive	**Video out:** Composite
Opt. accessory: 8 MB memory card	**Pack-in game:** *Wacky Race on Jumpin' Bean Island*

SPECS

Two years after the release of the V.Smile children's console, VTech expanded its edutainment lineup with the V.Flash. Aimed at the slightly older 6- to 10-year-old demographic, the V.Flash offered non-violent and educational 3D games with graphics similar to the original Sony PlayStation. Each disk included a standard game mode, an educational mode, and an artistic creative mode, with games based on properties such as *SpongeBob Squarepants* and Pixar's *Cars*. However, the system was not as successful as VTech's V.Smile line, and the V.Flash was discontinued after releasing only 9 games.

The V.Flash was jointly developed by VTech and Koto Laboratory, the designer of the WonderSwan handheld.


Microsoft
XBOX ONE



8th Generation

After a prosperous and overly long seventh console generation, the eighth generation saw the gaming industry undergo a shift as most companies failed to repeat their previous successes. While Sony resumed its role as the industry leader with the hugely popular PlayStation 4, its portable Vita console only sold a fraction of what the PSP did. Microsoft's Xbox One stumbled with a disastrous prelaunch, which lost the Xbox its popularity abroad. Nintendo, after its market share plummeted due to poor Wii U sales, replaced the system mid-generation with the Switch, a console and handheld hybrid that became a runaway success. Finally, smart phone technology gave rise to a new genre of "microconsoles" powered by mobile processors, most of which failed due to their redundancy and lack of compelling games.

(opposite) Xbox One motherboard, (above) PlayStation 4 motherboard

Nintendo 3DS (2011)

SPECS		
	Launch price: $249	**RAM:** 128 MB
	CPU: Dual ARM11s at 268 MHz	**GPU:** Custom PICA200
	Resolution: 400 × 240 (top), 320 × 240 (bottom)	**Storage:** 1 GB (internal), SD/microSD card

The 3DS, Nintendo's successor to its DS handheld line, was a new system capable of displaying stereoscopic 3D without the use of 3D glasses. Despite the DS's previous success, the 3DS sputtered at launch, with slow sales that were attributed to the handheld's high price and a lack of interest in the system's 3D ability.

Nintendo responded with a drastic $80 price cut just months later, which, along with the release of flagship *Mario* and *Pokémon* titles, resulted in increased sales. Despite heavy competition from mobile and tablet gaming, the 3DS became another hit for Nintendo and sold more than 72 million systems worldwide.

The Nintendo 3DS was backward compatible with the original DS.


X
Y
A
B

Nintendo 3DS Models and Variants

The 3DS series had multiple redesigns and updates over its life, starting with 2012's 3DS XL, a model with larger screens and a softer, rounded design. In 2013, Nintendo released the 2DS (opposite), an inexpensive, single-screen model without 3D support. In 2014, Nintendo released the New Nintendo 3DS line, which included a regular model (previous page) and an XL model (top), which both featured a second analog stick, a faster processor, two extra shoulder buttons, and improved 3D viewing.


PWB/CPU/AU-C/FTR-01
MADE IN CHINA

PlayStation Vita (2011)

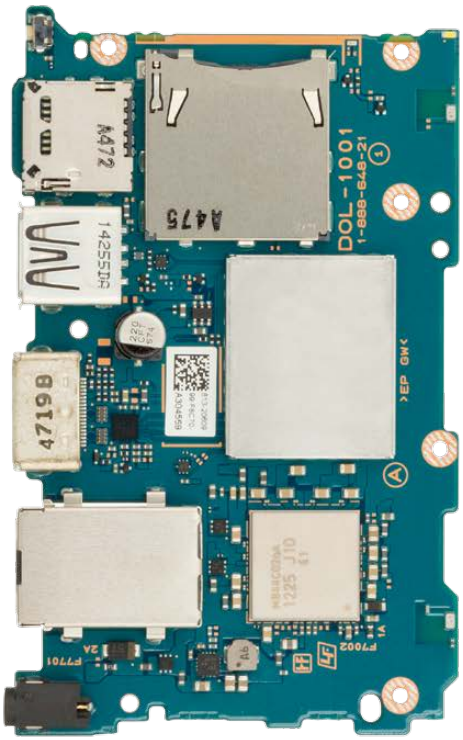
SPECS		
	Launch price: $249 (Wi-Fi), $299 (3G/Wi-Fi)	**RAM:** 512 MB
	CPU: Quad-core ARM Cortex A9	**VRAM:** 128 MB
	GPU: SGX543MP4+	**Resolution:** 960 × 544 pixels

The PlayStation Vita was an advanced, feature-packed handheld console from Sony that was the successor to the PSP. The Vita failed to match the success of the PSP, however, in part due to heavy competition from mobile devices that stole away casual and average gamers, leaving the Vita with narrow appeal. After sales slowed following the system's debut, official and AAA game support dwindled. The Vita became a niche console that was kept afloat by a dedicated userbase that appreciated its library of Japanese RPGs, visual novels, and American indie games. Due to its low sales, Sony stated that there were no plans for a successor.

The first Vita model used an OLED display that was well regarded for its high contrast and vibrant colors.

The Vita 2000 (above) was a slimmer and lighter redesign from 2013 that replaced the previous model's OLED screen with a standard LCD.

The PS TV (below) was a Vita variant released in 2013 that played a selection of Vita, PSP, and PSone games on a television.

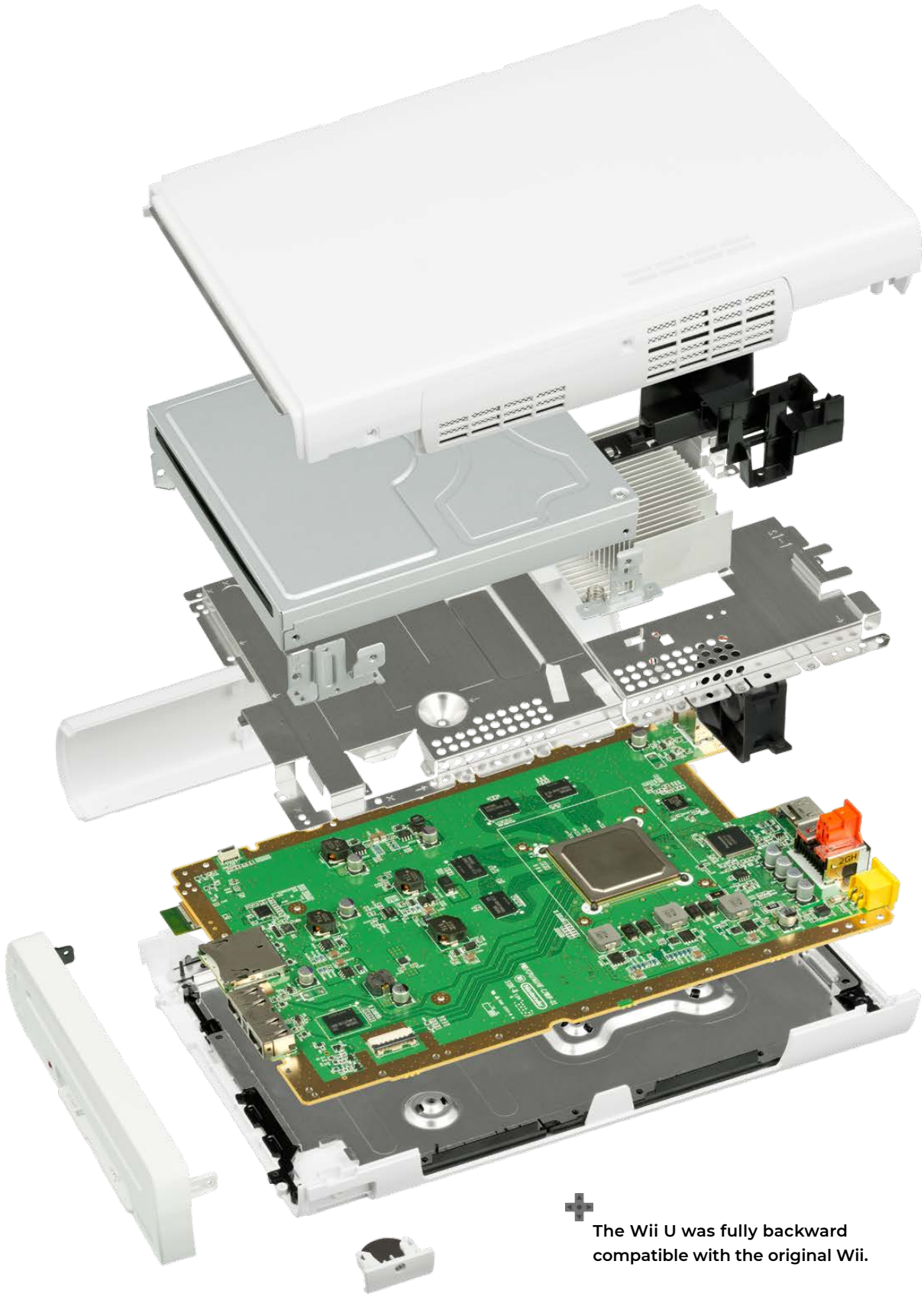


Nintendo Wii U (2012)

SPECS		
	Launch price: $299 (8 GB), $349 (32 GB)	**RAM:** 2 GB DDR3
	CPU: Custom IBM tri-core “Espresso” at 1.24 GHz	**GamePad resolution:** 854 × 480 pixels
	GPU: Custom AMD Radeon “Latte” at 550 MHz	**Games released:** 150+ (retail)

The Wii U was Nintendo’s first HD console and the successor to the hugely popular Wii. Built around a large, tablet-like controller with a built-in screen, the Wii U could play games without a television and offered the promise of innovative, dual-screen gameplay. However, casual gamers ignored the system, and average gamers were put off by the console’s high price, poor online ecosystem, and lack of third-party support that led to months-long game droughts. After launch, sales slowed dramatically and never picked up, and Nintendo ended support for the system in early 2017 with only 13 million units sold worldwide.

Poor marketing caused many consumers to believe the Wii U’s controller was an add-on for the original Wii.



The Wii U was fully backward compatible with the original Wii.

In their first year of release, rare Amiibo created a frenzy on eBay, with some figurines selling for more than $100 each.

Amiibo

In 2014, Nintendo introduced Amiibo, a line of $13 to $16 figurines that featured characters from Nintendo and other various franchises. Each Amiibo's base contained a special chip that could be scanned when placed on a wireless sensor built into the Wii U GamePad controller. When scanned into a compatible game, the figurines could unlock in-game bonus content such as items and costumes. The Amiibo platform was also available on the 3DS and Nintendo Switch consoles.

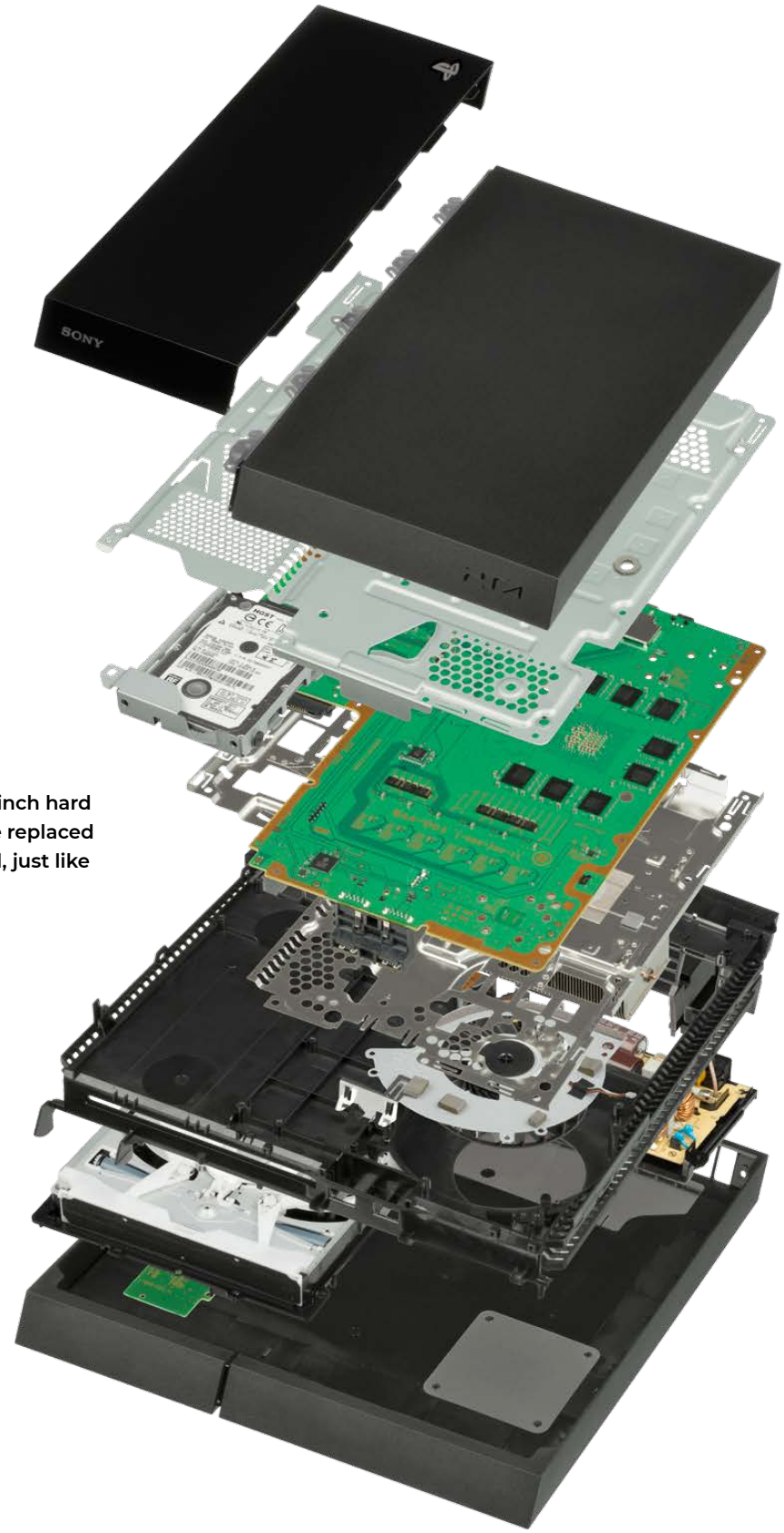
The GamePad's built-in screen was a major selling point for the Wii U; however, many developers struggled to make use of the second display during gameplay.

Sony PlayStation 4 (2013)

SPECS		
	Launch price: $399 (500 GB)	**RAM:** 8 GB GDDR5
	CPU: Custom 8-core AMD "Jaguar" at 1.6 GHz	**Internal storage:** 500 GB, 1 TB (expandable)
	GPU: Custom AMD Radeon GCN at 800 MHz	**Operating system:** Orbis OS

The PlayStation 4 was Sony's long-awaited successor to the 2006 PS3. Learning from the PS3's rough start due to its complex architecture and high price, Sony built the PlayStation 4 to be more affordable and developer friendly, pairing a straightforward design with a robust graphics processor and fast memory. The PS4 launched alongside the Xbox One, where it sold for $100 less and offered better performance in most games compared to Microsoft's console. The PS4 was an immediate hit for Sony, with gamers and developers flocking to the system. The PlayStation 4 would go on to greatly outsell the Xbox One and Wii U to become the generation's best-selling system.

Unlike the PS2 and PS3, the PS4 was not backward compatible.



The PS4's 2.5-inch hard drive could be replaced and upgraded, just like the PS3's.

PlayStation 4 Pro

In 2016, Sony released an enthusiast PS4 model for $399 that offered enhanced gaming performance. Called the PS4 Pro, it had an overclocked CPU, faster RAM, and double the graphics processor cores of a standard PS4. The result was better-looking games with smoother framerates and higher resolutions in supported titles.

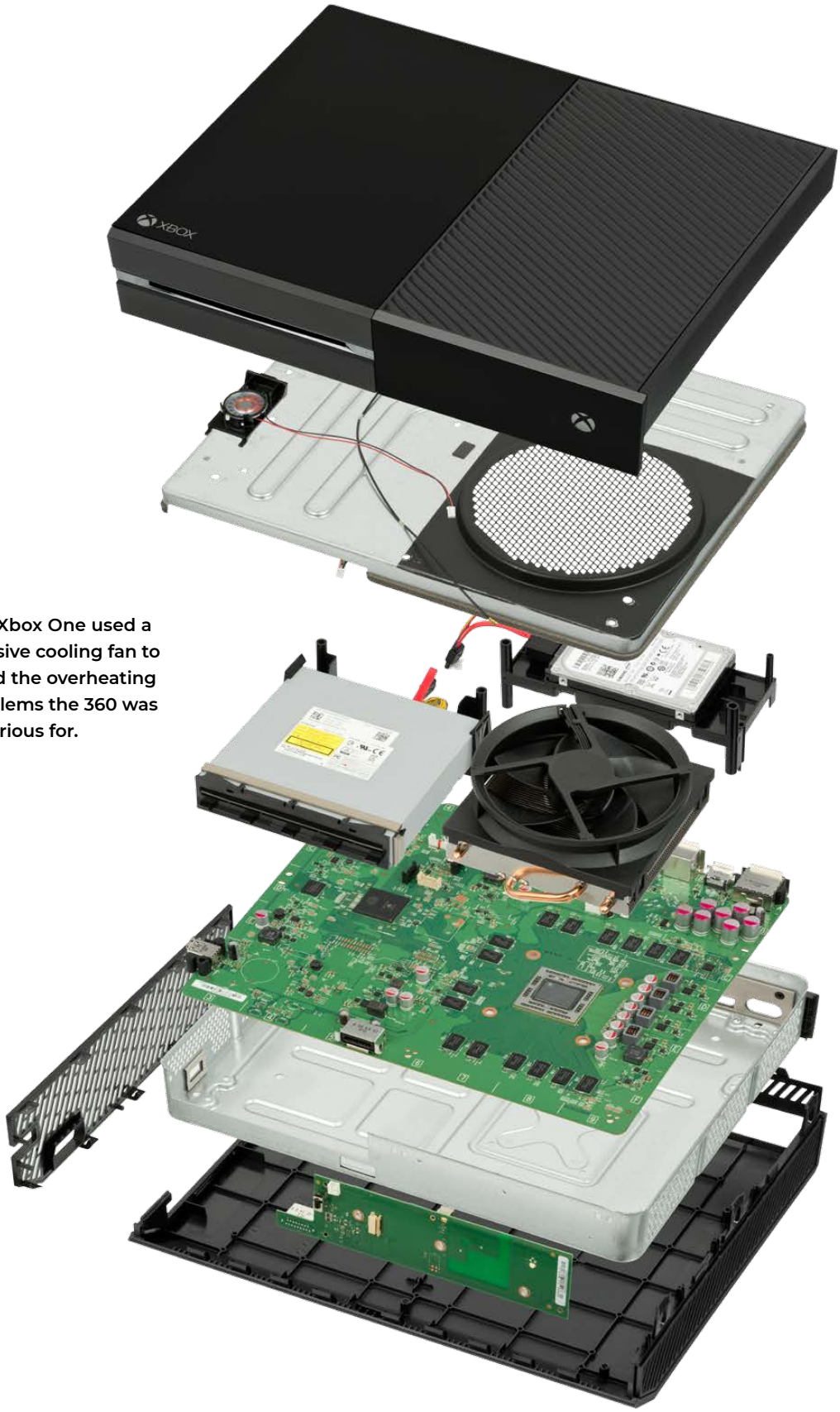
The PS4's DualShock 4 controller added a light bar, touch pad, and a built-in speaker.

Microsoft Xbox One (2013)

SPECS		
	Launch price: $499 (500 GB with Kinect)	**RAM:** 8 GB DDR3, 32 MB ESRAM
	CPU: Custom 8-core AMD "Jaguar" at 1.75 GHz	**Internal storage:** 500 GB, 1 TB, 2 TB
	GPU: Custom AMD GCN at 853 MHz	**Unique feature:** HDMI passthrough

The Xbox One was Microsoft's follow-up to its successful Xbox 360 console. Microsoft introduced the Xbox One as an *all-in-one* entertainment system that focused on live TV, media streaming, and social media just as much as gaming. The new direction alienated gamers, which, combined with confusing anti-consumer policies such as the banning of used games, all of which were dropped before launch, took a heavy toll on the Xbox brand's popularity. While the Xbox One eventually regained lost ground in the US with aggressive price drops and a renewed focus on gaming, the system never recovered abroad, where it was vastly outsold by the PlayStation 4.

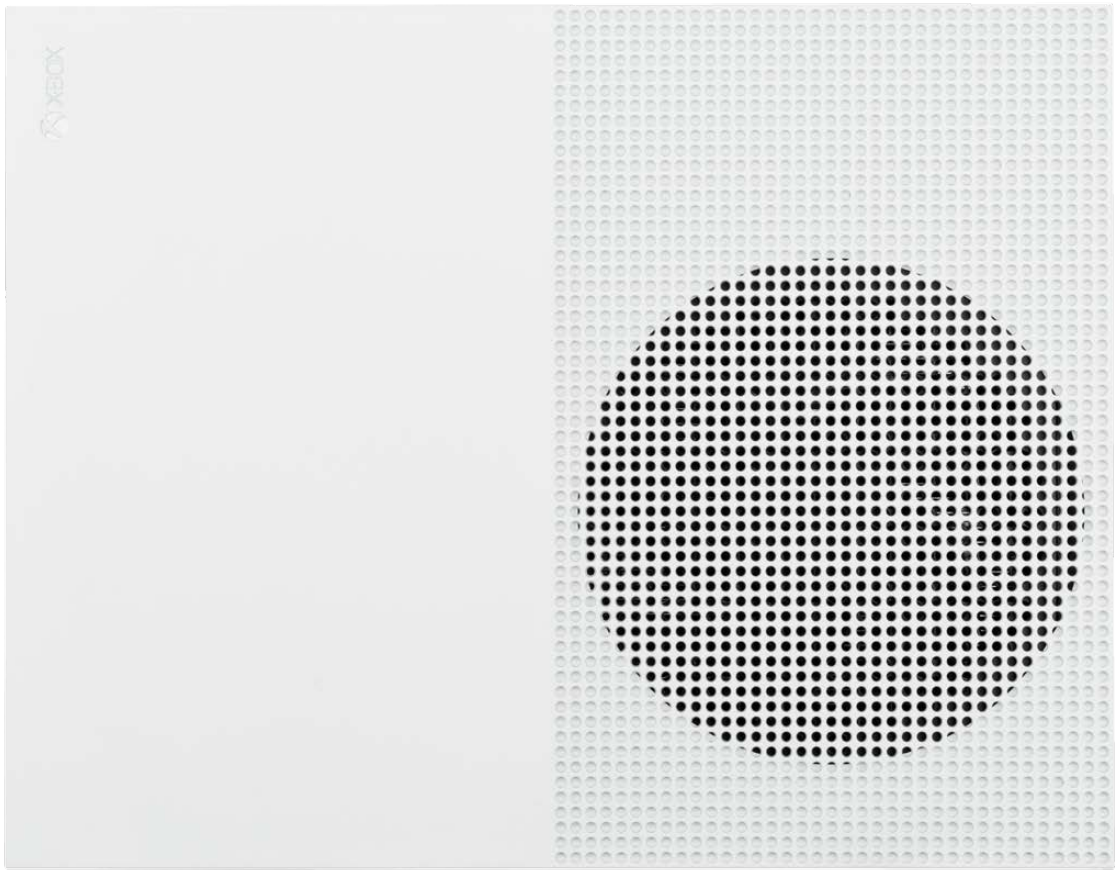
Like the PS4, the Xbox One used an AMD x86 processor and GPU, but it also included 32 MB of ultrafast ESRAM.



The Xbox One used a massive cooling fan to avoid the overheating problems the 360 was notorious for.

Xbox One S

In 2016, Microsoft replaced the standard Xbox One with the new S model. Forty percent smaller than the previous Xbox One, the S featured a handful of updates and improvements, such as an internal power supply and a built-in infrared blaster for controlling other electronics. Also included was 4K and HDR video support, from either online streaming sources or its new and upgraded 4K UHD Blu-ray drive.



Microsoft invested more than $100 million into designing the Xbox One controller.

Nintendo Switch (2017)

SPECS		
	Launch price: $299	**RAM:** 4 GB LPDDR4
	CPU: 8-core ARM Cortex-A57 + Cortex-A53	**Storage:** 32 GB + MicroSD support
	SoC package: Nvidia Tegra X1	**Screen resolution:** 1280 × 720 pixels

The Nintendo Switch was a handheld and console hybrid that was the successor to both the Wii U and 3DS. Essentially a tablet with detachable controllers, the Switch was a hybrid system that offered console-level performance as a handheld device or could be played as a traditional TV console. This unique and flexible design grabbed consumer attention, which combined with an effective ad campaign to generate substantial prerelease hype. At launch, the system sold out quickly, and demand outpaced stock for months. The Switch became one of Nintendo's fastest-selling systems ever, managing to eclipse the Wii U's lifetime sales in less than a year.

When docked and played on a TV, the Switch ran in a high-performance mode that offered higher resolutions and framerates than as a handheld.

The Pro Controller was an optional purchase for players looking for a more traditional gaming controller.

Each of the Switch's detachable controllers, the Joy-Con, contained its own battery and could be used wirelessly.

Each Joy-Con could be used as an individual controller, allowing for spontaneous two-player gaming.

Ouya (2013)

SPECS		
	Launch price: $99	**RAM:** 1 GB DDR3
	CPU: Quad-core ARM Cortex-A9 at 1.7 GHz	**Internal storage:** 8 GB
	GPU: Nvidia ULP GeForce at 520 MHz	**Operating system:** Android Jelly Bean

The Ouya was an Android-based gaming microconsole brought to life through an $8.5 million Kickstarter crowdfunding campaign. Built from tablet and cell phone parts, the Ouya mostly played mobile game ports and offered a few exclusives through its dedicated online store. On its release, the system suffered from hardware and software issues, and was plagued by bad reviews and negative press. It sold poorly at retail, and very few of those who did buy the console actually bought games for it, instead using the Ouya for emulators and media playback. After its failure, the Ouya's assets were sold to the company Razer, and the console was discontinued in 2015.

Each Ouya also functioned as a dev system, meaning owners could use it to create their own games.

GameStick (2013)

Launch price: $79	**RAM:** 1 GB DDR3
CPU: ARM Cortex A9 at 1.5 GHz	**Internal storage:** 8 GB
GPU: ARM Mali-400	**Operating system:** Android Jelly Bean

SPECS

The GameStick was an Android-powered gaming microconsole that, like the Ouya, began with a Kickstarter campaign. The company PlayJam successfully raised $650,000 in early 2013 and released the console later that year after multiple delays. The system's reviews were tepid at launch, citing bugginess and a limited, locked-down online store mostly made of mobile game ports. The GameStick's hardware was also less capable than comparable Android-based systems available, which made compatibility with future games uncertain. After poor sales, retail stock was liquidated in 2014, and the GameStick's online game store closed permanently in early 2017.

The GameStick's small HDMI dongle was the actual brains of the system.

Amazon Fire TV (2014)

SPECS		
	Launch price: $99 (controller sold separately)	**RAM:** 2 GB LPDDR2
	CPU: Quad-core Snapdragon 600 at 1.7 GHz	**Internal storage:** 8 GB
	GPU: Qualcomm Adreno 320	**Operating system:** Android-based Fire OS

The Fire TV was a line of Android-powered TV boxes from Amazon.com that streamed media, played games, and ran apps. At launch, Amazon promoted its Fire TV line as a gaming platform that could play a variety of mobile ports as well as Amazon-produced exclusive titles with an optional controller. However, support for controller-driven games dried up over time, with Amazon diverting its gaming focus toward its more popular Fire tablet series. Unable to play these touchscreen-based games, the Fire TV line primarily became media streaming devices, and by 2017, references to gaming were dropped from the Fire TV's online product pages altogether.

Like the Ouya and GameStick, the Fire TV used a proprietary app store for buying games and could not access Android's default Google Play store.

Nexus Player (2014)

Launch price: $99 (controller sold separately)	**RAM:** 1 GB LPDDR3
CPU: Quad-core Intel Atom at 1.8 GHz	**Internal storage:** 8 GB
GPU: PowerVR G6430 at 457 MHz	**Operating system:** Android TV

SPECS

In 2008, the first smartphone that used Android was released. Android, a Google-developed OS for mobile devices, steadily gained dominance over the smartphone market and began making its way onto other systems such as various smart TV boxes and the Ouya game console. In 2014, Google unveiled Android TV, a specific Android variant for streaming media and game playing on televisions. Google's official Nexus Player was the first device to use the OS, but the Nexus Player soon found itself facing heavy competition from other TV boxes made by Apple, Amazon, and Roku. After just modest sales, Google quietly discontinued the device in 2016.

With most Android games meant for phone and tablet touchscreens, only a fraction of the games were playable on the Nexus Player with a controller.

Nvidia Shield TV (2015)

SPECS		
	Launch price: $199 (16 GB), $299 (500 GB)	**RAM:** 3 GB
	CPU: 8-core ARM Cortex-A57 + Cortex-A53	**SoC package:** Nvidia Tegra X1
	GPU: Maxwell GM20B at 1 GHz	**Operating system:** Android TV

The Shield TV was a high-end, Android-based microconsole from Nvidia, the major graphics processor manufacturer. The Shield TV was part of Nvidia's Shield line of products that began in 2013 with the Shield Portable (a controller with built-in mobile hardware and a flip-up screen), which was followed by the Shield Tablet in 2014. In 2015, Nvidia released the Shield TV, a powerhouse Android TV box and microconsole that was more gaming focused than other TV boxes available at the time. Thanks to the power of Nvidia's own X1 chip, the Shield TV could output 4K HD video, stream games from a computer, and play exclusive ports of console games.

The Nvidia Shield TV's Tegra X1 chip would later be used to power the Nintendo Switch console.

Steam Link (2015)

Launch price: $49 (controller sold separately)	**RAM:** 512 MB
CPU: Marvell DE3005	**Internal storage:** 4 GB
GPU: Vivante GC1000	**Operating System:** Custom Linux build

SPECS

The Steam Link was a device from Valve that allowed users to stream games from their computer's Steam library to their TV. Steam, the digital distribution platform for computers, was developed by the game publisher Valve in 2003 and eventually became the world's largest gaming platform. The Steam Link was Valve's attempt at bringing the home console experience of couch gaming to the PC. The streaming device worked with a variety of console controllers as well as Valve's own Steam Controller, which used dual touch pads and a high degree of customization to help translate the PC's couch-unfriendly keyboard and mouse setup to a controller.

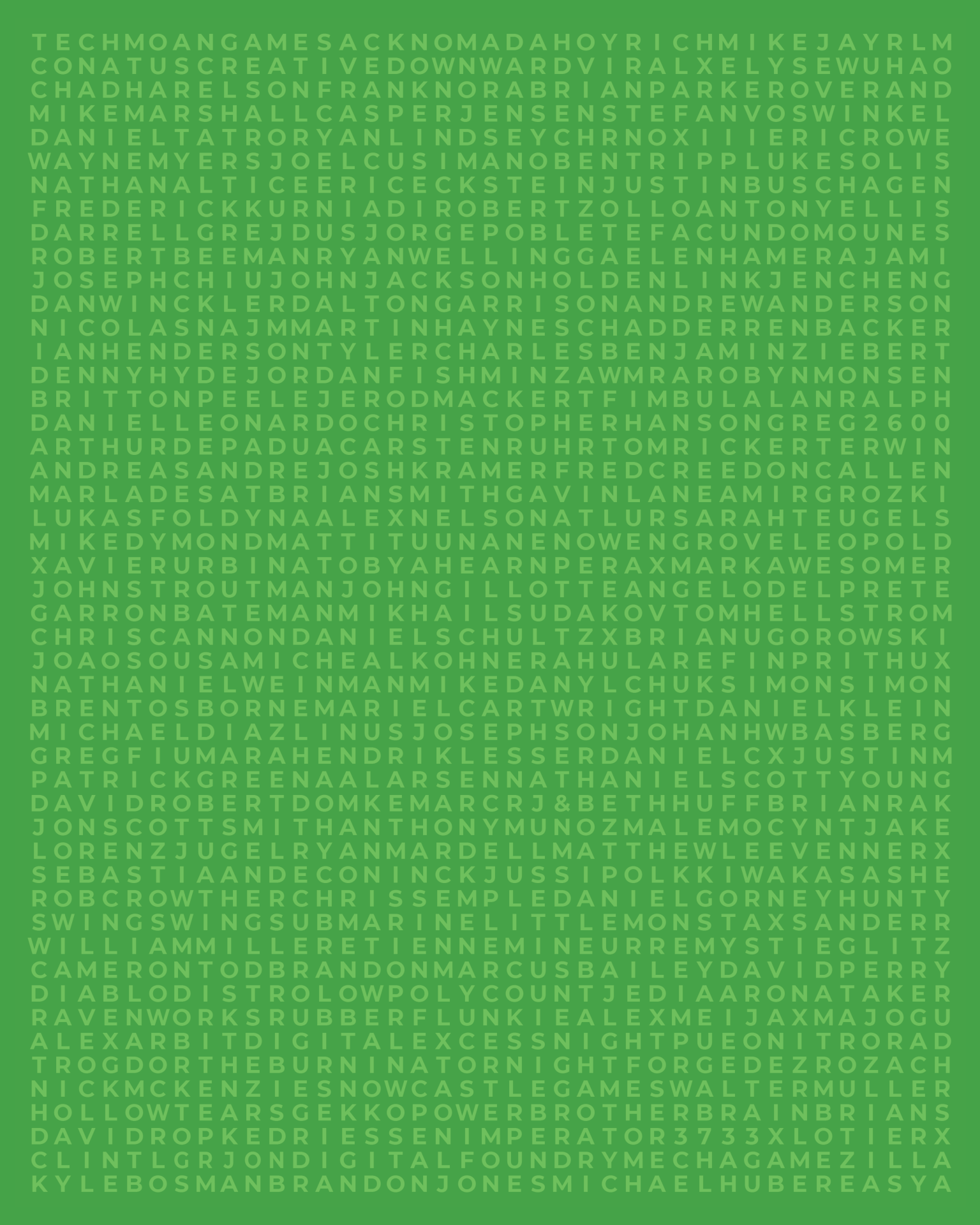
The Steam Controller featured fully customizable controls, gyroscope aiming, and dual touch pads with haptic feedback.

Excluded Systems

This book contains a wide variety of game consoles and a few computers, but it isn't an exhaustive list. For various reasons, a few noteworthy consoles have been excluded.

The following is a list of consoles and gaming-heavy computers that were left out of the book.

- Acorn Archimedes
- Amstrad CPC
- Android phones/tablets
- Apple II
- Apple Macintosh
- Atari ST
- Bandai Super Vision 8000
- BBC Micro
- Coleco ADAM
- Commodore Vic-20
- Commodore 128
- Commodore Amiga
- Enterprise computer
- Fujitsu FM-7, FM-77
- Gakken Compact Vision TV Boy
- Game King
- Gamepark GP32
- Hartung Game Master
- IBM PC Standard
- iPhone/iOS
- LJN Video Art
- Mad Catz M.O.J.O.
- Mattel Aquarius
- MSX computers
- NEC PC-8001
- NEC PC-8801
- NEC PC-98
- Nichibutsu My Vision
- Onlive Game System
- Oric computer
- Palmtex Super Micro
- Panasonic 3DO M2
- Philips Videopac G7400
- Razer Forge
- Sharp MZ
- Sharp X1
- Sharp X68000
- Sinclair ZX81
- Sinclair QL
- Spectravideo
- Steam Machines
- Sega Pico
- Tandy TRS-80
- Texas Instruments TI-99/4A
- Tomy Tutor/Pyuta
- ZX Spectrum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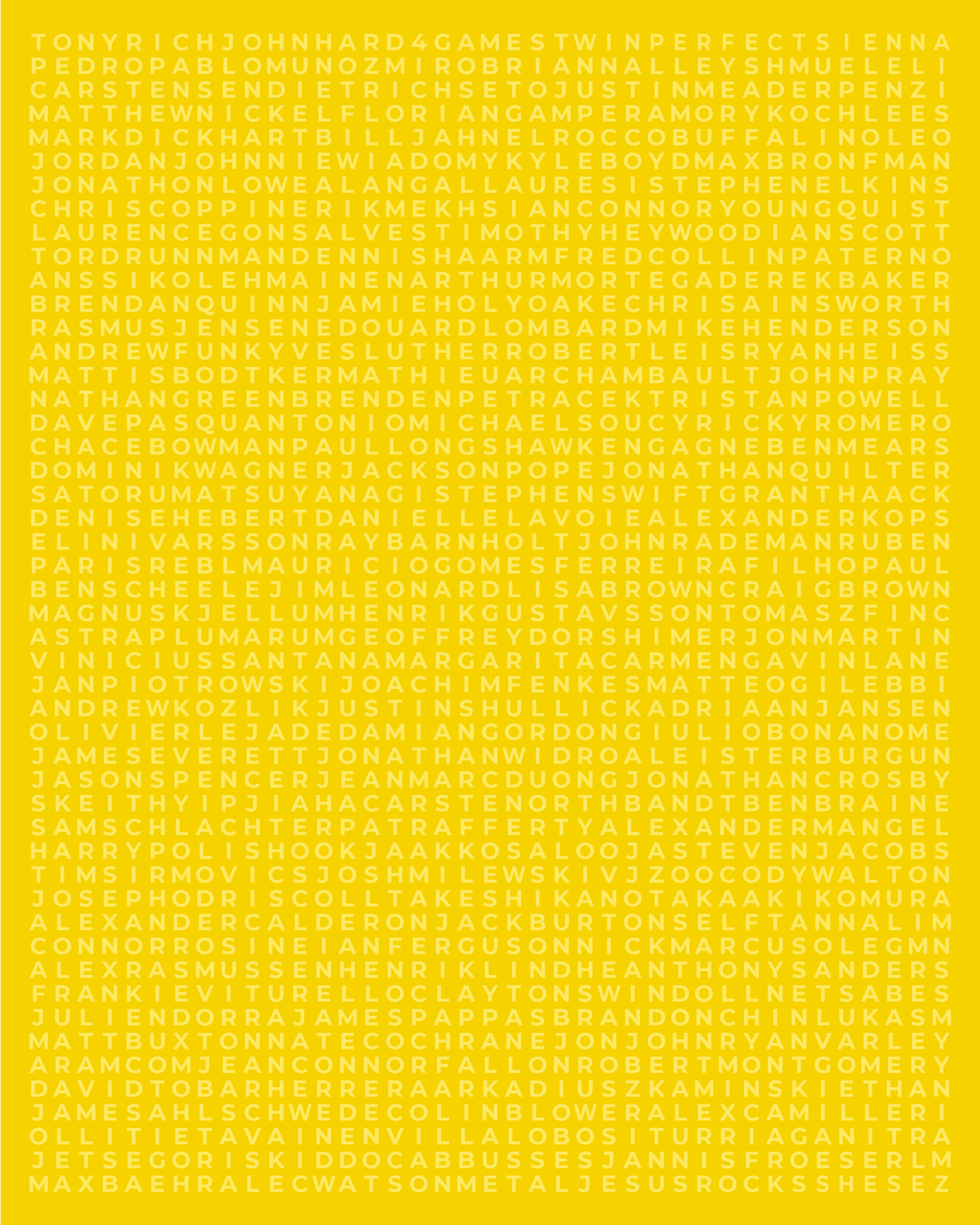
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