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Atari 2600

The **Atari 2600**, initially branded as the **Atari Video Computer System** (**Atari VCS**) from its release until November 1982, is a home video game console developed and produced by Atari, Inc. Released in September 1977, it popularized microprocessor-based hardware and games stored on swappable ROM cartridges, a format first used with the Fairchild Channel F in 1976. The VCS was bundled with two joystick controllers, a conjoined pair of paddle controllers, and a game cartridge—initially *Combat*[3] and later *Pac-Man*.[4]

Atari was successful at creating arcade video games, but their development cost and limited lifespan drove CEO Nolan Bushnell to seek a programmable home system. The first inexpensive microprocessors from MOS Technology in late 1975 made this feasible. The console was prototyped as codename Stella, by Atari subsidiary Cyan Engineering. Lacking funding to complete the project, Bushnell sold Atari to Warner Communications in 1976.

The Atari VCS launched in 1977 with nine simple, low-resolution games in 2 KB cartridges. The system's first killer app was the home conversion of Taito's arcade game *Space Invaders* in 1980. The VCS became widely successful, leading to the founding of Activision and other third-party game developers and to competition from console manufacturers Mattel and Coleco. By the end of its primary lifecycle in 1983–84, games for the 2600 were using more than four times the storage size of the launch games[5] with significantly more advanced visuals and gameplay than the system was designed for, such as Activision's *Pitfall!*.

In 1982, the Atari 2600 was the dominant game system in North America. Amid competition from both new consoles and game developers, a number of poor decisions from Atari management affected the company and the industry as a whole. The most public was an extreme investment into licensed games for the 2600, including *Pac-Man* and *E.T. the Extra-Terrestrial*. *Pac-Man* became the system's biggest selling game, but the conversion's poor quality eroded consumer confidence in the console. *E.T.* was rushed to market for the holiday shopping season and was critically panned and a commercial failure. Both games, and a glut of third-party shovelware, were factors in ending Atari's relevance in the console market. Atari's downfall reverberated through the industry resulting in the video game crash of 1983.

Atari 2600

Four-switch VCS model (1980–1982)

Also known as	Atari VCS (prior to November 1982)
Manufacturer	Atari, Inc.
Type	Home video game console
Generation	Second generation
Release date	NA: September 1977 EU: 1978 FRA: 1982 JP: October 1983 (Atari 2800)
Lifespan	1977–1992
Introductory price	US$189.95 (equivalent to $850 in 2021)
Discontinued	January 1, 1992[1]
Units sold	30 million (as of 2004)[2]
Media	ROM cartridge
CPU	8-bit MOS Technology 6507

Warner sold Atari's home division to former Commodore CEO Jack Tramiel in 1984. In 1986, the new Atari Corporation under Tramiel released a lower-cost version of the 2600 and the backward-compatible Atari 7800, but it was Nintendo that led the recovery of the industry with its 1985 launch of the Nintendo Entertainment System. Production of the Atari 2600 ended on January 1, 1992, with an estimated 30 million units sold across its lifetime.

Memory	128 bytes RAM
Graphics	Television Interface Adaptor
Controller input	Joystick, paddles, driving, keypad, Trak-Ball
Best-selling game	*Pac-Man*, 8 million (as of 1990)[a]
Predecessor	Atari Home Pong
Successor	Atari 5200

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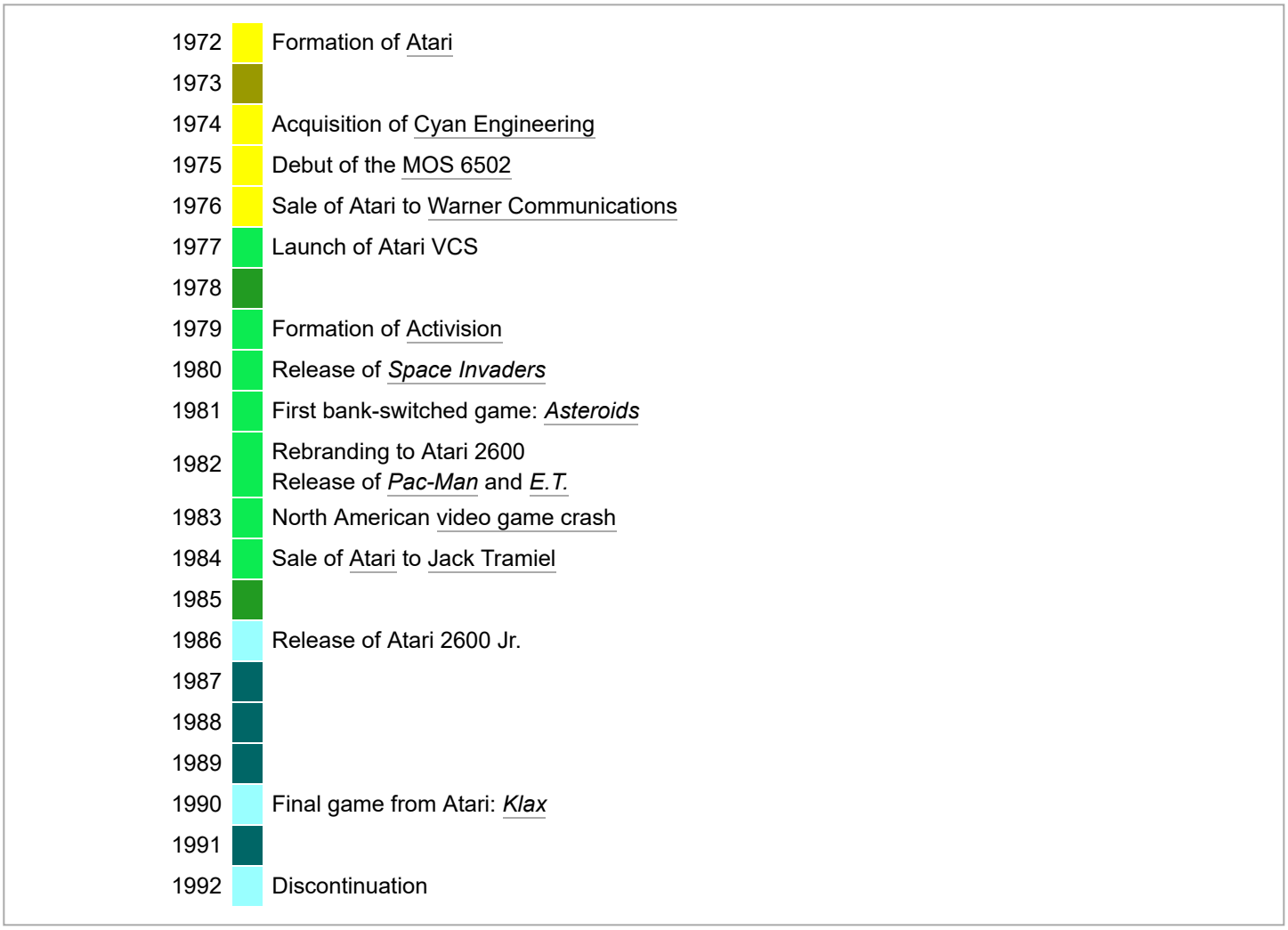
History

Atari, Inc. was founded by Nolan Bushnell and Ted Dabney in 1972. Its first major product was *Pong*, released in 1972, the first successful coin-operated video game.[6] While Atari continued to develop new arcade games in following years, *Pong* gave rise to a number of competitors to the growing

Atari VCS/2600 timeline



competing against Magnavox, the only other major producer of home consoles at the time. Atari engineers recognized, however, the limitation of custom logic integrated onto the circuit board, permanently confining the whole console to only one game.[8] The increasing competition increased the risk, as Atari had found with past arcade games and again with dedicated home consoles. Both platforms are built from integrating discrete electro-mechanical components into circuits, rather than programmed as on a mainframe computer. Therefore, development of a console had cost at least $100,000 (equivalent to about $504,000 in 2021) plus time to complete, but the final product only had about a three-month shelf life until becoming outdated by competition.[7]

By 1974, Atari had acquired Cyan Engineering, a Grass Valley electronics company founded by Steve Mayer and Larry Emmons, both former colleagues of Bushnell and Dabney from Ampex, who helped to develop new ideas for Atari's arcade games. Even prior to the release of the home version of *Pong*, Cyan's engineers, led by Mayer and Ron Milner, had envisioned a home console powered by new programmable microprocessors capable of playing Atari's current arcade offerings. The programmable microprocessors would make a console's design significantly simpler and more powerful than any dedicated single-game unit.[9] However, the cost $100–300 of such chips was far outside the range that their market would tolerate.[8] Atari had opened negotiations to use Motorola's new 6800 in future systems.[10]

MOS Technology 6502/6507

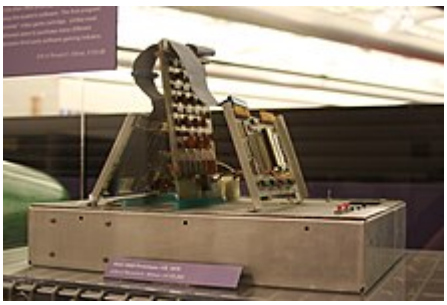
In September 1975, MOS Technology debuted the 6502 microprocessor for $25 at the Wescon trade show in San Francisco.[11][9] Mayer and Milner attended and met with the leader of the team that created the chip, Chuck Peddle, and proposed using the 6502 in a game console, and offered to discuss it further at Cyan's facilities after the show.[10]

Over two days, MOS and Cyan engineers sketched out a 6502-based console design by Meyer and Milner's specifications.[12] Financial models showed that even at $25, the 6502 would be too expensive, and Peddle offered them a planned 6507 microprocessor, a cost-reduced version of the 6502, and MOS's RIOT chip for input/output. Cyan and MOS negotiated the 6507 and RIOT chips at $12 a pair.[10][13] MOS also introduced Cyan to Microcomputer Associates, who had separately developed debugging software and hardware for MOS, and had developed the JOLT Computer for testing the 6502, which Peddle suggested would be useful for Atari and Cyan to use while developing their system.[9] Milner was able to demonstrate a proof-of-concept for a programmable console by implementing *Tank*, an arcade game by Atari's subsidiary Kee Games, on the JOLT.[9]

As part of the deal, Atari wanted a second source of the chipset. Peddle and Paivinen suggested Synertek whose co-founder, Bob Schreiner, was a friend of Peddle.[8] In October 1975, Atari informed the market that it was moving forward with MOS. The Motorola sales team had already told its management that the Atari deal was finalized, and Motorola management was livid. They announced a lawsuit against MOS the next week.[10]

Building the system

By December 1975, Atari hired Joe Decuir, a recent graduate from University of California, Berkeley who had been doing his own testing on the 6502. Decuir began debugging the first prototype designed by Mayer and Milner, which gained the codename "Stella" after the brand of Decuir's bicycle. This prototype included a breadboard-level design of the graphics interface to build upon.[7][9] A second prototype was completed by March 1976 with the help of Jay Miner, who created a chip called the Television Interface Adaptor (TIA) to send graphics and audio to a television.[14] The second prototype included a TIA, a 6507, and a ROM cartridge slot and adapter.[7]


The first Stella prototype on display at the Computer History Museum

As the TIA's design was refined, Al Alcorn brought in Atari's game developers to provide input on features.[9] There are significant limitations in the 6507, the TIA, and other components, so the programmers creatively optimized their games to maximize the console.[12] The console lacks a framebuffer and requires games to instruct the system to generate graphics in synchronization with the electron gun in the cathode-ray tube (CRT) as it scans across rows on the screen. The programmers found ways to "race the beam" to perform other functions while the electron gun scans outside of the visible screen.[15]

Alongside the electronics development, Bushnell brought in Gene Landrum, a consultant who had just prior consulted for Fairchild Camera and Instrument for its upcoming Channel F, to determine the consumer requirements for the console. In his final report, Landrum suggested a living room aesthetic, with a wood grain finish, and the cartridges must be "idiot proof, child proof and effective in resisting potential static [electricity] problems in a living room environment".[9] Landrum

Hardy had been an engineer for Fairchild and helped in the initial design of the Channel F cartridges, but he quit to join Atari in 1976. The interior of the cartridge that Asher and Hardy designed was sufficiently different to avoid patent conflicts, but the exterior components were directly influenced by the Channel F to help work around the static electricity concerns.[9][16]

Atari was still recovering from its 1974 financial woes and needed additional capital to fully enter the home console market, though Bushnell was wary of being beholden to outside financial sources.[9] Atari obtained smaller investments through 1975, but not at the scale it needed, and began considering a sale to a larger firm by early 1976.[9] Atari was introduced to Warner Communications, which saw the potential for the growing video game industry to help offset declining profits from its film and music divisions.[9] Negotiations took place during 1976, during which Atari cleared itself of liabilities, including settling a patent infringement lawsuit with Magnavox over Ralph H. Baer's patents that were the basis for the Magnavox Odyssey.[9] In mid-1976, Fairchild announced the Channel F, planned for release later that year, beating Atari to the market.[16]

By October 1976, Warner and Atari agreed to the purchase of Atari for $28 million.[9] Warner provided an estimated $120 million which was enough to fast-track Stella.[7][17] By 1977, development had advanced enough to brand it the "Atari Video Computer System" (VCS) and start developing games.[7]

Launch and success

The unit was showcased on June 4, 1977, at the Summer Consumer Electronics Show with plans for retail release in October. The announcement was purportedly delayed to wait out the terms of the Magnavox patent lawsuit settlement, which would have given Magnavox all technical information on any of Atari's products announced between June 1, 1976, and June 1, 1977.[9] However, Atari encountered production problems during its first batch, and its testing was complicated by the use of cartridges.

The second VCS model has lighter plastic molding and shielding, and a more angular shape, than the 1977 launch model.

The Atari VCS was launched in September 1977 at $199 (equivalent to about $890 in 2021), with two joysticks and a *Combat* cartridge; eight additional games were sold separately.[18] Most of the launch games were based on arcade games developed by Atari or its subsidiary Kee Games; for example, *Combat* was based on Kee's *Tank* (1974) and Atari's *Jet Fighter* (1975).[7] Atari sold between 350,000 and 400,000 Atari VCS units during 1977, attributed to the delay in shipping the units and consumers' unfamiliarity with a swappable-cartridge console that is not dedicated to only one game.[19]

From 1980, the VCS has only four front switches and a capital-letters logotype.

In 1978, Atari sold only 550,000 of the 800,000 systems manufactured. This required further financial support from Warner to cover losses.[19] Atari sold 1 million consoles in 1979, particularly during the holiday season, but there was new competition from the Mattel Electronics Intellivision and Magnavox Odyssey², which also use swappable ROM cartridges.[20]

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