= Sega Genesis =

The Sega Genesis , known as the Mega Drive (Japanese : ?????? , Hepburn : Mega Doraibu) in most regions outside North America , is a 16 @-@ bit home video game console which was developed and sold by Sega Enterprises , Ltd . The Genesis was Sega 's third console and the successor to the Master System . Sega first released the console as the Mega Drive in Japan in 1988 , followed by a North American debut under the Genesis moniker in 1989 . In 1990 , the console was distributed as the Mega Drive by Virgin Mastertronic in Europe , by Ozisoft in Australasia , and by Tec Toy in Brazil . In South Korea , the systems were distributed by Samsung and were known as the Super Gam * Boy , and later the Super Aladdin Boy .

Designed by an R & D team supervised by Hideki Sato and Masami Ishikawa , the hardware was adapted from Sega 's System 16 arcade board , centered on a Motorola 68000 processor as a primary CPU and a Zilog Z80 as a secondary processor . The system supports a library of more than 900 games created both by Sega and a wide array of third @-@ party publishers and delivered on ROM @-@ based cartridges . It can play Master System games when the separately sold Power Base Converter is inserted . The Genesis has benefited from several peripherals and network services , as well as multiple first @-@ party and third @-@ party variations of the console that focus on extending its functionality .

In Japan , the Mega Drive did not fare well against its two main competitors , Nintendo 's Super Famicom and NEC 's PC Engine , although it achieved considerable success in North America , Brazil , and Europe . Contributing to its success were its library of arcade game ports , the popularity of the Genesis @-@ exclusive Sonic the Hedgehog series , several popular sports game franchises , and aggressive youth marketing that positioned the system as the cool console for adolescents . The release of the Super Nintendo Entertainment System two years after the Genesis resulted in a fierce battle for market share in the United States and Europe that has often been termed as a " console war " by journalists and historians . As this contest drew increasing attention to the video game industry among the general public , the Genesis and several of its highest @-@ profile games attracted significant legal scrutiny on matters involving reverse engineering and video game violence . Controversy surrounding violent titles such as Night Trap and Mortal Kombat led Sega to create the Videogame Rating Council , a predecessor to the Entertainment Software Rating Board .

Sega sold 30 @.@ 75 million units worldwide . In addition , Tec Toy sold an estimated 3 million licensed variants in Brazil , Majesco projected it would sell 1 @.@ 5 million licensed variants of the system in the United States , and much smaller numbers were sold by Samsung in South Korea . The console and its games continue to be popular among game fans , game music fans , collectors , and emulation enthusiasts . As of 2015 , licensed third party re @-@ releases of the console are being sold by AtGames in North America and Europe . Many games have been re @-@ released in compilations for newer consoles and offered for download on various online services , such as Virtual Console , Xbox Live Arcade , PlayStation Network , and Steam . The Genesis was succeeded by the Sega Saturn .

= = History = =

= = = Development = = =

In the early 1980s , Sega Enterprises , Inc . , then a subsidiary of Gulf & Western , was one of the top five arcade game manufacturers active in the United States , as company revenues rose to $ 214 million . A downturn in the arcade business starting in 1982 seriously hurt the company , leading Gulf & Western to sell its North American arcade manufacturing organization and the licensing rights for its arcade games to Bally Manufacturing . The company retained Sega 's North American R & D operation , as well as its Japanese subsidiary , Sega Enterprises , Ltd . With its arcade business in decline , Gulf & Western executives turned to Sega Enterprises , Ltd . ' s president , Hayao Nakayama , for advice on how to proceed . Nakayama advocated that the company leverage its

hardware expertise gained through years working in the arcade industry to move into the home console market in Japan , which was in its infancy at the time .

Nakayama received permission to proceed with this project , leading to the release of Sega 's first home video game system , the SG @-@ 1000 , in July 1983 . The SG @-@ 1000 was not successful , and was replaced by the Sega Mark III within two years . In the meantime , Gulf & Western began to divest itself of its non @-@ core businesses after the death of company founder Charles Bluhdorn , so Nakayama and former Sega CEO David Rosen arranged a management buyout of the Japanese subsidiary in 1984 with financial backing from CSK Corporation , a prominent Japanese software company . Nakayama was then installed as CEO of the new Sega Enterprises , Ltd .

In 1986 , Sega redesigned the Mark III for release in North America as the Sega Master System . This was followed by a European release the next year . Although the Master System was a success in Europe , and later also Brazil , it failed to ignite significant interest in the Japanese or North American markets , which , by the mid @-@ to @-@ late 1980s , were both dominated by Nintendo . With Sega continuing to have difficulty penetrating the home market , Sega 's console R & D team , led by Masami Ishikawa and supervised by Hideki Sato , began work on a successor to the Master System almost immediately after that console launched .

In 1987 , Sega faced another threat to its console business when Japanese computer giant NEC released the PC Engine amid great publicity . To remain competitive against the two more established consumer electronics companies , Ishikawa and his team decided they needed to incorporate a 16 @-@ bit microprocessor into their new system to make an impact in the marketplace and once again turned to Sega 's strengths in the arcade industry to adapt the successful Sega System 16 arcade board into a home console architecture . The decision to use a Motorola 68000 as the system 's main CPU was made late in development , while a Zilog Z80 was used as a secondary CPU to handle the sound due to fears that the load to the main CPU would be too great if it handled both the visuals and the audio .

First announced in June 1988 in Beep ! , a Japanese gaming magazine , the developing console was referred to as the " Mark V , " but Sega management felt the need for a stronger name . After reviewing more than 300 proposals , the company settled on " Mega Drive . " In North America , the name of the console was changed to " Genesis . " The reason for this change is not known , but it may have been due to a trademark dispute .

=== Launch ===

Sega released the Mega Drive in Japan on October 29 , 1988 , though the launch was overshadowed by Nintendo 's release of Super Mario Bros. 3 a week earlier . Positive coverage from magazines Famitsu and Beep ! helped to establish a following , but Sega only managed to ship 400 @,@ 000 units in the first year . In order to increase sales , Sega released various peripherals and games , including an online banking system and answering machine called the Sega Mega Anser . Nevertheless , the Mega Drive was unable to overtake the venerable Famicom and remained a distant third in Japan behind Nintendo 's Super Famicom and NEC 's PC Engine throughout the 16 @-@ bit era .

Sega announced a North American release date for the system on January 9 , 1989 . At the time , Sega did not possess a North American sales and marketing organization and was distributing its Master System through Tonka . Dissatisfied with Tonka 's performance , Sega looked for a new partner to market the Genesis in North America and offered the rights to Atari Corporation , which did not yet have a 16 @-@ bit system . David Rosen made the proposal to Atari CEO Jack Tramiel and the president of Atari 's Entertainment Electronics Division , Michael Katz . Tramiel declined to acquire the new console , deeming it too expensive , and instead opted to focus on the Atari ST . Sega decided to launch the console through its own Sega of America subsidiary , which executed a limited launch on August 14 , 1989 , in New York City and Los Angeles . The Sega Genesis was released in the rest of North America later that year .

The European version was released on November 30 , 1990 . Building on the success of the

Master System , the Mega Drive became the most popular console in Europe . Since the Mega Drive was two years old at the time of its release in the region , more games were available at launch compared to the launches in other regions . The ports of arcade titles like Altered Beast , Golden Axe and Ghouls ' n Ghosts , available in stores at launch , provided a strong image of the console 's power to deliver an arcade @-@ like experience . The release of the Mega Drive in Europe was handled by Virgin Mastertronic , which was later purchased by Sega in 1991 and became Sega of Europe .

Other companies assisted in distributing the console to various countries worldwide . Ozisoft handled the Mega Drive 's launch and marketing in Australia , as it had done before with the Master System . In Brazil , the Mega Drive was released by Tec Toy in 1990 , only a year after the Brazilian release of the Master System . Tec Toy produced games exclusively for the Brazilian market and began a network service for the system called Sega Meganet in 1995 . In India , Sega entered a distribution deal with Shaw Wallace in Spring 1995 in order to circumvent an 80 % import tariff , with each unit selling for INR ? 18 @,@ 000 . Samsung handled sales and distribution in Korea , where it was renamed the " Super Gam * Boy " and retained the Mega Drive logo alongside the Samsung name . It was later renamed " Super Aladdin Boy . "

= = = North American sales and marketing = = =

For the North American market , former Atari Corporation Entertainment Electronics Division president and new Sega of America CEO Michael Katz instituted a two @-@ part approach to build sales in the region . The first part involved a marketing campaign to challenge Nintendo head @-@ on and emphasize the more arcade @-@ like experience available on the Genesis , summarized by slogans including " Genesis does what Nintendon 't " . Since Nintendo owned the console rights to most arcade games of the time , the second part involved creating a library of instantly @-@ recognizable titles which used the names and likenesses of celebrities and athletes such as Pat Riley Basketball , Arnold Palmer Tournament Golf , James ' Buster ' Douglas Knockout Boxing , Joe Montana Football , Tommy Lasorda Baseball , Mario Lemieux Hockey , and Michael Jackson 's Moonwalker . Nonetheless , it had a hard time overcoming Nintendo 's ubiquitous presence in consumers ' homes . Tasked by Nakayama to sell one million units within the first year , Katz and Sega of America managed to sell only 500 @,@ 000 units .

In mid @-@ 1990 , Nakayama hired Tom Kalinske to replace Katz as CEO of Sega of America . Although Kalinske initially knew little about the video game market , he surrounded himself with industry @-@ savvy advisors . A believer in the razor and blades business model , he developed a four @-@ point plan : cut the price of the console , create a U.S.-based team to develop games targeted at the American market , continue and expand the aggressive advertising campaigns , and replace the bundled game Altered Beast with a new title , Sonic the Hedgehog . The Japanese board of directors initially disapproved of the plan , but all four points were approved by Nakayama , who told Kalinske , " I hired you to make the decisions for Europe and the Americas , so go ahead and do it . " Magazines praised Sonic as one of the greatest games yet made , and Sega 's console finally took off as customers who had been waiting for the release of the international version of Nintendo 's Super Famicom ? dubbed the Super Nintendo Entertainment System or SNES ? decided to purchase a Genesis instead . Nintendo 's console debuted against an established competitor , while NEC 's TurboGrafx @-@ 16 failed to gain traction , and NEC soon pulled out of the market . In large part due to the popularity of this game , the Sega Genesis outsold the SNES in the United States nearly two to one during the 1991 holiday season . This success led to Sega having control of 65 % of the 16 @-@ bit console market in January 1992 , making it the first time Nintendo was not the console leader since December 1985 .

To compete with Nintendo , Sega was more open to new types of games than its rival , but still tightly controlled the approval process for third @-@ party games and charged high prices for cartridge manufacturing . Technicians from American third @-@ party video game publisher Electronic Arts (EA) reverse engineered the Genesis in 1989 , following nearly one year of negotiations with Sega in which EA requested a more liberal licensing agreement than was standard

in the industry before releasing its games for the system . The clean room reverse engineering was led by Steve Hayes and Jim Nitchals , lasting several months before EA secretly began game development . EA founder Trip Hawkins confronted Nakayama with this information one day prior to the 1990 Consumer Electronics Show (CES) , noting that EA had the ability to run its own licensing program if Sega refused to meet its demands . Sega relented , and the next day EA 's upcoming Genesis games were showcased at CES . EA signed what Hawkins described as " a very unusual and much more enlightened license agreement " with Sega in June 1990 : " Among other things , we had the right to make as many titles as we wanted . We could approve our own titles ... the royalty rates were a lot more reasonable . We also had more direct control over manufacturing . " After the deal was in place , EA chief creative officer Bing Gordon learned that " we hadn 't figured out all the workarounds " and " Sega still had the ability to lock us out , " noting " It just would have been a public relations fiasco . " EA released its first two Genesis games , Populous and Budokan : The Martial Spirit , within the month . The first Genesis version of EA 's John Madden Football arrived before the end of 1990 , and became what Gordon called a " killer app " for the system . Taking advantage of the licensing agreement , Gordon and EA 's vice president of marketing services Nancy Fong created a visual identifier for EA 's Genesis cartridges : A yellow stripe on their left side added during manufacturing .

Sega was able to outsell Nintendo four Christmas seasons in a row due to the Genesis ' head start , a lower price point , and a larger library of games when compared to the Super Nintendo Entertainment System (SNES) at its release . Sega had ten games for every game on SNES , and while the SNES had an exclusive version of Final Fight , one of Sega 's internal development teams created Streets of Rage , which had bigger levels , tougher enemies , and a well @-@ regarded soundtrack . ASCII Entertainment reported in spring 1993 that Genesis had 250 titles versus 75 for Super Nintendo , but limited shelf space meant that stores typically offered 100 Genesis and 50 Super Nintendo titles . The NES was still the leader , with 300 titles and 100 on shelves .

Sega 's advertising positioned the Genesis as the cooler console , and as its advertising evolved , the company coined the term " blast processing " (the origin of which is an obscure programming trick on the graphics hardware) to suggest that its processing capabilities were far greater than those of the SNES . A Sony focus group found that teenage boys would not admit to owning a SNES rather than a Genesis . With the Genesis often outselling the SNES at a ratio of 2 : 1 , Nintendo and Sega both focused heavily on impression management of the market , even going to the point of deception , with Nintendo claiming they had sold more consoles in 1991 than they actually had , and forecasting they would sell 6 million consoles by the end of 1992 , while their actual U.S. install base at the end of 1992 was only just more than 4 million units . Due to these tactics , it was difficult to ascertain a clear leader in market share for several years at a time , with Nintendo 's dollar share of the U.S. 16 @-@ bit market dipping down from 60 % at the end of 1992 to 37 % at the end of 1993 , Sega claiming 55 % of all 16 @-@ bit hardware sales during 1994 , and Donkey Kong Country helping the SNES to outsell the Genesis from 1995 through 1997 . According to a 2004 study of NPD sales data that presents year by year charts through 2001 , the Sega Genesis was able to maintain its lead over the Super NES in the American 16 @-@ bit console market . According to a 2014 Wedbush Securities report based on revised NPD sales data , the SNES outsold the Genesis in the U.S. market .

= = = Sonic the Hedgehog = = =

While Sega was seeking a flagship series to compete with Nintendo 's Mario series along with a character to serve as a company mascot , several character designs were submitted as part of a company @-@ wide contest , including " an anime @-@ inspired egg and a teal hedgehog with red shoes created by Naoto Oshima that he called Mr. Needlehouse . " " Mr. Needlemouse " won the contest and was renamed Sonic the Hedgehog , spawning one of the best @-@ selling video game franchises in history . The gameplay of Sonic the Hedgehog originated with a tech demo created by Yuji Naka , who had developed an algorithm that allowed a sprite to move smoothly on a curve by determining its position with a dot matrix . Naka 's original prototype was a platform game that

involved a fast @-@ moving character rolling in a ball through a long winding tube , and this concept was subsequently fleshed out with Oshima 's character design and levels conceived by designer Hirokazu Yasuhara . Sonic 's blue pigmentation was chosen to match Sega 's cobalt blue logo , and his shoes were a concept evolved from a design inspired by Michael Jackson 's boots with the addition of the color red , which was inspired by both Santa Claus and the contrast of those colors on Jackson 's 1987 album Bad ; his personality was based on Bill Clinton 's " can do " attitude .

Although Katz and Sega of America 's marketing experts disliked the idea of Sonic , certain that it would not catch on with most American kids , Kalinske 's strategy to place Sonic the Hedgehog as the pack @-@ in title paid off . Featuring speedy gameplay , Sonic the Hedgehog greatly increased the popularity of the Sega Genesis in North America . Bundling Sonic the Hedgehog with the Sega Genesis is credited with helping Sega gain 65 % of the market share against Nintendo .

= = = Trademark Security System and Sega v. Accolade = = =

After the release of the Sega Genesis in 1989 , video game publisher Accolade began exploring options to release some of their PC game titles onto the console . At the time , Sega had a licensing deal in place for third @-@ party developers that increased the costs to the developer . According to Accolade co @-@ founder Alan Miller , " One pays them between $ 10 and $ 15 per cartridge on top of the real hardware manufacturing costs , so it about doubles the cost of goods to the independent publisher . " To get around licensing , Accolade chose to seek an alternative way to bring their games to the Genesis . They did so by purchasing one in order to decompile the executable code of three Genesis games . Such information was used to program their new Genesis cartridges in a way that would allow them to disable the security lockouts on the Genesis that prevented unlicensed games from being able to be played . This strategy was used successfully to bring Ishido : The Way of Stones to the Genesis in 1990 . To do so , Accolade had copied Sega 's copyrighted game code multiple times in order to reverse engineer the software of Sega 's licensed Genesis games .

As a result of piracy from foreign countries and unlicensed development issues , Sega incorporated a technical protection mechanism into a new edition of the Genesis released in 1990 , referred to as the Genesis III . This new variation of the Genesis included a code known as the Trademark Security System (TMSS) , which , when a game cartridge was inserted , would check for the presence of the string " SEGA " at a particular point in the memory contained in the cartridge . If the string was present , the console would run the game , and would briefly display the message : " Produced by or under license from Sega Enterprises , Ltd . " This system had a twofold effect : it added extra protection against unlicensed developers and software piracy , and forced the Sega trademark to display when the game was powered up , making a lawsuit for trademark infringement possible if unlicensed software were to be developed . Accolade learned of this development at the Winter Consumer Electronics Show in January 1991 , where Sega showed the new Genesis III and demonstrated it screening and rejecting an Ishido game cartridge . With more games planned for the following year , Accolade successfully identified the TMSS file . They later added this file to the games HardBall ! , Star Control , Mike Ditka Power Football , and Turrican .

In response to the creation of these unlicensed games , Sega filed suit against Accolade in the United States District Court for the Northern District of California , on charges of trademark infringement , unfair competition , and copyright infringement . In response , Accolade filed a counterclaim for falsifying the source of its games by displaying the Sega trademark when the game was powered up . Although the district court initially ruled for Sega and issued an injunction preventing Accolade from continuing to reverse engineer the Genesis , Accolade appealed the verdict to the United States Court of Appeals for the Ninth Circuit .

As a result of the appeal , the Ninth Circuit overturned the district court 's verdict and ruled that Accolade 's decompilation of the Sega software constituted fair use . The court 's written opinion followed on October 20 , 1992 , and noted that the use of the software was non @-@ exploitative , although commercial . Further , the court found that the trademark infringement , being required by the TMSS for a Genesis game to run on the system , had been inadvertently triggered by a fair use act and the fault of Sega for having caused false labeling . Ultimately , Sega and Accolade settled

the case on April 30 , 1993 . As a part of this settlement , Accolade became an official licensee of Sega , and later developed and released Barkley Shut Up and Jam ! while under license . The terms of the licensing , including whether or not any special arrangements or discounts were made to Accolade , were not released to the public . The financial terms of the settlement were also not disclosed , although both companies agreed to pay their own legal costs .

= = = Videogame Rating Council and Congressional hearings on video game violence = = =

 In 1993 , American media began to focus on the mature content of certain video games . Games such as Night Trap for the Sega CD , an add @-@ on , received unprecedented scrutiny . Issues about Night Trap were brought up in the United Kingdom , with former Sega of Europe development director Mike Brogan noting that " Night Trap got Sega an awful lot of publicity ... it was also cited in UK Parliament for being classified as " 15 " due to its use of real actors . This came at a time when Sega was capitalizing on its image as an edgy company with attitude , and this only reinforced that image . The most controversial title of the year by far was Midway 's Mortal Kombat , ported to the Genesis and SNES by Acclaim . In response to public outcry over the game 's graphic violence , Nintendo decided to replace the blood in the game with " sweat " and the arcade 's gruesome " fatalities " with less violent finishing moves . Sega took a different approach , instituting America 's first video game ratings system , the Videogame Rating Council (VRC) , for all its current systems . Ratings ranged from the family friendly GA rating to the more mature rating of MA @-@ 13 , and the adults @-@ only rating of MA @-@ 17 . With the rating system in place , Sega released its version of Mortal Kombat , appearing to have removed all the blood and sweat effects and toning down the finishing moves even more than in the SNES version . However , all the arcade 's blood and uncensored finishing moves could be enabled by entering a " Blood Code " . This technicality allowed Sega to release the game with a relatively low MA @-@ 13 rating . Meanwhile , the tamer SNES version shipped without a rating .
 The Genesis version of Mortal Kombat was well received by gaming press , as well as fans , outselling the SNES version three- or four @-@ to @-@ one , while Nintendo was criticized for censoring the SNES version of the game . Executive vice president of Nintendo of America Howard Lincoln was quick to point out at the hearings that Night Trap had no such rating , saying to Senator Joe Lieberman :
 In response , Sega of America vice president Bill White showed a videotape of violent video games on the SNES and stressed the importance of rating video games . At the end of the hearing , Lieberman called for another hearing in February 1994 to check on progress toward a rating system for video game violence .
 As a result of the Congressional hearings , Night Trap started to generate more sales and released ports to the PC , Sega 32X , and 3DO . According to Digital Pictures founder Tom Zito , " You know , I sold 50 @,@ 000 units of Night Trap a week after those hearings . " Although experiencing increased sales , Sega decided to recall Night Trap and rerelease it with revisions in 1994 due to the Congressional hearings . After the close of these hearings , video game manufacturers came together to establish the rating system that Lieberman had called for . Initially , Sega proposed the universal adoption of its system , but after objections by Nintendo and others , Sega took a role in forming a new one . This became the Entertainment Software Rating Board , an independent organization that received praise from Lieberman . With this new rating system in place , Nintendo decided its censorship policies were no longer needed , and the SNES port of Mortal Kombat II was released uncensored .

= = = 32 @-@ bit era and beyond = = =

 In order to extend the life of the Genesis , Sega released two add @-@ ons to increase its capabilities : a CD @-@ based peripheral known as the Sega CD (Mega @-@ CD outside North America) , and a 32 @-@ bit peripheral known as the Sega 32X . 2 @.@ 24 million Sega CD units were sold worldwide , and an estimated 665 @,@ 000 32X units were sold by the end of 1994 .

Following the launch of the next @-@ generation 32 @-@ bit Sony PlayStation and the Sega Saturn , sales of 16 @-@ bit hardware and software continued to account for 64 % of the video game market in 1995 . Sega underestimated the continued popularity of the Genesis and did not have the inventory to meet demand for the product . Sega was able to capture 43 % of the dollar share of the U.S. video game market and claimed to have sold more than 2 million Genesis units in 1995 , while Genesis software such as Vectorman remained highly successful , but Kalinske estimated that " we could have sold another 300 @,@ 000 Genesis systems in the November / December timeframe . " Nakayama 's decision to focus on the Saturn over the Genesis , based on the systems ' relative performance in Japan , has been cited as the major contributing factor in this miscalculation . By contrast , Nintendo concentrated on the 16 @-@ bit home console market , as well as its successful handheld , the Game Boy . As a result , Nintendo took in 42 % of the video game market dollar share , without launching a 32 @-@ bit console to compete directly with the PlayStation or the Saturn . Following tensions with Sega Enterprises , Ltd. over its focus on the Saturn , Kalinske , who oversaw the rise of the Genesis in 1991 , grew uninterested in the business and resigned in mid @-@ 1996 .

Sega sold 30 @.@ 75 million Genesis units worldwide . Of these , 3 @.@ 58 million were sold in Japan , and sales in Europe and the U.S. are roughly estimated at 8 million and 18 million as of June 1997 (at which time Sega was no longer manufacturing the system) respectively . In 1998 , Sega licensed the Genesis to Majesco in North America so it could rerelease the console . Majesco began reselling millions of formerly unsold cartridges at a budget price , together with 150 @,@ 000 units of the second model of the Genesis . It released the Sega Genesis 3 , projecting to sell 1 @.@ 5 million units of the console by the end of 1998 . An estimated 3 million Genesis units were sold by Tec Toy in Brazil .

= = Technical specifications = =

The main microprocessor is a 16 / 32 @-@ bit Motorola 68000 CPU clocked at 7 @.@ 6 MHz . The console uses a Zilog Z80 sub @-@ processor , mainly used to control the sound hardware and provide backwards compatibility with the Master System . The system has 72 kB of RAM , 64 kB of video RAM , and can display up to 61 colors at once from a palette of 512 . The games are in ROM cartridge format and inserted in the top .

The system produces sound using a Yamaha YM2612 FM synthesizer and a Texas Instruments SN76489 PSG ; the latter is integrated with the Video Display Processor (VDP) . The Z80 processor is primarily used to control both sound chips to produce stereo music and sound effects . Most revisions of the original system contain a discrete YM2612 and a separate YM7101 VDP ; the functionality of these two chips was later integrated into a single custom ASIC (FC1004) for the model 2 and later revisions .

The back of the model 1 console provides a radio frequency output port (designed for use with antenna and cable systems) and a specialized 8 @-@ pin DIN port , both of which provide video and audio output . Both outputs produce monophonic sound ; a headphone jack on the front of the console produces stereo sound . On the model 2 , the DIN port , radio frequency output port , and headphone jack are replaced by a 9 @-@ pin mini @-@ DIN port on the back for composite video , RGB and stereo sound , and the standard RF switch . Earlier model 1 consoles have a 9 @-@ pin extension port , although this was removed in later production runs and is absent in the model 2 . An edge connector on the bottom @-@ right of the console allows it to be connected to a peripheral .

= = = Peripherals = = =

The standard controller features a rounded shape , a directional pad , three main buttons , and a " start " button . Sega later released a six @-@ button version in 1993 . This pad is slightly smaller and features three additional face buttons , similar to the design of buttons on some popular arcade fighting games such as Street Fighter II . Sega released a wireless revision of the six @-@ button controller , the Remote Arcade Pad .

The system is backwards compatible with the Master System . The first peripheral released , the Power Base Converter (Master System Converter in Europe) , allows Master System games to be played . A second model , the Master System Converter 2 , was released only in Europe for use with the Mega Drive II .

Other peripherals were released to add functionality . The Menacer is a wireless , infrared light gun peripheral used with compatible games . Other third parties created light gun peripherals for the Genesis , such as the American Laser Games Pistol and the Konami Justifier . Released for art creation software , the Sega Mega Mouse features three buttons and is only compatible with a few games , such as Eye of the Beholder . A foam @-@ covered bat called the BatterUP and the TeeVGolf golf club were released for both the Genesis and SNES .

In November 1993 , Sega released the Sega Activator , an octagonal device that lies flat on the floor and translates the player 's physical movements into game inputs . Several high @-@ profile games , including Mortal Kombat and Street Fighter II : Special Champion Edition , were adapted to support the peripheral . The device was a commercial failure , due mainly to its inaccuracy and its high price point . IGN editor Craig Harris ranked the Sega Activator the third worst video game controller ever made .

Both EA and Sega released multitaps to allow more than the standard two players to play at once . Initially , EA 's version , the 4 Way Play , and Sega 's adapter , the Team Player , only supported each publisher 's titles . In response to complaints about this , Sega publicly stated that " We have been working hard to resolve this problem since we learned of it " and that a new Team Player which would work with all multitap games for the console would be released shortly . Later games were created to work on both the 4 Way Play and Team Player . Codemasters also developed the J @-@ Cart system , providing two extra ports on the cartridge itself , although the technology came late in the console 's life and is only featured on a few games . Sega planned to release a steering wheel peripheral in 1994 , and the Genesis version of Virtua Racing was advertised as being " steering wheel compatible , " but the peripheral was cancelled .

= = = Network services = = =

In its first foray into online gaming , Sega created Sega Meganet , which debuted in Japan on November 3 , 1990 . Operating through a cartridge and a peripheral called the " Mega Modem , " this allowed Mega Drive players to play seventeen games online . A North American version dubbed " Tele @-@ Genesis , " was announced but never released . Another phone @-@ based system , the Mega Anser , turned the Japanese Mega Drive into an online banking terminal .

In 1994 , Sega started the Sega Channel , a game distribution system using cable television services Time Warner Cable and TCI . Using a special peripheral , Genesis players could download a title from a library of fifty each month , and demos for upcoming games . Games were downloaded to internal memory and deleted when the console was powered off . The Sega Channel reached 250 @,@ 000 subscribers at its peak and ran until July 31 , 1998 , well past the release of the Sega Saturn .

In an effort to compete with Sega , third @-@ party developer Catapult Entertainment created the XBAND , a peripheral which allowed Genesis players to engage in online competitive gaming . Using telephone services to share data , XBAND was initially offered in five U.S. cities in November 1994 . The following year , the service was extended to the SNES , and Catapult teamed up with Blockbuster Video to market the service , but as interest in the service waned , it was discontinued in April 1997 .

= = Game library = =

The Genesis library was initially modest , but eventually grew to contain games to appeal to all types of players . The initial pack @-@ in title was Altered Beast , which was later replaced with Sonic the Hedgehog in 1991 . Top sellers included Sonic the Hedgehog , its sequel Sonic the Hedgehog 2 , and Disney 's Aladdin . During development for the console , Sega Enterprises

focused on developing action games , while Sega of America was tasked with developing sports games . A large part of the appeal of the Genesis library during the console 's lifetime was the arcade @-@ based experience of its games , as well as more difficult entries such as Ecco the Dolphin , and sports games such as Joe Montana Football . Compared to its competition , Sega advertised to an older audience by hosting more mature games , including the uncensored version of Mortal Kombat .

As Sega was a prolific arcade developer in the 1980s , early Genesis games included arcade ports such as Altered Beast , Golden Axe , and Super Hang @-@ On . Console teams would develop titles in acclaimed series such as Castle of Illusion , Phantasy Star , Shinobi , and Streets of Rage . Alex Kidd was the mascot of Sega 's previous console , but he would not receive any Mega Drive sequels after Alex Kidd in the Enchanted Castle due to Sega of America wanting to replace him with the titular character from Sonic the Hedgehog as mascot . The Sonic the Hedgehog series was a big hit both commercially and critically , with the original game being the best selling game on the system . Sega of America would also help set up Sega Technical Institute and Sega Interactive , who worked on titles such as Comix Zone and Eternal Champions respectively in an attempt to appeal more to western audiences .

In addition to games developed by Sega 's internal studios , Sega would collaborate with various other developers to publish more games for the system . These developers include Ancient (Beyond Oasis) , BlueSky Software (Vectorman) , Camelot (Shining Force) , Climax Entertainment (Landstalker) , Johnson Voorsanger Productions (ToeJam & Earl) , Novotrade International (Ecco the Dolphin) , Technopop (Zero Tolerance) , Treasure (Gunstar Heroes) , Vic Tokai (Decap Attack) , and Virgin Games (Disney 's Aladdin) .

Initially , the Genesis suffered from limited third @-@ party support due to its low market share and Nintendo 's monopolizes practices . Notably , the arcade hit Street Fighter II by Capcom initially skipped the Genesis , instead only being released on the SNES . However , as the Genesis continued to grow in popularity , Capcom eventually ported a version of Street Fighter II to the system known as Street Fighter II ? : Champion Edition , that would go on to sell over a million copies . One of the biggest third @-@ party companies to support the Genesis early on was Electronic Arts . Trip Hawkins , founder and then president of EA , believed the Genesis faster drawing speed made it more suitable for sport games than the SNES , and credits EA 's success on the Genesis for helping catapult the EA Sports brand . Another third @-@ party blockbuster for the system was the port of the original Mortal Kombat game . Although the arcade game was released on the SNES and Genesis simultaneously , the two ports were not identical . The SNES version looked more identical to the arcade game , but the Genesis version allowed players to bypass censorship , helping make it the more popular port . Ed Boon , co @-@ creator of the Mortal Kombat franchise , compared the two versions , stating that the SNES version did not play as well the Genesis version .

= = = Sega Virtua Processor = = =

In order to produce more visually appealing graphics , companies began adding special processing chips to their cartridges to effectively increase the console 's capabilities . On the SNES , these are several DSP chips and RISC processors , which allows the console to produce faster and more accurate 3D and pseudo @-@ 3D graphics . In particular , the Super FX chip was designed to offload complex rendering tasks from the main CPU , enabling it to produce visual effects that the console cannot produce on its own . The chip was first used in Star Fox , which renders 3D polygons in real time , and Super Mario World 2 : Yoshi 's Island demonstrated the ability to rotate , scale , and stretch individual sprites and manipulate large areas of the screen .

As these enhancements became more commonplace on the Super NES , the stock of existing Genesis games began to look outdated in comparison . Sega began work on an enhancement chip to compete with the Super FX , resulting in the Sega Virtua Processor . This chip enables the Genesis to render polygons in real time and provides an " Axis Transformation " unit that handles scaling and rotation . Virtua Racing , the only game released with this chip , runs at a significantly

higher and more stable frame rate than similar games on the SNES . The chip was expensive to produce , and increased the cost of the games that used it . At US $ 100 , Virtua Racing was the most expensive Genesis cartridge ever produced . Two other games , Virtua Fighter and Daytona USA , were planned for the SVP chip , but were instead moved into the Saturn 's launch line @-@ up . There were plans to sell the SVP chip as a separate upgrade module for the Genesis , but this module was never released .

= = Add @-@ ons = =

In addition to accessories such as the Power Base Converter , the Sega Genesis supports two add @-@ ons that each support their own game libraries . The first is the Sega CD (known as the Mega @-@ CD in all regions except for North America) , a compact disc @-@ based peripheral that can play its library of games in CD @-@ ROM format . The second is the Sega 32X , a 32 @-@ bit peripheral which uses ROM cartridges and serves as a pass @-@ through for Genesis games . Sega produced a custom power strip to fit the peripherals ' large AC adapters . Both add @-@ ons were officially discontinued in 1996 .

= = = Sega CD = = =

By 1991 , compact discs had gained in popularity as a data storage device for music and software . PCs and video game companies had started to make use of this technology . NEC had been the first to include CD technology in a game console with the release of the TurboGrafx @-@ CD add @-@ on , and Nintendo was making plans to develop its own CD peripheral as well . Seeing the opportunity to gain an advantage over its rivals , Sega partnered with JVC to develop a CD @-@ ROM add @-@ on for the Genesis . Sega launched the Mega @-@ CD in Japan on December 1 , 1991 , initially retailing at JP ¥ 49 @,@ 800 . The CD add @-@ on was launched in North America on October 15 , 1992 , as the Sega CD , with a retail price of US $ 299 ; it was released in Europe as the Mega @-@ CD in 1993 .
In addition to greatly expanding the potential size of its games , this add @-@ on unit upgraded the graphics and sound capabilities by adding a second , more powerful processor , more system memory , and hardware @-@ based scaling and rotation similar to that found in Sega 's arcade games . It provided battery @-@ backed storage RAM to allow games to save high scores , configuration data , and game progress ; an additional data storage cartridge was sold separately .
Shortly after its launch in North America , Sega began shipping the Sega CD with the pack @-@ in game Sewer Shark , a full motion video (FMV) game developed by Digital Pictures , a company that became an important partner for Sega . Touting the benefits of the CD 's comparatively vast storage space , Sega and its third @-@ party developers produced a number of games for the add @-@ on that include digital video in their gameplay or as bonus content , as well as rereleasing several cartridge @-@ based games with high @-@ fidelity audio tracks . In 1993 , Sega released the Sega CD 2 , a smaller and lighter version of the add @-@ on designed for the Genesis II , at a reduced price compared to the original . A limited number of games were later developed that use both the Sega CD and the Sega 32X add @-@ ons .
The Mega @-@ CD sold only 100 @,@ 000 units during its first year in Japan , falling well below expectations . Although many consumers blamed the add @-@ on 's high launch price , it also suffered from a tiny software library ; only two titles being available at launch . This was due in part to the long delay before Sega made its software development kit available to third @-@ party developers . Sales were more successful in North America and Europe , although the novelty of FMV and CD @-@ enhanced games quickly wore off as many of the system 's later games were met with lukewarm or negative reviews . In 1995 , Sega announced a shift in focus to its new console , the Saturn , and discontinued all advertising for Genesis hardware , including the Sega CD . The add @-@ on sold 2 @.@ 24 million units worldwide .

= = = Sega 32X = = =

With the release of the Sega Saturn slated for 1995 , Sega began to develop a stop @-@ gap solution that would bridge the gap between the Genesis and the Saturn , and would serve as a less expensive entry into the 32 @-@ bit era .

At the Winter Consumer Electronics Show in January 1994 , Sega of America research and development head Joe Miller took a phone call from Nakayama , in which Nakayama stressed the importance of coming up with a quick response to the Atari Jaguar . One potential idea for this came from a concept from Sega Enterprises , later known as " Project Jupiter , " an entirely new independent console . Project Jupiter was initially slated to be a new version of the Genesis , with an upgraded color palette and a lower cost than the upcoming Saturn , as well as with some limited 3D capabilities thanks to integration of ideas from the development of the Sega Virtua Processor chip . Miller suggested an alternative strategy , citing concerns with releasing a new console with no previous design specifications within six to nine months . At the suggestion from Miller and his team , Sega designed the 32X as a peripheral for the existing Genesis , expanding its power with two 32 @-@ bit SuperH @-@ 2 processors . The SH @-@ 2 had been developed in 1993 as a joint venture between Sega and Japanese electronics company Hitachi . At the end of the Consumer Electronics show , with the basic design of the 32X in place , Sega Enterprises invited Sega of America to assist in development of the new add @-@ on .

Although the new unit was a stronger console than originally proposed , it was not compatible with Saturn games . Before the 32X could be launched , the release date of the Saturn was announced for November 1994 in Japan , coinciding with the 32X 's target launch date in North America . Sega of America now was faced with trying to market the 32X with the Saturn 's Japan release occurring simultaneously . Their answer was to call the 32X a " transitional device " between the Genesis and the Saturn . This was justified by Sega 's statement that both platforms would run at the same time , and that the 32X would be aimed at players who could not afford the more expensive Saturn .

The 32X was released in November 1994 , in time for the holiday season . Demand among retailers was high , and Sega could not keep up orders for the system . More than 1 @,@ 000 @,@ 000 orders had been placed for 32X units , but Sega had only managed to ship 600 @,@ 000 units by January 1995 . Launching at about the same price as a Genesis console , the price of the 32X was less than half of what the Saturn 's price would be at launch . Notwithstanding the lower priced console 's positioning as an inexpensive entry into 32 @-@ bit gaming , Sega had a difficult time convincing third @-@ party developers to create games for the new system . After an early run on the peripheral , news soon spread to the public of the upcoming release of the Sega Saturn , which would not support the 32X 's games . The Saturn was released early on May 11 , 1995 , four months earlier than its originally intended release date of September 2 , 1995 . The Saturn , in turn , caused developers to further shy away from the console and created doubt about the library for the 32X , even with Sega 's assurances that there would be a large number of games developed for the system . In early 1996 , Sega conceded that they had promised too much out of the 32X and decided to stop producing the system in order to focus on the Saturn . Prices for the 32X dropped to $ 99 and cleared out of stores at $ 19 @.@ 95 .

= = Variations = =

More than a dozen licensed variations of the Sega Genesis / Mega Drive have been released . In addition to models made by Sega , alternate models were made by other companies , such as Majesco , AtGames , JVC , Pioneer Corporation , Amstrad , and Aiwa . A number of bootleg clones were created during its lifespan .

= = = First @-@ party models = = =

In 1993 , Sega introduced a smaller , lighter version of the console , naming it the Genesis II in North America and the Mega Drive II everywhere else . This version omits the headphone jack in the front , replaces the A / V @-@ Out connector with a smaller version that supports stereo sound ,

and provides a simpler , less expensive mainboard that requires less power .

 Sega released a combined , semi @-@ portable Genesis / Sega CD unit called the Genesis CDX (marketed as the Multi @-@ Mega in Europe) . This unit retailed at $ 399 @.@ 95 in the US (roughly $ 100 more than the individual Genesis and Sega CD units put together , since the Sega CD dropped its price to $ 229 half a year before) , and was bundled with Sonic the Hedgehog CD , Sega Classics Arcade Collection , and the Sega CD version of Ecco the Dolphin . It is incompatible with some games and cannot work with the Sega 32X due to overheating and electrical shock issues . The CDX features a small LCD screen that , when the unit is used to play audio CDs , displays the current track being played . With this feature and the system 's lightweight build (weighing two pounds) , Sega marketed it in part as a portable CD player .

 Late in the 16 @-@ bit era , Sega released a handheld version of the Genesis called the Genesis Nomad . Its design was based on the Mega Jet , a Mega Drive portable unit featured on airplane flights in Japan . As the only successor to the Game Gear , the Nomad operates on 6 AA batteries , displaying its graphics on a 3 @.@ 25 @-@ inch (8 @.@ 25 @-@ mm) LCD screen . The Nomad supports the entire Genesis library , but cannot be used with the Sega 32X , the Sega CD , or the Power Base Converter .

 Exclusive to the Japanese market was the TeraDrive , a Mega Drive combined with a computer . Sega produced three arcade system boards based on the Mega Drive : the System C @-@ 2 , the MegaTech , and the MegaPlay , which support approximately 80 games combined .

= = = Third @-@ party models = = =

 Working with Sega Enterprises , JVC released the Wondermega on April 1 , 1992 , in Japan . The system was later redesigned by JVC and released as the X 'Eye in North America in September 1994 . Designed by JVC to be a Genesis and Sega CD combination with high quality audio , the Wondermega 's high price ($ 500 at launch) kept it out of the hands of average consumers . The same was true of the Pioneer LaserActive , which requires an add @-@ on known as the Mega @-@ LD pack , developed by Sega , in order to play Genesis and Sega CD games . Although the LaserActive was lined up to compete with the 3DO Interactive Multiplayer , the combined price of the system and the Mega @-@ LD pack made it a prohibitively expensive option for Sega players . Aiwa released the CSD @-@ GM1 , a combination Genesis / Sega CD unit built into a boombox . Several companies added the Mega Drive to personal computers , mimicking the design of Sega 's TeraDrive ; these include the MSX models AX @-@ 330 and AX @-@ 990 , distributed in Kuwait and Yemen , and the Amstrad Mega PC , distributed in Europe and Australia .

 After the Genesis was discontinued , Majesco Entertainment released the Genesis 3 as a budget version in 1998 . In 2009 , AtGames began producing two new variations : the Firecore , which can play original Genesis cartridges as well as preloaded games , and a handheld console preloaded with 20 Genesis games . Companies such as Radica Games have released various compilations of Genesis and Mega Drive games in " plug @-@ and @-@ play " packages resembling the system 's controller .

= = = Re @-@ releases and emulation = = =

 A number of Genesis and Mega Drive emulators have been produced , including GenEM , KGen , Genecyst , VGen , St0rm , and Gens . The GameTap subscription gaming service included a Sega Genesis emulator and had several dozen licensed Genesis games in its catalog . The Console Classix subscription gaming service includes an emulator and has several hundred Sega Genesis games in its catalog . In addition to emulation , a number of Sega Genesis games have been released on compilation discs for other video game consoles . These include Sonic Mega Collection and Sonic Gems Collection for PS2 , Xbox , and Nintendo GameCube ; Sega Genesis Collection for PS2 and PSP , and most recently Sonic 's Ultimate Genesis Collection (known as the Sega Mega Drive Ultimate Collection in PAL territories) for PlayStation 3 and Xbox 360 .

 During his keynote speech at the 2006 Game Developers Conference , Nintendo president Satoru

Iwata announced that Sega was going to make a number of Genesis / Mega Drive titles available to download on the Wii 's Virtual Console . These games are available along with other systems ' titles under the Wii 's Virtual Console . There are select Sega Genesis titles available on the Xbox 360 through Xbox Live Arcade , such as Sonic the Hedgehog and Sonic 2 , as well as games available via the PlayStation Network and Steam .

= = = Later releases = = =

On May 22 , 2006 , North American company Super Fighter Team released Beggar Prince , a game translated from a 1996 Chinese original . It was released worldwide and was the first commercial Genesis game release in North America since 1998 . Super Fighter Team would later go on to release two more games for the system , Legend of Wukong and Star Odyssey . In December 2010 , WaterMelon , an American company , released Pier Solar and the Great Architects , the first commercial role @-@ playing video game specifically developed for the console since 1996 , and the biggest 16 @-@ bit game ever produced at 64Mb . Pier Solar is the only cartridge @-@ based game which can optionally use the Sega CD to play an enhanced soundtrack and sound effects disc . In 2013 , independent programmer Future Driver , inspired by the Disney film Wreck @-@ It Ralph , developed Fix @-@ It Felix Jr. for the Genesis .
On December 5 , 2007 , Tec Toy released a portable version of the Mega Drive with twenty built @-@ in games . Another version called " Mega Drive Guitar Idol " comes with two six @-@ button joypads and a guitar controller with five fret buttons . The Guitar Idol game contains a mix of Brazilian and international songs . The console has 87 built @-@ in games , including some from Electronic Arts based on the mobile phone versions .
In 2009 , Chinese company AtGames produced a Sega Genesis / Mega Drive @-@ compatible console , the Firecore . It features a top @-@ loading cartridge slot and includes two controllers similar to the six @-@ button controller for the original Genesis . The console has 15 games built @-@ in and is region @-@ free , allowing cartridge games to run regardless of their region . AtGames produced a handheld version of the console . Both machines have been released in Europe by distributing company Blaze Europe .

= = Reception and legacy = =

The Sega Genesis has often been considered among the best video game consoles ever produced . In 2009 , IGN named it the fifth best video game console , citing its edge in sports games and better home version of Mortal Kombat , and lauding " what some consider to be the greatest controller ever created : the six button . " In 2007 , GameTrailers named the Sega Genesis as the sixth best console of all time in their list of top ten consoles that " left their mark on the history of gaming , " noting its great games and solid controller , and writing of the " glory days " of Sonic the Hedgehog . In January 2008 , technology columnist Don Reisinger proclaimed that the Sega Genesis " created the industry 's best console war to date , " citing Sonic the Hedgehog , superior sports games , and backwards compatibility with the Sega Master System . GamingExcellence also gave the Sega Genesis sixth place in 2008 , declaring " one can truly see the Genesis for the gaming milestone it was . " At the same time , GameDaily rated it ninth of ten for its memorable games . In 2014 , USgamer 's Jeremy Parish wrote that " If the Atari generation introduced video games as a short @-@ lived ' 70s fad ... and the NES generation established it into an enduring obsession for the young , Sega 's Genesis began pushing the medium toward something resembling its contemporary form " , expounding that the system served as " the key incubator for modern sports franchises " , made " consoles truly international " by providing Western third @-@ parties previously put at a disadvantage by Nintendo 's restrictive licensing policies with a more profitable alternative , created " an online subscription service " that foreshadowed " PlayStation Plus more than 15 years early " with the Sega Channel , and " played a key role in ensuring the vitality and future of the games industry by breaking Nintendo 's near @-@ monopolistic hold on the U.S. and awakening the U.K. to the merits of television gaming . " For his part , Kalinske highlighted Sega 's

role in developing games for an older demographic and pioneering " the concept of the ' street date ' " with the simultaneous North American and European release of Sonic the Hedgehog 2 . John Sczepaniak of Retro Gamer noted " It was a system where the allure was born not only of the hardware and games , but the magazines , playground arguments , climate , and politics of the time . "