

= Defender (1981 video game) =

Defender is an arcade video game developed and released by Williams Electronics in February 1981 . A horizontally scrolling shoot ' em up , the game is set on a fictional planet where the player must defeat waves of invading aliens while protecting astronauts . Development was led by Eugene Jarvis , a pinball programmer at Williams ; Defender was Jarvis ' first video game project and drew inspiration from Space Invaders and Asteroids .

Defender was one of the most important titles of the Golden Age of Video Arcade Games , selling over 55 @,@ 000 units to become the company 's best selling game and one of the highest @-@ grossing arcade games ever . Praise among critics focused on the game 's audio @-@ visuals and gameplay . It is frequently listed as one of Jarvis ' best contributions to the video game industry , as well as one of the most difficult video games . Though not the first game to scroll horizontally , it created the genre of purely horizontal scrolling shooters . It inspired the development of other games and was followed by sequels and many imitations .

There were many ports to contemporary systems , most of them by either Atari , Inc. or its software label for non @-@ Atari platforms , Atarisoft .

= = Gameplay = =

Defender is a two @-@ dimensional side @-@ scrolling shooting game set on the surface of an unnamed planet . The player controls a space ship as it navigates the terrain , flying either to the left or right . A joystick controls the ship 's elevation , and five buttons control its horizontal direction and weapons . The object is to destroy alien invaders , while protecting astronauts on the landscape from abduction . Humans that are abducted return as mutants that attack the ship . Defeating the aliens allows the player to progress to the next level . Failing to protect the astronauts , however , causes the planet to explode and the level to become populated with mutants . Surviving the waves of mutants results in the restoration of the planet . Players are allotted three ships to progress through the game and are able to earn more by reaching certain scoring benchmarks . A ship is lost if it is hit by an enemy , or hit by an enemy projectile , or if a hyperspace jump goes wrong (as they randomly do) . After exhausting all ships , the game ends .

= = Development = =

Defender was Williams Electronics ' first attempt at developing a new video game ; the company 's earlier game was a Pong clone . The popularity of coin operated arcade games in 1979 spurred the company to shift its focus from pinball games to arcade games . The company chose Eugene Jarvis , who had a successful record of Williams pinball games , to head development . Larry DeMar , Sam Dicker , and Paul Dussault assisted Jarvis . At the time , Williams had a small staff and the management was unfamiliar with technology used for its electronic games . As a result , the staff was afforded a large amount of creative freedom .

= = Initial development = = =

Space was a popular setting for video games at the time , and Jarvis felt the abstract setting would help obscure simple graphics that lacked realism . Initially , Jarvis spent 3 ? 4 months developing color variations of Taito 's Space Invaders and Atari 's Asteroids . First inspired by Space Invaders , he created a similar game with new gameplay mechanics . After spending a few weeks on the design , however , the team abandoned the idea , believing it lacked enjoyment . Development then shifted to emulating Atari 's Asteroids , but hardware differences between Asteroids and Defender 's proposed specifications were problematic . Asteroids displays vector graphics on a special monitor , while the staff planned to use pixel graphics on a conventional monitor . The team experimented with recreating the game with pixel graphics , but also abandoned it because they felt the gameplay lacked enjoyment and visual appeal .

Believing their first attempts to be too derivative , the developers held brain storming sessions . During a session , they agreed that one of Asteroids 's favorable elements was its wrapping effect . They felt a game that allowed the player to fly off the screen would be exciting , and decided to create a game world larger than the screen displayed . The game 's environment was made longer than the screen , with the visible area scrolling horizontally . Expanding on the idea , they envisioned a version of Space Invaders rotated 90 degrees . By changing the orientation of Space Invaders ' design , the ship moved up and down while flying horizontally . Large asteroids , an element from Asteroids , were then added to the game world , but were later removed because the staff felt it lacked enjoyment . Jarvis intended the screen to scroll only from left to right ; fellow Williams employee Steve Ritchie , however , convinced him the game should be able to scroll in either direction .

After six months of development , the team felt the game had not made enough progress . They examined other games and concluded that survival was a necessary component to implement . To achieve this , they devised enemies to present a threat , the first of which was the " Lander " . Jarvis enjoyed violent , action entertainment , and wanted the game to have those elements . However , he felt the action should have a reasonable objective . Inspired by the 1960s television show The Defenders , Jarvis titled the game Defender , reasoning that the title helped justify the violence . He added astronauts to expand on the space theme and give players something to defend while they shot enemies . The element of flying over a planetscape was added after a brainstorming session between Jarvis and Ritchie . The landscape is depicted as a line only a pixel wide , primarily because the hardware was not powerful enough to generate anything more detailed .

= = = Later development = = =

By July , development was behind schedule and Jarvis 's superior began to pressure him to finish the game in time for an upcoming trade show , the AMOA , in September . Jarvis spent several weeks creating the astronauts , which his boss felt should be omitted if the process didn 't speed up . The pressure frustrated him to the point he considered resigning . Around that time , a new programmer named Sam Dicker was hired . He assisted programming the game and added visual and audio effects . For example , Dicker implemented a particle effect algorithm to generate unique explosions for destroyed enemies . The new elements re @-@ invigorated Jarvis , who felt the project began to show promise .

Development then shifted focus to the enemies . Landers were given the ability to capture humans , and a new enemy was devised from the mechanic : " Mutants " , captured humans that had turned hostile . The Mutants added a rescue element to the game that Jarvis believed made it more interesting to players and encouraged them to continue playing . The element of making a " comeback " from a dire situation was applied to the planet as well . Jarvis felt it mimicked the ups and downs of real life . " Bombers " , enemies which release floating bombs on the screen , were added next . More enemies were added to create different gameplay elements . " Swarms " and " Pods " were designed to attack the spaceship as opposed to the astronauts . " Baiters " were included to add pressure to the player by preventing them from lingering . The enemies quickly follow the spaceship to collide with it , and were based on a similar enemy in Asteroids .

By September , the game was still unfinished , and almost every Williams programmer assisted in meeting the deadline for the AMOA trade show . The evening before the trade show , the arcade cabinets were delivered for display . The developers , however , forgot to create an attract mode ? an automated sequence designed to entice an audience to play ? for the game , and began working on it that night . Early the next morning , the team created the final EPROM chips for the mode and installed them in cabinets . The chips , however , did not work and the designers made additional attempts to correct the problem . Once the attract mode was operational , Jarvis and the team returned to their homes to prepare for the show . After the show , the developers expanded the game to allow users to play indefinitely . The display model featured five levels , which the team felt was more than enough because of the game 's difficulty . Most Williams employees could not progress past the third level and Jarvis 's score of 60 @,@ 000 points seemed unbeatable to them .

The developers decided it was best to be prepared for players that might exceed their expectations and added more levels that repeated .

= = = Hardware = = =

The game features amplified monaural sound and pixel graphics on a CRT monitor . A Motorola 6809 central processing unit handles the graphics and gameplay , while a Motorola 6800 microprocessor handles the audio . A pack of three AA batteries provide power to save the game 's settings and high scores when the machine is unplugged from an electrical outlet . The cabinet artwork is stenciled on the wooden frame .

Development started by focusing on the game 's hardware . The staff first debated what type of monitor to use : black and white or color . They reasoned that using advanced technology would better establish them as good designers and chose a color monitor . The developers estimated that the game would require 4 colors , but instead chose hardware that could display each pixel in 16 colors . At the time , the designers believed that was more than they would ever need for a game . The monitor 's resolution is 320 × 256 , an expansion from the then industry standard of 256 × 256 . The staff believed that the wider screen provided a better aspect ratio and would improve the game 's presentation . Video games at the time relied on hardware to animate graphics , but the developers decided to use software to handle animation and programmed the game in assembly language . The switch allowed them to display more on @-@ screen objects at a lower cost .

The game 's control scheme uses a two @-@ way joystick and five buttons . Jarvis designed the controls to emulate both Space Invaders and Asteroids simultaneously . The player 's left hand manipulates the joystick similar to Space Invaders and the right hand pushes buttons similar to Asteroids . The button functions also use a similar layout to Asteroids , with the button to shoot projectiles and accelerate on the far right and left , respectively . Jarvis reasoned that players were accustomed to the control schemes of past games , and felt altering past designs would prove difficult for them .

= = Reception = =

Initially , the game was slow to gain popularity . Defender did not attract much attention at the 1980 AMOA show . In retrospect , Jarvis believed many passersby were intimidated by its complexity . The game , however , was well received in arcades , and crowds gathered around the cabinet during its first nights of play testing . The success spurred Williams to release a cocktail version as well . Defender eventually became Williams ' best selling arcade game , with over 55 @,@ 000 units sold worldwide . By 2004 , the game was a popular collector 's item ; the upright cabinets were common , while the cocktail models were more rare . Since its release , it has become one of the highest grossing arcade games ever , earning over US \$ 1 billion . Williams employee Larry Demar was surprised at the game 's popularity , stating that it was the only game he 'd seen able to earn that quantity of quarters . Six months after its release , the game was one of the top earners in the United States video game industry . Mark Stearny of JoyStik magazine called Defender the most successful game in 1981 , commenting that it outperformed Pac @-@ Man .

The game garnered praise for its graphics , audio , and gameplay features . Gamespy 's David Cuciz lauded Defender 's challenging gameplay , commenting that it is representative of what other games should be . He described the graphics as " beautiful " , citing the varied sprites and flashing explosions . Matt Barton and Bill Loguidice of Gamasutra stated the audio @-@ visuals and gameplay 's depth balanced the excessive difficulty . They praised the game 's " catch and rescue " feature , as well as the minimap . Cuciz also praised the minimap , stating that the game is impossible without it and that it allows players to plan strategies . Author John Sellers praised the audio @-@ visuals and the connection between the game 's plot and gameplay . At the time of its release , Stan Jarocki , director of marketing at then competitor Midway Manufacturing , described the game as " amazing " . In 2008 , Guinness World Records listed it as the number six arcade game in technical , creative , and cultural impact . That same year , Retro Gamer rated the game

number ten on their list of " Top 25 Arcade Games " , citing it as a technical achievement and a difficult title with addictive gameplay . Also in 2008 , Edge ranked Defender the sixth best game from the 1980s . The editors described its design as very " elegant " despite a lack of narrative and characters .

Defender is often described as one of the most difficult games in the industry . Softline in 1983 wrote that it " remains one of the hardest arcade games ever developed . Initial attempts lasting less than ten seconds are not uncommon for novices " . GameDaily in 2009 rated Defender the ninth most difficult game , citing the attack and rescue gameplay . Author Steven L. Kent called it " one of the toughest games in arcade history " . He also stated that novice players typically are able to play only a few seconds , and that enthusiasts saw proficiency at the game as a " badge of honor " . David Cuciz echoed similar comments . Sellers described Defender 's difficulty as " humbling " , saying that few could play it with proficiency . He further stated , however , that players would continue to play despite the difficulty . Author David Ellis attributes the game 's success to its challenging design . Its difficulty is often attributed to its complex control scheme . Edge magazine called Defender " one of the most difficult @-@ to @-@ master " games , describing its controls as " daunting " . Retro Gamer writer Craig Grannell called the game and controls " ruthless " and " complex " respectively .

In 1983 Softline readers named the Atari 8 @-@ bit version fifth on the magazine 's Top Thirty list of Atari programs by popularity . The magazine was more critical , however , stating that " The game 's appeal does not justify its unreasonable cost " of being shipped on cartridge .

= = Impact and legacy = =

Players have competed to obtain the highest score at the game and the longest play time on a single credit . Competitive playing for the longest play time was popularized by Mario Suarez from Atlantic City , who played Defender for over 21 and half hours in 1982 at the Claridge Casino Hotel in Atlantic City . It was authenticated by the Casino / hotel and the many witnesses that watched along with the Press of Atlantic City ; the media attention spurred other players to attempt the same feat . Expert players exploited software bugs to extend the length of their play time . Defender was the focus of the first Twin Galaxies video game contest . Players in 32 cities simultaneously competed the weekend of April 3 ? 4 , 1982 . Rick Smith was the victor with a score of 33 @,@ 013 @,@ 200 which took 38 hours . One bug , related to how the game keeps track of scoring , allows players to earn a large number of " extra lives " . Players can then use the extra lives to leave the game unattended while they rest . Other bugs allow the ship to avoid damage from the enemies , also prolonging the length of play .

Professor Jim Whitehead listed Defender as the first horizontally scrolling shooting game , and describes it as a breakthrough title for its use of full 2D motion , multiple goals , and complex gameplay that provides players with several methods to play . James Hague of Dadgum Games called Defender a landmark title from the 1980s . Stearny said that the game 's use of scrolling helped remove design limitations associated with the screen . Cuciz stated that Defender 's use of scrolling introduce the " first true ' gaming environment ' " . He further said that though the game 's minimap feature had been introduced before , Defender integrated it into the gameplay in a more essential manner . Stearny described it as the most important space game in the early 1980s . He commented that its realism and technological advances pushed developers to create more popular games , citing Gorf and Phoenix as examples . Vince listed the game as a classic title that introduced new technology , specifically scrolling . Ellis stated that prior to Defender , companies designed video games to have a balanced challenge . They believed games should be easy enough to attract players , but difficult enough to limit play time to a few minutes ; anything too challenging would dissuade players . Loguidice and Barton commented that Defender 's success , along with Robotron : 2084 , illustrated that video game enthusiasts were ready for more difficult games , which spurred developers to create more complex game designs .

Jarvis 's contributions to the game 's development are often cited among his accolades . Author John Vince considered him as one of the originators of " high @-@ action " and " reflex @-@ based

" arcade games , citing Defender 's gameplay among other games designed by Jarvis . Ellis stated that Jarvis established himself as an early " hard @-@ core " designer with Defender . In 2007 , IGN listed Eugene Jarvis as a top game designer whose titles (Defender , Robotron : 2084 and Smash TV) have influenced the video game industry . Barton and Loguidice stated that the game helped establish Williams and Jarvis as key figures in the arcade game industry . Sellers echoed similar comments . After the success of Defender , Williams expanded their business by building a new facility and hired more employees . Before the expansion , Jarvis could work in isolation . But the influx of people created an environment he was unhappy with . He left Williams along with DeMar to found their own development company , Vid Kidz . The company served as a consulting firm to Williams and developed two games for them .

= = = Remakes and sequels = = =

The success of Defender prompted Williams to approach Vid Kidz , who originally wanted to create a new game . DeMar , however , suggested creating an enhanced version of Defender to meet Williams ' four @-@ month deadline . Vid Kidz titled the game Stargate , and developed it as a sequel to Defender . It features new elements and improved the original 's performance . Some home ports of Stargate were released under the title Defender II for trademark purposes .

Williams released a Defender @-@ themed pinball machine in 1982 . It has many elements from the original game : sound effects , enemies , waves , and weapons . Williams produced less than 400 units , which have become rare machines .

Midway 's 1991 Strike Force is an arcade update to Defender in the same way that Smash TV is an update to Robotron : 2084 . Jarvis and DeMar assisted with the game , which was programmed by Todd Allen and Eric Pribyl . The game was not widely distributed .

Atari released Defender 2000 in 1995 for the Atari Jaguar console . It written by Jeff Minter who had previously updated Tempest as Tempest 2000 .

A 2002 remake , published simply as Defender , features 3D graphics and a third @-@ person viewpoint . It was released for the Xbox , Game Cube , and PlayStation 2 .

Emulated versions of Defender have been included in various home compilations , such as Williams Arcade 's Greatest Hits .

= = = Influenced games and clones = = =

Home games that copied Defender 's design include Gorgon for the Apple II (1981) , Repton for the Apple II (1983) , Defender 64 for the Commodore 64 (1983) , Dropzone for the Atari 8 @-@ bit family (1984) , Guardian for the Commodore 64 (1984) , and Planetoid for the BBC Micro (1984) .

Video game designer Jeff Minter based several of his games on Defender 's design .

Other games built upon the design elements of Defender , especially protecting people or vehicles along the ground in a horizontally scrolling world , such as Protector II for the Atari 8 @-@ bit family (1982) , Chopper Command for the Atari 2600 (1982) , and Choplifter for the Apple II (1982) .

= = = Cultural references = = =

The game has been referenced in music : Lou Reed 's song " Down At The Arcade " on his 1984 album New Sensations , Manilla Road 's song " Defender " on their 1982 album Metal , Buckner & Garcia 's song " The Defender " on their 1982 album Pac @-@ Man Fever , and the Beastie Boys ' song " Body Movin ' " on their 1998 album Hello Nasty . Nerdcore rapper mc chris mentions Defender in the chorus of his anthemic song " Never Give Up " from his 2008 album , MC Chris is Dead . Other artists to have used sound effects from Defender include Aphex Twin (on " Mt Saint Michel + Saint Michaels Mount " and " Bucephalus Bouncing Ball ") , and Limp Bizkit (used to censor swearing on the clean version of " My Generation ") . The game figured prominently and somewhat incongruously in the music video for the Sheena Easton song " Almost Over You " .

In 2004 , Tim Waggoner authored a novel called " Hyperswarm " based on the video game .

Defender and other Midway properties appear in the Toy @-@ to @-@ Game title Lego Dimensions . The ship from Defender plays a role in the final battle against the game 's villain Lord Vortech .