Supercade

a visual history of the videogame age 1971–1984

van burnham

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a visual history of the videogame age **1971–1984**

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For Honey and Rex.

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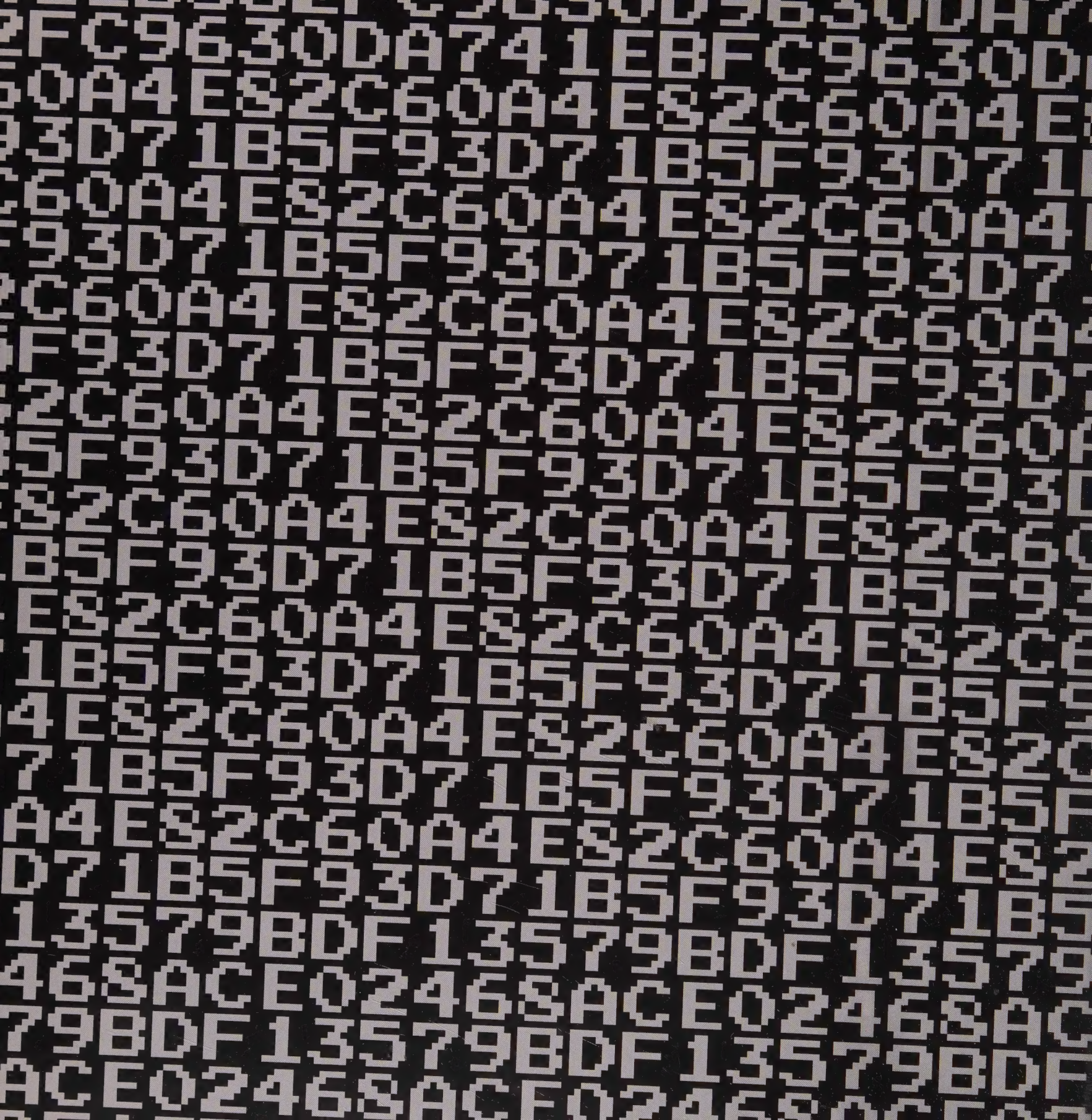

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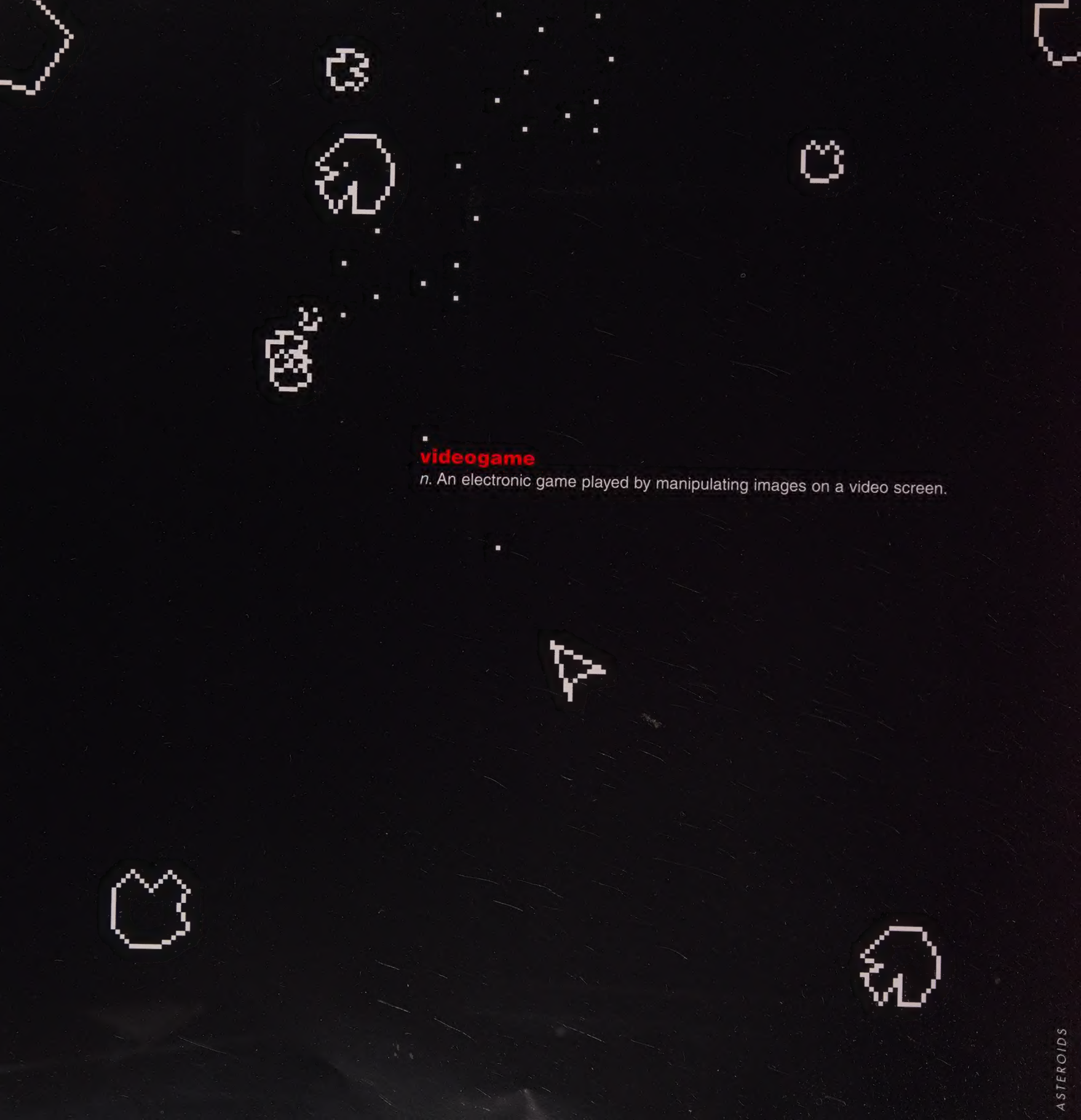

videogame

n. An electronic game played by manipulating images on a video screen.

ASTEROIDS

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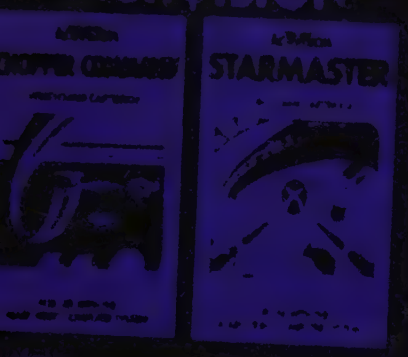

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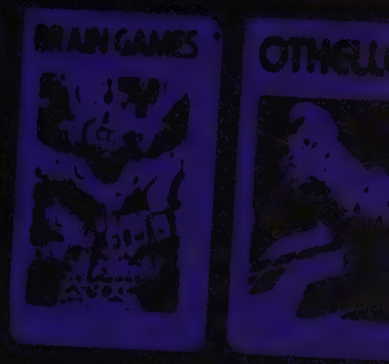

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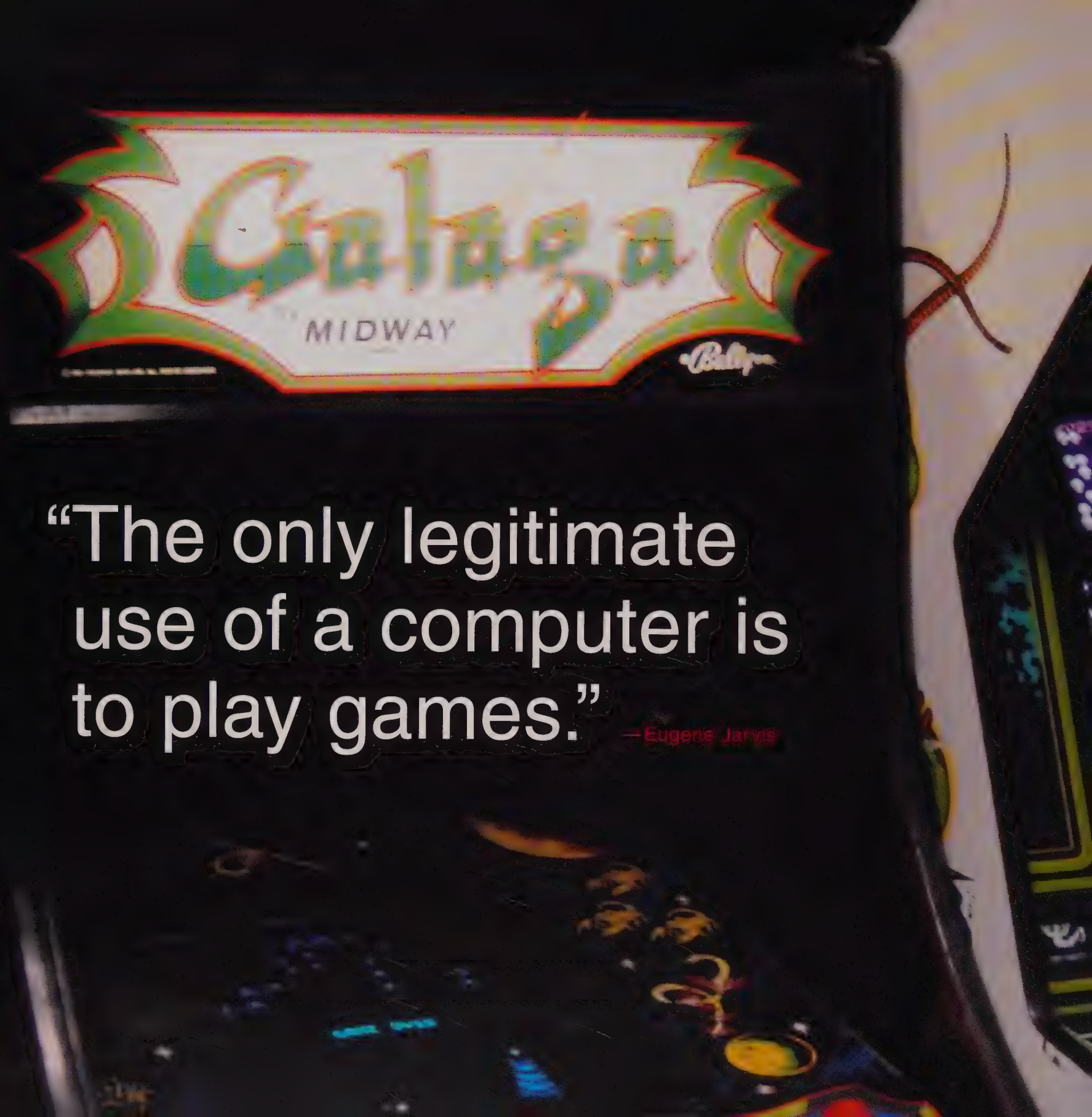

Galaga
MIDWAY
Bally
"The only legitimate use of a computer is to play games."
—Eugene Jarvis

MAN
COIN 1 PLAY
©1980 ATARI

Foreword

"It wasn't until I came along and recognized that there were already over **80 million** TV sets in US homes — and that they might be used as displays for playing games — that the concept of **home videogames** became a practical reality." —Ralph H. Baer, inventor of the Magnavox O

The Father of TV Games

Videogames have become so ingrained in modern culture that there appears to be an assumption that they've always been a part of the landscape… Well, they haven't.

Although I didn't invent a game like *Pac-Man* or *Donkey Kong*, I did play a key role in the creation of the industry – and can vouch for the fact that there was no such thing as "videogames" a scant thirty years ago. I know because I was the one who came up with the idea of playing games on a television set in the first place. That was in 1966.

What started as an idea to build a "game box" that could make novel use of a television has since evolved into a new form of electronic entertainment – as well as a new digital art form. Little did I know that what started with that idea would become so pervasive, it would create a multi-billion dollar industry over the course of a few decades.

History has proven that when technology is ready for something – and becomes affordable – it is going to be developed by someone. I simply came along and saw the millions of TV sets doing nothing but broadcasting whatever the local stations churned out, and soon a TV Game was born. Technically, it was a bit too early – low-cost microprocessors weren't available and digital integrated circuits were still far too expensive – so the first games were relatively primitive. But it was a start.

We live in a technological world that seems determined to be ruled by Moore's Law. Everything doubles in no time – processing speed, memory capacity, graphics capability – and videogames seem to benefit most from this reality. The fact that today we can buy a 128-bit videogame system – like the latest videogame platforms of Sega and Sony – for a few hundred bucks boggles the mind. The fact that we can pop in a videogame disc with 650MB of memory – when just yesterday programmers were thrilled to have 8K of memory in an Atari VCS cartridge – is nothing short of phenomenal.

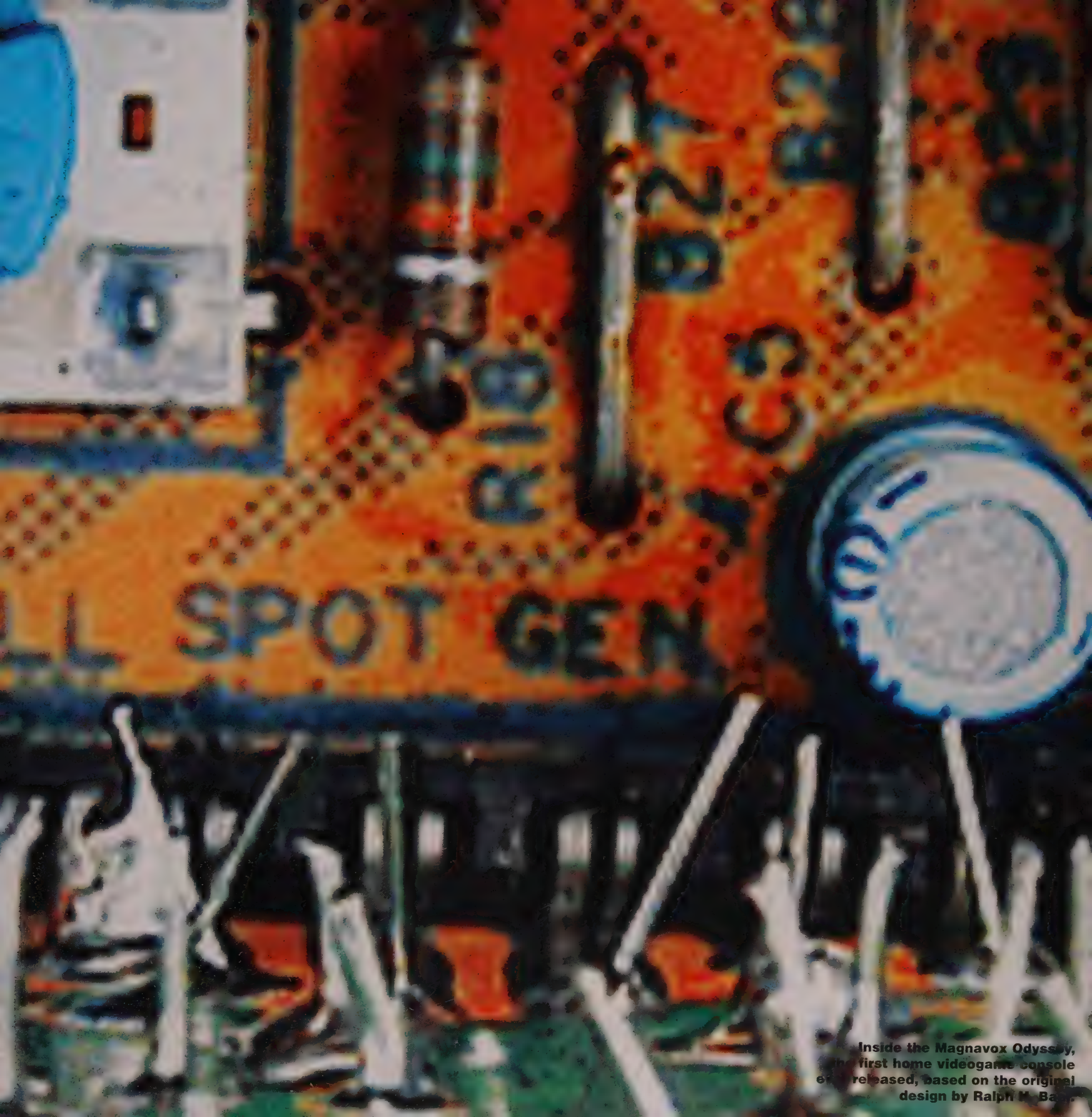
No one can deny that the ubiquitous invasion of computers into the home was started by the videogame console. If not for videogames and their enthusiasts – and the constant need to keep them enthused with ever-improving game graphics and lightning-fast speeds – advanced computer graphics would perhaps still be found only in the exclusive domain of universities and the high-tech world.

The history of videogames reflects the shift into a truly technological society – a trend started nearly half a century ago that has transformed mainstream culture into today's Digital Age – and continues to drive this evolution in the dynamic world of interactive entertainment. In this world of endless possibilities in both game design and technology, a new generation of super-talented videogame developers continues to push the boundaries of this art form.

It's about time for a book to comprehensively review the history and evolution of the dynamic videogame world – fortunately, *Supercade* is that book. Enjoy the trip!

—Ralph H. Baer

AGE (LEFT) COURTESY RALPH H. BAER. RICHIE SHAUN GEOAN/LOOMIS



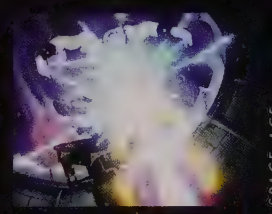
Inside the Magnavox Odyssey, the first home videogame console ever released, based on the original design by Ralph H. Baer.

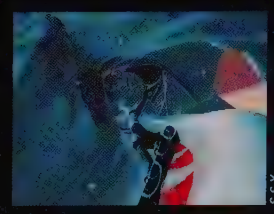
IMAGE: DAN McCOY/RAINBOW

Introduction

In 1981, over **250,000,000** games of *Pac-Man* were played in arcades around the world – **20 billion** quarters were plunked into arcade videogames in 1982 alone – In the year 2000, Nintendo of America announced that over **100 million** Game Boy systems had been shipped worldwide...

The Great Escape


SPACE ACE


SSX

SOUL CALIBUR

There it was, simply marked "GAMES" in black Sharpie marker. When I moved into my very first Manhattan apartment, my parents brought up a carload of ancient history that had been sitting in their attic for well over a decade. I had no idea what I'd find. But when I opened up that battered cardboard box, I found the mother lode of classic videogame treasure: my Odyssey² – the ultimate computer videogame system! – in the box, along with every game cartridge I'd ever had still in its original packaging, complete with manuals. I even had the lucite system base and vinyl dustcover to match. I'd forgotten, but it all came rushing back.

That was 1993, and that's when I started to collect all the videogames I had always wanted as a kid – now financed by my adult disposable income. The next year, I discovered the Internet and with it, hundreds of people just like me – a new breed of classic videogame collectors, linked together in the sprawl of the Web, scouring cyberspace instead of Salvation Armys for their long-lost videogame systems of youth. So with a brand new Pipeline account I made friends, traded videogames and systems, and waged heated, yet hilarious, debates over which was more righteous: Odyssey or Atari? I scanned in my Odyssey² boxes – *The Quest for the Rings*, *K.C. Munchkin!*, *Volleyball!* – converted the text of the Odyssey² owner's manual to HTML, and put it all online so collectors and enthusiasts could also benefit from my collection.

But as I started to research other videogames and systems of the era I began to wonder why a comprehensive print resource didn't exist – something that covered console systems *and* arcade games. Most of the videogame books ever written were, unfortunately, out of print, and those that did exist seemed to be little more than a nostalgia trip. (Ooh, Wocka Wocka!) The Internet was no doubt a great resource, but what I wanted was a book. Leonard Herman's *Phoenix: The Fall and Rise of Home Videogames* (Rolenta Press) was a great start, but I still wanted a different kind of book. So I started to visualize the ultimate videogame resource.

A great deal of what fueled the "golden age" of videogames in the early eighties was the fact that the aesthetic of games permeated everything all at once – video arcades, movies, fashion, television, technology, music, and media. I imagined a book that captured all of this – a book that reflected the neon-drenched dynamic of the videogames as well as their culture, presented in a format that conveyed the impact of the videogame phenomenon.

It was at this point when I realized that maybe I was the one who was supposed to write it. So. That's when I started to work on *Supercade*.

I was born in 1971. The year the first videogame hit arcades, Magnavox first licensed the Television Gaming Apparatus, and Roy Disney opened the doors to Walt Disney World in Orlando, Florida. All momentous events. As a result, I grew up with each and every iteration of interactive entertainment – from the original Odyssey to the Xbox – and many of my earliest and fondest videogaming memories take place within the luxurious red-carpeted game room of the Contemporary Resort Hotel. *Sprint 2. Fire Truck. Night Driver. Pong.*

My obsession with videogames started the day my father brought home the Odyssey Home Entertainment System – the new "electronic game of the future" from Magnavox.

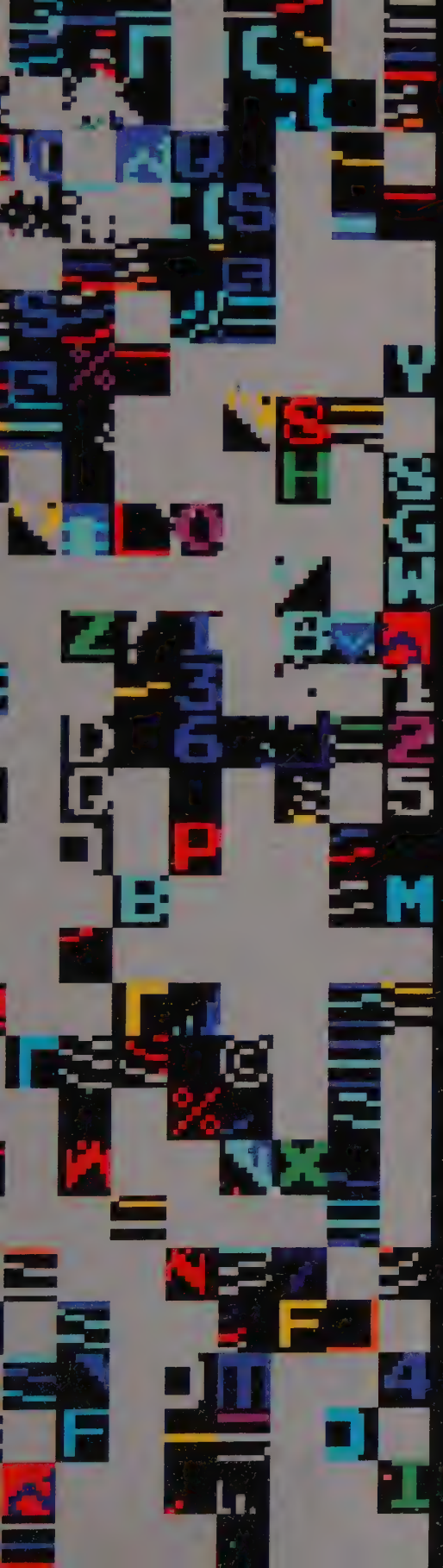
Designed by Ralph Baer, the Odyssey was the first home videogame console ever released. Likely bought on closeout special after the system was discontinued in 1975, the Odyssey came complete with six plug-in game "cartridges" and a dozen printed overlays to simulate colorful background graphics on our swank RCA console television. *Table Tennis. Roulette. Haunted House.*

The Odyssey also came with clunky beige control boxes, reversible game boards, dice, plastic poker chips, pastel-colored phoney money, and far too many playing cards to keep track of. Nobody in my family could figure out exactly what to do with it all, so with the help of my overactive imagination I would make up my own original games. *Haunted House Slalom Adventure. National Super Bowl Bookie.* It was a nebulous pile of technology. I was only four. But despite the awkward interface and baffling gameplay, it was clear that this machine was much greater than the sum of its now archaic parts. This was the future.

As I grew up, I played videogames with my friends and family – intense rec room battles where an eternity would flash by in an instant. Looking at the promotional art from all the classic systems, with their images of happy nuclear families calmly playing games together in their new electronic wonderland, I can't help but wonder if that was *ever* the reality. It certainly wasn't for me. In my world, it was a bit more exciting.

After the Odyssey I got a knock-off Pong system, followed by the Odyssey² – "the ultimate computer videogame system." It was Christmas, 1979. That system was everything I wanted. I was fascinated by the console, the alpha-numeric keyboard, and the SELECT GAME screen – it was all so high-tech. And just so very cool.

The next year my cousin Louis (my best friend and ultimate videogaming nemesis) got an Intellivision, so I spent many lost weekends playing that system as well. On Saturday mornings, after we'd secured



the critical bowls of Cap'n Crunch and constructed an elaborate front row TV fort with blankets, batons, and sofa cushions, we would watch *Super Friends* and *Thundarr the Barbarian* – directly followed by hours of *Astrosmash*, *Pitfall*, and *Space Armada*. We would play until our thumbs blistered.

Then on Christmas morning in 1982 Santa Claus brought me ColecoVision – the ultimate videogame system for anyone who loved arcade games. So when I wasn't at Bally's Great Escape, I was home playing hours of *Smurf: Rescue From Gargamel's Castle*, *Popeye*, *Mouse Trap*, *Turbo*, *Zaxxon*, and my all-time favorite, *Donkey Kong*.

But soon after I discovered cute boys and designer jeans and Duran Duran and feathered earrings and I didn't play videogames as much, but I'd still sneak over to my friend Kim's house to play her NES – Konami's *Track & Field* on the Power Pad to be exact. Those were the salad days.

Today I have an extensive collection of classic home and arcade videogames. But no doubt the highlight of my collection is the blue *Computer Space* that sits quietly by my desk, its silvery metalflake shimmering across its curvaceous body. Made in 1971, it is the first arcade videogame ever released – and my most treasured possession.

And now, as if trapped in some adolescent fantasy, I am lucky enough to make a living playing and writing about the only thing that ever truly mattered to me: videogames. The only difference is that it's now called "interactive entertainment." Never in my wildest dreams did I ever imagine growing up that, one day, I would actually be paid to play games – but instead of playing *Mouse Trap* on my ColecoVision, I play new games like *SSX*, *Unreal Tournament*, *Conker's Bad Fur Day*, and *Soul Calibur*. Even so, I'll always play the classics. *Pac-Man*. *Galaga*. *Space Ace*. I love those games – now more than ever.

Classic videogames are determined by a number of factors – age, aesthetics, nostalgia – but when I play a game like *Spyro the Dragon* or *The Legend of Zelda*, I realize that modern games have the potential to be equally timeless. So it's important to appreciate videogames for their unique character – the balance they strike between the technology and the context they were created in. From that perspective, every game can transcend history and become the next generation of classics.

But the role classic videogames have played in our culture goes far beyond history or nostalgia or their impact on the evolution of the multi-billion dollar interactive entertainment industry.

The golden age of videogames marks the point in time when society shifted from an analog to digital culture. Personal computers. BBSs. Compact discs. Email. Desktop publishing. Mobile computing. Unix. The Web. All innovations that were made possible because a generation was exposed to the future of technology in a way that made it accessible and, most of all, fun – through videogames.

As a result, we now live in the greatest escape of all – a future world of interactive online all-the-time entertainment that even the great futurist Walt Disney failed to predict. Now, instead of Mickey and pals, our society is surrounded by pixellated images of the new cultural icons that define this brave new world – Mario, Crash, Lara, and Pikachu – and reflect the promise of our digital future.

Supercade was conceived to be the first book to both illustrate and document the history, legacy, and visual language of the videogame phenomenon – and pay tribute to the designers, engineers, and programmers who ushered in a new era of modern entertainment. Who created the future. *Supercade* should also stand as a testament to the profound importance of the role videogames have played in the history of technology – pushing the development and evolution of computers, microprocessors, artificial intelligence, programming languages, video display technologies, virtual reality, compression technologies, broadband networks, and nearly every technological innovation since the dawn of *Spacewar!*

That's why videogames are so incredibly important – and anything but child's play.

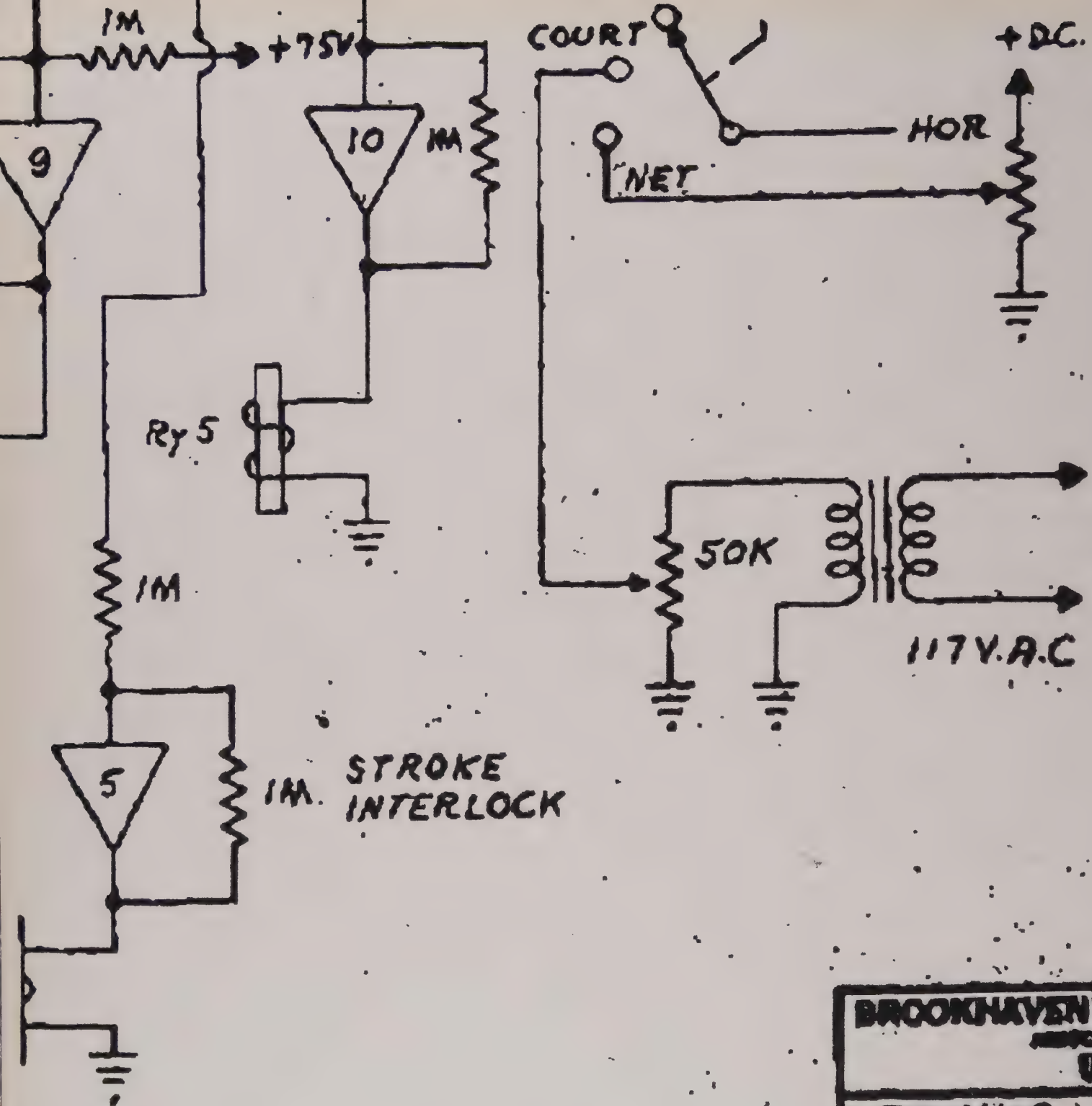
I have made an attempt to include each and every one of the videogames that truly made a difference in the world – the games that revolutionized the industry, broke new technological ground, improved the human condition, and pushed the boundaries of reality – right next to some whose only virtue is their bizarre eccentricity.

So I hope that you enjoy this glimpse into the history of videogames – perhaps you'll uncover some links to your past, as well as your future. Now all you need to find is that long-lost Atari...

—Van Burnham

IMAGE COURTESY WALT DISNEY PRODUCTIONS

Jeff Bridges as Kevin Flynn, star programmer of *Space Paranoids*, in a promotional still for Disney's futuristic motion picture *Tron* – one of the first films created with computer-generated graphics.



BROOKHAVEN NATIONAL LA
UPTON, N. Y.

TENNIS PROGRAMM

SCHEMATIC

10-15-58	AE	RVD	RVD	

SHM-900-

Brookhaven National Labs

Tennis For Two

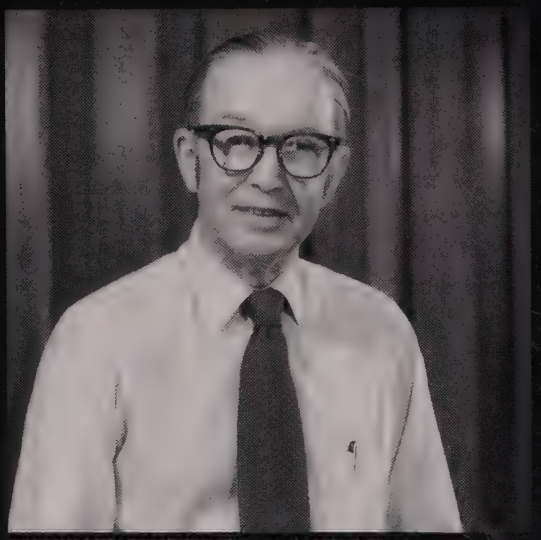
It all started with a big bang. During World War II, a new technology was invented that would change the course of history and circuitously lead to the creation of the first interactive videogame: the atomic bomb.

Also called the A-Bomb, this weapon of mass destruction was capable of great explosive power, resulting from the release of thermal energy and gamma rays following the splitting of the nuclei in such heavy elements as plutonium or uranium. Under specific conditions, the escaping neutrons of this reaction – also known as fission – would strike and split more of the surrounding nuclei, which, in turn, would emit even more neutrons that would split even more nuclei. This series of rapidly compounding fissions results in a chain reaction that builds up to critical mass, at which point nearly all of the material is consumed. This phenomenon generates the explosion called an atomic blast.

The first atomic bombs were built in the United States during World War II in a secret government program known as the Manhattan Project. In 1945, an atomic bomb was tested in Alamogordo, New Mexico. Then, the first bomb used in warfare was dropped by the US on Hiroshima, Japan, on August 6, 1945. The resulting blast – which had the force of more than 15,000 tons of TNT – instantly devastated four square miles of the city, and killed over 65,000 people. A second atomic bomb was dropped on Nagasaki on August 9, 1945, producing a blast even more powerful than the first. The Japanese surrendered the following day, finally bringing an end to the largest and most destructive war in the history of the world.

Even though America had won the war, by 1950 the country was now at the height of the Cold War – an era of intense political tension and rivalry between the United States and the Soviet Union. Although the two countries had been allied against Germany, Italy, and Japan during World War II, Stalin's aggressive seizure of control in Eastern Europe at the end of the war swiftly destroyed any alliance that may have existed.

Although the conflict between the US and USSR never escalated to a state of full-scale war, the profound malaise and uncertainty of the Cold War permeated every level of American society – and the overwhelming fear of nuclear war that ensued became symbolic of this era in history as bomb shelters, air-raid drills, and anti-communist rallies became as commonplace as Radiolas, Ovaltine, and comic books in popular culture.



WILLY HIGINBOTHAM: The patriarch of *Pong*.

In 1947, Brookhaven National Laboratory was founded by Associated Universities Incorporated – a nonprofit educational consortium contracted by the Atomic Energy Agency. Constructed on the site of Camp Upton, BNL was envisioned as a regional laboratory to provide researchers across the country with powerful research tools – tools like nuclear reactors and particle accelerators – that their own institutions didn't have the resources to build or maintain.

In 1950, BNL opened its first research reactor – a small nuclear reactor used for peaceful scientific exploration – the Brookhaven Graphite Research Reactor. It was joined in 1952 by the Cosmotron, the first particle accelerator that achieved billion-electron-volt energies and would later inspire a Nobel Prize-winning discovery.

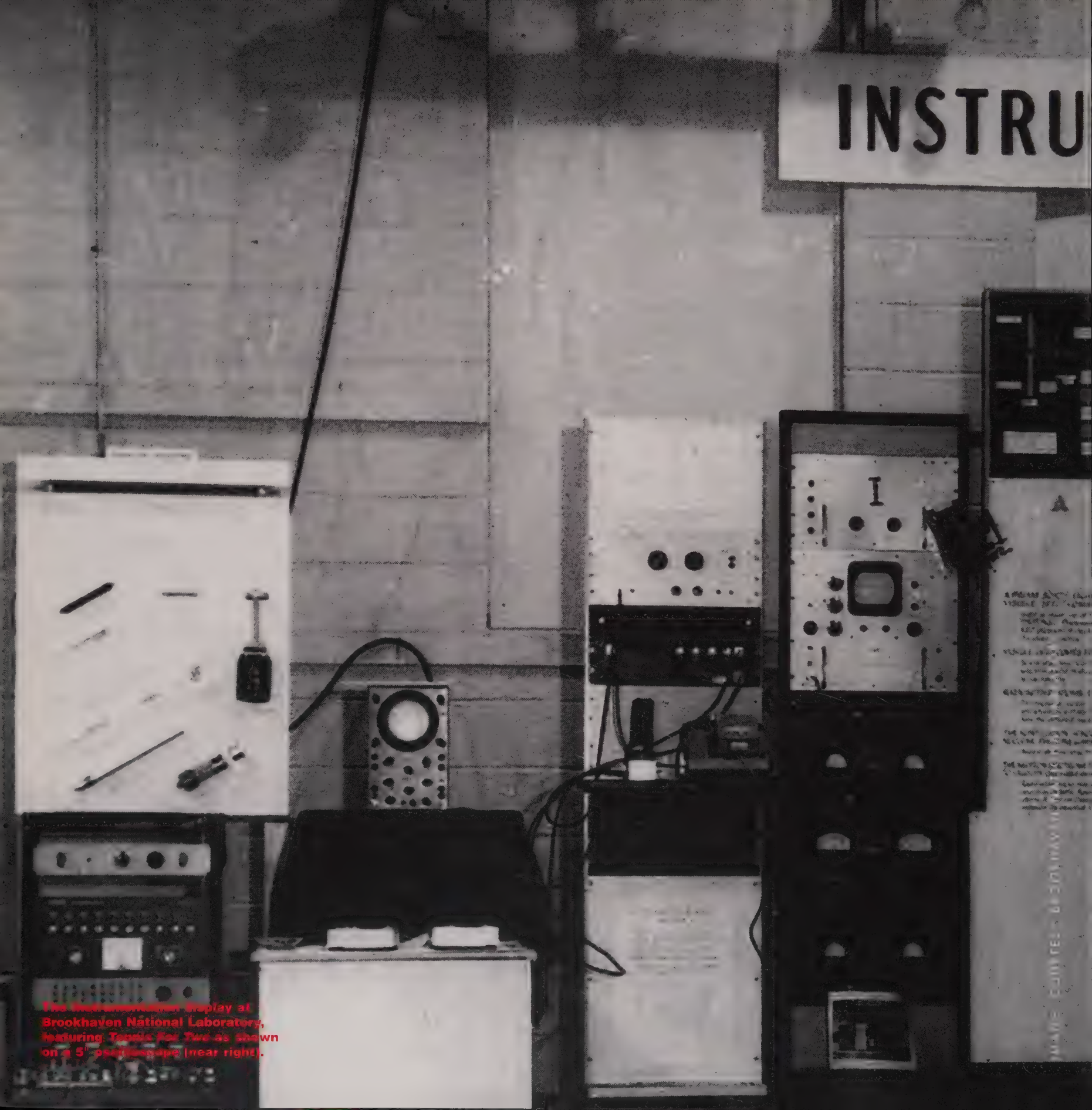
Staffed with scientists and researchers, BNL quickly grew to become a prominent fixture in Suffolk County, Long Island. Unfortunately, in light of the lingering fear and cultural stigma of nuclear power and radiation, many residents felt that the laboratory posed a threat to their community. So in order to generate positive public relations, and reduce the civic controversy, Brookhaven National Laboratory began to host an annual "visitor's day" so that members of the surrounding community could come view the fascinating – yet harmless – research being conducted there.

Enter William Higinbotham, a fun-loving physicist who had come to BNL from the Manhattan Project where he had developed advanced radar systems – and witnessed the detonation of that first atomic bomb back in 1945. He was now dedicated to help promote peaceful uses of nuclear power. One day, Higinbotham had an idea to entertain the visiting guests who were bored by the spinning reels and blinkenlights of the mainframe computers. "I knew from past visitor's days that people were not much interested in static exhibits," said the late Willy Higinbotham, "so for that year, I came up with an idea for a hands-on display – a video tennis game."

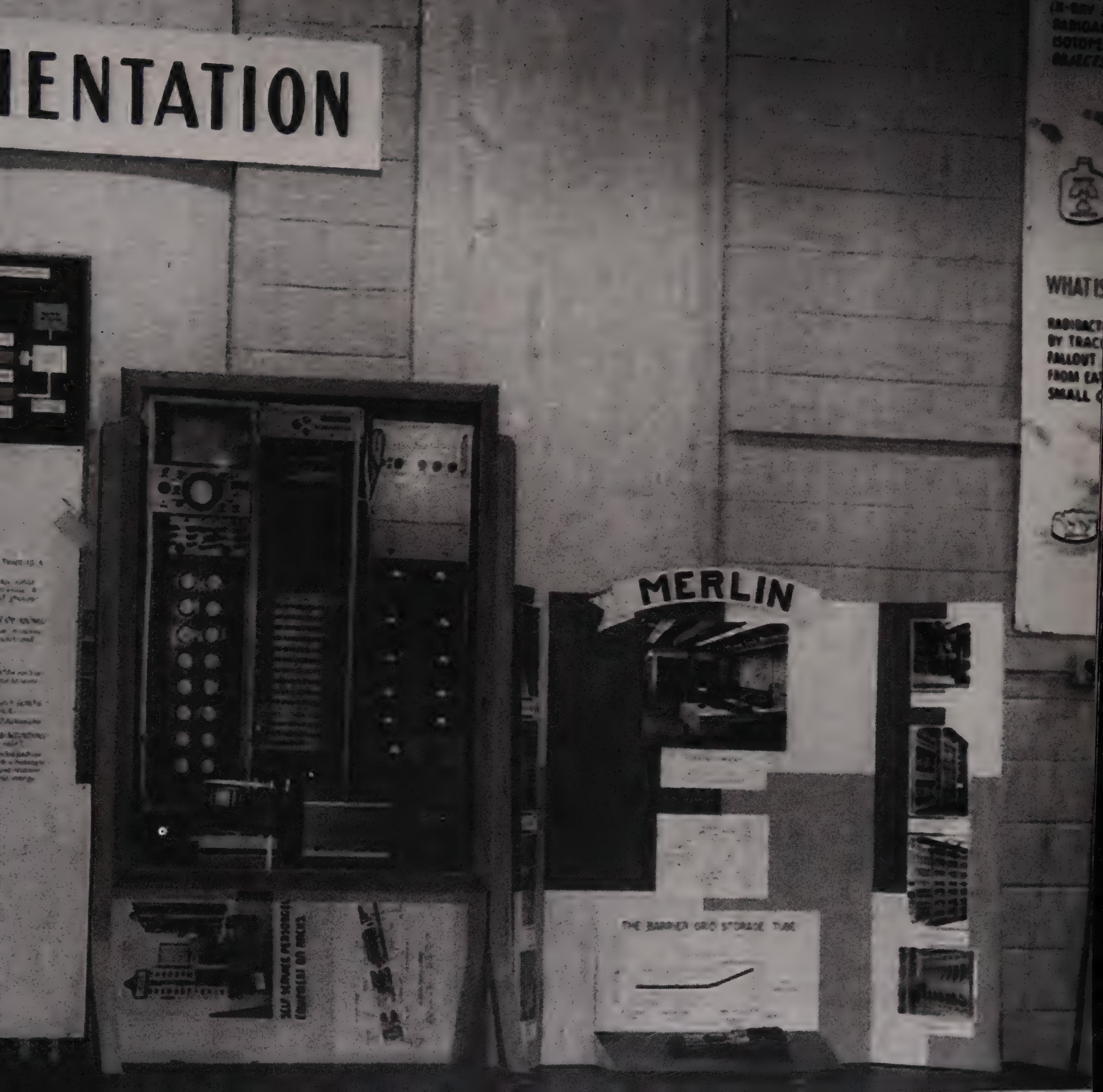
The game he created was called *Tennis For Two* – and it was the first recorded iteration of the game that later evolved into *Pong*. Featuring a blip of electronic light, this revolutionary tennis simulation was programmed in 1958 by Higinbotham and his team using trajectory paths on an analog computer. The team also added two control boxes, each with a knob to control the ball and "serve" button – likely the first implementation of a "joystick" in an interactive game. *Tennis For Two* was displayed on a 5" monochrome oscilloscope screen and debuted in the Instrumentation Division display that same year. People waited for hours to play.

Higinbotham never considered marketing his tennis simulator as a consumer product and chose not to patent the game. However, *Tennis For Two* lives on in history as the progenitor of interactive computer games – and the precursor to *Pong*. ■

IMAGE: PREVIOUS AND LEFT: COURTESY BROOKHAVEN NATIONAL LABRATORY; RIGHT, PHOTODISC INC.



The Instrumentation Display at Brookhaven National Laboratory, featuring *Tennis For Two* as shown on a 5" oscilloscope (near right).


ENTATION
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MASSACHVSETTS INSTITVTE OF TECHNOLOGY

MIT

Building 20

BY NICK MONTFORT

The Massachusetts Institute of Technology, established in 1865, packed up and moved across the river from Boston to Cambridge in 1916. The new campus was shaped in granite and brass, and the main building – cut through by the famous infinite corridor – was topped with a majestic Greek temple dome. This "Great Dome" quickly became a primary target for pranks, and is now the most recognizable architectural symbol of the Institute. But the structure that came to represent the true heart of MIT was no stone monument overlooking the Charles River – it was a 250,000 square-foot run-down three story wooden building called Building 20.

Built in 1943 and covered with a shell of asbestos tile, this ramshackle building became a defining source of inspiration and innovation at MIT for over half a century. One of many "temporary" structures built during World War II, Building 20 was the birthplace of recreational computing, the testing ground for revolutionary programming techniques, and the epicenter of the new hacker culture that was emerging at MIT.

In his book *How Buildings Learn*, Stuart Brand uses it as a key example of a configurable and desirable work environment, and notes that it was Building 20's many desirable features – including "sash windows, interesting neighbors, strong floors, and freedom" – combined with the flexibility of the structure itself – that allowed this crude architectural space to be endlessly reconfigured and upgraded. Since Building 20 was temporary (and, at any given point in time, was slated to be demolished in a few years) no one would object to a group knocking down a wall or cutting into the floor to redesign their space to fit their needs. It was so flexible, Brand writes, that "even the roof was used for short-term structures."

As a result of Building 20's shabby appearance, the building was featured in a 1950s film to help MIT convince donors of how badly the university needed money. However, the building relentlessly remained standing – and a catalyst for innovation – until finally falling to the wrecking ball in 1998.

The first group to be quartered in Building 20 were researchers working to advance a revolutionary new technology: radar. This US military project gave its new laboratory the then-innocuous name Radiation Lab – also known as Rad Lab. Fred Hapgood, in his intellectual history of engineering at MIT entitled *Up the Infinite Corridor*, lists Rad Lab as one of the first interdisciplinary efforts, since the laboratory hired both engineers and physicists. Other similar collaborations would soon develop in

RAD LAB: The Cold War corridors of the Radiation Laboratory

Building 20 as a result of the unusually diverse researchers that would come into contact with one another there.

One long-time occupant of Building 20 was Institute Professor Emeritus Morris Halle. During the Celebration of Building 20, he said that the large amount of space it offered allowed many risky projects to get their start. Linguistics was one of them. "But for the existence of Building 20, it would not have been developed at MIT," Halle said. And so, Building 20 also became the office address of famed linguist Noam Chomsky, known for his outspoken criticism of the US military as well as his theory of generative grammar. So it seems ironic that the building also happened to house MIT's ROTC program – just down the hall from Chomsky's office. As further evidence of this somewhat forced diversity, Building 20 was also the site of the campus piano repair facility, the original offices of The MIT Press, and the home of the Research Lab of Electronics.

So for over five decades – as the building's inevitable demise was delayed again and again – a broad assortment of intellectual misfits found their way into Building 20. Work there led to numerous technological advances including the development of air-to-air missiles, experiments in stroboscopic flash photography, as well as the creation of one of the most influential computer games of all time.

At the dawn of the 1960s, denizens of Building 20 had begun some programming explorations that would profoundly influence the future of interactive entertainment. An upstart computer company called DEC (Digital Equipment Corporation), which had been incubated in the building, decided to donate a powerful new minicomputer to MIT – the PDP-1. This machine was immediately embraced by the nascent programming community. However, the pioneering work in interactive videogame technology that the DEC PDP-1 would ultimately inspire was done not by some Institute research group or Specially Trained Personnel. It was done by some members of the student model railroad club.

In the clubroom, on the third floor of Building 20's E wing, relays clicked away beneath a huge layout of meticulously configured HO gauge railroad tracks. It was here that the members of the Tech Model Railroad Club drank Cokes and gronked the layout, members that included programming visionaries Steve Russell, Alan Kotok, and Peter Samson – the quintessential computer hackers. It was here that the minds of these young videogame vanguards first connected, minds that would later conspire to create the seminal intergalactic showdown – a computer game known as *Spacewar!* ■

IMAGE: PREVIOUS AND LEFT: COURTESY THE MIT MUSEUM; RIGHT: JOHN F. COOK/THE MIT MUSEUM

WARNING
PLEASE BE CERTAIN THAT
BOTH GATES ARE CLOSED
ATTENTION
the elevator
CAUTION
All Vehicles Shall Off Engine
Strictly Enforced
Campus Police
NO PARKING
UNAUTHORIZED
VEHICLES WILL BE
TOWED AWAY
AT VEHICLE
OWNERS EXPENSE

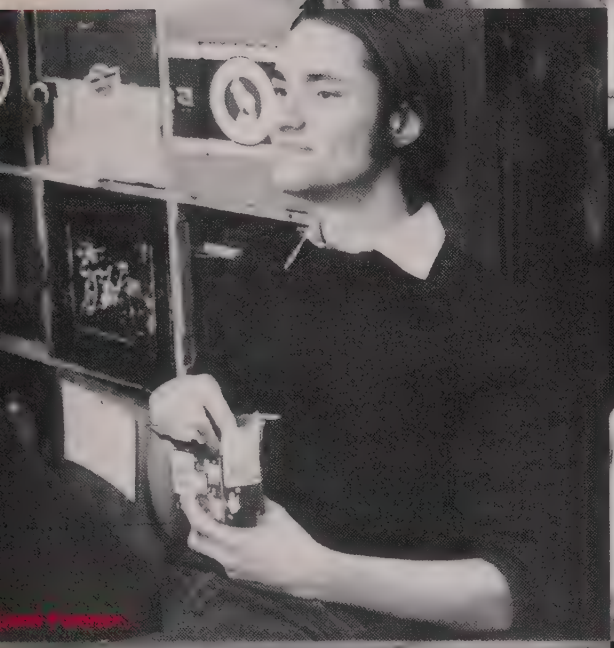
Coca-Bottle
IAGE JOHN McNAMARA

The Tech Nickel Plate Railroad's Gifford City station (left), named after the club's first faculty advisor.

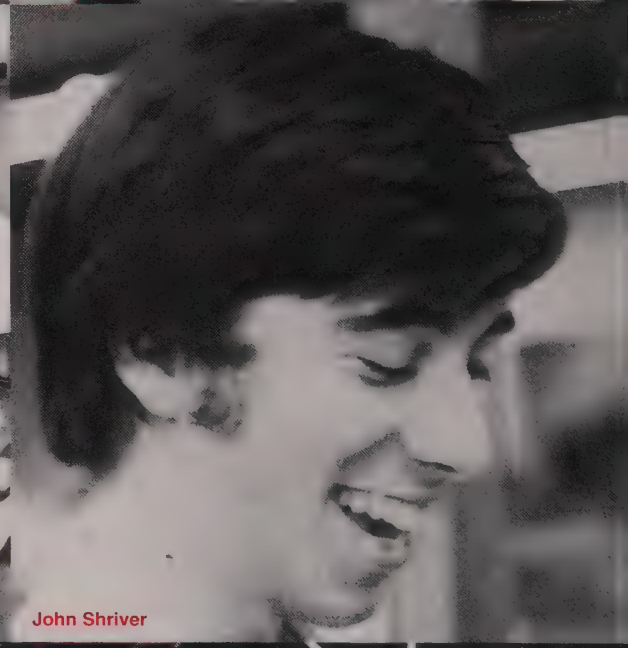
Alan Kotok

John Shriver

Bob Mill

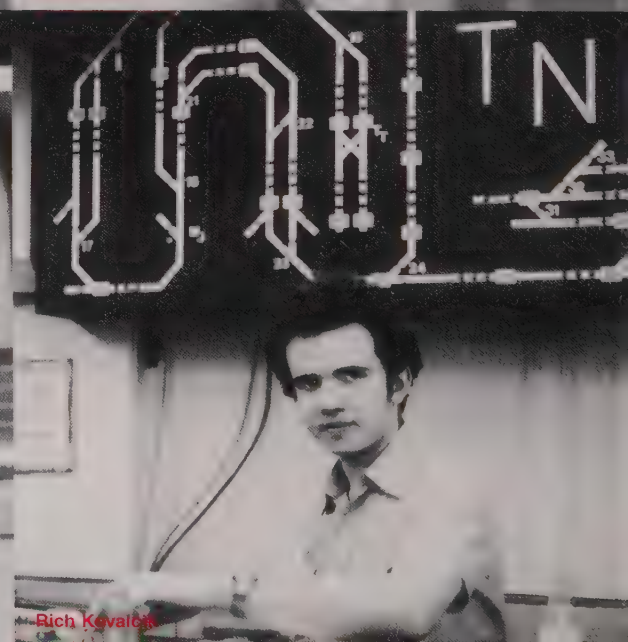


Steve Russell



John Shriver

Elliot Bradshaw



Rich Kovalcik

BY NICK MONTFORT

Trains course through the simulated landscape. Time runs fast. Run the freight train – there's a stack of orders indicating loads to be delivered in each of the cars. This game is a multi-player endeavor, with several trains going at once, and a complex layout that can be infinitely upgraded – with some extra effort, of course. But this is no *Railroad Tycoon* or *SimCity*. No, the model cities and railroad are real. Atop the complex layout – **switched by advanced telco relays that have never before seen recreational use – current runs through the web of nickel-plated rails and into the churning wheels of detailed miniature locomotives.** Welcome to the Tech Model Railroad Club.

The club – also known as TMRC (tee-merck) – first moved into their clubroom in Building 20 when Rad Lab completed its research following World War II, and their meticulously built model train layout has been around since the club's founding in 1947. The TMRC created its current technical backend – also known as The System – by scrounging various parts from around the MIT campus, as well as throughout Cambridge proper. As a result, late night raids on abandoned storage rooms, the appropriation of apparently unused equipment, and scamming all sorts of technical gadgetry soon became regular club activities. As a result, the club's initials were often said to stand for "The Midnight Requisitioning Committee."

Alan Kotok joined the TMRC in 1958. He once said that all these extra components lying around – including some high-quality relays acquired from Western Electric's excess inventory – begged to be incorporated into the layout. And so, the TMRC would embark on what would become a ten-year project: to build a progressive cab control system utilizing the phone relays. This type of switching system would be a huge advance over that being used at the time. It would automatically connect one operator's controller to the track section of the appropriate train, while allowing other sections to be connected to other controllers. TMRC's system would be the first of its kind ever built.

It became clear that the modelers would now need access to more advanced technology in order to carry out their plans. And so, after hours, in the basement of Building 26, just below the sprawling mass of the hulking IBM 704 mainframe computer, club member Peter Samson and pals would enter the unguarded Electrical Accounting Machines room and hack into the circuitry of an IBM 407 electromechanical keypunch machine in order to program the new switching system. It was perhaps one of the first computer "hacks" ever recorded.

GRAND CENTRAL STATION: The entrance to 20E, home of the original TMRC clubroom.

The TMRC's fascination with computer technology grew until, in 1959, the first course in computer programming was offered by the Institute: #641 Artificial Intelligence, taught by professor John McCarthy. Kotok, Samson, and a few other TMRC members were among the first to sign up. So as the modelers gronked The System and taught the IBM 704 how to play chess, they also found out about another interesting bundle of circuitry – an experimental computer, built three years ago by MIT scientists at Lincoln Labs, that was now on permanent loan to the Department of Electrical Engineering. The TX-0. Compared to the 704, the TX-0 was not all that powerful. But considering that it was the first transistor-based computer – including a light pen, CRT display, and Flexowriter to program the computer interactively, without the need for endless stacks of punched cards – the TX-0 was truly revolutionary.

The TX-0 was controlled by John McKenzie and Jack Dennis, who kindly gave the TMRCies every opportunity to play around with it. The modelers soon resigned themselves to Building 26, where the TX-0 resided, and began hanging out at all hours waiting to use it. Fred Hapgood once explained that the TMRC hackers would get extra time on the machine by offering to do any job that came up in less time than the user had signed up for – in exchange for the extra time, of course. Before long, the TMRC hackers had developed impressive programming expertise. One of the first programs created was a hack that converted Arabic numerals into Roman numerals, written by Samson. The program was instantly recognized as clever – yet utterly worthless – and, as a result, won him tremendous praise.

Some entertaining visual programs – also known as display hacks – had been written for the TX-0 at Lincoln Labs. Doug Ross and John Ward had done a program called *Mouse in the Maze*, in which a mouse scrambled around the CRT screen drinking martinis. But the brainiacs of TMRC wanted to write their own programs. They would soon get their chance.

Although Building 26 had become a curious salon for these budding computer geeks, pushing the boundaries of computer science, it wasn't until the much anticipated delivery of the PDP-1 – a new compact, solid state general purpose computer designed by Ben Gurley and manufactured by Digital Equipment Corporation of Maynard, MA – that their destiny would begin to take shape.

Now with the power of the DEC PDP-1, the TMRC hackers would pull off their most ambitious hack yet – the creation of *Spacewar!* ■

COURTESY TECH MODEL RAILROAD CLUB

Spacewar!

n. A space-combat simulation game inspired by E.E. "Doc" Smith's Lensman books, in which two spaceships duel around a central sun, shooting torpedoes at each other and jumping through hyperspace. *–The New Hacker's Dictionary*

The Origin of *Spacewar!*

BY J.M. GRAETZ

Before *Spacewar!* The Lensman, The General, and the Hingham Institute

You could blame it on Kimball Kinnison. Or Godzilla. Or Georges "General" Doriot and his $70,000. Without E.E. Smith, Toho Studios, or the American Research and Development Corp., there would be nothing to write about. If Doc Smith had been content designing doughnuts, if American-International Pictures had stuck to beach blanket flicks, and if – most of all – Doriot hadn't waved that money in front of Ken Olsen in 1957, the world might yet be free of *Spacewar!*

It all came together in 1961 at the Hingham Institute, a barely habitable tenement on Hingham Street in Cambridge, Massachusetts. Three Institute Fellows were involved: Wayne Wiitanen, mathematician, early music buff, and mountain climber; Stephen "Slug" Russell, specialist in railroads, trivia, and artificial intelligence; and me – man of no fixed talent who tended to act superior because he was already a Published Author. We were all about 25.

At the time, we were crashing and banging our way through the Skylark and Lensman novels of Edward E. Smith, Ph.D., a cereal chemist who wrote with the grace and refinement of a pneumatic drill. These stories are pretty much all the same – after some preliminary foofaraw to get everyone's name right, a bunch of overdeveloped Hardy Boys go haring off through the universe to punch out the latest gang of galactic goons, blow up a few planets, kill all sorts of nasty life forms, and just have a heck of a good time.

In a pinch, which is where they usually were, our heroes could be counted on to come up with a complete scientific theory, invent the technology to implement it, build the tools to implement the technology, and produce the weapons to blow away the baddies, all while being chased in their spaceship hither and thither through the trackless wastes of the galaxy (he wrote like that) by assorted Fenachrone, Boskonians, and the World Steel Corporation.

Is that enough to turn the mind to margarine? It is not. In breaks between books, we would be off to one of Boston's seedier cinemas to view the latest trash from Toho.

In the days before Nissans and Nintendos, the Japanese churned out a steady diet of cinematic junk food of which Rodan and Godzilla are only the best known examples. For their effects, these movies depended on high quality modelwork, oceans of rays, beams, and explosions, and the determined avoidance of plot, character, or significance. They were the film equivalent of *The Skylark of Space*.

If that's the case, we asked ourselves, why doesn't anyone make Skylark movies? Hearing no reply – our innocence of current film technology, economics, and copyright law was enormous – we often passed the time on Hingham Street in deep wishful thought, inventing special effects and sequences for a grand series of space epics that would never see a sound stage. Nonetheless, these books, movies, and Hingham Street bull-sessions established the mind-set that eventually led to *Spacewar!*

When Computers Were Gods

In early 1961, Wayne, Slug, and I were working at Harvard's Littauer Statistical Laboratory. A large part of our job was to run statistics computations for various Harvard persons. The agent of choice for this work was an IBM 704.

To a generation whose concept of a computer is founded on Compaqs and Palm Pilots, it may be hard to visualize a 704 or comprehend the place it held in the public imagination as a specimen of what a computer was: a collection of mysterious hulking gray cabinets approachable only through the intercession of The Operator. In the specially built computer room, The Operator set switches, pushed buttons, and examined panels of flashing lights, while his Assistants attended various whirring, clanking, and chattering devices – rushing to and fro with stacks of cryptically printed paper, decks of strangely punched cards, and reels of recondite brown ribbon – all to the background hum of The Machine.

Everything about the 704, from the inscrutable mainframe to the glowing vacuum tubes in the glass-walled core memory case, proclaimed that this was a Very Complicated System operated only by Specially Trained Personnel, among whom programmers and other ordinary mortals were not numbered. In short, a computer was something that you simply did not sit down and fool around with.

A Stone's Throw from Olympus

In the summer of 1961 I went to work for Professor Jack Dennis in the Research Laboratory of Electronics at the Massachusetts Institute of Technology. Professor Dennis was then proprietor of the TX-0, a recent arrival to MIT that was only slightly less legendary than its ancestor, Whirlwind. The TX-0 computer was transistorized, and while solid-state computers were beginning to appear on the market, "Tixo" was the original. Even in 1961 ▸

IMAGES: PREVIOUS: COURTESY J.M. GRAETZ; LEFT: E.E. SMITH'S LENSMAN NOVELS COURTESY FANTASY PRESS; RIGHT: COURTESY DIGITAL EQUIPMENT CORPORATION

Promotional image of the DEC PDP-1 – a high speed, solid state digital mini-computer donated to MIT in 1961.

it was acknowledged to be a historically important research system; many of the programs developed for the TX-0 – such as Dennis's MACRO assembler and Thomas Stockham's FLIT editing and debugging program – were truly the first of their kind. So the chance to work on this computer was in many ways a rite of passage. It meant that one had joined the ranks of the Real Programmers.

While hardly your average populist iMac, the TX-0 was definitely a step away from the Computer-as-Apollo. Instead of being sealed into its own special chapel, it sat at one end of a large, messy research space in MIT's Building 26. With its racks of exposed circuitry, its power supplies and meters, and its long, low L-shaped console, the TX-0 looked like the control room of a suburban power station. And the thing of it was, you were expected to run it yourself.

So here was the former 704 Operator's Assistant pushing buttons, flipping switches, and pressing keys to make his own programs work. In some ways it was simpler than the 704 – for one thing, there wasn't a battery of clanking mechanical monsters. The TX-0's input and output medium was something called a Flexowriter, an all-in-one keyboard, printer, paper-tape reader and punch, that worked like a mule and had a personality to match. (There was also a "high-speed" paper tape reader that could read programs into memory almost as fast as the cassette drive on a TRS-80.)

Moreover, the TX-0 had a Scope. Console-mounted, programmable CRTs were not unheard of at that time, but they were generally slow, inflexible, and awkward to program. The TX-0's scope, on the other hand, was easy to use; you could generate a useful display with fewer than a dozen instructions. And if that weren't enough, it also had a magic wand: the light pen. With the right program, you could use the pen to draw things on the screen, sense what was already there, and move things about. Just as we do now with a mouse or touchpad.

That was the TX-0, the world's first interactive computer, and the training ground for the designers and programmers of later generations of hands-on machines. The first computer bums – the first real hackers – were the products of this training; without it, and them, there would have been no *Spacewar!*

Tixo's people

The users of the TX-0 were a melange of students, staff researchers, and professors with not much in common other than a need for large amounts of unstructured computer time. The feel of the place, however, was established by the hackers – mostly students – whose lives seemed to be organized in 18-bit strings. Many of them worked for Professors John McCarthy and Marvin Minsky in the Artificial Intelligence Group, an odd bunch even by MIT standards who seemed convinced that, given enough random-access memory and a really fast cycle time, you could model the cognitive parts of the brain and *hey presto!* a real thinking machine. Others worked for Professor Dennis, who presided over the use and development of the TX-0 and more or less kept a semblance of order. The man who kept it all running was the chief engineer, a soft-spoken gentleman named John McKenzie.

Out of this cloud of computer bums emerged the group that brought *Spacewar!* to the silver screen: Dan Edwards, LISP specialist; Robert A. "RAS" Saunders, who wrote MIDAS, the successor to MACRO; Alan Kotok, who wrote the MIDAS debugger; Peter Samson, who made the Tixo and PDP-1 play Bach; Steve Russell, Hingham Institute fellow; and me.

"You Mean That's All It Does?"

When computers were still marvels, people would flock to watch them whenever the opportunity arose. They were usually disappointed. Whirring tapes and clattering card readers can hold one's interest for only so long. They just did the same dull thing over and over; besides, they were obviously mechanical – at best, overgrown record changers – and thus not very mysterious. The mainframe, which did all of the work, just sat there. There was nothing to see.

However, something is always happening on a TV screen, which is why people stare at them for hours. On MIT's annual Open House day people came to stare at Whirlwind's CRT screen. What were they staring at? *Bouncing Ball.*

Bouncing Ball, programmed for the Whirlwind, may have been the first computer-CRT demonstration program. It certainly didn't do much: a dot appeared at the top of the screen, fell to the bottom, and bounced, with a loud "thok" from the console speaker. It bounced off the sides and the floor of the displayed box, gradually losing momentum until it hit the floor and quietly rolled off the screen through a hole in the bottom line. And that was all.

MIT's Whirlwind computer – the first digital computer with magnetic core memory – played host to the CRT demonstration program, *Bouncing Ball*.

The TX-0's counterpart to *Bouncing Ball* was *Mouse in the Maze*, written by Douglas Ross and John Ward. Essentially, it was a short cartoon: a stylized mouse searched through a rectangular maze until it found a piece of cheese which it then ate, leaving a few crumbs. With the light pen, you constructed the maze and placed the cheese or cheeses – you could have more than one – throughout the playfield. A variation replaced the cheese with a martini; after drinking the first one the mouse would stagger to the next.

Besides the Mouse, the TX-0 also had HAX, which displayed changing patterns according to the settings of two console switch registers. Well-chosen settings could produce interesting shapes or arrangements of dots, sometimes accompanied by amusing sounds from the console speaker.

Finally, there was the inevitable Tic-Tac-Toe, with the user playing the computer. The TX-0 version used the Flexowriter rather than the scope.

These four programs pointed the way toward interactive entertainment. Bouncing Ball was a pure demonstration – you pushed the button, and it did all the rest. Mouse in the Maze was a little more interesting, because you could make it different every time. HAX was a real toy – you could play with it while it was running and change it on the fly. And Tic-Tac-Toe was an actual game, however simpleminded. So all the ingredients were there – now we just needed an idea.

The World's First Toy Computer

For all its homeliness, the TX-0 was still very much a god. It took up lots of space, it had to be carefully tended, it took special procedures to start it up and shut it down, and it cost a lot of money to build.

All this changed in the fall of 1961, when Digital Equipment Corporation's first production-model PDP-1 was installed in the "Kluge Room" next door to the TX-0. Its arrival had been anticipated for months; an early brochure announcing the machine had been circulating for some time. It was clear that the PDP-1 had TX-0 genes – the hackers would certainly feel right at home.

The PDP-1 would be faster than the Tixo, more compact, and available. It was the first computer that did not require one to have an E.E. degree and the patience of Buddha to start it up in the morning. You could turn it on any time by flipping one switch, and when you were finished, you could turn it off. We had never seen anything like that before.

Spacewar! Begun: The Hingham Institute Study Group On Space Warfare

Long before the PDP-1 was up and running Wayne, Slug, and I had formed a sort of ad-hoc committee on what to do with it, and in particular what to do with the Type 30 Precision CRT display that would arrive shortly after. It was clear from the start that while Bouncing Ball, the Mouse, and HAX were clever and amusing, they really weren't very good as demonstration programs.

Why not? Zooming across the galaxy with our Bergenholm Inertialess Drive, the Hingham Institute Study Group on Space Warfare devised its Theory of Computer Toys. A good demonstration program ought to satisfy three important criteria:

1. It should show off as many of the computer's resources as possible, and tax those resources to the limit.

2. Within a consistent framework, it should be interesting, which means that every run should be different.

3. It should make the viewer a participant – in other words, it should be an interactive game.

With the Fenachrone hot on our ion track, we dumped ideas on the table...

"Look, you need action and you need some kind of skill level. You have be able to control things moving around on the scope." We warmed up the third-order projectors.

"Spaceships are nice."

"Doing what – a race? A contest?" We aimed our DeLameters at the zwilnik base, and fired simultaneously.

"SPACEWAR!" we cried, as the last force screen flared into the violet and went down. (No, really, he did write like that.)

The basic rules developed quickly. There would be at least two spaceships, each controlled by a set of console switches ("Gee, it would be nice to have a joystick or something like that..."). The ships would have a supply of rocket fuel and some sort of a weapon – a ray or beam, or possibly a missile. For really hopeless situations, we needed a panic button. Hmmm...aha! Hyperspace! And that, pretty much, was that.

The Hackers Meet *Spacewar!*

By the end of the summer of 1961, Steve Russell had moved from Littauer over to the Artificial Intelligence Group. Consequently, whatever ideas the Hingham Institute came up with were soon circulating among the hackers. *Spacewar!* was an appealing, simple concept, and the hackers were the appealingly simple people to bring it to life.

First, however, there was the small matter of software. The PDP-1 was a no-frills machine – except for a few diagnostic and utility routines, there was no program library. In a way this suited the hackers just fine; here was a chance both to improve on TX-0 software and to write new stuff that couldn't have been done before. In fact, Prof. Dennis gave his blessing to the project only on the condition that we provide the new programs first. So in the course of one intense weekend, the AI guys translated MACRO and FLIT from TXish to PDPese, FLIT morphing into the first of a long line of DDT on-line debugging programs. Steve Piner wrote a text display and editing program called Expensive Typewriter, another original whose lineage you can trace, if you like, right down to the latest versions of EMACS.

With the software taken care of we could now write real programs, which is to say, toys. Bouncing Ball was successfully converted to PDP-1 use, but HAX, for some reason, was not. No one really missed it, though, because we had a brand-new toy invented by Marvin Minsky. This program displayed three dots that proceeded to "interact," weaving various patterns on the scope. As with HAX, the constants were set in the console switches. Among the patterns were geometric displays, Lissajous-like figures, and "fireworks." Minsky's original program title was something like "Tri-Pos: Three-Position Display," but from the very beginning we never called it anything other than the *Minskytron*. ▸

COURTESY THE COMPUTER MUSEUM HISTORY CENTER

First Steps

By the end of 1961, all the elements were in place: a brand new, available computer, a cloud of eager hackers, tolerant (when not actively implicated) employers, and an exciting idea. Steve Russell was getting the heat from everyone to Do Something about *Spacewar!*.

Russell, never one to Do Something when there was an alternative, begged off for one reason or another. "One of the excuses for not doing it," Slug remembers, "was 'We don't have a sine-cosine routine and gee, I don't know how to write a sine-cosine routine...' Then Alan Kotok came back from a trip all the way to DEC headquarters in Maynard with paper tapes, saying, 'All right, Russell, here's a sine-cosine routine. Now what's your excuse?' Well, I looked around and I didn't find one, so I had to settle down and do some figuring."

With the heavy mathematics in hand, Slug produced the first object-in-motion program in January 1962. This was nothing more than a dot that could accelerate and change direction under switch control. Even without a hardware multiply-divide capability – on the early PDP-1s, anything stiffer than integer addition and subtraction had to be done by subroutine – the computer was clearly not being pushed.

From dot to rocket ship was a surprisingly easy step, "I realized," Slug says, "that I didn't have to worry about the speed of the sine-cosine routine, because there were only two angles involved in each frame – one for each ship. Then the idea of rotating the grid came out." The ship outlines were represented as a series of direction codes starting from the nose of the ship – when the ship was vertical and tail-down, each code pointed to one of the five possible adjacent dots that could be displayed next. To display the ship at an angle, Russell added the appropriate sine and cosine to the original direction code constants, in effect rotating the entire grid. With this method, the two ships' angles had to be calculated only once in each display frame.

By February, the first game was operating. It was a bare-bones model: just the two ships, a supply of fuel, and a store of "torpedoes" – points of light fired from the nose of the ship. Once launched, a torpedo was a ballistic missile, zooming along until it either hit something – more precisely, until it got too close to a ship or another torpedo – or its "time fuse" caused it to self-destruct.

The classic needle and wedge space ship outlines and the opposite-quadrant starting positions were established at this stage. Acceleration was realistic; it took time to get off the mark, and to slow down you had to reverse the ship and blast in the other direction. The rocket's exhaust was a flickering "fiery tail." At first, rotation was also realistically inertial, but the ships were so hard to control that Slug hid that feature under a console switch, and converted rotation into a simple start/stop effect – a sort of rotational Bergenholm, I guess.

It was apparent almost immediately that a featureless background was a liability as it was hard to gauge relative motion. When the ships were moving slowly you couldn't tell if they were drifting apart or together. What we needed, obviously, were some fixed stars. Russell created a random display of dots, and the quality of play improved. The only thing left, we thought, was Hyperspace, and that was on the way. In fact, we'd only just begun.

Spacewar! Complete: The Control Boxes

Spacewar! worked perfectly well using the test word switches on the console to control the ships. But the CRT was off to one side, so one player always had a visual advantage. More to the point, two excitable space warriors jammed into a space meant that for one reasonably calm operator, damage to the equipment was a constant threat. At the very least, a jittery player could miss the torpedo switch and hit the start lever, obliterating the universe in one big anti-bang.

A separate control device was obviously necessary, but joysticks – our original idea – were not readily available in 1962. So Alan Kotok and Bob Saunders, who just happened to be members of the Tech Model Railroad Club, trundled off to the TMRC room, scrabbled around under the layout for a while to find odd bits of wood, wire, Bakelite, and switch-board hardware, and when the drilling and sawing and soldering had ceased, there on the CRT table were the first *Spacewar!* control boxes. Now the players could sit comfortably apart, each with a clear view of the screen. That, plus the carefully designed layout of the controls, improved one's playing skills considerably, making the game even more fun.

The Stars of the Heavens

One of the forces driving the dedicated hacker is the quest for elegance. It is not sufficient to write programs that work. They must also be "elegant," either in code or in function – both, if you can manage it. An elegant program does its job as fast as possible, or is as compact as possible, or is as clever as possible in taking advantage of the particular features of the machine in which it runs, and produces its results in an aesthetically pleasing form without compromising either the results or operation of the other programs associated with it.

"Peter Samson," Russell remembers, "was offended by my random stars." In other words, while a background of miscellaneous points of light might be all very well for some run-down jerkwater space fleet, it just wouldn't do for the Galactic Patrol. So Samson sat down and wrote Expensive Planetarium.

Using data from the *American Ephemeris and Nautical Almanac* for stars brighter than fifth magnitude, Samson encoded the entire night sky between 22.5°N and 22.5°S, thereby including most of the familiar constellations. The display could remain fixed or move gradually from right to left, ultimately displaying the entire 45°-wide firmament. The elegance does not stop there. On the MIT machine, each dot was either on or off – essentially a 1-bit pixel. But you could make it brighter by intensifying the point repeatedly before the phosphor could decay. By firing each point the appropriate number of times, Samson produced a display that showed the stars at something close to their actual relative brightness. An attractive demonstration program in its own right, Expensive Planetarium was duly admired and "inhaled" into *Spacewar!*

The Heavy Star

Up to this point, *Spacewar!* was heavily biased toward motor skills and fast reflexes, strategy counting for very little. Games tended to become nothing more than wild shoot-outs, which was exciting, but ultimately unrewarding. Some sort of equalizer was called for.

Steve Russell recalls, "Dan Edwards was offended by the plain spaceships, and felt that gravity should be introduced. I pleaded innocence of numerical

IMAGE: RIGHT: COURTESY J. M. GRAETZ

Dictionary of the TMRC Language

BY PETER SAMSON

Acquisition
a means of getting something for nothing.

Coolie
one who does menial labor; always in demand.

Crock
1. a *kludge* that doesn't work; 2. something which fails the purpose of its design from the moment of its conception; 3. something which by normal or accelerated decay is utterly worthless.

DEC
1. home for wayward *TMRC* members; 2. kind, gracious benefactor to us all.

Foo
the sacred syllable (Foo Mani Padme Hum); to be spoken only when under obligation to commune with the Deity.

Gronk
v. to cut, sever, smash, or similarly disable. Gronking parties are held at random intervals.

Hack
1. an article or project without constructive end; 2. work undertaken on bad self-advice; 3. an entropy booster; 4. to produce, or attempt to produce, a hack.

Hacker
n. one who hacks, or makes them.

Kludge
1. a *crock* that works. 2. Incorrect (though regrettably common) spelling of *kluge* (*The New Hacker's Dictionary*).

Kotok
1. hereditary treasurer; 2. The Alan Kotok Award for Fiscal Constraint; 3. astronomical unit of refrigeration.

Psiton
elementary particle carrying the sinister force. The probability of a process losing is proportional to the number of psitons falling on it.

TMRC
n. The Midnight Requisitioning Committee. Other known alias: Tech Model Railroad Club.

TX-0, the first transistorised computer built at MIT's Lincoln Lab in 1957.

analysis and other things, so Dan did the gravity calculations."

The Heavy Star blazed forth from the center of the screen, its flashing rays a clear warning that it was not to be trifled with. Its gravity well encompassed all space – no matter where you were, if you did not move you would be slowly drawn into the sun and destroyed. (As a gesture of good will toward beginners and less skillful players, a switch option turned annihilation into a sort of hyperspatial translation to the "anti-point," that is, the four corners of the display.)

The Star did two things. It introduced a player-independent element that the game needed – when speeds were high and space was filled with missiles, it was often sheer luck that kept one from crashing into the Star. It also brought the other elements of the game into focus by demanding strategy. In the presence of gravity both ships were affected by something beyond their control, but which a skillful player could use to gain an advantage.

The first result of this new attention to strategy was the initial move dubbed the "CBS" opening because of its eye-like shape. It took a while to learn this maneuver, but it soon became the standard opening among more experienced players, as it generally produced the most exciting games.

Unfortunately, the addition of gravity pushed *Spacewar!* over the edge of flicker-free display. To get back under the limit, Dan Edwards devised an elegant fiddle. In Russell's original program, the codes for the spaceship outlines were kept in two tables that had to be examined and interpreted in every display frame, an essentially redundant operation. Edwards replaced this procedure with an outline "compiler" that examined the tables at the start of a game and compiled a program to generate the outlines. This dramatically reduced calculation time, restoring the steady display and making room for the last of the original bells and whistles.

Hyperspace

While this was going on, I was in my secret hideaway (then known as the Electronic Systems Lab) working on the ultimate intergalactic panic button: hyperspace. The idea was that when all else failed your ship could jump into the fourth dimension ▶

and disappear. As this would introduce an element of something very like magic into an otherwise rational universe, the use of hyperspace had to be hedged in some way. Our ultimate goal was a feature that, while useful, was not entirely reliable. The machinery, we said, would be the Mark One Hyperfield Generators. They'd be good for one or two shots, but would deteriorate rapidly after that. They might not work at all, or if they did, your chances of coming back out intact were rather less than even. As Russell says, "It was something you could use, but not something you wanted to use."

The original hyperspace was actually not all that elegant. "Mark One unreliability" boiled down to this: you had exactly three jumps. In each jump your ship's coordinates were scrambled so that you never knew where you would reappear – it could be in the middle of the sun. Also, you were gone for a discernible period of time, which gave your opponent a bit of a breather. When you did come back, your original velocity and direction were restored as well.

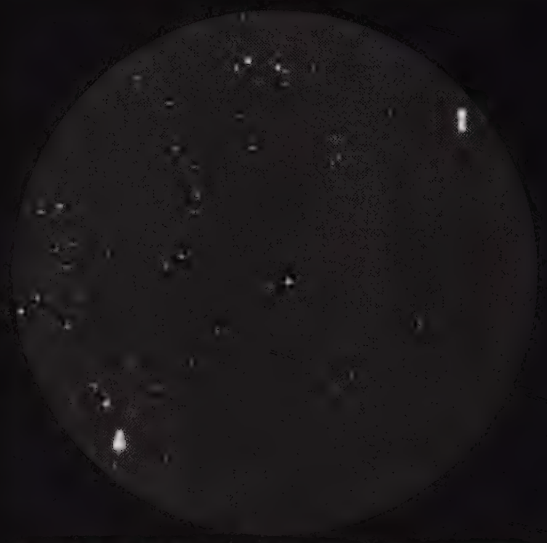
At first, your ship just disappeared when you pushed the Hyperspace lever. Then I had an idea. Remember the *Minskytron*? One of its displays looked very much like a classical Bohr atom, which in those days was an overworked metaphor for anything to do with space and science-fiction. Reasoning that a ship entering hyperspace would cause a local distortion of space-time resulting in a warp-induced photonic-stress emission (see how easy this is?), I made the disappearing ship leave behind a short *Minskytron* signature.

The game was essentially complete by the end of April, 1962. It soon became so popular that some rules had to be laid down: no *Spacewar!* except during lunch hour and after 5PM. People from all over MIT came to see what the fuss was all about, so the game was an obvious choice for MIT's annual Science Open House in May. To make it presentable, we added a scoring facility so that matches could end, making it easier to limit the playing time for any one person. A large-screen laboratory CRT was attached to the computer as a slave display, and placed on top of a high cabinet so that onlookers could watch.

Crocks and Loose Ends

Consider: *Spacewar!* with two ships, realistic acceleration, torpedoes, gravity, a spectacular background, even hyperspace, ran in the equivalent of 9KB of memory – yes, that's kilobytes – on a machine with a clock speed of roughly 1MHz. Is it surprising, then, that we had to let a few inelegant bits slip by?

The most irritating of these, and the first to be improved in later versions, was the appropriately named Crock Explosion. Something dramatic obviously had to happen when a ship was destroyed, but we were dealing with a Cartesian dot-matrix display. The original control program produced a random-dot burst confined within a small square whose outlines were all too discernible. This explosion was intended merely as a place-holder until something more plausible could be worked out, but after all of the other features had been inhaled, there wasn't room or time for a fancier calculation.



THE STARTING POSITION: The ships are in the centers of diagonally opposite quadrants – you can see the stars of Orion at the left.

Similarly, the torpedoes were not quite consistent with the Spacewar universe after the Heavy Star was in place. Gravity calculations for two ships were as much as the program could handle; there was no time to include gravity for half a dozen missiles as well. So the torpedoes were unaffected by the Star, with the odd result that you could shoot right through it and hit something on the other side – if you weren't careful getting round the Star, it could be you. We made up a typical excuse, "mumblemumble photon bombs mumblemumble," but no one really cared.

The heavy star itself was not entirely Newtonian. The common tactic of plunging down the gravity well to gain momentum by whipping around the sun gave you somewhat more energy than you were really entitled to. As this just made the game more interesting, nothing was done to correct it.

Life After *Spacewar!*

In May, 1962, the first meeting of DECUS (Digital Equipment Computer Users' Society) was held in Bedford, Massachusetts. At the meeting, I delivered the first paper on the subject, pretentiously entitled "*Spacewar!* Real-Time Capability of the PDP-1."

Over the summer, the original *Spacewar!* hackers began to drift away. Alan Kotok and I went to work for Digital. Steve Russell followed John McCarthy to the SAIL. Peter Samson and Bob Saunders stayed in Cambridge for a while, but, eventually, they too went west. Dan Edwards remained with the AI group for a few years, then moved to Project MAC – along with Jack Dennis and the PDP-1 – which soon evolved into MIT's Laboratory for Computer Science.

Others took up the maintenance and development of *Spacewar!* as program tapes began showing up all over the country. The game migrated not only to almost every PDP built by DEC, but also to just about any research computer that had a programmable CRT. Eventually it even showed up in video arcades in the form of Cinematronics' hulking *Space Wars* and inspired the Atari classic *Asteroids*.

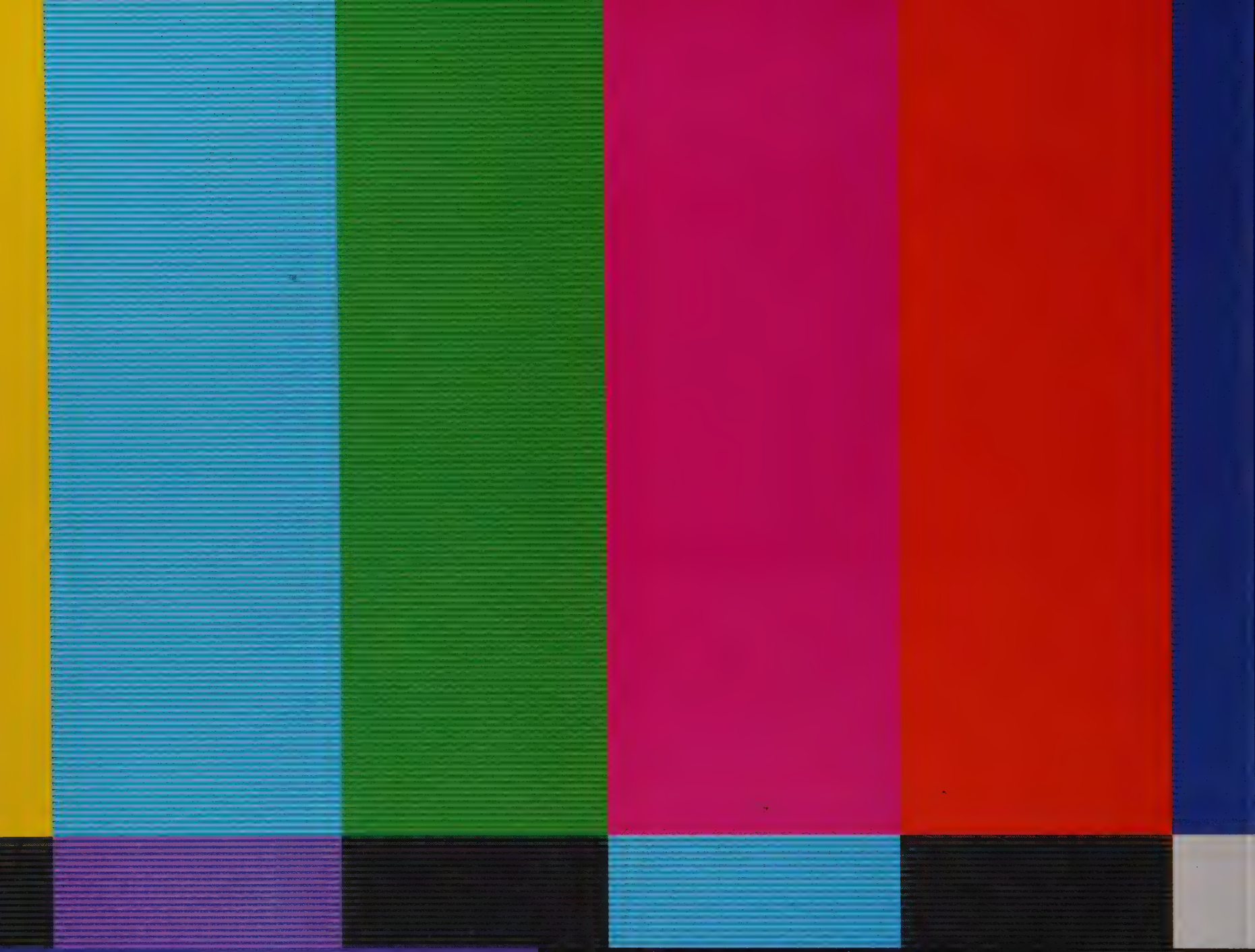
Most attempts to port *Spacewar!* successfully to the PC or Macintosh did not succeed, but in 1996, working at the MIT Media Lab, Brian Silverman, along with his brother Barry and Vadim Gerasimov, wrote a Java applet which does a good simulation, but without Expensive Planetarium or Hyperspace. You can play it online at:

http://lcs.www.media.mit.edu/groups/el/projects/spacewar/

Spacewar! on a PDP-1 was revived for the opening of the Computer Museum in Boston, in 1984, with joysticks substituting for the long-lost control boxes. The PDP-1 has since been retired to California, and the Computer Museum itself is history, having been merged into Boston's Museum of Science in 1998. But the original *Spacewar!* hackers are still out there, waiting for the last star to flare out in the violet haze of some distant galaxy. ■

IMAGE: LEFT: COURTESY CREATIVE COMPUTING; RIGHT: COURTESY THE COMPUTER MUSEUM HISTORY CENTER

From left to right, Alan Kotok, Steve "Slug" Russell, and the author, J.M. "Shag" Graetz play a round of *Spacewar!* at The Computer Museum in Boston.



"The present invention pertains to an apparatus [and method], in conjunction with monochrome and color television receivers, for the generation, display, manipulation, and use of symbols or geometric figures upon the screen of the television receivers for the purpose of [training simulation, for] playing games [and for engaging in other activities] by one or more participants. The invention comprises in one embodiment a control unit, an apparatus connecting the control unit to the television receiver and in some applications a television screen overlay mask utilized in conjunction with a standard television receiver. The control unit includes the control, circuitry, switches and other electronic circuitry for the generation, manipulation and control of video signals which are to be displayed on the television screen. The connecting apparatus selectively couples the video signals to the receiver antenna terminals thereby using existing electronic circuits within the receiver to process and display the signals generated by the control unit in a first state of the coupling apparatus and to receive broadcast television signals in a second state of the coupling apparatus. An overlay mask which may be removably attached to the television screen may determine the nature of the game to be played or the training simulated. Control units may be provided for each of the participants. Alternatively, games [training simulations and other activities] may be carried out in conjunction with background and other pictorial information originated in the television receiver by commercial TV, closed-circuit TV or a CATV station." —US Patent Office Abstract #3,728,480

TV Game Project

Television Gaming Apparatus

It was 1948. The American cultural landscape was evolving at a dramatic rate as society shifted from the values of small country towns to a decidedly more cosmopolitan sensibility. Thousands of college graduates fresh off the G.I. Bill flooded the nation's cities in search of new opportunities in the thriving post-war economy. Development reached an all-time high and new suburban communities – paradigms of the idyllic middle-class lifestyle – were built from Long Island to Los Angeles in order to accommodate the boom. Constructed from space age materials and filled with all the latest modern conveniences, these communities defined the essence of the American Dream and signaled a new era of modern life, fueled by leisure income and the promise of a future filled with boundless optimism and opportunity.

Key to this transition was the steady stream of new technologies from the realm of science fiction into the reality of the modern cultural mainstream. Supercomputers. Supermarkets. Super-8. But it wasn't until the birth of a blinking box known as "television" that a technology would so perfectly reflect and express this new suburban sensibility. As a result, the commercial television industry exploded at a fantastic rate. In the early 1950s, there were five television stations in New York City alone, broadcasting TV programs like *Howdy Doody*, *The Goldbergs*, *The Texaco Star Theater*, and as much professional wrestling as they could possibly tape from high-powered antennas atop the Empire State and Chrysler buildings.

It was during this period that a German immigrant named Ralph H. Baer began his career in television upon graduating from Chicago's ATIT (American Television Institute of Technology) with a bachelor's degree in Television Engineering.

"I'd been a radio and television technician before World War II and had installed and repaired a few RCA receivers in the early forties... Now it was my goal to design TV receivers – I was always thinking about new things to do with the technology."

Fast-forward to 1966. Baer was now the chief engineer and manager of equipment design for Sanders Associates, a large military electronics firm in Nashua, New Hampshire. Ironically, none of Baer's work at Sanders involves television technology – yet. But all along, he continues to ponder new ways to use a TV set for more than watching network broadcasts.

In the late '60s, there were approximately eighty million television sets in American homes that, in

CHASSIS NO. 1: The first "Television Gaming Apparatus" – built with vacuum tubes in 1967 – is covered with the evidence of its years touring the court circuit defending Baer's patents.

Baer's mind, needed to be used for something other than watching reruns. One thought he'd had was the possibility of playing games on a TV screen. It was a revolutionary concept. And so, the idea of a TV Game slowly began to take shape until finally, during a trip to New York City, Baer jotted down a few notes on the subject of TV Games while awaiting a colleague at the Port Authority bus terminal.

"When I got back to my office in Nashua on September 1, 1966, I transcribed the notes into a four-page paper outlining the idea of playing TV games on an ordinary home television set and listed the various types of games that might be played using a TV set as a video display. My idea was to develop a small 'game box' that would attach to the television and do some neat things – and cost, perhaps, twenty-five dollars at retail. That was the original idea."

Little did Baer realize that in that moment he had started a chain reaction that would change the course of technological history and evolve into the twenty billion dollar interactive entertainment industry that exists today.

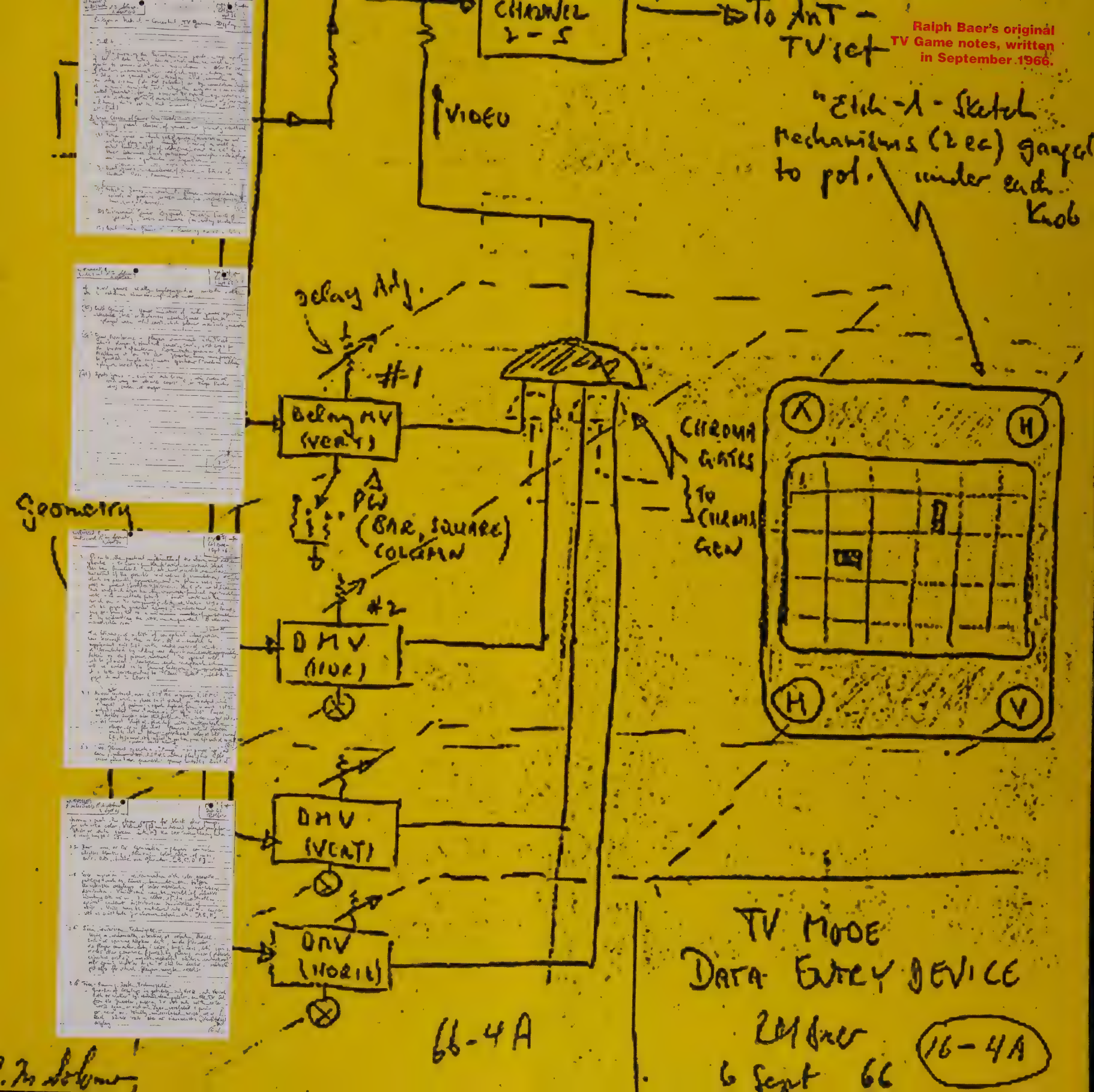
Within a week of drafting those initial notes, Baer was hard at work sketching out the original schematics for what would become the first home videogame system. The initial circuit design allowed for two spots to be generated on a TV screen and manipulated them so they could be moved around on the screen using two vertical and two horizontal control knobs attached to a control box. Baer then engineered these "spot generators" to modulate a transmitter tuned to Channel 3 or 4 so that the game signal could enter any standard television set by way of its antenna terminals.

Soon after, Baer directed one of his technicians, Bob Tremblay, to build a vacuum tube circuit to produce this simple two-spot display. He quickly designed the system, a kluge of four vacuum tubes, three potentiometers, and dual triodes, mounted on a shiny stainless steel chassis. It was with this architecture that they were able to create the first "videogame" ever played on a television screen – *Fox & Hounds*.

"The game was to pretend that one spot was a fox and the other a hound. The object was to have the hound chase the fox until he was 'caught' by way of simply touching the spot. It was primitive, all right, but it was a videogame – and it was fun. So we were encouraged to move forward with the project." ▶

IMAGES: LEFT: VAN BURNHAM; RIGHT: COURTESY RALPH H. BAER

Ralph Baer's original TV Game notes, written in September 1966.



It was at this point in the "unofficial" TV Game Project that Baer decided to demonstrate his concept of television gaming to the Sanders director of R&D, Herb Campman. Campman came to their lab and played the *Fox & Hounds* game on the vacuum tube prototype. He was so impressed with their new invention that he asked Baer to draft a formal request for funding. That request resulted in a budget allocation of $2,500 for labor and materials – not much by today's standards but enough to make the team official and keep the project going for a few more weeks.

In January 1967, Bill Harrison, another Sanders technician, was recruited for the TV Game Project. Baer then relocated the team to a small room on the fifth floor of Sanders Canal Street building and gave Harrison the only key to the door. The "Game Room," as it became known, was now classified Top Secret, and no one – other than Harrison and Baer – was authorized entrance.

The team began rapidly developing new games, technologies, and system designs to expand and exploit their invention. One day, Harrison bought a plastic toy rifle. Baer proceeded to convert the rifle into a light-sensitive gun that could interact with the TV screen. Utilizing one of the "spots" as a target the light-gun could "shoot" at the target, which – when directly hit – would disappear from the screen. Harrison would use the control box to move the spot around onscreen and simulate a moving target. With that invention, the first video target-shooting games were born.

The team then designed a second system that played a game called *Firefighter* – the object of which was to extinguish a fire by turning the TV screen from red to blue before a timer ran out. This task was accomplished by rapidly pressing a button on the stainless steel box, located under a wood handle that the player could easily "pump" like a water well. The entire screen would start out red and the faster the player pumped, the faster the screen would turn blue – rising steadily from the bottom to the top to slowly fill the screen. Later, an acetate overlay with an image of a house was attached to the screen for a more realistic effect.

During the next several months, Harrison and Baer worked to improve the circuitry and design of the systems. They built better horizontal and vertical synchronization circuits, improved the modulator and transmitter designs, created a color background generator, and developed new variations on chase and target-shooting games. Bill Harrison continued to improve on the circuit design and soon their work was nearly done. Harrison drafted a final materials list and priced the system out at a whopping cost of sixteen dollars. As a result, Baer's idea of a twenty-dollar "game box" was rapidly fading – not to mention that they still had no idea how this invention could be transformed into a viable commercial product.

It was around this time that Herb Campman recruited another technician, Bill Rusch, for the TV Game Project. Rusch was a slightly eccentric engineer working with Campman's corporate R&D group. Rusch was also a musician and one of the more "creative" types at Sanders. Campman felt that this unique perspective would no doubt be a valuable asset to the team. Little did he know that Rusch would prove the perfect catalyst to help move the project forward.

Within a few weeks of Rusch's arrival, the concept of a third spot was born. Unlike the two player controlled spots they had implemented so far, this third spot was to be controlled by the system itself. It was Bill Rusch who had the idea to make the third spot symbolize a "ball" so that the system could play some sort of ball game. With this new feature, the TV Game was now be able to play any conceivable variation of a sports game. Ping-Pong. Hockey. Tennis. Football. Volleyball. There was no end to the possibilities.

Harrison engineered the new TV Ping-Pong game circuitry based on Rusch's initial design and by November the team had a working prototype. The new architecture was far more interesting than the original chase games – and infinitely more fun. After a formal demonstration to Sanders management, everyone agreed that the team had created something extraordinary and the TV Game Project received a significant infusion of funds that gave them the freedom to spend several months perfecting the architecture for what would soon become the very first programmable TV game system.

In regard to aesthetics, the state of the art in the sixties did not allow for the generation of high-resolution background graphics in a low-cost game system. The technology simply did not exist. As a result, the display capabilities of the system itself were fairly limited. The paddle and ball spots would remain white and the screen's background color would change depending upon what game was being played – blue for hockey, green for tennis and football, and black for chase and target-shooting games.

Baer was now forced to focus on the problem of just how Sanders Associates was going to get a return on their now substantial investment. The team had spent a considerable amount of time, energy, and money developing this concept of television gaming – and Sanders management was beginning to grow impatient.

The first solution that Baer proposed was that the concept of playing games on a TV set may be of interest to the nascent cable television industry. Any cable provider could transmit the top view of a tennis court or football field simply by pointing a TV camera at a graphic. The system's white ball and paddle spots would then be superimposed onto a high-resolution full-color background, an effect that would result in an exciting and dynamic screen presentation. It made perfect sense.

So the team added circuitry to the prototype that allowed the game-generating hardware to work synchronously with a cable signal. When they had the system working, Baer called up Hub Schalafly, an executive at TelePrompTer in New York City. TelePrompTer was the largest cable company in the United States with over 50,000 subscribers and they were interested enough to come to Nashua for a demonstration. Schalafly was impressed and urged Irving Kahn, TelePrompTer's chairman, to come to Nashua for a preview in early 1968. But, unfortunately, the growing cable industry soon fell victim to depressed conditions – the result of increasing FCC regulation that nearly paralyzed the industry – and negotiations between Sanders and TelePrompTer quickly began to fall apart.

Bill Rusch left the project shortly thereafter. Ralph Baer and Bill Harrison continued to spend time on the project and developed better hardware and games over the next several months. They built several programmable models in an attempt to streamline the design and reduce its cost. But it was the last iteration of the hardware's development that would become the infamous "Brown Box" – the final prototype for what would eventually evolve into the world's first commercially released home videogame system. ■

The Brown Box

It was now 1968, and Baer's thoughts had again turned to how he could transform this TV Game Project into a marketable product. The team had finally completed work on the "Brown Box" prototype. Unlike Chassis No. 1, the Brown Box was solid state. It was a switch-programmable game system – made up of 40 transistors and 40 diodes – that could play Ping-Pong, hockey, volleyball, ski, tennis, football, soccer, roulette, baseball, horse racing, chase games, maze games and target-shooting games with a light rifle – all by simply placing a cardstock template on the switchplate and turning the designated switches either OFF or ON.

It occurred to Baer that the Brown Box may appeal to television set manufacturers since most of the components and manufacturing resources needed to build the system would be similar to those of a TV. So, Baer met with Lou Etlinger, Sanders director of patents, to discuss this idea and devise a possible licensing strategy. The team decided to invite representatives from the major US television manufacturers to come for a demonstration. The delegation from General Electric were the first to arrive and were soon followed by all the key players in the industry including RCA, Sears, Magnavox, and Zenith.

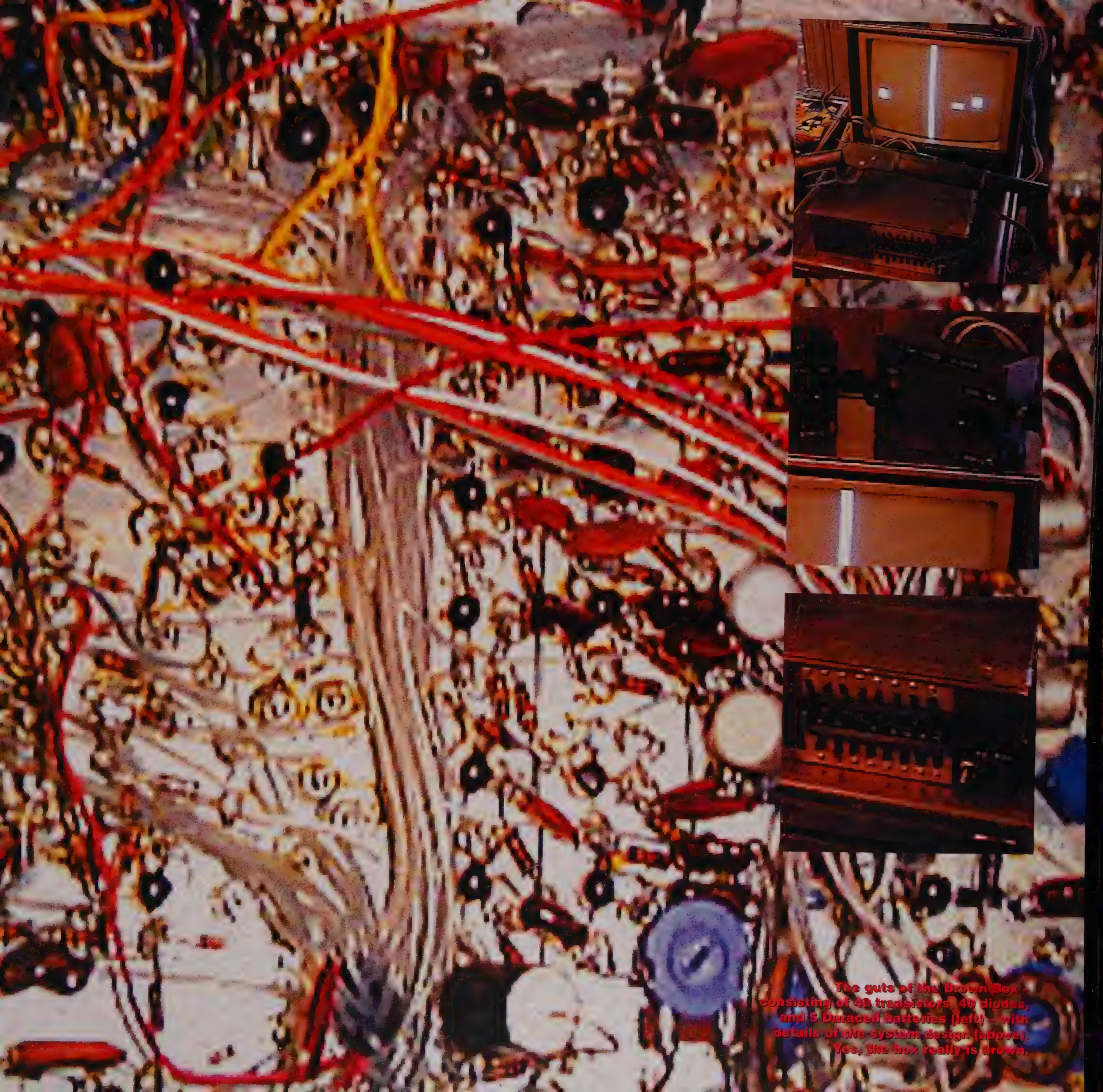
At this point, the biggest challenge that the TV Game Project faced was not proving the merits of this invention – that part was easy; the difficulty was in breaking through the resistance they relentlessly encountered. It isn't easy to introduce people to new concepts. So, they had to do a litttle more than just show off their cool new toy – they also had to convince people that there was such a thing as videogames, that they couldn't "bust" the TV by pushing the wrong button, that the game wouldn't make their children go blind, and reassure all the philistine apprehensions typically encountered when introducing any new technology to the public. It was this very combination of paranoia and fear that ultimately scared off most of the companies that attended the demos held at Sanders in 1969. The representatives would appear impressed by the technology – and agree that TV Games were no doubt a "great idea" – but at the end of the day they wouldn't dare take the next step. Except for one. It was RCA, based in Camden, New Jersey, who commanded the courage and vision to take a risk on the TV Game Project.

After a few preliminary meetings with RCA's management and a tentative agreement, months of negotiations ensued. The Sanders team remained hopeful – it seemed they were finally seeing the big payoff for all their years of work. But things weren't working out quite as they had planned. RCA's demands were becoming unreasonable – and it soon became clear that RCA wanted to *own* the Brown Box technology, not just license it. This was definitely not the deal Sanders was after and the negotiations were terminated.

Fortunately for Sanders one member of the original RCA delegation had left to take a VP spot with their rival, Magnavox. In fact, he was so impressed with Baer's Brown Box demonstration that he urged the Magnavox management in Fort Wayne to take another look at the TV Game Project.

Baer and Etlinger were invited to Magnavox's corporate headquarters to once again demonstrate the Brown Box to a roomful of executives. The reception they got was far from overwhelming – actually, no one showed much enthusiasm at all – but they did impress one man: Gerry Martin. Martin was head of product development and manufacturing for all of Magnavox – and was the only person in the room they needed to impress. The project was green-lighted on the spot. ■

IMAGES



The guts of the Brown Box consisting of 48 transistors, 40 diodes, and 5 Duracell batteries (left) – with details of the system design (above). Yes, the box really is brown.

Timeline

In the beginning there was *Bouncing Ball*. Then in 1958, a physicist at Brookhaven National Laboratory named Willy Higinbotham created *Tennis for Two* for the facility's annual visitor's day display. This hardware-based computer game was played on a 5" monochrome oscilloscope wired up to a pair of control boxes that let players serve and rally a blip of electronic light in the first truly interactive computer game.

Three years later, MIT student Steve Russell programmed *Spacewar!* – the very first software-based computer game. Written on the DEC PDP-1, this space-age dogfight was played on a $30,000 vector monitor using the computer's control panel switches to navigate two warring spaceships as they orbit a deadly sun.

In 1966, a television engineer named Ralph Baer hit upon a revolutionary concept – a "TV Game" that would allow a standard set to be used as a display for playing games. Working at Sanders Associates, Baer began to build a prototype with fellow engineers Bill Harrison and Bill Rusch. By 1968 the team had created the Brown Box, a switch-programmable game system engineered with 40 transistors and 40 diodes, capable of playing over a dozen games on a TV screen including Ping-Pong, hockey, football, baseball, roulette, horse racing, and maze games, as well as a target-shooting game complete with a realistic light rifle. Although they were primitive Baer's games proved prescient, and set the foundation for nearly every genre of videogames that would follow.

As a student at the University of Utah, future Atari founder Nolan Bushnell had often played *Spacewar!* on the school's computer – and imagined a day when amusement park midways would be lined with machines offering the game for a quarter. So in 1971 while working as an engineer in Silicon Valley, Bushnell designed *Computer Space*, the first coin-operated arcade videogame. Inspired by Russell's notorious shoot-'em-up, *Computer Space* let aspiring space cowboys battle alien ships as they float and thrust through a star-filled galaxy for only the cost of a quarter.

That very same year, Magnavox licensed Baer's Brown Box technology and repackaged it as the Magnavox Odyssey – the first home videogame system ever released.

The rest, as they say, is history – here is a visual aid...

containing 44 MOS ICs, this "Time Computer marks the beginning of consumer applications for microchip technology

system. Inspired, he creates a computer game, ***Colossal Cave Adventure***, later known simply as *Adventure*.

Gygax. This legendary fantasy adventure game, played with paper, pencil, and dice creates a new genre of role-playing

► ***Hunt the Wumpus***, a text-based role-playing game, is developed at the University of Massachusetts by Gregory Yob. Players navigate a 12-sided maze to kill the eponymous monster.

▲ Xerox's **Alto**, the first computer to utilize a GUI (graphical user interface) and mouse input device, is developed at Xerox PARC. The system is widely credited as inspiring the Apple Macintosh.

ATARI

◄ In Santa Clara, California, Bushnell and Ted Dabney partner in a new videogame venture. They name the company **Atari**, the Japanese word for *check* in the board game Go.

◄ **Taito Corporation**, a Japanese amusement-game manufacturer that later becomes a leading game developer, introduces its first arcade videogames, including *Elepong*.

◄ Atari releases the arcade videogame ***Gran Trak 10*** – the first racing game designed with a steering wheel and gear shift mounted to the control panel for realistic "speedway" action.

► Engineer Al Alcorn installs a prototype of Atari's first game, ***Pong***, a TV Ping-Pong game. Placed on a barrel in a local bar named Andy Capp's, its coin box is jammed with quarters.

► Atari releases the arcade videogame ***Quadrapong***, a new four-player cocktail version of its now ubiquitous video Ping-Pong game. Fortunately, it is also one of the last.

► Masaya Nakamura's Tokyo-based amusement company, Nakamura Manufacturing (now called **Namco**), enters the arcade videogame market after acquiring Atari Japan for $500,000.

◄ Entrepreneur Nolan Bushnell designs ***Computer Space***, the first coin-op arcade videogame. He sells it to novelty game maker, Nutting Associates which builds 1,500 units.

PONG

◄ *Pong* becomes an overnight sensation, inspiring a flood of coin-op copycat games. Atari sells 10,000 units – yet knockoffs still outsell the original two to one.

◄ MGM releases the sci-fi film ***Soylent Green***, starring Leigh Taylor Young, Charlton Heston, and a gleaming white *Computer Space* – the first videogame cameo.

KEE GAMES

◄ Bushnell establishes **Kee Games** – a secret subsidiary managed by his friend Joe Keenan – as a way to avoid distributors' exclusivity contracts.

START ► 1971 1972 1973 1974

◄ Future videogame fan and author of *Supercade* **Van Burnham** is born on June 28 – coincidentally, on her mother's birthday – at Rex Hospital in Raleigh, North Carolina.

◄ Magnavox debuts the **Odyssey** – at an industry preview in Burlingame, California. Based on Baer's Brown Box, the system plays a version of Ping-Pong.

► **Williams**, a Chicago-based pinball and novelty game maker, introduces its first arcade videogame, a Ping-Pong game called *Paddle Ball*. It will also be its last until 1980.

Paddle Ball

◄ Ralph Baer designs, and, along with Sanders Associates, patents a **Television Gaming Apparatus** that gives them the exclusive rights to make ball-and-paddle videogames.

◄ Magnavox launches the **Odyssey Home Entertainment System** nationwide – the first home videogame system ever released at retail. The Odyssey sells over 200,000 units.

Don't miss the television event of the season!

Magnavox presents Frank Sinatra

◄ During Frank Sinatra's NBC comeback special *Ol' Blue Eyes Is Back* – sponsored by Magnavox – the Chairman himself introduces the **Odyssey** videogame system to millions of TV viewers.

TANK

◄ Kee Games releases ***Tank***, the first arcade videogame to utilize ROM chips for graphics. This successful coin-op will be reinvented later as the ubiquitous *Combat* for the Atari VCS.

► **Walt Disney World** celebrates its grand opening in Orlando, Florida. A new *Computer Space* graces the luxury game room of the ultra-modern Contemporary Resort.

► Magnavox releases the **Shooting Gallery** – an add-on electronic light rifle for Odyssey that plays target-shooting games like Dogfight, Prehistoric Safari, and Shooting Gallery.

► **Exidy** is founded by former Ramtek exec Pete Kaufman to develop arcade videogames. The company later scores with classics like *Circus* and *Venture*, made for the Atari VCS.

Exidy

► Intel introduces the revolutionary **4004** microprocessor. Heralded as the first "computer on a chip," the 4004 has nearly the processing power of an ENIAC computer.

intel TM 71

► The **Kenbak I** – one of the first "personal computers" – appears in the pages of *Scientific American*. Designed by John Blankenbaker, it contained 130 ICs and used a 256-byte memory.

KENBAK-1

◄ Midway Games, a subsidiary of Chicago pinball giant Bally, licenses *Pong* from Atari and releases its own version entitled ***Winner***. It is Midway's first foray into arcade videogames.

touch-me

◄ Atari introduces ***Touch Me***, an arcade game where the player repeats changing sound patterns by hitting buttons. It will later inspire Milton Bradley's successful electronic game Simon.

► ***Oregon Trail*** – a text-based simulation of the settlers' wagon train journey to the West – is programmed by teacher Don Rawitsch. Students still play this pioneering "edutainment" game.

THE OREGON TRAIL 4TH

► Atari introduces its next arcade videogame, ***Space Race***. Players speed their starships across the galaxy while dodging through a deadly asteroid belt. It fails to really take off.

► Atari releases the arcade game ***Gotcha***. Because the controls of this cat-and-mouse maze videogame consist of two pink rubber mounds, it's swiftly dubbed "the

► Atari introduces the arcade videogame ***Breakout***, designed by Atari's fortieth employee, Steve Jobs, along with his friend, Steve "Woz" Wozniak. It is soon Atari's top selling game.

► The original ***Zork*** – a text-based computer adventure that takes place in the Great Underground Empire – is programmed by Marc Blank and Dave Lebling at MIT.

► Scott Adams founds the software company **Adventure International** to market his self-published text adventure game *Adventureland*. He sells over 10,000 copies.

► Atari releases the arcade videogame ***Warrior***, designed by Tim Skelly. This graphically enhanced vector-based sword fighting game was among the first to feature head-to-head combat.

General Instruments velops the **AY-3-8500** crochip, A.K.A. Pong a chip. Demand for e part causes a short- e that drives many Ping-Pong makers t of business.

► A wave of **Pong** clones hits toy store shelves across the country. Most of these dedicated home videogame systems – all utilizing the new GI chip – include tennis, hockey, and shooting games.

► Commodore Business Machines release the **PET 2001** (Personal Electronic Transactor) computer, designed by Chuck Peddle. With a 6502 microprocessor it sells for $600.

► Richard Garriott, also known as "Lord British," programs an adventure game for the Apple II entitled ***Akalabeth***. After selling 25,000 copies, Garriott follows up with a new game called *Ultima*.

▼ Warren Robinett codes the first documented **Easter Egg** into *Adventure*, a game for the Atari VCS. After entering a secret room, players can see his signature.

◄ Atari founds a new subsidiary called **Horror Games**. Their first release, *Shark Jaws*, is an arcade videogame that cashes in on the feeding frenzy following the release of the film *Jaws*.

◄ Coleco introduces the **Telstar**, a dedicated home videogame system powered by GI's new microchip. Being one of the first to place an order, Coleco were among the lucky few to receive chips.

► Atari introduces the **Atari 400** and **800** home computers. Based on the 6502 processor, the systems feature speeds up to 1.8 MHz and spawn a new generation of amateur programmers.

▼ Cinematronics release the goliath vector-based game ***Space Wars***, designed by MIT student Larry Rosenthal. Based on *Spacewar!*, it's the first arcade videogame with "hyperspace" button.

Midway releases the oot-'em-up arcade ame ***Gun Fight***. ased on a game Taito ade for the Japanese arket, it's the first deogame designed ith a microprocessor.

► Former Atari staffer Steve Jobs and his pal Steve Wozniak found **Apple Computer** and introduce the Apple I personal home computer at a Homebrew Computer Club meeting.

▲ Apple Computer unveils the **Apple II**– the first home computer with color graphics. The system ships with a 6502 CPU, 16 Kbits of RAM, Basic software, and game paddles.

◄ APF introduce **The Imagination Machine**. Based on the 6800 microprocessor, it was a hybrid of the M-1000 videogame system – complete with data cassette, keyboard, and 9K RAM.

▼ Mattel Electronics launches **Intellivision** (intelligent television). The arcade-quality graphics of this home videogame console are superior to the other leading home systems.

◄ Atari designs a home version of ***Pong***. After a successful demo, Tom Quinn, a buyer for Sears, places an order for as many games as Atari can crank out.

◄ Nolan Bushnell sells Atari to **Warner Communications** in a deal estimated to be worth $28 million. He stays on as chairman of the board until 1978.

◄ Atari releases the **VCS**. Over the next five years it becomes one of the most popular consoles ever, with more than 25 million units and 120 million cartridges sold worldwide.

◄ Bally introduces the **Professional Arcade** programmable home videogame system – it even includes a keypad so players can program games with *Bally BASIC*.

1975

1976

1977

1978

1979

Shin Nihon Kikau is corporated in Japan. 1986, the arcade nd home videogame aker would change s name to **SNK** orporation.

► Sega introduces the arcade videogame ***Heavyweight Champ*** – a boxing game that is widely cited as the first commercial videogame designed in Japan.

► RCA introduces the black-and-white **Studio II** home videogame console. It comes with five built-in games, but still can't compete with popular color systems.

► Magnavox unveils the new cartridge-based **Odyssey²**. With an alpha-numeric keyboard and futuristic graphics, it's hyped as the ultimate computer game system.

► Midway releases the arcade hit ***Galaxian***, licensed from Namco of Japan. This Z-80-based alien shoot-'em-up was one of the first full-color arcade videogames.

► Fairchild Camera and Instrument releases **Channel F**, the first full-color, cartridge-based, programmable home videogame system. The breakthrough console sells for $170.

► Japanese playing-card and toy manufacturer **Nintendo** releases its first line of dedicated TV Ping-Pong home videogame consoles, including the Color TV Game 6 and 15.

► Nolan Bushnell leaves Atari to start **Pizza Time Theater**. An animatronic wonderland starring an oversize rat named Chuck E. Cheese, it's one of the first family-oriented arcades.

► Milton Bradley releases the **Microvision** hand-held videogame system. Designed by Jay Smith, this LCD game device is the first to combine a cartridge-based home console with portability.

Bill Gates and Paul llen found **Microsoft** o market a Basic inter- reter for the MITS ltair. The company will ater become the largest oftware developer in he world.

▼ Exidy introduces *Death Race* – the first videogame to be vilified for violent content. Inspired by the movie *Death Race 2000*, the gameplay consists of mowing down pedestrians.

► **Mattel** introduces a family of handheld electronic games. The popular LED-based series soon expands to include football, basketball, and baseball games.

► Midway licenses arcade phenomenon ***Space Invaders*** from Taito and releases it in the US. In Japan the videogame is so popular that it causes a coin shortage.

► Atari debuts ***Asteroids***. An arcade game designed by Lyle Rains and Ed Logg, this distant relative of *Spacewar!* becomes one of Atari's most successful coin-ops, selling over 70,000 units.

◄ Zilog introduces the **Z-80** microprocessor. With its dual-register architecture and speeds of 2.5 MHz, the chip becomes the industry standard in arcade videogame hardware.

► TOMY release ***Blip: The Digital Game***, a handheld electronic "TV Ping-Pong" game. The game is actually an electro-mechanical game with an LED blip and wind-up timer.

► Milton Bradley releases **Simon**, designed by Odyssey inventor Ralph Baer. Inspired by Atari's failed *Touch Me*, Simon becomes one of the most successful electronic games in history.

▼ Atari releases the hit ***Atari Football***, the first arcade videogame to use a trackball instead of a joystick. Designed by Alan Miller, it featured a scrolling playfield for more realistic gameplay.

◄ The MITS **Altair 8800** computer is featured on the cover of *Popular Electronics*. The home computer kit sells for $395 dollars – nearly the cost of a single Intel 8800 microchip.

◄ Kee Games releases ***Sprint 2***, an arcade driving game designed by Dennis Koble. It was one of the first arcade videogames designed by Atari to utilize a microprocessor chip.

◄ **Stern Electronics** is founded by Gary Stern. They acquire game developers Universal Research Labs and its subsidiary Electra Games in order to develop new arcade

► Atari rolls out ***Space Invaders*** for the Atari VCS. Programmed by Rick Maurer, it's the first home videogame licensed from an arcade game. More than one million units are sold.

arcade game also features realistic driving controls including a working tachometer.

The game is actually a *Pac-Man* PCB with an enhancement kit created by General Computer

Electronic Games – the first consumer magazine dedicated to the dynamic world of home console and arcade videogames.

Conway and Roy Thomas for DC Comics, the five mini-comics were packed-in with select Atari 2600 cartridges.

◄ Atari launches the apocalyptic arcade game ***Missile Command***, programmed by Dave Theurer. In this simulation of nuclear warfare, players defend five cities against a hail of ICBMs.

◄ Bill Grubb and Dennis Koble establish **Imagic**, the second independent game software company. Its nine-person staff includes former programmers of both Atari and Mattel Electronics.

► ***Starcade***, a TV game show hosted by Geoff Edwards that has teens and their parents playing arcade and videogame trivia games for cash and prizes, airs across the country.

► Warner sells **Atari** to Tramel Technology – owned by Commodore's founder and former president, Jack Tramiel – for $240 million. To cut costs, most of Atari's staff is laid off.

◄ **Activision**, the first "third-party" videogame software company, is founded by James Levy with former Atari programmers Larry Kaplan, Alan Miller, David Crane, and Bob Whitehead.

◄ Roberta and Ken Williams program ***Mystery House*** for the Apple II – the first adventure game to combine text and graphics. Inspired by its success, the couple found Sierra Online.

▼ GCE introduces the **Vectrex** all-in-one home console. Designed by Jay Smith, the advanced videogame system – later acquired by Milton Bradley – has a built-in 9-inch vector display.

◄ Sega debuts arcade game ***Zaxxon***, one of 10 games honored in the *Electronic Games* Hall of Fame. In it, players pilot a fighter jet through an isometric 3-D world while evading enemy fire.

▼ RDI Video Systems releases the **Halcyon**, a $2,500 laserdisc-based home videogame system that features voice synthesis technology. It ships with the game *Thayer's Quest*.

▲ Nintendo unveils the **Game & Watch** series of LCD-based handheld games, designed by Gunpei Yokoi. Nintendo of America is established to handle US distribution.

► Nintendo of America releases ***Donkey Kong***. Designed by Shigeru Miyamoto, the new game introduces Mario, who goes on to become one of videogaming's most enduring characters.

▲ Buckner & Garcia record the hit single **"Pac-Man Fever."** Other videogame-inspired songs on the album are "Do The Donkey Kong," "The Defender," and "Goin' Berzerk."

► Cinematronics introduces laserdisc game ***Dragon's Lair***, a fantasy adventure created by Rick Dyer and illustrated by Don Bluth. The game earns $32 million during its first 8 months.

▲ Cinematronics debuts ***Space Ace***, a sequel to *Dragon's Lair*. This laserdisc game, also designed by Dyer and Bluth, is sold as a conversion kit for existing *Dragon's Lair* cabinets.

► Atari introduces the ***Pac-Man*** cartridge for the VCS. Programmed by Tod Frye, it becomes one of the best-selling games – regardless of its primative graphics.

► Emerson releases the **Arcadia 2001** home videogame system. Finding success mostly in Canada, it featured innovative mini-joystick controllers.

► Atari ships ***I, Robot***, the first videogame to be rendered with polygons. Designed by *Tempest* creator Dave Theurer, the technology is light years ahead of its time.

1980

► Williams introduces the arcade videogame ***Defender***, designed by Eugene Jarvis. This space-age shooting match ends up being one of the decade's most popular arcade games.

◄ Atari previews the **Cosmos** holographic handheld videogame at a press conference in NYC. Designed by *Pong* engineer, Al Alcorn, the unique system is never released.

◄ Atari introduces the arcade videogame ***Centipede***. The game was co-designed by Ed Logg and Dona Bailey – one of the only female game programmers in the videogame industry.

◄ Atari introduces the arcade game ***Battlezone***, a vector-based combat simulator. The videogame is so realistic that Atari is commissioned to design a version of the game for US military training.

1981

◄ Bally/Midway debut ***Pac-Man***, Toru Iwatani's dot-gobbling maze game licensed from Namco. The addictive game soon becomes the most popular videogame ever.

◄ Walter Day opens the **Twin Galaxies** arcade in Ottumwa, IA. With its renowned "Intergalactic Scoreboard" it becomes the most famous video arcade in the world.

► Atari unleashes ***Tempest*** – programmed by Dave Theurer – the first arcade videogame to make use of the Quadrascan color XY generator for stunning full-color vector graphics.

◄ IBM introduces the **IBM PC**. Based on the Intel 8088 processor, the computer runs at 4.77 MHz. MS-DOS 1.0 was shipped with the PC. The system becomes the industry standard.

◄ Taito releases the arcade game ***Stratovox***. It is among the first videogames to include voice synthesising technology – taunting its players with statements like "We'll be back!"

◄ Commodore releases the **VIC-20**. Marketed as a "computer for the masses," it is the first home computer to cost less than $300. The more powerful Commodore-64 follows in 1982.

► Former Apple exec Trip Hawkins establishes game software company **Electronic Arts**, a company renowned for its high-quality games and high-concept packaging inspired by rock albums.

1982

► Sega Enterprises of Tokyo introduces the **SG-1000**, its first home videogame system. The cartridge-based console it plays popular Sega arcade games.

▲ Atari rolls out its **5200 Super System** home videogame platform. Essentially a stripped-down Atari 400 computer in a sleek black case, the $299, 8-bit system ships with *Super Breakout*.

► Entex introduces **Adventure Vision**, the first cartridge-based tabletop game system. It ships with a version of *Defender* and offers games like *Super Cobra*, and *Space Force*.

► Stern introduces the laserdisc game ***Cliff Hanger***, an epic RPG with animation drawn from the Japanese series, *Lupin III*. It is one of the last laserdisc arcade games released.

► Mystique introduces ***Custer's Revenge***, an X-rated game for the Atari 2600 that portrays the rape of a Native American woman. The game provokes outrage and boycotts.

1983

► Nintendo debuts the **Famicom** in Japan. The console – the precursor to the NES released in the US – sells more than 2.5 million units in its life span.

◄ Coleco releases the **ColecoVision**, an arcade-quality home videogame platform with processing speeds of up to 3.5 MHz. The system ships with hit Nintendo game *Donkey Kong*.

▲ Atari releases the arcade game ***Marble Madness***. Designed by 17-year-old programming prodigy Mark Cerny, the game features advanced stereo sound and 3-D graphics.

► Atari begins work on an arcade game based on the Universal film, ***The Last Starfighter***. Although the videogame appears prominently in the movie, it will never be released.

1989

▼ Apple Computer launches the revolutionary **Macintosh** personal computer with a 30-second *Super Bowl XVIII* television spot by *Blade Runner* director Ridley Scott.

1971

The number of Arpanet host sites reaches **23** — The Kenbak-1 personal computer kit is advertised for **$750** in *Scientific American* — Hamilton Watch Co. introduces the **Pulsar** LED digital watch containing 44 MOS ICs — Approximately **13,000** Automatic Teller Machines (ATMs) are installed nationwide:...

Syzygy

In 1965, yet another student at the University of Utah was introduced to Steve Russell's *Spacewar!* on the computer science lab's DEC PDP computer – an event that occurred ever more frequently as the program made its way through research labs and universities across the country. But this event was somewhat exceptional. This wasn't just one of the legion wannabe hackers that would play the game during all-night "study" sessions; this kid had real vision. And when he played *Spacewar!* he saw more than just expensive planetariums and blurred missile trails – he saw the future of interactive entertainment. That kid's name was Nolan Bushnell, and he would go on to create one of the most important names in the videogame universe: Atari.

Nolan Bushnell was born just outside Salt Lake City in 1945. He was a gifted child who loved games and challenges from a very young age. As a result, he became fascinated with finding out how things worked. Obsessed with technology, he would spend hours working with a local ham radio operator who taught him all about radios, circuitry, and electronics. Soon, Nolan became the youngest ham radio operator in the state of Utah. Sadly, Bushnell's father passed away when Nolan was just fifteen years old, leaving him in charge of the family's cement business. Running work crews and managing a company on his own were no doubt hard lessons for a teenager, but the experience helped fuel an entrepreneurial spirit that would later drive the fastest growing entertainment company in history.

During college, Nolan took a part-time job setting up the ball toss at a local amusement park called the Lagoon in order to earn extra money and have a little fun. Nolan was a natural in the business, and was soon promoted to arcade manager. The job taught him everything he needed to know about the industry – the games, the players, and the business of coin-op. All knowledge he would use to develop the next generation of midways: video arcades.

Back in the University of Utah computer lab, Nolan realized that *Spacewar!* held the potential to revolutionize the amusement industry. He imagined a room filled with computers – each playing a round of *Spacewar!* for a quarter. But considering that in 1965 a DEC PDP system cost somewhere in the neighborhood of $120,000 – it was an extremely unrealistic proposition. As a result, Nolan's dream of a computer arcade would require a giant leap in technology in order to make his vision a practical reality.

SPACEWAR! As seen on a DEC CRT.

In 1968, Nolan Bushnell graduated with a BA in Electrical Engineering and began to apply for jobs throughout the tech industry. His ultimate goal at the time was to get a job working for the greatest amusement empire of them all – Walt Disney Co. But an offer from Disney never came, so he accepted a job as an engineer for Ampex – the company that invented videotape in 1956 – based in Sunnyvale, California. He then packed up his car, his family, and all of his possessions, and drove west to Silicon Valley to meet his fate.

The year was now 1970, and computer technology was progressing at a staggering pace. Transistors were being replaced by new microprocessor chips, which made computers that were smaller, cheaper, and infinitely more reliable. Bushnell realized that the new breed of mini and microcomputers that were now becoming available – and affordable – as a result could be the technology solution he needed to create his dream of arcade *Spacewar!*

Inspired by a late-night *Spacewar!* session at the Stanford University Artificial Intelligence Lab (SAIL), Nolan got to work on the project – now determined to make his vision of a computer arcade become a reality. After doing initial cycle-time calculations with pencil and paper, he set up shop in his house – building a makeshift computer lab in what had been his daughter Britta's bedroom.

During the game's development, the hardware architecture went through numerous iterations – from a linked system of multiple raster displays connected to a single dedicated computer to a hardware-based system – before they arrived at what would become the industry standard game architecture for nearly every arcade videogame to follow until the introduction of microprocessor-based games in 1975.

Working together with his friend and co-worker at Ampex, Ted Dabney, Bushnell finally developed a working prototype. The initial system consisted of a black-and-white television wired to an intricately soldered circuit board filled with dull metallic dots that echoed the pattern of stars and spaceships, resembling a primitive arcade PCB. The gameplay itself was similar to Steve Russell's original *Spacewar!* program, only now with two sinister enemy saucers battling against the player's weightless rocket, thrusting across the flickering raster screen. The game was so addictive that Bushnell found his techie friends camping out in his yard awaiting their turn to play.

Realizing the opportunities that his new videogame would create, Nolan quit his job to devote all of his time to the project. He needed a name for this new videogame venture, so one night he and Dabney chose a word out of the dictionary meaning the sun, moon, and earth in total eclipse: Syzygy. ■

IMAGE: PREVIOUS: COURTESY TOM CLOUD; LEFT: COURTESY DIGITAL EQUIPMENT CORPORATION; RIGHT: PHOTODISC INC.

"People would look at you like you had three heads. 'You mean you're going to put the TV set in a box with a coin slot and play games on it?'"

—Nolan Bushnell

COMPUT
A SIMULATED SP
COMPUTER-GUI
A ROCKET SH
IMAGE VAN

ER SPACE

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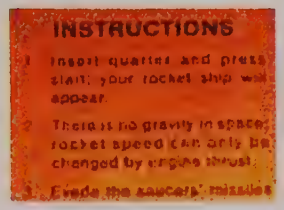
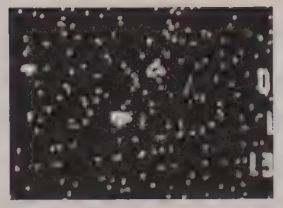




Computer Space

Nutting Associates

When the prototype for arcade *Spacewar!* was finally complete, Bushnell took the game to Nutting Associates, a local coin-op manufacturer (whom he had heard about through his dentist) that had found success in the late sixties with novelty electronic trivia games including *Computer Quiz*. The owner of the company, Bill Nutting, saw the potential in this new "videogame" and offered to manufacture the machine. Soon after, Bushnell joined Nutting as senior engineer to oversee the design and production of what would eventually be released around the world as *Computer Space* – the first arcade videogame in history.

In the fall of 1971, the first of a total run of 1,500 *Computer Space* machines rolled off the Nutting assembly line in Mountain View, California. With its striking molded fiberglass cabinet and shimmery metalflake exterior paint treatment, *Computer Space* transcended the harsh machine aesthetic characteristic of the era to resemble something straight out of science fiction fantasy. The space-age cabinet – originally molded on the Bushnell family kitchen table out of clay by none other than Nolan himself – with its amorphous modern lines, was one of the most stunning videogame cabinets ever produced. Its curvaceous hollow fiberglass shell was not only beautiful, but extremely practical; the materials combined a high level of durability with a lightweight structure, allowing the entire unit to weigh under 100 pounds – half the weight of the plywood and particleboard cabinets of today.

Unlike the novelty rifle games, test-your-strength machines, and assorted mechanical distractions that littered the arcades of the early seventies, *Computer Space* was the perfect embodiment of everything that was modern and state-of-the-art. When *Computer Space* was first introduced to the world at the AMOA convention in Chicago – the premier annual event for the amusement industry – Bushnell and Nutting Associates shocked the unsuspecting crowd. Reflecting on that event, Bill Nutting is quoted as saying, "We blew the coin-op industry's mind."

Computer Space was shipped out to hundreds of arcades, restaurants, student unions, bowling alleys, supermarkets, and bars across the country and around the world. The game was originally available as a single-player model (a two-player model was introduced the following year) and was offered in a spectrum of brilliant colors including blue, red, and green metalflake, and the more rare harvest gold, solid blue, white, and silver models. Inside the pod-like cabinet – floating behind a sheet of clear plexiglass – was a 13" GE black-and-white TV. The disembowled television, with its exposed vacuum tubes and capacitors, sat high above the hollow interior on a chassis of solid steel. It was connected to three circuit boards that controlled each of the three ships, an external speaker, and a Xentek power supply to drive the system – all mounted solidly to the rear door.

Outside, below the monitor itself, was a luminous back-lit "Computer Space" mini-marquee that also included numbered instructions for playing the game. The brushed aluminum control panel – located on a riser extending out from the body of the cabinet – contained a combination of buttons or joysticks to control the rocket's thrust, steering, and missile fire. The panel configurations varied from machine to machine depending on the model and its date of production. Also located on the panel was the label "Syzygy Engineered," a coin slot that dropped quarters into a coffee can cashbox, and a square button labeled simply "Start Game."

The gameplay of *Computer Space* consists of maneuvering a rocket ship around the star-filled screen as you attempt to destroy two computer-guided flying saucers with your missiles. Each hit equals one point. The game is set on a 99-second timer and whoever has the most points at the end of the game wins. As a bonus, if you manage to outscore the enemy saucers, the entire starfield inverts for extended play in "hyperspace."

In light of the fact that *Computer Space* was the world's first arcade videogame, it seems odd that most people have never heard of it. The primary reason for this pervasive cultural amnesia can be ascribed to the fact that, despite all its fantastic technology and profound innovation, *Computer Space* was a colossal commercial flop. Not even the titillating *Computer Space* sales flyer, featuring the new spokesmodel for the future of interactive entertainment – a sexy topless dancer from the Brass Rail – and detailing the game's "exciting player action," was enough to push the videogame on less forward-thinking distributors.

The failure of *Computer Space* can also be blamed on the general public's inability to comprehend the basic mechanics of the gameplay. The truth is, *Computer Space* is extremely difficult to play. Aside from the frustrating experience of controlling the slow-moving rocket ship, the two enemy saucers always seem to know exactly where you are – and where you are going. So if you manage to survive the first few seconds of the game, the challenge lies in targeting the saucers, which fly in an erratic pattern across the screen. Actually *hitting* them requires mastering the fine art of "after-touch" – guiding your missiles after they have launched.

Possibly the greatest impact *Computer Space* had on the videogame industry – other than creating it – was the fact that the game established the basic system architecture for nearly every arcade game to follow; the configuration of cabinet, circuit board (PCB), monitor, control panel, audio speaker, power supply, and lighted game marquee has remained virtually unchanged to this day.

There is no doubt that *Computer Space* was light-years ahead of its time. In 1971, a *Computer Space* was installed in the game room of the ultra-modern Contemporary Resort Hotel for the grand opening of the new Walt Disney World vacation paradise in Orlando, Florida – an appropriate, if not somewhat ironic, beginning to Nolan Bushnell's career in the videogame industry; after years of hard work and dedication to his vision, he had finally earned his place in the wonderful world of Disney. ■

IMAGE: LEFT: DAN McCOY/RAINBOW; RIGHT: COURTESY ELECTRIC PLAYGROUND

IMAGE: COURTESY MGM/UA

Leigh Taylor Young as Shirl, playing a round of *Computer Space* in Richard Fleischer's dystopian sci-fi thriller *Soylent Green*.

1972

Atari

THE ULTIMATE STATUS SYMBOL: The original Atari "Fuji" logo.

Following the release – and subsequent failure – of *Computer Space*, Nolan Bushnell was forced to reconsider his strategy. He realized that however interesting a videogame may appear, for it to be successful, the gameplay had to be exciting, yet simple enough for the general public to understand. Finding this elusive balance was now the greatest challenge.

Meanwhile, Bill Nutting, owner of Nutting Associates, the maker of *Computer Space*, had gotten wind of a new electronic "TV Game" that was to be released by Magnavox. At the time, Nutting thought his company was the only player in the videogame arena and his curiosity was piqued. So, in May 1972, when the Magnavox press machine rolled into town – featuring the new "mystery product" – Nutting sent Bushnell to go check out their competition. Little did Nolan realize that inspiration and fate were set to collide at the Airport Marina Hotel in nearby Burlingame, California, when he was put face to face with the future of interactive entertainment: Odyssey.

Many speculate that after playing a game called *Table Tennis* on the Odyssey Home Entertainment System that day, Bushnell may have realized that this simple game – with its two phosphorescent paddles, center court, and bouncing blip of light – was just the type of game he had been searching for. Ping-Pong was something that everyone knew how to play. Plus, the Odyssey proved that it could be easily implemented in video hardware.

Back at Nutting, Nolan was disenchanted with his cut of the exciting player action. He was unhappy with the royalties he was earning on *Computer Space*, and felt that he was entitled to a more profitable arrangement for his next game. What Nolan wanted was a stake in Nutting Associates itself – thirty percent, to be exact – and more control over design and marketing decisions. So when Nolan pitched arcade Ping-Pong to Bill Nutting, he put these demands on the table. Nutting was less than enthusiastic.

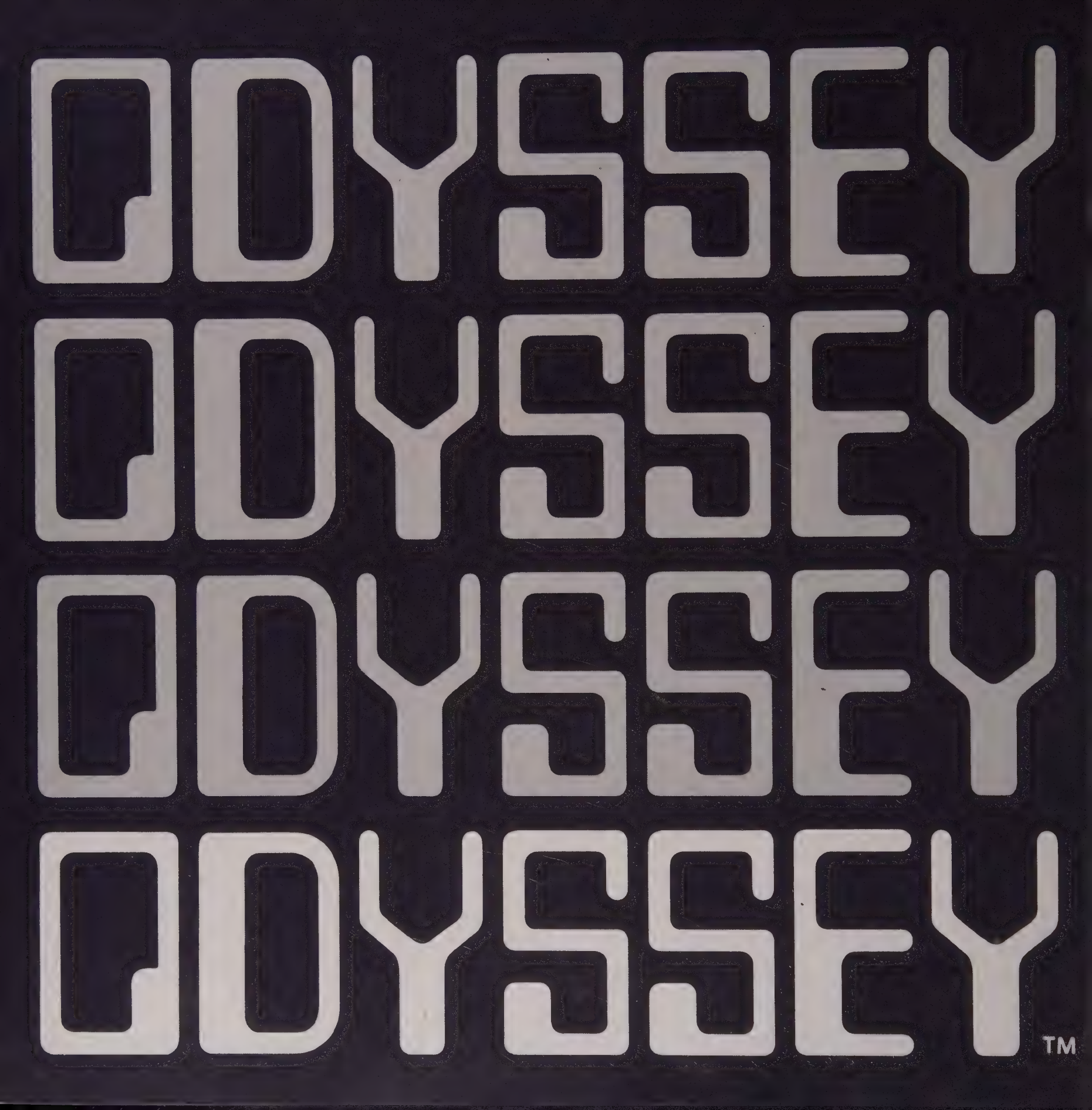
"I didn't like his deal," Nutting said. "The kind of royalties Nolan was asking for didn't seem fair. But, as they say, hindsight is 20/20."

Bill Nutting offered him royalties of five percent. Nolan refused. As a result, the relationship between Nolan and Nutting began to deteriorate until Bushnell decided it was time to break out on his own. The first person he called was his friend Ted Dabney. Nolan convinced him that they should start their own videogame company to market arcade Ping-Pong.

With $250 in royalties from *Computer Space* and an equal investment from Dabney, the partners headed down to the California Secretary of State's office to incorporate their new videogame venture. Unfortunately, their chosen name, Syzygy, was already being used by a roofing company. Nolan, a fan of an ancient chess-like Japanese game called Go, thought some of the words used in the game might make for a good name. He suggested Sente, Hane, and Atari. The clerk at the window liked the latter – the equivalent of *gardéz* in chess – so in June 1972, Atari Inc. was official. ■

IMAGE: MICHAEL ALEXANDER/TIMEPIX

Atari president and lead tester, Nolan Bushnell, plays a game of *Tank* on the assembly line in 1975. The company's first production facility was actually a deserted roller-skating rink.


ODYSSEY
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TM

Odyssey

Magnavox

Following Gerry Martin's enthusiastic embrace of the TV Game Project in 1969, it took nearly six months to negotiate the licensing agreement for the Brown Box technology between Sanders Associates and Magnavox. But once the final papers were signed, Baer turned the Brown Box prototype over to Magnavox engineers in Fort Wayne to begin work on what would soon become the Magnavox Odyssey, Model #ITL200.

The Magnavox team quickly went to work reverse engineering the Brown Box's internal circuitry in order to design a preliminary Odyssey prototype. Throughout Odyssey's development, the Sanders Team was shuttled between Nashua and Fort Wayne to assist the engineers and Bob Fritsche, Odyssey product manager, with various technical and marketing decisions.

It was now 1971. Baer and Sanders Associates had finally been awarded a patent (#3,728,480) on their Television Gaming Apparatus as the first Odyssey prototype was near completion. The circuitry of the Brown Box – consisting of 40 diodes and transistors – was perfectly copied with but a few exceptions. The hardware-generated full-color backgrounds were replaced with acetate screen overlays to cut down the system cost – a sacrifice that, in retrospect, may have had a more profound impact on the long-term success of the system than Magnavox had anticipated. In addition, the 16-switch game control panel and cardstock templates were replaced by a plug-in card slot and programmable game cards – a brilliant system design that would become the industry standard for every cartridge-based home videogame system ever released.

As soon as the final system was approved, the Magnavox marketing machine swiftly kicked into gear as they began to leak rumors of a new "mystery product" to the consumer electronics press. Articles began to appear in magazines and newspapers nationwide speculating on the possible identity of the top-secret product and building an intense industry buzz.

Then, in March 1972, Magnavox held a press tour for their 1972 product line – the "Magnavox Profit Caravan" – at various venues across the country. Ralph Baer attended one such presentation held at the Tavern on the Green restaurant located in Central Park in the middle of New York City.

The Magnavox line presented that day included a number of new color television sets, a new color camera, and, finally, the "mystery product" – the Odyssey Home Entertainment System.

HAPPY HOLIDAYS: The Magnavox Odyssey, advertised for only $49.95 – with the purchase of any Magnavox TV.

The press went wild. The new "electronic game of the future" was the hit of the show – and instantly became the hottest product release of the season. Soon after these demonstrations, Magnavox began shipping production Odyssey units to their dealers, selling for a retail price of $100 each.

The system design itself was stunning. Sculpted in sleek white and black plastic (with faux wood-grain trim), the Odyssey cut a clean modern silhouette with its angular lines and low profile. The "master control unit" contained all the internal circuitry as well as the battery compartment, sockets, and switches. The plug-in game card slot was but a sliver of space along the front end, and all system controls and I/O ports were located in back. The two detachable control units, with matching wood-grain inlay, echoed the design of the master control unit and consisted of two knobs (vertical and English/horizontal) on each side with a small "reset" button on top. A simple punch-tape label marked the control unit "1" or "2" and a 3/8-inch cable with 12-prong plug connected each back to the main unit. To complete the circuit, a game cord linked the master control unit to an RF box – or "TV/Game switch" – connected to the VHF or UHF antenna terminals of a television set.

The system shipped in a glossy black box with the futuristic computer-inspired Odyssey logo repeated in grey and white across the top. Screenshots and promotional images of a family – reveling in their new electronic playground – were accompanied by attention-getting marketing copy on all four sides. "Odyssey is the new electronic game of the future. Odyssey is the excitement of Wimbledon, the snow covered slopes of the Rockies, the fast casino action of Monte Carlo. Odyssey is thought, action, and reaction." It was clear that Odyssey was the future of home entertainment.

Included with the system – nested within the game box's perfectly packaged Styrofoam inner casing – were six plug-in game cards, two sets of acetate overlays (to fit both 18" and 25" screen sizes) for each of a dozen games, and nearly 300 various "game accessories" to enhance the videogame experience including stickers, poker chips, play money, playing cards, a reversible game board, a US map, and a manual score card. It was an overwhelming array of items that required in-depth study of the Odyssey's "Installation and Game Rules" manual to fully comprehend.

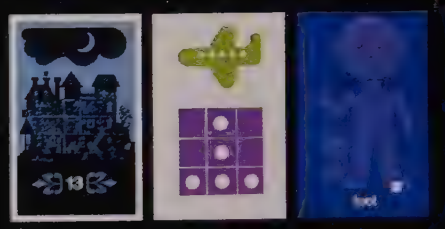
Shortly after the official system launch in May, the Shooting Gallery light-rifle and six new add-on game packages – *Baseball*, *Fun Zoo*, *Handball*, *Invasion*, *Volleyball*, *Wipeout*, and *Percepts** – were released. ▸

IMAGE: RIGHT, COURTESY RALPH H. BAER

ODYSSEY
GAME ACCESSORIES

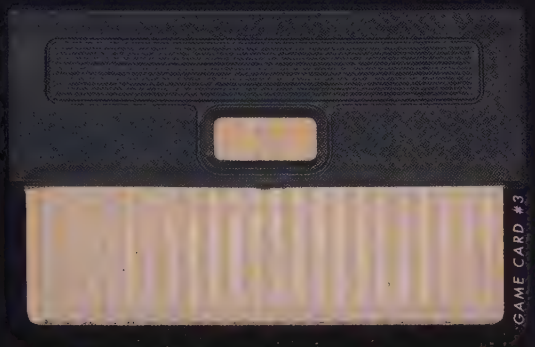
HAUNTED HOUSE / ODYSSEY / © MAGNAVOX CO. 1972

IMAGE: RIGHT: 3. COURTE SHAUN GEGAN/LOOMIS



1. TV overlay for ***Haunted House***; 2. ***Ski*** stickers; 3. Poker chips and dice; 4. Phoney money; 5. Playing cards (***Haunted House***, ***Percepts***™ and ***Simon Says***); 6. Reversible game board for ***Football*** and ***Roulette***; 7. ***States*** study map.

The Shooting Gallery – marketed to customers with an impressive in-store display – included the pump-action plastic light-rifle and four target games: *Shootout*, *Shooting Gallery*, *Prehistoric Safari*, and *Dogfight*. The six aftermarket games were each packaged in an individual box with plug-in card, overlays, instructions, and all game accessories required for play. Additional add-ons offered for the Odyssey system included a white carrying-case (with compartments for overlays and Scotch tape dispenser) and a 9-volt external power adapter.



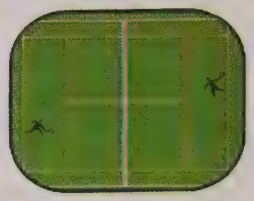
At the time of Odyssey's release, Magnavox sold its product line exclusively through a network of franchised Magnavox dealers. Although it made perfect sense in the short term to use the same distribution system, the wisdom of the decision to sell the Odyssey in this manner – rather than through department and toy store chains – is a point of great debate. Even though the Magnavox dealers were located in key markets nationwide, their potential reach was nowhere near as broad as that of a Sears, K-Mart, or Kiddie City.

And then the real problems started. Magnavox featured the new Odyssey system in their fall television ad campaign – unfortunately, they did so in a manner that implied that the system would only work with Magnavox brand television sets. The fact that the Service Center sales personnel did everything they could to push a new Magnavox TV on every potential Odyssey customer who walked through the door did nothing but feed the confusion.

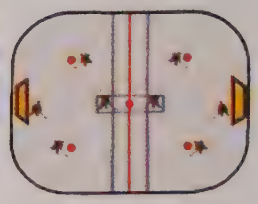
In spite of these distribution and marketing gaffes, Magnavox sold approximately 200,000 Odyssey systems and 25,000 Shooting Gallerys before the product was discontinued in 1975. Although the Odyssey wasn't quite the rage that Magnavox had hoped for, it was certainly a start – and it helped introduce mainstream culture to the excitement that home videogames could inspire. ■

THE 12 ODYSSEY GAMES

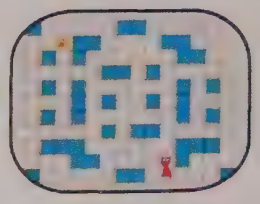
TABLE TENNIS. The basic Odyssey game that develops your electronic coordination.



TENNIS. All the excitement of Wimbledon as you serve, volley and score.



HOCKEY. Face-off, dig for the net, maneuver the puck . . . goal!

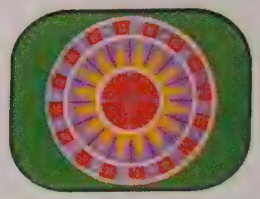


CAT AND MOUSE. Electronic hide and seek as the clever mouse tries to elude the cantankerous cat

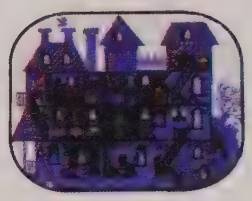
FOOTBALL. Just like the pros. Plan your own strategy. Pass, run, even kick. Touchdown!

SKI. Race the clock as you schuss in and out between the flags.

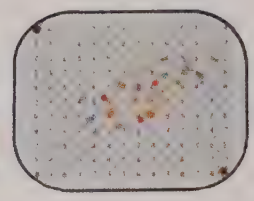
STATES. Children will have great fun learning the states and capitals.



ROULETTE. Fascinating casino action. Put your chips down on your lucky number and try to break the bank



HAUNTED HOUSE. Grope in the dark as cats, bats, skeletons and a scary ghost guide you to the secret treasure



ANALOGIC. A space race through the numeric maze of a computer charted galaxie

SUBMARINE. Navigate your convoy into harbor as you pass through dangerous submarine infested waters

SIMON SAYS. A learning game created to help preschoolers learn the various parts of the body

SHOOTING GALLERY

offers you an exciting new dimension in the enjoyment of your ODYSSEY

The SHOOTING GALLERY, model 1TL950, includes an ELECTRONIC RIFLE, two Printed Circuit Game Cards and 4 different Targe* Overlays in two sizes. The total unit offers 6 variations for creating your own home shooting gallery. **$24.95**

SHOOTOUT

SHOOTING GALLERY

PREHISTORIC SAFARI

DOGFIGHT

*The game ***Percepts*** was available only as a free gift from Magnavox – an added bonus for filling out the "Consumer Registration and Product Information" card that was enclosed with each Odyssey system. As a result, it is today one of the rarest of the Odyssey add-on games.

IMAGE: RIGHT: COURTESY RALPH H. BAER

AVOID MISSING BAL

L FOR HIGH SCORE.

PONG

Pong

Atari

Atari's first office was located in a run-down industrial park at 2962 Scott Boulevard in Santa Clara, California. Nolan's initial business plan was based on a licensing model – he visualized Atari as an R&D think tank, developing arcade videogames to license to the established coin-op manufacturers. That way he would be able to focus exclusively on creating new technology without the distraction of common concerns like assembly lines, distribution networks, and warehousing.

At the start, Nolan was preoccupied with designing a two-player model of *Computer Space* that had been commissioned by Nutting Associates, and building the foundation of his new videogame empire. So in order to begin work on TV Ping-Pong, Atari desperately needed an engineering department. He remembered a young Berkeley engineering student who had worked with him at Ampex. His name was Al Alcorn and he would soon become Atari's first employee.

Nolan immediately put Alcorn to work designing the circuitry for TV Ping-Pong. He described exactly how the game should play, how it should look, and even how it should *sound*. Alcorn then engineered and built the first prototype to Nolan's specifications using solid-state circuitry and TTL logic – all wired up to a standard television display.

As in its predecessor, *Computer Space*, there were separate circuit boards for each of the game's functions – one for the paddles, one for the ball, and one for the scoring. The image seen on-screen was a reflection of the shifting ON/OFF patterns in the circuitry, drawn with a pulsing raster scan. As the patterns changed, they created a shift in voltage that, in turn, generated wave forms that – when amplified – would make the most fantastic sound. *Pong*. It was perfect.

So they installed the first prototype at a local Sunnyvale tavern, Andy Capp's, on El Camino Real. One of the regulars approached the game, set atop a wooden barrel, and watched as the tiny phosphorescent ball bounced across the screen. "Avoid missing ball for high score," was all that the instructions said. Finally, someone inserted a quarter and the first match began.

The following morning, a line of anxious players – patiently waiting for the bar to open – had formed outside the tavern. It was a scene that Bushnell had certainly seen before – but this time it wasn't just engineers and techies sitting out on his lawn. This time it was real people.

THE REAL GAME CUBE: Al Alcorn's original *Pong* prototype, as played at Andy Capp's.

A few days later Atari got a call from Bill Geddes, the manager of Andy Capp's. The machine was broken and he wanted someone to come down and fix it. So Al Alcorn went on his first service call. When Al arrived, it wasn't long before he located the source of the problem – the cashbox was so full of quarters that it had overflowed and jammed the machine. Considering that the box held somewhere around 1200 quarters – well, it was a problem that Atari didn't mind fixing.

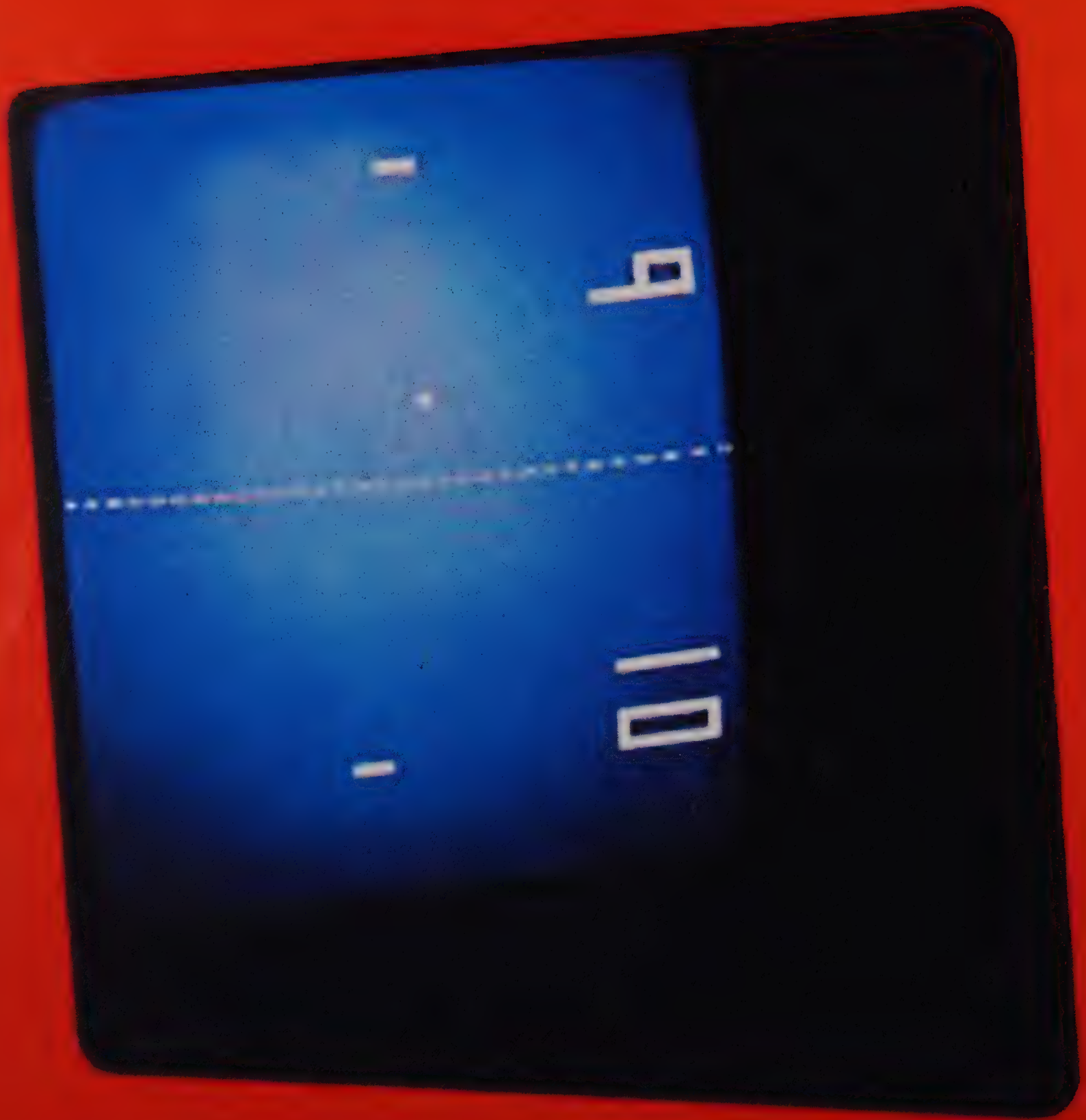
Meanwhile, Nolan Bushnell had taken *Pong* on the road to find a manufacturer to license the game. His first stop was Bally/Midway in Chicago, one of the most revered names in the pinball world. He demonstrated a prototype of *Pong*. Unfortunately, the coin-op industry had watched the failure of *Computer Space* quite closely, and had determined that videogames were merely a passing fad. As a result, Bally decided to pass on *Pong*. But that night, Nolan got a call from Al who told him what had happened at Andy Capp's.

Encouraged by *Pong*'s prodigious success, Nolan decided that Atari should take on the first production run itself. So with the help of some high-paying consulting work and a $50,000 credit line, Nolan was able to finance the operation. He rented a deserted roller-skating rink nearby and hired a bunch of students and hippies to work the line assembling the machines. The Atari factory was no doubt a fantastic sight. Black Sabbath blaring, it was a high-tech wonderland filled with barefoot technicians smoking joints as they soldered circuit boards. To an outsider, it looked like chaos – but the truth was that Atari's ragtag crew of misfits managed to turn out nearly a dozen games a day.

Out on the assembly line, the final design of *Pong* varied considerably from its original red cube-like prototype. The production model was built as a large upright cabinet – now painted bright yellow – containing a Motorola TV, game circuitry, speaker, cashbox, and power supply. A heavy aluminum control panel, mounted to the front of the cabinet, held metal knobs controlling each paddle.

In November 1972, Atari introduced *Pong*, their first arcade videogame, and Nolan Bushnell – the former carnival hustler turned videogame evangelist – sold every single machine they could build. It was a solid business – but to bring in the tall dollars, Nolan knew Atari needed to expand. So he started pitching to investors throughout Silicon Valley. Finally, the famed venture capitalist Don Valentine decided to take a chance on Atari. With the sudden infusion of cash – and credibility – Atari sold a grand total of 8000 *Pong* machines, and earned Nolan the nickname "King Pong." ■

IMAGE: LEFT: VAN BURNHAM, RIGHT: COURTESY CURT VENDEL/ATARI HISTORICAL SOCIETY



1973

Annual sales for Atari Inc., reach [redacted] — Over [redacted] people tune in to watch Billie Jean King defeat Bobby Riggs in the "Battle of the Sexes"— The [redacted] GUI-based computer is developed at Xerox PARC — IBM racks up an annual profit of 1.5 billion dollars on total sales of over 10 billion...

TV Ping-Pong

In 1972, Atari's had been the only videogame in town – but it was only a matter of time before the rest of the world caught up.

In the coin-op universe – where the only thing that counts is the quarters in the cashbox – *Pong* was a bona fide smash. In a good location, the game was bringing in upwards of $300 a week (500% the average take on a pinball or novelty game of the era). Considering that a typical production run for even the most popular pinball machine was around 2500 units, 8000 *Pong* units was truly extraordinary – especially for the new kid on the block. So when the coin-op kings in Chicago woke up to what was happening out in Silicon Valley, it seemed they couldn't jump on the videogame bandwagon fast enough. Even companies that had previously scoffed at Nolan Bushnell's august high-tech vision were jonesing to get in on the video action.

As a result, 1973 saw the introduction of new videogame divisions in many of the established pinball and novelty game manufacturers, not to mention the emergence of countless videogame start-ups – the "jackals" as Bushnell would call them – which were mostly fly-by-night operations located right in Atari's own backyard.

Because videogame technology was still based on solid state circuitry, reverse-engineering a game was a rather simple procedure. Anyone with even the most basic knowledge of electrical engineering and a television set could make a videogame, and since Atari had yet to receive a patent on its new technology – or even a trademark for *Pong* – the result was a rush of copycat games to the tune of over 90,000 machines that hit the market.

Allied Leisure, Amutronics, Bally/Midway, Chicago Coin, For-Play, Fungames, Ramtek, Taito, Williams, and even Bushnell's former employer and business partner, Nutting Associates, all introduced their own versions of TV Ping-Pong in 1973. But Nolan stayed cool. Although the competition was beginning to escalate, he knew that Atari had the critical creative edge. However, his partner, Ted Dabney, grew worried about the flood of competition in the as-yet-unproven videogame market, and his apprehensions soon became more than he could bear. As a result, Dabney sold his stake in Atari to Nolan for next to nothing. In exchange, Dabney took over Atari's coin route and accepted a few shares in the company – shares that would later make him a millionnaire.

In order to keep up with the relentless emulation, Atari followed the release of *Pong* with the introduction of *Pong Doubles* – a four-player version of the game. Since Atari was the only company doing research and development, every other videogame company was releasing endless variations on the now prosaic Ping-Pong theme – hockey, soccer, tennis – any game that didn't require extensive modification to the game circuitry. The problem was so widespread that distributors began to fear that videogames were just a one-trick pony and begged for some new games to sell. In order to keep ahead of the curve – and keep the customers happy – it was imperative that Atari continue to innovate with new games and technology.

At the time, the coin-op business was structured by a long-standing system of exclusivity. Distributors had strategic relationships with a single vendor – one for pinball, one for jukeboxes, etc. – and would not distribute games marketed by their competition. This made it difficult for a growing company like Atari not just to enter a new region, but – more important – to expand their business once they got there.

Nolan desperately wanted Atari to dominate the market with its videogames positioned in multiple locations within a region. To accomplish this, he needed to work with more than one distributor. Unfortunately, with the exclusivity system so deeply rooted in the coin-op industry, it was an impossible situation. Nolan's solution to the problem was so brilliant that it forever changed the system – he simply became his own competition.

In the fall of 1973, Nolan established a second arcade videogame company, run by his longtime friend and neighbor, Joe Keenan. The company was called Kee Games and its connection to Atari was kept a secret. Although Atari and Kee shared their resources – including manufacturing facilities – they were kept distant enough that, to the outside world, they appeared to be rival companies. So for every game that Atari released, Kee would introduce a competing title. But when Kee Games released the hit arcade videogame *Tank*, all of the distributors – including those committed to Atari – desperately wanted the game. In response, Atari and Kee Games announced a "merger" and, in turn, destroyed the exclusivity system.

In the early seventies, the coin-op industry was evolving at a dramatic rate to compete in the booming videogame market – and Atari continued to raise the bar. The only problem was that Atari was expanding faster than its resources would allow. The company relocated to larger offices to increase production, filled them with a flood of new hires, and even established a Japanese division, Atari Japan. As a result, the company now needed to release a new game every six weeks just to cover overheard. Atari was making history all right – along with some colossal mistakes.

At this time, videogames also began to creep into mainstream culture as larger-than-life images of classic arcade games began to appear on the silver screen. In 1973, a custom *Computer Space* was featured in Richard Fleischer's sci-fi thriller *Soylent Green* as a solitary symbol of a utopian high-tech future. The following year, *Pong* stole the scene as the perfect comedic distraction in Frank Perry's wacky Western romp, *Rancho Deluxe.* It was the start of what would become a long and prosperous relationship between videogames and Hollywood.

Interactive entertainment had come a long way since 1971. It was now obvious to the industry and the world that videogames were much more than a passing fad – this was the future. ■

IMAGE: COURTESY TAITO CORPORATION

The bold Ping-Pong-inspired graphics of the *Elepong* sales flyer, released by Taito in 1973

Asteroid

Bally/Midway

Bally/Midway's *Asteroid* – a direct regeneration of *Space Race* – was the second videogame title that the company licensed from Atari. Released in the summer of 1973, it was a significant improvement over its somewhat plain progenitor.

SPACE RACE

Although the gameplay of *Space Race* was copied exactly, *Asteroid* possessed a striking full-color cabinet design. Filled with space-age images of ominous asteroid fields, twinkling quarks, quasars, celestial stars, and thrusting rocket ships – printed in an all-over design covering both the sides and front of the cabinet, as well as the monitor bezel itself – *Asteroid* is one of the earliest instances of colorful "side art" (artwork created to enhance the outside of a game cabinet, either hand-screened or attached as adhesive decals) used on an arcade videogame cabinet.

Much more than mere decorative artifice, side art came to serve as a vehicle to express the more detailed visual nuances of a game's theme that were impossible to translate with an 8-bit microprocessor and pulsing raster scan. The medium of cabinet art has since come to define the aesthetic qualities of the videogame era just as much as the onscreen graphics that characterize them. Although *Asteroid* may have found only modest success in video arcades, its colorful legacy is no doubt worthy of tribute. ■

IMAGE: RIGHT: COURTESY ATARI HISTORICAL SOCIETY

Gotcha

Atari

Gotcha – Atari's fourth coin-op release – was introduced in the fall of 1973. Designed by Al Alcorn, it was no doubt one of the most unusual videogames to hit arcades that year: both *Gotcha*'s gameplay and control interface were highly innovative for its time. In a landscape now dominated by TV Ping-Pong, *Gotcha* was the first example of what is now known as a "maze" game. This videogame genre – featuring a labyrinthine playfield with character sprites maneuvering inside the maze – would grow to include such videogame classics as *Ladybug*, *Make Trax*, *Mouse Trap*, and *Pac-Man*, as well as Team Sonic's modern cult classic *Chu Chu Rocket*.

Gotcha, a solid state "cat and mouse" type game, is played with two players – one the pursuer (■) and the other the pursued (+). As the pursuer approached the pursued, an electronic beeping sound would increase in frequency to reach a fever pitch until the pursued is "caught" and the sprite disappears from the screen. Each time a capture is made, one point is scored.

But the most unique element of *Gotcha* was found in its interface. Where most videogames had buttons adorning their control panels, *Gotcha* had nothing more than two small malleable pink mounds. Moving the rubber mounds caused the sprites to move around within the maze (there were joysticks underneath). Due to the somewhat obvious visual associations of this interface design, *Gotcha* soon became known as "the boob game."

Gotcha was a surprise hit for Atari – most likely the result of its popularity among the single's bar crowd, who loved its licentious theme – and paved the way for a myriad of maze games to follow. ■

Paddle Ball

Williams Electronics

Williams Manufacturing was founded in 1944 by pinball pioneer Harry Williams to create and distribute new coin-operated arcade games, including a game he had franchised called *Jai Alai*. Soon Williams expanded to develop electro-mechanical novelty games. Based in Chicago – the center of the pinball universe – Williams quickly became one of the most well-respected names in the industry, and was key in the development of new pinball technologies, including the "tilt" feature (*Advance*), electro-mechanical pinball games (*Contact*), and oversize flippers. In the early '70s, with an impressive roster of pinball titles to its credit and a dedicated network of distributors, Williams had the potential to become a major player in the nascent videogame industry.

Inspired by the incredible success of Atari's newest video arcade games, the company established Williams Electronics in 1973 to release its own coin-operated videogame, *Paddle Ball*. Although Williams was an acknowledged vanguard of the pinball industry, they were light-years behind the minds that were creating the future of "innovative leisure" out at Atari. As a result, *Paddle Ball* was yet another variation on the now pervasive Ping-Pong theme that flooded the nation's arcades in the wake of *Pong*. In truth, Williams' first videogame owed no small debt to its celebrated muse, but *Paddle Ball* is unique in that it's likely the only video arcade game ever to be engineered with a "tilt" switch.

Although *Paddle Ball* shared *Pong*'s basic gameplay and design, it did not share its success. After this disappointing debut, Williams remained wary of the videogame sector until 1980 when they re-entered the fray with the release of the now classic *Defender*, designed by Eugene Jarvis. ■

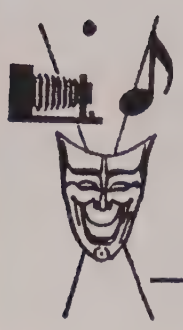
Rally

For-Play

Rally, a competitive fast action space-age arcade videogame, was released by For-Play Manufacturers Corp. of Burbank, California. This solid state TV Ping-Pong game borrowed quite blatantly from both *Pong* and *Computer Space* (note the shimmery molded metalflake monitor bezel), and even went so far as to print the oft-quoted "Avoid missing ball for high score" boldly across its own control panel.

But in the flood of post-*Pong* pirate PCBs, *Rally* – with its sparkly lowboy cabinet – was no doubt one of the more striking knock-offs to hit airport cocktail lounges in the spring of 1973. However derivative its gameplay may have been, *Rally* was at least making an attempt to be somewhat unique among its class.

The For-Play *Rally* featured a large 16" monitor and realistic sound effects, and boasted "record profits already proven on location." Now whether these profits were actually proven on *Rally* machines is still a point of contention. ■



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Space Race

Atari

Space Race, introduced in July 1973, was the third title released by Atari, Inc. The gameplay was a simple two-player race against the clock. You control the thrust of a rocket ship to reach the top – all the while avoiding an "asteroid belt" that travels across the screen. If your rocket is hit, your opponent scores one point and the race starts over.

Space Race was developed primarily in response to the endless parade of *Pong* clones that hit the videogame market that year. The distributors, as well as the game players, desperately wanted something new, and *Space Race* was Atari's answer.

Space Race was an interesting example of just how far the *Pong* circuitry could be pushed to create an entirely new game. Both its scoring and center court circuitry – now manipulated to become center linear "asteroid belt" – were used now with the addition of two rocket ships and a timing mechanism similar to that in *Computer Space*. In fact, *Space Race* and *Pong* were so similar technically that the manual for *Space Race* was nothing more than a photocopy of the original *Pong* documentation – with all occurrences of the word "Pong" covered in Wite Out and "Space Race" written in its stead.

Atari later licensed *Space Race* to Taito who released the game as *Astro Race*, and Bally/Midway who later released it as *Asteroid*. Although *Space Race* was innovative in terms of gameplay, with its generic cabinet and no-name marquee it paled in comparison. The combination of *Space Race*'s low profile and plain jane exterior looked bland when compared to the more ambitious cabinet designs – and sadly most of the machines ended up at the dump. ■

IMAGE: LEFT: COURTESY ATARI HISTORICAL SOCIETY

Winner

Bally/Midway

Ever since the golden age of pinball, Bally Manufacturing Corp. was considered the undisputed leader of the coin-op industry. Established in Chicago in 1932, Bally was well known for its pinball, novelty, and other coin-operated arcade games.

Midway, also based in Illinois, was a small electro-mechanical and novelty arcade game manufacturer. But when they were acquired by Bally, they collectively became the largest and most powerful arcade game maker in the world.

Following the incredible success of *Pong*, Bally executives realized they may have been a bit hasty in their dismissal of Nolan Bushnell and his video arcade vision. So in 1973, Bally/Midway made Atari an offer to license *Pong* for their own manufacture. Atari agreed and that same year the company produced a run of ten thousand *Pong* clones, released under the name *Winner*.

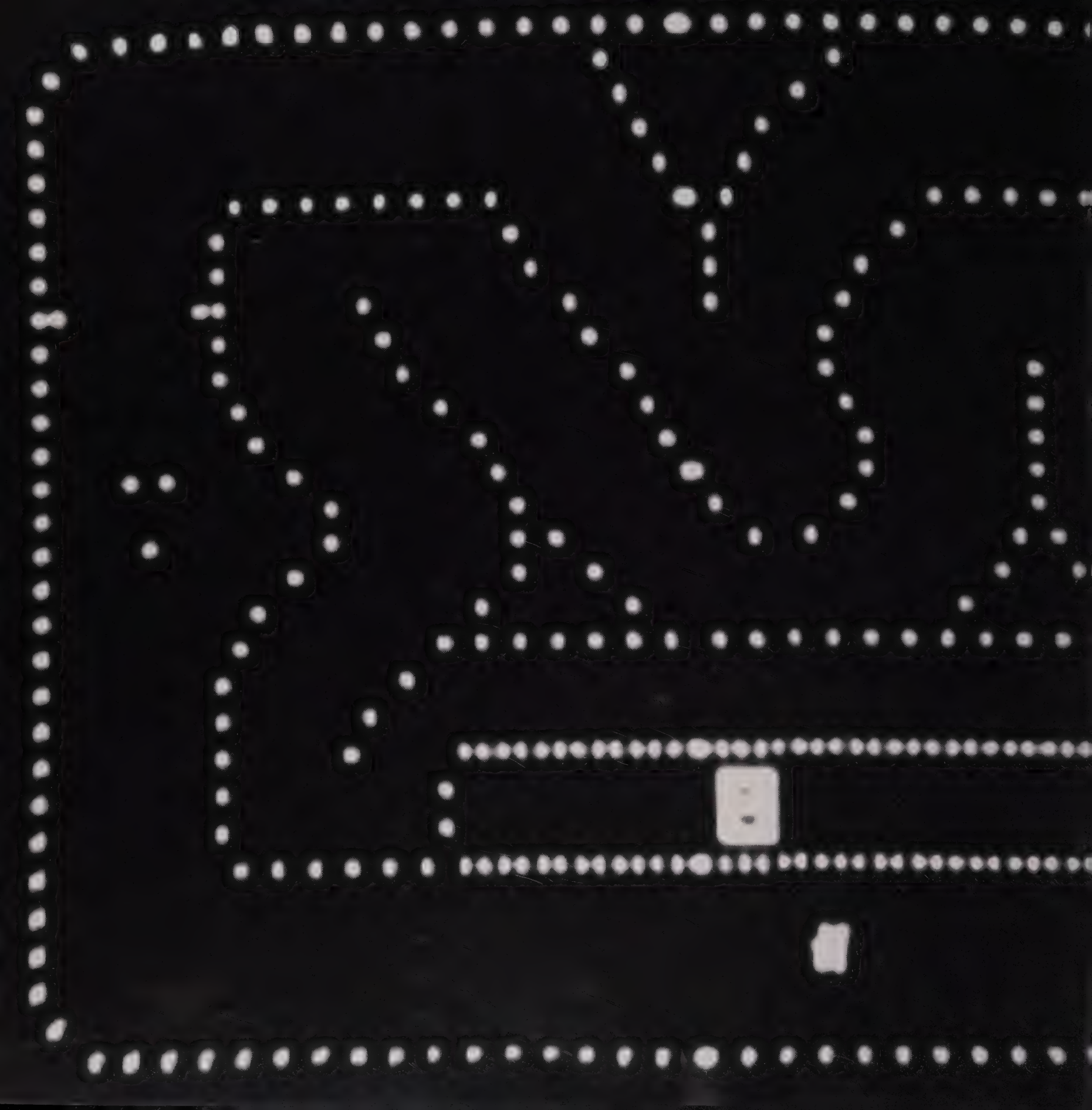
Winner was based on the same basic game circuitry and system architecture as *Pong*. However, the game added a new dimension to the genre with the addition of a screen-printed monitor glass to its videogame cabinet – a graphic element that would become standard on nearly every video arcade game to follow.

With its dark burled woodgrain formica and stylish red geometric-patterned bezel, it was a prime example of the elegant modality growing ever more common in the mid-seventies. But, even with its sophisticated visual styling and proven gameplay, *Winner* found only moderate success in a market now flooded with also-rans. Still, Bally followed with *Winner IV* – its own version of *Pong Doubles* – and the video tennis game, *Leader*. ■

QUADRAPONG

1974

Commodore purchases a majority stake in **MOS Technology**, maker of the 6502 microchip — Over **6.5 million** US troops return from the war in Vietnam — Zilog introduces the **Z80** microprocessor — Following the **Watergate** scandal, Richard Nixon resigns as president of the United States...



Gran Trak 10

Atari

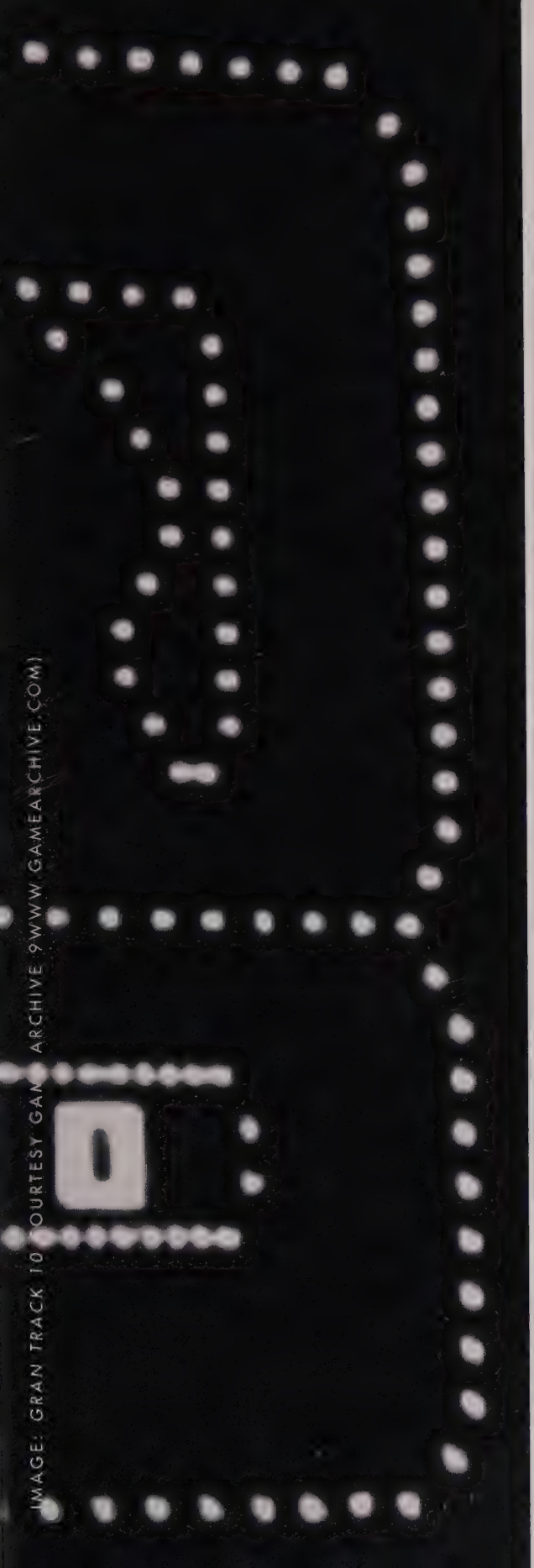


IMAGE: GRAN TRACK 10 COURTESY GAME ARCHIVE (WWW.GAMEARCHIVE.COM)

Nolan Bushnell had been driven to create an arcade racing videogame since as early as 1972 – unfortunately, the technology simply was not ready. But Atari's relentless research and development of new gaming technologies finally made authentic driving videogames a reality.

Atari released *Gran Trak 10* in the spring of 1974. *Gran Trak 10* was the first videogame to include a steering wheel and four-speed gear shift mounted to the control panel, as well as brake and gas pedals at the base of the game cabinet for a more realistic driving experience. The playfield of *Gran Trak 10* is an overhead view of a race course – complete with high speed straightaways and hairpin curves – all glowing luminous white on a sea of black tarmac. The colorful graphic details of a raceway grandstand crowd, checkpoints, and checkered flag pattern were included to enhance the cabinet and monitor bezel design.

The player controls a small race car blip whose speed is regulated by the gas pedal, brake, and gear shift. An authentic steering wheel controls the direction of the car. The game is set on a timer, and the goal is to see how many points you can score for distance traveled – reaching the check points in a specific order – before the timer runs out. At the end of the game, you can check your performance against a chart included on the game cabinet.

The gameplay was marked by the blocky motion of the race car itself. Controlling the car's direction with the nondirectional steering wheel wasn't always as easy as it seemed, and the car would often careen into the pylons owing to overly aggressive driving. The exciting Grand Prix action of *Gran Trak 10* attracted a number of die hard fans, among them Steve Wozniak, creator of the Apple computer. Silicon Valley lore tells of a young Woz hanging around Atari with his friend Steve Jobs to play *Gran Trak 10* for free in Atari's game room.

A follow-up to *Gran Trak 10* entitled *Gran Trak 20* – a two-player model with dual steering wheels and brake-locking oil slicks – was released later that year. The following month, Atari also introduced a more advanced version of *Gran Trak 10* – complete with a linked LED lap timer – called *Formula K*.

GRAN TRAK 10: For that little Jacques Villeneuve in all of us.

Gran Trak 10 was a breakthrough for the industry and inspired similar releases from Atari, including *Hi-way*, *Indy 800*, and *Le Mans*, as well as *Wheels* by Bally/Midway. Although these games may seem painfully primitive when compared to modern games like *Tokyo Extreme Racer* or *Gran Turismo 3*, they opened the gate for the next generation of racing games.

As the genre evolved to include microprocessors *(Sprint 2)*, a first-person perspective of the road *(Night Driver)*, sit-down cockpits complete with color graphics and stereo sound *(Monaco GP)*, force-feedback *(Out Run)*, and reality-mapping *(Cruis'n USA)*, they collectively pushed the limits of videogame technology – making possible the hyper-realistic driving experiences of today. ■

Puppy Pong

Atari

Riding the wave of Pong fever that swept Atari *Puppy Pong* was released in the summer of 1974. Designed by Chaz Grossman, it was conceived as a children's version of the soon to be released *Dr. Pong* – a tabletop *Pong* machine modified for free play to be installed in doctor's waiting rooms to entertain patients. The original concept was "Snoopy Pong," with the game built in a "dog house" cabinet to be placed in pediatrician's offices. But when licensing efforts for the Snoopy character didn't pan out, the cabinet was simply painted yellow instead of red and Snoopy was replaced by a giant panting pup. It was a perfect game for kids to play – big, colorful, fun – and all it took was the push of a big button located on the roof to start the game.

It is widely rumored that the similarities between the design of *Puppy Pong* and Snoopy's infamous dog house inspired legal representatives of *Peanuts* creator Charles Schulz to issue a cease and desist for potential copyright infringement – but the story just isn't true.

Although *Puppy Pong*'s arcade career may have been cut tragically short, it is a prime example of just how ridiculously far a game franchise can be pushed – a rare event in the early days of videogames that has today become the rule rather than the exception. But it wasn't until the success of *Pac-Man* in 1980 that videogame spin-offs and the subsequent merchandising blitz would be carried to the outer limits. Since then, videogames such as *Donkey Kong*, *Sonic the Hedgehog*, and *Pokemon Gold* have created videogame superstars in the form of Mario, Sonic, and Pikachu. The overwhelming list of games that these franchises have created far exceed the prodigious progeny of *Pong*. ■

IMAGE, LEFT: COURTESY ATARI GAMING HEADQUARTERS

Qwak!

Atari

Released in November, *Qwak!* was among the first target shooting arcade videogames. In this virtual hunting game. players use an authentic rifle – tethered to the game cabinet by a steel cable (an alarm would sound if the gun was stolen) – that contains a specialized light gun (similar to the that used in the Odyssey Shooting Gallery) in the barrel to aim and fire at video ducks as they fly across the screen.

As they fly, the ducks make realistic "Qwak" sounds. Players have three shots to hit each duck before it disappears. When a duck is hit, the screen flashes and the duck folds its wings to take a nose dive to the ground. Once fallen, the duck is quickly retrieved by a video-generated "hunting dog" and carried off-screen. Throughout the game, the number of ducks shot is counted across the top of the screen.

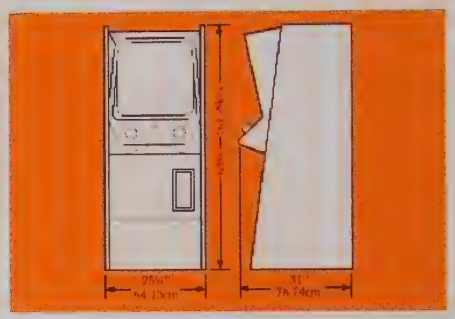
Qwak! possessed advanced collision-detection capability – the ducks would "swerve" if a shot was placed close by. The patterns in which the ducks flew were randomized so that no two games would play exactly alike.

Qwak! was an influence on later games like *Triple Hunt*, *Safari*, and the ubiquitous *Duck Hunt* (later released for the Nintendo Entertainment System). ■

Rebound

Atari

"Just like real volleyball..." boasts the sales flyer for Atari's *Rebound*, released in February 1974. Basically, the game is *Pong* as played from the ground up, designed for two players (you can't play against the computer). After the ball is served over an electronic "net" it must be returned by the opponent's paddle. If a player misses the ball – allowing it to hit the ground – a point is scored for the opposing side.



The gameplay is highlighted by an audio "bleep" every time the ball is returned – adding to the excitement.

The game cabinet featured bright modern graphics and a new molded white plastic monitor bezel to give the design a more futuristic feel.

During the heyday of the Atari vs. Kee Games feigned battle of the arcade megastars, it was common for the two companies to release identical games into the market. As a result, in March 1974, Kee Games released *Spike* – their own foray into video volleyball action.

The basic dynamics of *Rebound* and *Spike* set the foundation for the popular Atari game *Breakout*, released in 1976, which used the same horizontal paddle and ball to strike at a wall of bricks along the top of the screen. ■

IMAGE: RIGHT: COURTESY TAITO CORPORATION

SPEED RACE

Japanese novelty game manufacturer Taito introduces their first entry into the wide world of video arcade racing, ***Speed Race***. The fast-paced racer offered the realistic excitement of the track, enhanced by authentic engine sounds and explosions.

NEW FROM KEE GAMES

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- REALISTIC TANK CONTROLS!
- CANNON
- YOUR OWN TANK COMMA

Tank

Kee Games

In 1974, videogame distributors were begging for new original videogames to sell their operators – and *Tank* was exactly what they were waiting for. Designed by Steve Bristow and programmed by Lyle Rains, *Tank* was released by Kee Games in November 1974 to the praise of the entire industry, and soon became the most popular arcade videogame introduced that year. *Tank*'s success was a godsend for the now struggling Atari and is somewhat responsible for the company's survival until they finally hit big with the Pong home console in 1975.

Tank is a black and white combat simulator in which two tanks battle within a minefield maze. The playfield consists of a two-dimensional overhead view of the battlefield, each mine marked by an X. As in a real tank, the player controls the direction of the treads through a dual-joystick configuration and shoots artillery shells at the opposing tank with the press of a button. The goal is simply to avoid the mines and destroy the enemy tank as you travel through the maze of corridors.

Tank was the first arcade videogame to use a ROM chip to store additional graphic data. As a result, the game was capable of displaying detailed on-screen sprites and playfields that were superior to those of its peers – a feature that contributed greatly to *Tank*'s success. The gameplay is further enhanced by "realistic" clanking and rumbling sounds of the tank treads – as well as the explosive sounds of artillery fire as the screen flashes with each shot and tank explosion.

Tank would later be reincarnated as *Combat* – the ubiquitous pack-in cartridge for the Atari VCS – and would be an influence on modern games like *Tokyo Wars*, *BattleTanx*, and *Tank Wars*. ■

Touch Me

Atari

Touch Me – conceived as a new form of computer game to challenge players' hand-eye coordination as well as their memory – was released in June 1974. The game consisted of a 42" tall pedestal cabinet with four large light-up buttons on top. The object of *Touch Me* was to repeat a sequence of audible sounds – accompanied by a flash of light – by pressing the corresponding buttons in the same order in which they were originally heard.

As each sound sequence is correctly repeated, the patterns increase in both speed and duration, the buttons madly flashing along with an endless chorus of "bleeps" and "bloops."

Touch Me was an unmitigated failure for Atari – but in 1978, an inventor named Ralph H. Baer appropriated elements of the game to create a simple handheld electronic memory game called *Simon*. *Simon*, released by Milton Bradley, soon became one of the most popular games of the late seventies – and has enjoyed continuous production ever since. ■

The failure of *Touch Me* – shown here with its decidedly lo-fi cabinet – was not as much about technology as it was about timing.

TELE-GAMES
PONG
ATARI

1975

Atari Pong

In 1974, Atari desperately needed another hit of the same magnitude as *Pong*. Owing to Atari's rapid expansion after its initial success, the company had become painfully undercapitalized and was on the verge of bankruptcy. As a result of accounting errors, Atari was selling the popular *Gran Trak 10* at a loss. Atari Japan was losing so much money that it was swiftly sold off to Masaya Nakamura's growing amusement-turned-videogame business, Nakamura Manufacturing Co. (now known as Namco), for half a million dollars. Still, Atari knew – even with the sale – that the success of *Tank* would not hold them for much longer.

KING PONG: A sales flyer for Atari's 1972 smash arcade videogame, *Pong*

That's when Atari founder Nolan Bushnell and designer Bob Brown started to toss around an idea for a new consumer videogame product code-named "Darlene."

Everyone got excited about Darlene, because Darlene was *Pong* – compressed into a single Synertec chip that fit inside a small black box that hooked up to any television set – and a home version of *Pong* was exactly what Atari so desperately needed.

So in the fall of 1974, Brown and coin-op engineer Harold Lee immediately got to work designing a new hardware platform for Home Pong. Basically, the game was similar in concept to the Magnavox Odyssey designed by Ralph Baer – the first home videogame system, released in 1972 – only now it played just one game: TV Ping-Pong.

Atari's advantage over the ill-fated Odyssey was that technology had progresssed to a point where the resolution of Pong was dramatically improved over the Odyssey – at less than half the cost.

Although Odyssey had been an inspiration for Pong, it was also its biggest problem. Because the Odyssey had more or less failed in the marketplace – selling only 200,000 units in three years – it made it difficult for Atari to rally support for Pong. Another problem was that Atari was a coin-op company – and didn't know the first thing about the consumer electronics business. There was a reason why Bally, Gottlieb, and Williams didn't find success selling mini-pinball games for the home – the consumer market is a completely foreign world. So in order to enter into it successfully, Atari needed a partner just as badly as Baer had needed Magnavox.

So, Nolan Bushnell met with his advisors and finally decided to take the Pong prototype around to toy industry trade shows. Unfortunately, none of the buyers at Toy Fair knew what to make of Pong, and Nolan returned to Los Gatos unsure of what to do next. But soon after, a man named Tom Quinn stopped by Atari for a surprise visit. Tom was the sporting goods buyer for Sears, Roebuck and Co. – one of the largest retailers in the country. He had heard about Pong and made Atari an offer to buy every system the company could produce. He even offered to cover all production costs – in return for granting Sears the exclusive right to sell Pong.

With a strategic partner like Sears – and its over 900 stores nationwide – there was no way that they could fail. In 1975 alone, Atari sold 150,000 Pongs. And that was only the beginning. ■

Atari and Sears released numerous home versions of Atari's popular arcade game *Pong* throughout the seventies. Atari Pong for the home generated a popularity that would overshadow the Odyssey – having a profound impact on popular culture and inspiring an entire generation of videogame enthusiasts. Here are but a few of the systems...

Sears Tele-Games Pong | 1975

Atari Pong | 1975

Sears Tele-Games Super Pong | 1976

Atari Super Pong | 1976

Sears Tele-Games Pong Sports IV | 1977

IMAGE: FAR LEFT: COURTESY ATARI HISTORICAL SOCIETY

5

3

Odyssey 100-5000

Magnavox

Following the demise of the revolutionary Odyssey Home Entertainment System, Magnavox – now merged with Philips Electronics – released a series of dedicated TV Ping-Pong game systems targeted at the now Pong-crazed home market. Engineered with a new Texas Instruments chip set developed exclusively for Magnavox the games imitated the Odyssey's discrete components including the sync circuits, spot-generators, and subcircuit designs. These new systems were stripped-down versions of the Odyssey ITL-200, now complete with "action sound." Gone were the transistors, overlays, plug-in cards, and game accessories – all replaced by a sleek modern console manufactured in brilliantly colored molded plastic.

The first model to be introduced was the Odyssey 100 – a bright orange game console that played only two action-packed games, *Tennis* and *Hockey*. Odyssey 100 was self-contained (all control knobs were now mounted on top), and was powered by either an included AC adaptor or 6 "C" batteries (not included). The new system was cheaper, faster, and exactly what consumers wanted in 1975.

Magnavox had learned from mistakes made with Odyssey regarding compatibility issues – and were determined to keep history from repeating itself with these next generation systems. As a result, the Odyssey 100's packaging boldly read, "America's most exciting home video game… works on any brand TV." On every side of the box.

Tennis was played by hitting an electronic blip across the "net" (a vertical line drawn down the center of the screen) with an on-screen game paddle until you or your opponent miss the ball and a point is scored. *Hockey* was basically the same game – only now you needed to protect a "goal" instead (the break in a vertical line behind your paddle). Scoring for both games was kept with a numbered slider control on the console itself (onscreen scoring wouldn't be available until the next system was introduced).

The Odyssey 200 was nearly identical to the Odyssey 100, but now it offered onscreen scoring. It also had an additional TI chip for a new game, *Smash*, all in a space-age white plastic console.

Then in 1976, Magnavox released the Odyssey 300 – developed with a new microchip architecture. Engineered with the General Instruments AY-3-8500 microchip, a multi-game videogame chip developed at GI's Scotland labs, the Odyssey 300 set the industry standard for the dedicated TV Ping-Pong systems to follow. Although similar in shape and size to earlier Odyssey models, the 300 was cast in bright yellow plastic complete with slick black racing stripes and introduced a three-position "skill switch" to the console.

The next system, the Odyssey 400, dropped the skill switch in favor of a "doubles switch" that allowed for team play, and came in a sleek white case with blue and silver racing stripes. But it wasn't until the debut of the Odyssey 500 that Magnavox would take a giant leap in gaming technology. Along with *Soccer*, the 500 introduced full-color onscreen graphics, and the signature character sprites that would come to define the graphic aesthetic of Magnavox's next generation videogame system – the Odyssey².

TENNIS ANYONE? Advanced videogame graphics on the Odyssey 500.

Magnavox continued to introduce innovation to the Odyssey platform throughout 1977. With the 2000, 3000, and 4000 systems, the Odyssey reflected new advancements in home videogame technology, evolving to include a choice of up to eight games. But it wasn't until the development of the Odyssey 5000 – and the introduction of a new microprocessor chip capable of playing 24 full-color sports and combat games – that the future of Magnavox's home entertainment legacy finally came into focus. ■

IMAGES: RIGHT: COURTESY SHAUN GEGAN/LOOMIS

The Odyssey family of dedicated TV Ping-Pong home videogame systems were released by Magnavox – "the originator of home video games" – after the discontinuation of the original Magnavox Odyssey ITL-200 in 1975. These classic systems are easily identified by their bright, modern console designs…

Magnavox Odyssey 100 | 1975

Magnavox Odyssey 200 | 1976

Magnavox Odyssey 300 | 1976

Magnavox Odyssey 400 | 1976

Magnavox Odyssey 500 | 1976

Magnavox Odyssey 2000 | 1977

Magnavox Odyssey 2001 | 1977

Magnavox Odyssey 3000 | 1977

Magnavox Odyssey 4000 | 1977

The final system of the series – the Odyssey 5000 – shown in this sales flyer, was never released.

IMAGES: FAR LEFT: COURTESY SHAUN GEGAN/LOOMIS, ODYSSEY 5000 COURTESY RALPH H. BAER

The Odyssey 100 dedicated home videogame console features two action-packed games – Tennis and Hockey – and action sound.

In Exidy's ***Alley Rally***, you must drive a car through busy city streets. Featuring "crazy traffic action" and big yellow taxi graphics, the game was a primitive precursor to Hisao Oguchi's modern arcade masterpiece, *Crazy Taxi*.

Avenger

Electra Games

Following the incredible success of *Tank*, combat games were big business at the video arcade box-office. In response to the demand, a number of new air combat games were introduced in 1975.

Leading the squadron was Atari's popular *Anti-Aircraft*, an air combat simulator where players control an anti-aircraft gun to shoot down enemy planes as they circle the skies above – a game that later inspired the classic air combat game *Air-Sea Battle* for the Atari VCS.

PIXELS OVER THE PACIFIC: *Air-Sea Battle* on the Atari VCS.

Engineered with the same ROM-based architecture as *Tank*, *Anti-Aircraft* was capable of displaying detailed airplane graphics. Using this technology Atari and Kee released a number of similar games, including *Pursuit* and *Jet Fighter*, which inspired a wave of supersonic air battles throughout the coin-op industry.

Flying on the tail of these jet-fueled arcade games, Electra Games – now a division of Universal Research Labs – released its own video flight simulator, *Avenger*, in which you pilot a fighter plane and shoot down airborne attackers. With a unique aerial perspective, *Avenger* was innovative for its time and led to the development of other Electra games such as *Wings* and *Flying Fortress*. Since then the genre has evolved into such hyper-realistic high-flying aerial combat games as Microsoft's classic *Combat Flight Simulator*. ■

Gun Fight

Bally/Midway

Milwaukee Coin Industries was founded by industrial designer Dave Nutting in the late 1960s to design and manufacture coin-operated electromechanical amusement games. Nutting, who had also designed the Willy's Grand Wagoneer, was introduced to the coin-op industry by his brother, Bill Nutting – whose company, Nutting Associates, released *Computer Space* in 1971 – when he hired Dave to design an electronic version of a trivia game, introduced in 1968 as *Computer Quiz* and *IQ/Computer*.

Dave Nutting realized the potential in this new industry and quit his design job at Brooks Stevens Associates to concentrate on engineering coin-op games full time. In the next few years, Milwaukee Coin Industries developed numerous projection-based electromechanical coin-op games like *Flying Ace*, *U-Boat*, and *Air Ball*.

Empire Distributing, MCI's primary game distributor, happened to be owned by Bally/Midway – one of the coin-op industry's key players – and soon, Nutting and the Bally brass became fast friends. As a result of this relationship, a consulting agreement was proposed for MCI – now known as Dave Nutting Associates – to design games to be manufactured and distributed by Bally/Midway. This arrangement allowed Nutting to focus on what he loved most: designing games.

In 1974, Dave Nutting had started to experiment with Intel's new 4-bit microprocessor technology, which was beginning to take the computing world by storm. After getting hold of a development system and two *Flicker* pinball machines, Nutting and his team of engineers quickly designed the first microprocessor-based pinball game to best illustrate the benefits of this new technology to Bally executives. After demonstrating the gameplay of a standard production *Flicker* versus the new "enhanced" microprocessor-based machine, Nutting got the go-ahead to begin developing a microprocessor-based arcade videogame.

As Nutting and his team of engineers began to sketch out original game concepts, they realized that they desperately needed someone to help actually *program* the games. So Nutting hired two University of Wisconsin computer science students, Jay Fenton and Tom McHugh, to become DNA's first videogame programmers.

Gun Fight started out as a simple solid-state shoot-'em-up game entitled *Gunman* – developed by leading Japanese videogame manufacturer, Taito. Then, in 1975, Taito licensed the game to Bally/Midway for release in the US. After a brief demo, Nutting put plans for converting *Sea Wolf* on hold and *Gun Fight* soon became the test case – and the first arcade videogame engineered with a microprocessor chip.

After witnessing the groundbreaking engineering work done by DNA and Bally in converting *Gunman* to *Gun Fight*, Taito realized just how far behind the videogame curve they actually were. As a result, Taito ramped up its videogame development effort and in 1978 released their greatest achievement – *Space Invaders*, an arcade smash copied directly from the black-and-white 8-bit microprocessor-based system developed by Dave Nutting. ■

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During the beach arcade scene in Steven Spielberg's 1975 classic *Jaws*, look closely behind Sega's *Killer Shark* and you'll catch a glimpse of a rare yellow *Computer Space* lurking deep in the shadows.

IMAGE: LEFT: COURTESY UNIVERSAL PICTURES

BEWARE OF THE

MANEATER!

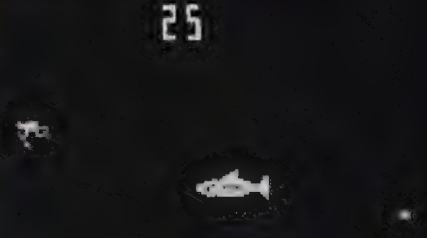
VIDEO TERROR!

The innovative cabinet of PSE's arcade videogame, ***Maneater***, was no doubt inspired by the notorious jaws of *Jaws*. Molded in reinforced fiberglass – with its realistic "chomp" and "scream" sound effects – *Maneater* was sure to inspire pure video terror.

Shark Jaws

Atari/Horror Games

Cashing in on the summer shark frenzy that followed the release of Steven Spielberg's terrifying motion picture, *Jaws*, Atari introduced a killer arcade videogame entitled *Shark Jaws* – released under their new Horror Games label – in September 1975. It is believed that the Horror Games subsidiary was established exclusively to protect Atari, Inc. from potential lawsuits brought on by *Jaws'* copyright holder, Universal Pictures. However derivative the game may have been, it certainly didn't help matters that the word "Jaws" appeared significantly larger than "Shark" on both the double-anodized side art and monitor bezel graphics. But, fortunately, the Great White's lawyers never called.



Built on the *Tank* hardware platform, *Shark Jaws* – rendered in black and white with a colored "overlay" on the monitor glass – was one of the first games to incorporate real detailed character sprites into the onscreen graphics using new ROM chip technology, which allowed for the storage of graphic data in the CPU.

In this shark hunting game, the player controls a deep-sea diver, equipped only with a handheld harpoon gun, who must spear small fish as they swim by for points while avoiding the deadly jaws of a Great White shark. ■

Steeplechase

Atari

"And they're off!" *Steeplechase* – one of the first arcade horse racing videogames – was released by Atari in October 1975.

In *Steeplechase*, up to six players can compete in an exciting race to the finish. The playfield consists of seven racing lanes – for six opponents and a seventh computer-controlled thoroughbred. The graphics for each lane include a starting gate, detailed horse and jockey, hurdles, and the finish line. The simple black and white display is enhanced by a spectrum of color overlays to distinguish each race lane, and players control their horse and jockey with a lighted button on the game's control panel that matches the color of their respective lane.

CALL TO THE POST: *Steeplechase* as seen on the Atari VCS.

Just like real horse racing (only without the bookies), the object of *Steeplechase* is to be the first horse to cross the finish line. To add to the challenge, the riders must also clear four dangerous hurdles along the way. Unfortunately, *Steeplechase* never gained mainstream popularity until Atari released the home version for the Sears Video Arcade and Atari VCS. Designed by Jim Heuther, the game now featured advanced game variations where up to four video jockeys could race as "Little Dictator," "Just Missed," "Absent Mind," or "Little Devil" – just add a cool mint julep, and it's almost like Derby. ■

4
HILD
DCART-2
• Dest
• Shoo
GRAM © FAIRCHILD 1976

1976

Steve Jobs and Steve Wozniak found and introduce the Apple I personal computer. General Instruments introduces the AY microchip. In a deal worth Warner Communications acquires Atari, Inc. is elected president of the United States.

TELSTAR

FOR VIDEO
SPORTS GAMES
ON ANY TV

Telstar

Coleco

The Connecticut Leather Company was founded in 1932 by Maurice Greenberg. As a manufacturer of leather goods, its business soon evolved to include leather craft kits featuring popular licensed characters like Davy Crockett and Howdy Doody. In 1956, the company upgraded its production facility in order to manufacture molded plastic toys, and expanded its product line to include various children's toys including kiddie-pools, sleds, sandboxes, and sporting goods. In the sixties, the company sold off the leather products division to focus exclusively on plastic toys, and – to reflect this shift in direction – shortened its name from Connecticut Leather Company to simply: Coleco.

Coleco quickly became a household name with their Coleco World of Sports tabletop games and the introduction of classic children's toys like the Micro-Range Oven. In 1974, Coleco introduced a glimpse of their future with its Super Coach TV Football, a board game that was played while watching Monday Night Football on television – their very first venture into the world of TV Games.

In 1976, the market potential of Pong loomed large on the horizon. Atari had sold over 150,000 Pong games exclusively in Sears, Roebuck sporting goods departments throughout 1975 – and were destined to make a fortune this year with increased production, and expanded distribution channels. In response to this heightened demand for TV Ping-Pong games, engineers at General Instruments' laboratories in Glenrothes, Scotland, had secretly begun to develop the AY-3-8500 microchip.

The AY-3-8500 was a multi-game videogame chip also known as the "pong chip." Ed Sacks, then manager of GI's Hicksville, Long Island plant, heard about the new chip and asked the Scottish engineers to fly to New York to demonstrate their new invention. Sacks then called Odyssey creator Ralph Baer to come down for a preview in early 1975. Baer was so impressed by the technology that he phoned his friend Arnold Greenberg, and urged him to come have a look at the new chip.

Baer and Greenberg had met briefly in Chicago at Marvin Glass & Associates, the premier studio for toy and game developers, where Baer was now a consultant. Greenberg, now president of Coleco, had expressed an interest in getting into the videogame business. So when Baer saw the new GI chip, he knew it would be the perfect architecture for Coleco to build a new videogame system on. As a result, Coleco became GI's first and preferred customer for the AY-3-8500, and the next major player in the pong wars.

PONG ON A CHIP: General Instruments' popular AY-3-8500.

The demand for the new microchip was great. General Instruments underestimated the number of chips needed to fill orders. Fortunately, Coleco had been one of the first to place an order and received a full shipment of microchips – just in time for the Father's Day rush.

Coleco put their development efforts into high gear. After a brief run-in with the FCC that nearly killed the project (Baer saved the day by installing a ferrite torroid ring to suppress excess radiation, allowing the system to pass FCC tests), Coleco officially licensed the TV Game technology from Sanders Associates and launched the Telstar range of home videogames in 1976. Telstar sold over one million units its first year on the market. ■

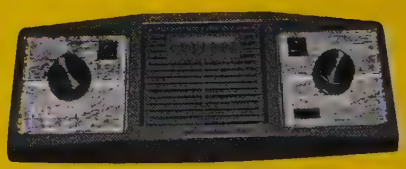
Coleco released over a dozen Telstar brand home videogame consoles from 1976 to 1978. Ranging from TV Ping-Pong to totally triangular, here are a few of the more popular systems...

Coleco Telstar | 1976

Coleco Telstar Classic | 1976

Coleco Telstar Ranger | 1977

Coleco Telstar Alpha | 1977



Coleco Telstar Colortron | 1978

Coleco Telstar Arcade | 1978

IMAGE: NEAR RIGHT: VAN BURNHAM

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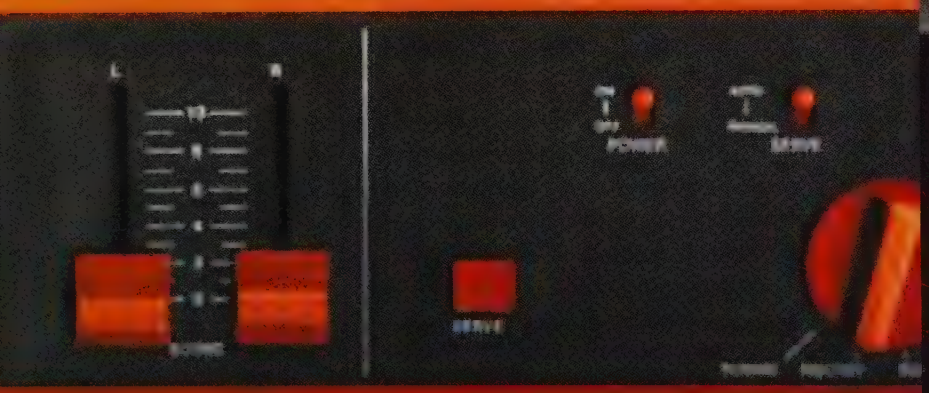
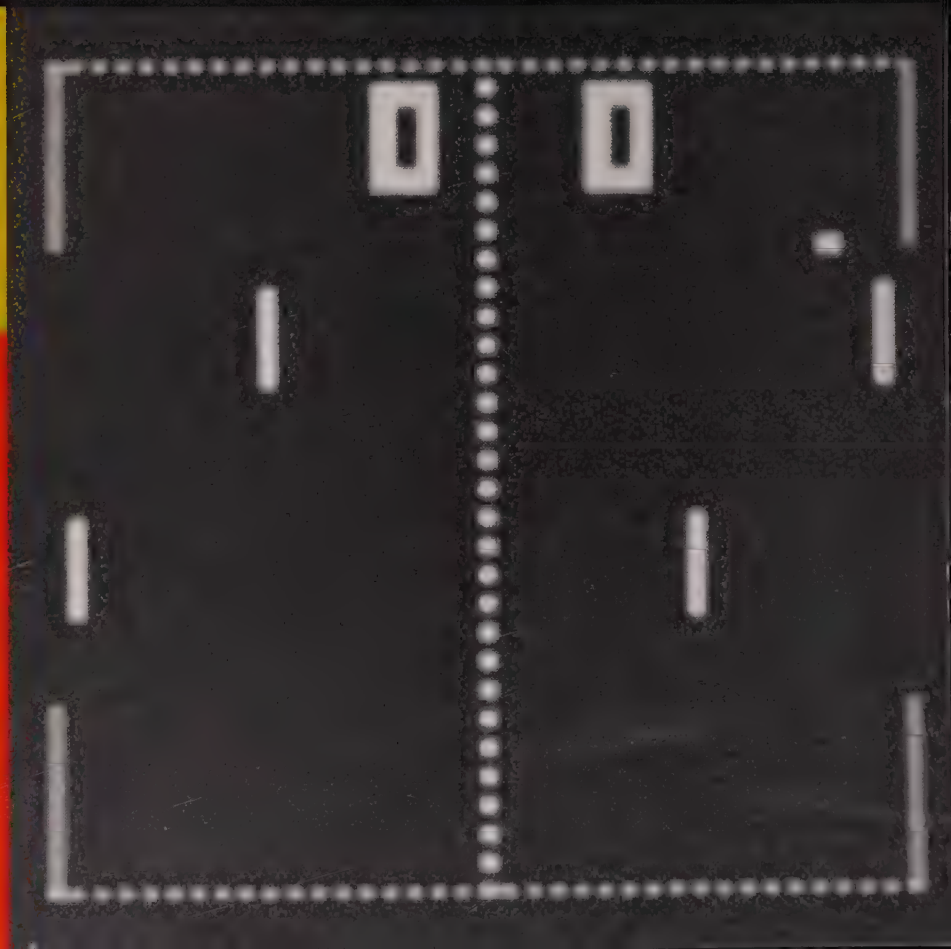

POWER
SERVE

HANIMEX

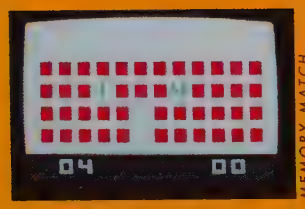
$6.95 VALUE
A.C. ADAPTER INCLUDED
JAI ALAI
HANDBALL
HOCKEY
TENNIS
TARGET
SKEET
T.V. GAME
WONDER WIZARD
BULL'S EYE
SIX EXCITING VIDEO GA
FEATURING:

Hundreds of TV Ping-Pong home videogame consoles were released in the late '70s – produced by companies including APF, Atari, Coleco, GHP, Hanimex, Magnavox, Radio Shack, Radofin, Unisonic, and Videomaster.

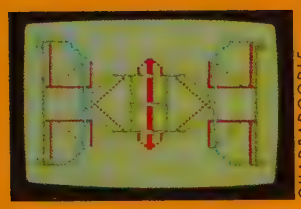


Channel F

Fairchild Camera and Instrument



MEMORY MATCH



QUADRADOODLE

MAZE

The Channel F Video Entertainment System (VES) was introduced just following the debut of the Coleco Telstar in August 1976. Released by Fairchild and designed by Jerry Lawson, it was the first home videogame system to use a "Videocart" game cartridge (a plug-in programmable ROM cartridge) in order to play additional games on the system.

Prior to the release of the Channel F, videogames were selected by a series of switches or dials to toggle between various built-in games. Although the original Magnavox Odyssey did include plug-in cards, they functioned in a similar manner to the switches in that they acted as a circuit "key" to switch between pre-programmed games and didn't contain any actual game programming. But the Channel F Videocart, with its bright yellow plastic outer casing and bold game label graphics, actually contained program ROM and is now considered the first videogame cartridge.

Designed around the Fairchild F8 8-bit microchip and four RAM chips, the architecture of the Channel F system was revolutionary in that it was the first home videogame system to use a programmable microprocessor with a screen bitmap – basically a scaled-down implementation of the technology now being used in coin-op arcade videogames.

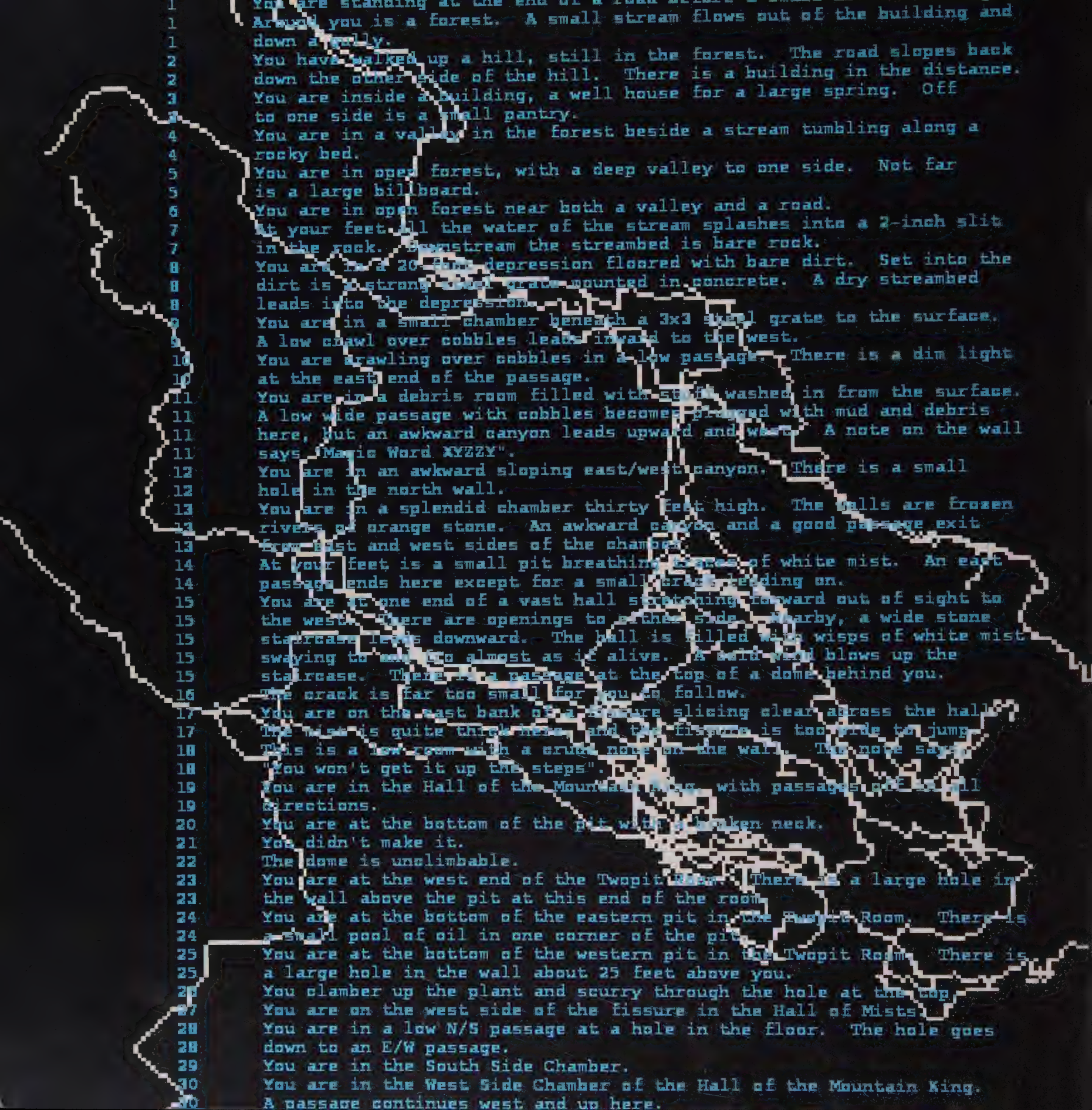
The Channel F shipped with the main system console, two game controllers, AC adaptor, and RF box. Two "console" games – *Hockey* and *Tennis* – were pre-programmed into the system. The console itself contained a slot for inserting the optional spring-loaded cartridges (about the size of an 8-track tape), a compartment to store the game controls, and numerous control switches including an innovative "Hold" button for freezing the action on-screen.

The Channel F was also the first home system to include a directional joystick. Videogame controllers – even the control boxes of the Odyssey – usually consisted of knobs to control the horizontal/vertical direction of active objects on-screen, or a light gun attachment for target games. However, the Channel F's plunger style game controls – hard-wired to the console – contained a knob on top that could be moved in eight directions: forward, backward, left, right, twisted left or right, pulled up, or pushed down. With this configuration it was now possible to control any number of on-screen actions.

The Channel F was incredibly popular following its release in 1976, and by 1977 the system was on back-order for nearly six months. Fairchild released a total of 21 games for the Videocart library throughout the life of the system including *Space War*, *Memory Match*, *Quadradoodle*, *Math Quiz*, *Shooting Gallery*, *Tic-Tac-Toe*, *Blackjack*, *Pinball Challenge*, and more. Zircon International (the makers of the handy "StudSensor" pocket tool) purchased the videogame division from Fairchild in 1979 and released the Channel F System 2 along with five additional game cartridges.

Unfortunately, the revolutionary Channel F was swiftly eclipsed following the release of the technologically superior Atari VCS – and was discontinued in 1980. ■

F



Adventure

(ADVENT)

BY JULIAN DIBBELL

You are standing at the end of a road before a small brick building. Around you is a forest. A small stream flows out of the building and down a gully.

You've been here before. The words may have looked slightly different – perhaps they were all in caps, LIKE SO – but the place was definitely the same. And of course you remember what lay beyond it: The locked metal grate at the bottom of the gully. The cavernous realm below the grate. The curious objects there (a star-tipped iron rod, a small wicker cage, a giant clam), the hidden treasures (rare coins, diamonds, a Ming vase). You remember, too, the stalactites and dusty rocks and "frozen rivers of orange stone." The maze of twisty little passages, all alike, and the splendid chambers higher than you could see. The knife-throwing dwarves, the thieving pirate, the maddeningly useless magic word XYZZY. The profound depths of frustration at puzzles seemingly unsolvable, the quiet thrill when the solutions suddenly occur to you. The bleary-eyed realization that you'd been wandering these caverns far longer, and far later, than you'd intended – that you'd succumbed once again to the addictive, half-imaginary world that flickered into being every time you loaded the computer game *Adventure*.

It's hard to believe that that world once represented the high frontier of computer gaming. Where players of latter-day quests like *Myst* point-and-click their way through complex graphical environments of an almost liquid radiance (and *Quake* warriors fly through their subterranean killing grounds like greased angels of death), *Adventure* was strictly hunt and peck – its game space nothing more than a collection of laconic text descriptions navigated by means of simple two-word commands ("go north," "climb beanstalk," "get coins," "open clam"). And yet, with *Adventure*, the style became a gaming phenomenon, sweeping through computer labs with something like the force of revelation.

The man who originally conceived of *Adventure*, a senior programmer on the original Bolt Beranek and Newman team that built the infrastructure of the Arpanet – the first draft of the Internet – in 1969, Will Crowther had a reputation for writing wire-tight, brilliantly simple code. But he also had expertise in an area equally relevant, if not more so, than his programming prowess – Crowther was a caver. Along with his wife, Patricia, he had participated in a historic expedition that found the link between the Flint Ridge and Mammoth cave systems in Kentucky – and in an early attempt to merge his passions for caving and computing, he and Pat had used BBN's line plotters to draw up cave maps from the survey data typed into the company's mainframes.

Crowther had also just recently discovered a fantasy role-playing game called *Dungeons & Dragons*, which he had started playing with a group of fellow BBN employees and MIT denizens (he went by the character name "Willie the Thief"). And soon, he was inspired to convert his Colossal Cave maps and adventures into a computer game program.

From this broad mix of influences, *Colossal Cave Adventure* – the first iteration of what later evolved into *Adventure* – was born. No longer extant, this version, programmed in FORTRAN, included most of the scenery that players of later versions would encounter early in the game – the small brick house, the Bird Chamber, the Hall of Mists. Though Crowther called the game Colossal Cave, the layout and many of the features were actually modeled on his vivid memories of Mammoth's Bedquilt segment. To add further to this realism, Crowther sprinkled the game with other colorful yet authentic names that he'd brought back from his caving adventures.

Sketchy and still a bit buggy, the program Crowther designed was nonetheless a hit – and though he soon lost interest in developing the game further, Crowther was happy to share it over the growing computer network he had helped create. So his kernel of a game floated from one Arpanet host to another, eventually finding its way to fertile ground – the Stanford Artificial Intelligence Laboratory, also known as SAIL.

At SAIL, in those days, the fascination of 1970s hacker culture with all things Tolkienesque was in full swing. The lab's rooms were named for various regions of Middle Earth. The vending machine was dubbed the Prancing Pony, after a tavern in *The Lord of the Rings*. Even the printer was loaded with elfish fonts. So when a young SAIL programmer named Don Woods discovered a copy of *Colossal Cave Adventure*, he was immediately inspired by its Middle Earthly blend of realism and magic. Woods soon tracked Crowther down and asked permission to refine and expand the program – Crowther was only too glad to pass the torch. Within a few months, Woods had doubled the program's size and scope – adding rooms, puzzles, and humor, and breathing life into the austere landscape that Crowther had created. Woods' final product survives today as the classic 350-point version of the game, which was now known as *Adventure*, or – owing to the TOPS-10 six character filename limit – more commonly as *ADVENT*. Woods' contribution to the game was considered of such import that he and Crowther have since been acknowledged as coauthors.

The profound impact and influence of *Adventure* can still be detected today – in the popularity of the vast online, multiplayer realms of MUDs, and in games like *Myst*, *Quake*, and *Ultima*, which have appropriated and updated elements of the *Adventure* oeuvre to the age of 128-bit graphics, 3D texture maps, and high-bandwidth Internet pipes. Some argue that what Crowther and Woods invented deserves recognition as creating a new literary form – but at the very least, *Adventure* marked the birth of what became a thriving new genre of text-based role-playing games, now labeled under the guise of "interactive fiction" – but once referred to simply as "adventure games." *Adventure* stands in an illustrious line of technological metaphors that have encouraged us to see what lies on the other side of the computer screen, seeing them not just as a calculator, a desktop, or even a worldwide web – but as a world all its own. And more than anything, *Adventure* encouraged us to believe that there is magic in that world. XYZZY. ■

BREAKOUT
•19" Monitor
•1 or 2 players
•Standard 3 balls,
operator adjustable
to 5 balls.
•Extended play option
•Color overlays on playfield
•Anti-reflective hood
•Sound effects
ATARI
Innovative
leisure

Breakout

Atari

In 1974, a young kid from Los Altos saw an ad in the Classified section of the *San Jose Mercury News* that read "Have Fun and Make Money." Having recently dropped out of Reed college, he decided to go see about the job. That kid was Apple Computer cofounder Steve Jobs, and the company he interviewed for was none other than Atari. He got the job.

As employee #40, Jobs started out as a technician earning ten dollars an hour – but it soon became clear that Jobs was definitely not a team player. After numerous run-ins with his fellow employees – whom he would often refer to as "dumb-ass" – his boss, Al Alcorn, decided it would be best to move him to the night shift.

Jobs had a friend named Steve Wozniak – known to his friends as "Woz" – who was an engineer over at Hewlett-Packard. Woz, who loved videogames, would often drop by Atari to visit Steve and play a few games in the company's game room where Atari would display all the latest releases. As the result of his videogame prowess, Woz would often be asked to come down to test new games.

One day, Jobs was assigned a new project – an arcade game conceived by Nolan Bushnell as a version of *Pong* where you hit a ball to knock out bricks. Bushnell had also challenged Jobs that for every IC he could eliminate from the design, he would get a $100 bonus. Jobs promised Bushnell to have the game done in four days.

Considering that Jobs' engineering experience was somewhat limited, it was doubtful that he had the ability to design a videogame from the ground up – let alone in four days. But, fortunately for Jobs, Woz – who was himself an engineering whiz and loved any technical challenge – was more than happy to help out. Jobs even offered to give him $350, "his half" of the bonus.

After four days of sleepless nights, the game – now entitled *Breakout* – was complete. Woz had also managed to eliminate fifty ICs from the design, earning Jobs a total of $5000. He never told Woz the real amount of the bonus and simply gave him the $350 he'd promised. Woz would not find out about the grift until nearly a decade later – long after he designed the Apple I, long after he and Jobs founded Apple Computer, and long after they revolutionized the computer industry.

Atari released *Breakout* in the spring of 1976. Although the game was similar to *Pong*, it was more akin to video pinball in that the goal of the game was to eliminate a wall of bricks by slowly knocking them out – one by one. The player controlled a paddle that moved from left to right along the bottom of the screen and would hit a ball up at the eight rows of bricks along top. You could bank the ball against the wall and whenever the ball hit one of the bricks, it would disappear. The game was programmed in black and white and had different color overlays along every two rows of bricks – yellow, green, orange, and red – for a multi-colored effect.

The sequel, *Super Breakout*, was released the next year and was later included as the pack-in cart for the Atari 5200, released in 1982. ■

DEATH RACE
IT'S FASCINATING!
IT'S FUN CHASING
IT'S MONSTERS
DEATH RACE

Death Race

Exidy

There are precious few classic videogames that transcend the pretense of "nostalgia" or a cursory impact on popular culture to become legends in their own right. These are games that, collectively, have shifted the course of the industry, pushed the bounds of technology, and influenced the future of the medium itself – games that have made history. *Death Race* stands among them.

Remembered not for its revolutionary gameplay, innovative graphics, or technological breakthroughs, *Death Race* will forever stand out in the annals of videogame legend simply because it was the first game ever to be vilified for its violent content – an historic first in an industry that is today relentlessly mired in the issue. In the wake of the Columbine massacre – an event that has pointed the lens of moral scrutiny at the interactive entertainment industry, as well as every facet of modern society – it seems the pandemic cultural conscience, political controversy, and media fallout that the Trench Coat Mafia has inspired may forever affect the perception of the industry and the very nature of videogame development, specifically, the shocking excesses of the thrill-kill genre. A genre in which *Death Race* was sole pioneer.

Exidy Inc., founded in 1973 by a former Ramtek executive named Pete Kaufman, introduced *Death Race* in January 1976. The game was inspired in part by the 1975 film *Death Race 2000* starring David Carradine and Sylvester Stallone as race car drivers who must run down pedestrians for bonus points in a nihilistic future where "hit-and-run" has become some twisted national sport. Although the basic premise of the gameplay in *Death Race* was slightly altered so that the pedestrians were now "monsters," it is impossible to deny the obviously cruel intentions that were fostered in the game – a fact that was relentlessly condemned by advocacy groups, parents, and the mainstream media during a wave of intense public outcry that followed the game's release. The protest even went so far as to inspire intimidating bomb threats to be dispatched to Exidy in Mountain View, CA.

In the game, you steer a speeding race car around a dark cemetery littered with potential victims. As you run down the monsters (you can even throw your car in reverse to finish off the more tenacious undead) you transform the screaming sprites into ghostly phosphorescent gravestones that slowly fill the video screen. Points are scored for every hit. *Death Race* is set on a timer and is best played with two players competing against each other for the most kills before time runs out.

CARMAGEDDON: *Death Race* action for the graveyard set

The game cabinet – complete with dual steering wheels and stereo sound – features colorful side art, monitor bezel, and backlit marquee designed by Exidy's resident graphic artist, Pat "Sleepy" Peak. The marquee shows two skeletal apparitions as they drag race along the graveyard boulevard in killer hemi-powered hotrods.

As a result of the controversy that shadowed *Death Race* – and the increasingly graphic game content that has flourished in its wake – the videogame industry has since been forced to adopt a "voluntary" content-based rating system, implemented by groups like the IESRB and IDSA. In retrospect, *Death Race* was nothing more than a test case, fatefully chosen to push the emerging moral boundaries of a virgin medium. Little did we know just how far they could go. ■

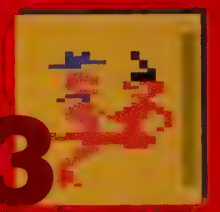
IMAGE: NEAR RIGHT: COURTESY AL KOSSOW/CALIFORNIA EXTREME

PARENTAL ADVISORY
EXPLICIT GRAPHICS

A brief retrospective of violence, censorship, and controversy in the videogame age...

1976

▶ Exidy releases ***Death Race***, an arcade videogame based on the film *Death Race 2000*. The object of the game is to run down "gremlins" with a speeding car for bonus points.



1983

▶ Mystique releases the controversial Atari 2600 cartridge ***Custer's Revenge***, a sexually explicit videogame depicting the rape of a nubile Native American squaw by a bitmapped General Custer.

1983

▶ Wizard Games releases ***The Texas Chainsaw Massacre*** for the Atari 2600, based on the movie of the same name – only now you control Leatherface and his whirring chainsaw as victims flee in terror.

1987

▶ Sierra Online introduces ***Leisure Suit Larry in the Land of the Lounge Lizards***, a videogame in which you assist Larry in persuing hot sexual encounters.

Continued on page 159 ▶

Atari's revolutionary arcade videogame ***Night Driver***, designed by Dave Shepperd, was the first racing game with a first-person view of the road and 3D perspective. In it, you control a Sebring racer as it speeds down a dark, winding raceway – with illuminated road markers as your only guide.

Sea Wolf

Bally/Midway

Sea Wolf was introduced by Bally/Midway to the praise of the entire industry. Based on the Intel 8080 processor – with detailed grahics and a unique submarine interface – it was destined to be a hit in arcades.

DAMN THE TORPEDOES! Sub action in *Sea Wolf*.

Sea Wolf, designed by Dave Nutting and Tom McHugh, was a submarine combat game where the player uses a realistic periscope to aim at ships as they move across the watery landscape on-screen. Once targeted in the cross-hairs, the player launches their torpedo salvos with the press of a button located on the scope. Targets vary in size and speed – the most difficult to hit being a small PT Boat that cruises full speed across the horizon. The game is set on a timer and bonus time is awarded when the player reaches a specified point level.

Sea Wolf was an unqualified success and sold approximately ten thousand units its first two years in arcades. In 1978, Bally/Midway released a sequel entitled *Sea Wolf II* – a two-player version based on the Z-80 microprocessor, now in radiant full color. ■

BLACK
000
KEE GAMES
OIL
OIL
GREY CARS DRIVE AUTOMA

Sprint 2

Atari

In 1975, MOS Technologies introduced the 6500 family of microprocessors. MOS (Metal Oxide Semiconductor), a new semiconductor company based in Norristown, Pennsylvania, was home to a team of former Motorola engineers, including the infamous Chuck Peddle, who had defected in order to engineer a fast, cost-effective chip. The 6502, an 8-bit processor based on the design of the Motorola 6800, was the first microprocessor you could buy for under a hundred dollars. Introduced in 1976 – with a retail price of only $25 – this cheap, powerful processor made graphics easier to program and played a key role in the evolution of computer games.

When Atari and Kee Games set out to design their first arcade game utilizing a microprocessor chip, the 6502 seemed to be the perfect choice. *Sprint 2*, designed by Dennis Koble, was an impressive leap into the future of videogame technology. Using this new microprocessor-based architecture, Atari was now capable of designing videogames that were more realistic, now with detailed character sprites, complex playfields, and faster gameplay.

In *Sprint 2*, players can choose between twelve different race tracks and can race either alone or against an opponent. In addition to the white and black player-controlled cars, there were two grey computer-controlled cars to compete against. The playfield was an overhead view of each respective track, with its hairpin curves and straightaways defined by simple white dotted lines. Also on the track were brake-locking oil slicks (black bitmapped splotches with the word "Oil" in the center) that would cause the driver to lose control when hit.

New monitor text graphics now communicated playing instructions to the player including "Push Start Button" and "Grey Cars Drive Automatically." After each race your driving performance would be rated and either "Granny," "Rookie," or "Pro" would flash on the screen – more than enough incentive to practice.

HARD DRIVIN': Players take the checkered flag in *Sprint 2*.

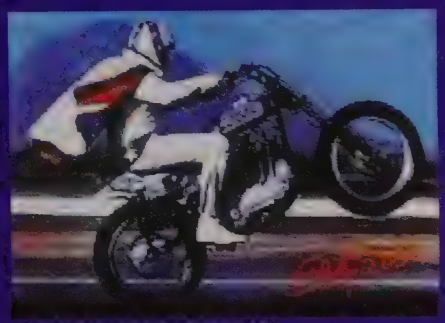
The players drive around the course in an attempt to complete the most laps before time runs out. Points are awarded for distance. Extended play is awarded when a predetermined score (set by the operator) is reached by the driver as the words "Extended Play" flash on-screen along with a countdown timer.

Covered in bold red, orange, and yellow racing graphics, and highlighted by a large monitor bezel featuring two racers speeding down the track – multicolored flames and black exhaust trailing behind them – *Sprint 2*'s mammoth game cabinet was pure 1976 hotrod chic. With its dual steering wheels, gas pedals, and 4-speed gear shifters, *Sprint 2* was the most realistic videogame driving experience to date. As a result of *Sprint 2*'s success, the franchise was later expanded to include games like *Sprint*, *Sprint 4*, *Sprint 8*, *Super Sprint*, and *Championship Sprint*. ■

Stunt Cycle

Atari

In 1976, Evel Knievel – the world's most famous daredevil – was also one of the most popular toy franchises of the decade. Following a successful jump of ten Mack trucks in 1974 and a failed attempt at the Snake River Canyon in 1975, the flood of red, white, and blue star-spangled Evel Knievel merchandise that filled toy store shelves included everything from Aladdin lunch boxes to Ideal's popular gyro-powered Stunt Cycle mini-motorbike play set.



THE GREATEST AMERICAN HERO: The death-defying motorcycle stunts of daredevil Evel Knievel

As a result, it was a logical progression for the Evel one to make the jump to the exciting world of videogames. In January, Atari released *Stunt Cycle* – a death-defying arcade videogame to capitalize on America's fascination with high-speed daredevil action. With its bold grandstand graphics and illuminated marquee, *Stunt Cycle* was a thrilling entry into the arcade arena. Players control a video stunt cycle, with realistic handlebar-grip throttle, as they attempt to jump over an increasing number of buses without crashing.

Later that same year, Atari introduced a dedicated Stunt Cycle home videogame console – with authentic cycle controls – that played four exciting motorcycle action games including *Stunt Cycle*, *Motocross*, and *Excitebike*. ★

IMAGE: LEFT: COURTESY EVEL.COM

ATARI

1977

George Lucas' film *Star Wars* debuts in theaters — Atari opens the first **Pizza Time Theater** in Sunnyvale, California — The original mainframe version of *Zork* is written by Marc Blank and Dave Lebling at MIT — Bill Gates drops out of Harvard University to work fulltime at Microsoft.

Atari VCS

Atari (a.k.a. Atari 2600)

BY LEONARD HERMAN

"HAVE YOU PLAYED ATARI TODAY?" blared TV commercials in 1982. Although the company had been around for a decade, Atari had now become a global phenomenon. The rise and eventual fall of Atari – as well as the videogame industry itself – centered around one of the most popular videogame consoles of all time: the Atari VCS.

By late 1975 Atari had created a lucrative business converting its arcade hits into stand-alone versions for the home. After a succession of consoles that included Pong, Video Pinball, and Stunt Cycle, the heads at Atari eagerly anticipated which arcade game should get the home treatment next. The problem was that it took $100,000 and over a year to develop a new home game. In that time a hit arcade game could lose popularity rapidly and Atari didn't want to invest a great sum of money on a console that would have limited appeal.

Nolan Bushnell decided that the solution would be a programmable system – one that could play many different games. So he assembled a team of star engineers – consisting of Joe Decuir, Steve Mayer, Ron Milner, and Jay Miner – to create a powerful yet inexpensive programmable home videogame system. They code-named the project "Stella" after Decuir's trusty bicycle.

The console that the team engineered was to be simple and efficient – it was the software that would do most of the work. Stella was designed to work with plug-in cartridges – similar to the Fairchild Channel F – that would contain the actual game program. At the heart of the console, containing 128 bytes of internal RAM, was a MOS 6507 processor running at a breathtaking 1 MHz. The TIA (Television Interface Adapter) graphics chip, commonly referred to as the Stella chip, generated the sounds and on-screen graphics including high-resolution objects, colors, and low-resolution backgrounds. But because of the archaic way that Stella sent data to the screen (one scan line at a time) the main part of each game program had to constantly write to Stella in order to refresh the graphics correctly.

To make it a challenge for the programmers, the game programs designed for Stella couldn't be any larger than 4K. Since the system had been designed primarily to play primitive games like *Pong* and *Tank*, the design team never anticipated that a game would ever need to go beyond that limit – if only they had known what was possible.

Once the original Stella prototype was complete, the Atari engineers and executives knew they had a winner. Stella would no doubt make Atari kings of the home videogame market. Unfortunately, Atari didn't have the capital to actually put the system into production. At the time, Nolan Bushnell had only two ways to raise that amount of cash – he could either take Atari public, or be sold. Considering the highly depressed state of the economy in 1976 – a lethal combination of inflation, unemployment, and sky-high interest rates, compounded by the lingering energy crisis – going public would be suicide. As a result, an acquisition was the company's best option.

So in 1976, Atari was sold to Warner Communications – one of the most powerful entertainment companies in the world – in a deal estimated at $28 million. Engineered by Warner chairman, Steve Ross, and vice president Manny Gerard, Atari was exactly the brand they were looking for. Warner's record division was steadily losing money and they needed a new trend in entertainment to push Warner into the future. Ross and Gerard saw videogames – and Atari – as the future they wanted. With Atari, Warner could take over the entertainment world.

With an influx of cash behind it, Atari released the Atari Video Computer System (Model #CX2600) in October 1977. The $199 videogame system was sold with both paddle and joystick controllers, and also included a "pack-in" videogame cartridge called *Combat* that featured several variations of Atari's popular arcade game, *Tank*. Eight additional optional cartridges were launched with the system including *Air-Sea Battle*, *Indy 500*, *Star Ship*, *Street Racer*, *Surround*, and *Video Olympics*.

Although the VCS outsold competing systems like the Channel F, the sales it was generating were not the kind of numbers required to sustain it for much longer. Even new home versions of popular arcade videogames like *Breakout* were not generating enough interest in the VCS. Considering that Atari was sitting on nearly $40 million worth of inventory, it was a serious problem – and Warner was getting nervous. They desperately needed someone at Atari who knew a thing or two about marketing. That's when they hired Ray Kassar – and that's when everything changed.

Shortly after the release of the Atari VCS, Taito's popular *Space Invaders* invaded arcades around the world. Atari knew that having a killer game like *Space Invaders* would be a marketing coup. So in an unprecedented move, Atari licensed the home rights for *Space Invaders* from Taito and released it in January 1980. As a result, Atari VCS sales sky-rocketed as millions of consoles were sold just so that kids could play *Space Invaders* at home. Atari's gross sales for that year were $415 million – more than double that of the previous year. Atari followed-up on the success of *Space Invaders* by licensing other arcade hits like *Defender*, as well as releasing its own arcade hits *Missile Command* and *Asteroids* for the VCS. They each sold millions.

Selling these games may have been easy – but programming them was an entirely different story. Owing to the system's limitations, it was very difficult to program for the Atari VCS. Steve Mayer once remarked in *IEEE Spectrum*, "There's a certain class of programmer that can deal in microcode like that. If it were easier, we wouldn't have these programmers, because they'd be bored. The VCS is an absolute challenge." One such programmer was Tod Frye, who was assigned the task of programming the home cartridge version of Atari's monster arcade hit, *Asteroids*. Frye quickly discovered that he couldn't create a faithful rendition of the game within the confines of the allotted 4K of memory. Frye decided to use a technique called ▸

IMAGES: TOP: COURTESY GREG CHANCE

ATARI

Yes! I want to join the Atari Club!
A promotional image for the official Atari fan club as it appears in an issue of *Atari Age* magazine.

"bank-switching," which had been developed – but never used commercially – by an Atari programmer named Larry Wagner. The technique involved dividing memory into sections or "banks." Although all banks were available to the program, only one could be accessed at a time. In the case of the VCS, an instruction within the first 4K bank branched to an address in a second 4K bank from which processing continued. The branch to the second bank of 4K was transparent to the CPU. In effect, this allowed the VCS to process games that were larger than 4K. Finally, 8K and even 16K games were now possible on the VCS.

Despite all of Atari's success, their programmers were beginning to grow restless. They resented that their creations earned hundreds of millions for the company while they were treated as no more than employees – employees who weren't even entitled to royalties. They wanted some recognition.

Atari had traditionally kept the identities of its game programmers anonymous for fear that competitors might try to lure them away. Atari programmer Warren Robinett decided to do something about it. While writing the game program for *Adventure*, he decided to include undocumented moves into the game that would cause his name to flash on the screen if they were discovered. When a twelve-year-old Utah boy found his hidden name, it was too late for Atari to correct the code. One executive called the hidden message an "Easter Egg," a term – and practice – that remains popular to this day.

But four other Atari programmers weren't satisfied with simply hiding their names in their program code. They wanted some upside. So these programmers, Larry Kaplan, Alan Miller, David Crane, and Bob Whitehead, teamed up with former record exec, Jim Levy, and formed Activision – the first third-party software developer for videogame consoles.

Activision – with their superior graphics and original, exciting games – was a direct threat to Atari's profits, and Warner management didn't like it one bit. Previously, Atari could always count on the fact that its releases – no matter how mediocre – would all be best sellers since there was no competition. And consumers always hungered for new games. But now Atari was in trouble because it didn't earn a dime when someone bought an Activision cartridge. So Atari sued Activision, but at the end of the day, all it won was a disclaimer on every Activision box. The cartridge wars were on.

With Activision's victory – and subsequent success – many other software companies began forming with the express purpose of developing software for home videogame systems. Some, like Imagic, were made up of former Atari and Mattel programmers. Others, like Quaker Oats, simply had no business developing videogames. By 1983 there were more than three dozen companies offering software for the VCS – now renamed the Atari 2600.

But the competition wasn't only on the software side. The 2600 fought for survival against the advanced graphics of Mattel's Intellivision and the ColecoVision – both of which offered adapters allowing them to play the entire library of 2600 games. In 1982, Atari responded with the 5200 SuperSystem. But even though these next generation videogame systems were technically superior to the 2600, their higher price tags kept Atari's humble little machine popular.

The 2600's immense popularity inevitably made it a magnet for a slew of add-on peripherals. Although some were released, others never made it past the prototype stage. Among them was Gameline, a modem that plugged into the cartridge slot and marked the first time videogames could download through telephone lines. Starpath's Supercharger and Amiga's Power Module also plugged into the cartridge slot, but had games loaded into them from cassette tapes. Amiga also released the Joyboard, a stand-on controller that was sold with a skiing game. Other controllers that never made it to market were a voice controller from Milton Bradley and Atari's Mindlink, a controller that sensed a player's head muscles.

Unfortunately, it was this very same popularity that led to the infamous "videogame crash" of 1983. By that time, there were hundreds of games on the market for the Atari 2600, most badly designed with little play value. Even Atari managed to release a few inferior games. Their 2600 version of *Pac-Man* bore little resemblance to the arcade mega-hit that inspired it: All of these myriad companies competed to occupy a limited amount of shelf space. There was no way they could all survive.

The first companies to go bankrupt sold their orphan inventories to salvage firms who sold them to retailers at extremely low prices. Consumers could then buy these bargain-basement games at $9.99 a pop. Choosing between the expensive new games and the cheap obsolete games was difficult. Most consumers – parents with little knowledge of the actual games themselves – usually chose the cheap ones. This created a vicious cycle that put yet more companies out of business – forcing even more salvaged games into already overflowing clearance bins. The remaining companies, including Atari, discounted their games to compete with the cut-rate carts – and lost a fortune in the process.

By 1984 only a few companies were left standing, and they no longer had a reason to spend money developing new games. By all accounts the 2600 – as well as the US videogame industry – was dead.

In 1984, Atari announced the Atari 7800 – an arcade-quality home videogame system, compatible with the entire library of 2600 cartridges – but corporate restructuring and lack of enthusiasm caused Atari to shelve the system. Following the successful launch of the Nintendo Entertainment System in the United States, Atari finally released the 7800 in 1986, along with an inexpensive version of the Atari 2600 called the 2600 Jr. The 7800 failed to catch on, but the $50 2600 Jr. was a hit with families that couldn't afford an NES – only it was too little, too late. The magic was gone. So in 1991, Atari unceremoniously stopped producing the Atari 2600 – and few seemed to care. Nevertheless, after being in continuous production for fourteen years, the 2600 enjoyed a production record that is still unparalleled. In its lifetime, a total of more than 25 million Atari 2600 home videogame systems were sold worldwide.

Today, we are seeing a VCS renaissance as these timeless games – along with new games still being developed by dedicated hobbyists – are emulated on modern gaming platforms and PCs, allowing a new generation of gamers to finally see what classic Atari fans have known all along: great games don't need to be 128-bit, texture-mapped epics built with a 3D graphics engine – all they need to be is fun. ■

IMAGE: LEFT: COURTESY SEAN KELLY

VIDEO COMPUTE

The Super System... with 10 to 50 dynamite game va

ATARI

R SYSTEM by ATARI

ations per Game Program.

Atari brings a powerful computer to your home TV. The system allows you to build a game library with additional Game Programs™ and controllers.

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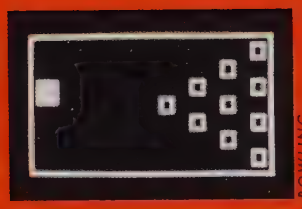
IMAGE: JOE SANTULLI

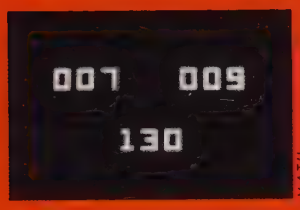
Studio II

RCA



BOWLING

DOODLES



MATH

FREEWAY

The Radio Corporation of America was formed in 1919 by General Electric as a means to organize radio efforts between GE, Westinghouse, and the United States government – and to further research and development for the future of wireless communications in the United States.

The company evolved to also manufacture and sell Radiolas to consumers. Shortly after founding the National Broadcasting Company, RCA introduced their latest technology – Television – at the 1939 World's Fair in Flushing Meadows, NY. Although television was not a new invention, this was the first time that the technology was demonstrated to such a large public audience. Following World War II, RCA introduced their very first consumer television set. Nearly 50,000 were produced.

It made perfect sense – considering the company's rich history in TV technology – that RCA should also be pioneers in the exciting new field of TV games. But, sadly, RCA's forays into the videogame industry were nothing more than a series of lost opportunities and might-have-beens.

In 1969, RCA passed up the golden opportunity to license Ralph Baer's revolutionary "Brown Box" technology (released as the Magnavox Odyssey) – and, with it, their chance to introduce the world's first home videogame system. Following this unfortunate gaffe, RCA had a great deal of catching up to do.

By the close of 1976 there were numerous home videogame consoles already flooding the market – the Atari Pong, the Magnavox Odyssey 500, the Coleco Telstar, and myriad generic TV Ping-Pong systems – all playing tennis and target games with action sound, on-screen scoring, and color graphics.

It was time for RCA to enter the fray. So in January 1977, RCA released their long-awaited entry into the videogame arena – the much hyped Studio II Home TV Programmer. Based on the RCA Cosmac 1802 microprocessor (the same chip used in the Voyager and Galileo space probes), the Studio II contained 256 bytes of RAM and shipped with five firmware games including *Bowling*, *Doodles*, *Freeway*, *Math*, and *Patterns*. RCA also released a dozen new games as separate plug-in tape cartridges.

The system's graphics consisted of primitive blocks enhanced by an unusually high degree of screen flicker. The game console featured two built-in numeric keypad controllers and a single lo-fi audio speaker – all game sounds were generated within the Studio II console itself. But the system's greatest handicap (aside from awkward keypad controllers, low resolution graphics, and shallow statical sound) was the fact that the RCA Studio II was only capable of generating black and white on-screen graphics. A tragic modus vivendi in the now full-color world of home videogames.

Had RCA been first to market with a programmable home videogame system – or had it been 1975 – the fact that the RCA Studio II was engineered in black and white might have been overlooked. But since color videogames had been the industry standard for nearly a year, and since the Channel F – a high-resolution plug-in programmable color system – had been on the market for nearly six months, the oversight was lethal. As a result of abysmal sales, the Studio II along with RCA's home videogame aspirations were swiftly discontinued in 1979. ■

IMAGE: RIGHT: VAN BURNHAM

Studio II
5 Programs to play
RCA
Studio II
Home TV Programmer
An entertainment center for family fun
for use with your home TV.
5 Video Programs built-in
with added programs available
Skill • Action • Sound
A
B
RCA
Studio II

Apple II

Apple Computer

BY JUSTIN HALL

The Apple II was the first personal computer built for ordinary people. With its sleek molded plastic case and extensive expandability, the Apple II was one of the most accessible and easy-to-use computers of the era.

Designed by Steve Wozniak – cofounder of Apple Computer and the engineering visionary behind the original Apple I personal computer – the Apple II debuted at the first West Coast Computer Faire in 1977. It was a revolutionary system. Based on the 6502 processor with built-in color graphics, memory of 4K (expandable to 48K), tape drive, game paddles, eight expansion slots, and floppy drive – the Apple II seemed destined for gaming applications. In fact, during its development, much of the Apple II's design was driven by videogames – mostly to accommodate Wozniak's love for gaming.

"A lot of features of the Apple II went in because I had designed *Breakout* for Atari... that was the reason that color was added in first – so that games could be programmed." Woz recalls. "So a lot of these features that really made the Apple II stand out in its day came from a game, and the fun features that were built in were only to do one pet project – to program a BASIC version of *Breakout* and show it off at the computer club."

Wozniak encoded the graphics display into the base of the operating system, so that line drawing and pixel rendering was at the ready disposal of the casual programmer. And the Apple II certainly inspired the casual programmer! The language developed for the system – Integer BASIC – was encoded into the system along with the 6502 disassembler, which allowed anyone to view the code for any program written and distributed for the Apple II.

As a result, an astonishing array of DIY programs evolved quickly within the Apple II community, and most of these programs were games. The first to emerge were simple shareware ports of existing home console games. But soon, videogames of increasing complexity began to emerge. *Lode Runner*. *Swashbuckler*. *Choplifter*. *Karateka*. Classic videogames that are still being saluted and remade today. The key to these games was their graphic complexity. With on-screen graphics considerably more advanced than their console contemporaries, they allowed for a deeper story with more characters involved.

Allowing for this more detailed narrative, great adventure games like *Zork* were soon developed on the Apple II. This text-based adventure – where players typed sentences to advance the gameplay – was first developed for the PDP-11. But most people got their first taste of deep and strange computer fantasy simulation from *Zork* on the Apple II. As a result of the game's success, a flood of text-based "interactive fictions" soon followed. From Infocom, *Zork*'s creator, there was *Deadline*, *Suspended*, *Planetfall*, *Sorcerer*, *Cutthroats*, and *Leather Goddesses of Phobos* – games that allowed you to play through fictional worlds as a detective, a wizard, an undersea treasure-hunter, and an experimental subject of sex-crazed alien minions. More developers soon followed.

Sierra Online began its software publishing on the Apple II with a game called *Mystery House*, a detective text adventure with black and white line-drawings programmed in 1979 by Roberta and Ken Williams. *Mystery House*'s simplistic graphics didn't prevent the game from becoming a best-seller – since it was the first time people had seen the combination of interactive fiction and onscreen graphics they bought it like gangbusters. By 1980, Sierra had also published *The Wizard and the Princess*, the first adventure game with color graphics. Later Sierra games like *Kings Quest*, *Space Quest*, and *Police Quest* would establish the standard for graphical adventure, while still using a text parser to manipulate the game world.

Ultima. *Wizardry*. *Might and Magic*. *Bard's Tale*. Today's role-playing game legends all got their start in the early 1980s selling to the only game market equipped to handle that level of simulation – the Apple II. Single-sided, single-density floppies inserted into the Apple Disk II could read and write information about saved games – remembering your progress into the dark dungeons, and which swords and armor you had managed to pick up along the way.

As a result of its ease of use and broad range of software titles, Apple IIs were also among the first computers to begin appearing in large numbers in elementary and high schools, thus providing a huge new audience for educational software. Soon, games began to incorporate the graphics and gameplay developed by fantasy titles with real world facts in order to teach children. Some of these popular "edutainment" games were even fun. In *Oregon Trail* players would control the actions of a pioneer making the grueling cross country journey to settle the West – an exercise far more engaging than reading a text book.

Overall, the Apple II had a tremendous impact on the world of game design. John Romero, genius programmer of *Doom* and one of the industry's most high-profile designers, believes as much.

"Large RPGs like *Ultima* originated on the Apple II ... so those games came from Apple II programmers and spread to other computers which, in turn, inspired game designers on other platforms."

Legendary software companies like Broderbund, Origin, Sierra, Interplay, SSI, and Electronic Arts all got their start developing software for the Apple II – as did millions of young bedroom programmers. As a testament to its longevity, the Apple II line remained in production until 1993, and is widely considered one of the most influential personal computers of all time. Today, there is still an active community of Apple II users online, preserving the system's legacy, cataloging classic Apple II ROMs, and creating modern BASIC games to be played on working systems or Apple II emulators downloaded from the Internet. ■

IMAGE: RIGHT. COURTESY THE COMPUTER MUSEUM HISTORY CENTER

apple II

PET

Commodore

BY NICK MONTFORT

Commodore Business Machines was founded in 1955 by Jack Tramiel, a Polish immigrant and survivor of Auschwitz who worked his way up from poverty to become president of one of the most successful home computer companies in the world.

In the beginning, Commodore was nothing more than a typewriter repair shop in the Bronx. But Tramiel was ambitious, and the company soon began to produce its own line of typewriters. The product range was later expanded to include electronic desktop and pocket calculators, and Commodore grew to become one of the leading manufacturers of office equipment – right next to established companies like Hewlett-Packard.

In 1977, eager to control the technology resources needed to make his products, Tramiel acquired MOS Technologies – the semi-conductor company who developed the 6502 microprocessor, and home of legendary engineer Chuck Peddle. At the time, Peddle was working on a project that would change the face of Commodore. He told Tramiel, "small computers are going to be the future of the world." Fortunately, Tramiel listened.

The Commodore PET was formally introduced at the Summer CES show in Chicago. Designed by Peddle, the PET – short for "Personal Electronics Transactor" – was a portable all-in-one home computer system based on the 6502 microprocessor. With its 9" monochrome display, 4K RAM, keyboard, tape drive, and built-in Microsoft BASIC – housed in a plastic case designed to hold all of these components – the PET was the first computer to be integrated into a single unit. The press response was phenomenal. As a result, over $3 million in pre-orders for the $599 system were received in anticipation of the PET's release, creating a waiting list of up to six months for some customers. ■

IMAGE: FAR RIGHT, TOP: COURTESY HITLER HISTORICAL MUSEUM

TRS-80

Tandy/Radio Shack

Tandy Corporation was founded in 1919 by Norton Hinckley and Dave Tandy as the Hinckley-Tandy Leather Company. As a leather wholesaler and manufacturer of shoe findings, the company was successful as it evolved and grew over the years. Then in 1960, following some extensive restructuring and a shift in its business direction, the company name was changed to Tandy.

The evolution of Tandy from shoestring superpower into leading electronics developer begins with their 1963 acquisition of a tiny company called Radio Shack. At the time, the Boston-based Radio Shack operated nine retail stores and a thriving mail order business targeted at ham radio operators and hard-core electronics hobbyists. But key to Tandy's transformation was the fact that Radio Shack also had a range of electronics products, manufactured under the Realistic brand, including AM/FM tuners and transistor radios.

Following the introduction of a line of electronic calculators, Tandy announced the release of their first home computer product – the TRS-80.

The Tandy TRS-80 – affectionately known among hobbyists as the "Trash-80" – was the first mass-marketed personal computer. Based on the Z80 microprocessor, the system contained 4K RAM, a keyboard, cassette, and optional floppy drives. It was also a killer videogame system, playing games like *Star Trek* loaded from cassette tapes. In contrast to the typical DIY kit computers available at the time, the TRS-80 was a turnkey system – and sold for the breakthrough price of only $599.

By 1977, Radio Shack had grown from its original nine stores to over three thousand locations across the country – and in the first year, Tandy sold over 50,000 TRS-80 home computers exclusively through Radio Shack stores. ■

PARENTAL

ADVISORY

EXPLICIT GRAPHICS

Continued from page 149

1989

▶ Mike Saenz, creator of the explicit *MacPlaymate*, releases ***Virtual Valerie*** – where you direct a woman to employ various everyday (and not so everyday) objects for sexual purposes.

1991

▶ Controversy reaches a fever pitch when underground neo-Nazi death camp sim ***KZ Manager*** – in which players run a concentration camp and score points for "efficiency" – hits US hard drives.

1993

▶ Acclaim releases the arcade fighting game ***Mortal Kombat***, heralded as the most graphic bloodbath ever to grace arcades. The game quickly becomes the most popular title for the Sega Genesis.

1993

▶ id Software release the successful PC game ***Doom***, a networked bloodfest that will redefine the genre of first-person shooters when the game is downloaded over 15 million times.

1994

▶ Digital Pictures release ***Night Trap***, by Rob Fulop and Jim Riley. This blood-sucking teen thriller inspired heated Senate debates – and a condemnation from Captain Kangaroo.

Continued on page 177 ▶

In Atari's ***Canyon Bomber***, designed by Howie Delman, you are on a mission to clear a target-filled canyon. Beginning with zeppelins and later graduating to biplanes, you must accurately drop bombs to score the most points for every target hit.

Circus

Exidy

Exidy introduced the arcade videogame *Circus* at the 1977 AMOA convention. With its whimsical circus graphics, comic clown antics, and entertaining musical score, *Circus* was the hit of the show – and soon transformed Exidy from a minor league videogame developer into a major industry player.

Designed by Howard Ivey and Edward Valleau, *Circus* was inspired in part by the gameplay of Atari's successful arcade videogame *Breakout*. Only instead of a bouncing ball and bricks, you now bounce two nimble clowns as they jump from a high platform onto a see-saw springboard down below – alternately bouncing them high in the air to pop tiny balloons lined up in colorful rows along the top of the screen. Each row carries a different point value, so that the higher the clowns jump, the more points are scored. The challenge steadily increases as the speed and difficulty intensify with each successful jump. Finally, when all of the balloons in a row are popped, the clown hangs in the air momentarily while a musical bonus is played, and extra points are awarded. But if a clown misses the board, he'll tumble and fall to the ground as circus music plays – taunting you with its capriciously chiding chorus.

Circus was the breakthrough arcade game for Exidy, setting the trend for arcade hits like *Mousetrap*, *Star Fire*, *Crossbow*, and *Venture* to follow. At the height of the game's production, nearly one hundred *Circus* machines were being sold every day, for a grand total of approximately 20,000 units in 1977. Following its initial arcade success, *Circus* would enjoy renewed popularity with the release of the now classic *Circus Atari* for the Atari VCS. ■

DragRace

Drag Race

Atari

Drag Race – programmed by a team led by Mike Albaugh including Howard Van Jepmond and Steve Ehret – was the first drag racing videogame of its kind.

The game features two supercharged funny cars facing off in a black-and-white split screen race against the clock. As the horizontal Christmas tree counts down from amber to green, you need split-second timing and a close eye on the tachometer, driven off the "motor-sound" circuit, to hit the strip at maximum performance in order to achieve your fastest possible race time. But you also need to watch your revs as redlining the tach can blow your engine, forcing you to restart the race. Adding to the realism, dragsters pop wheelies, smoke their tires, and throw chutes at the end of each run – just like the real thing.

The *Drag Race* cabinet followed similar styling cues as *Sprint 2* – both in size and graphic detail. The bold hot-rod-inspired graphics in bright orange, yellow ochre,

and black were especially a standout. However, the gameplay of *Drag Race* is likely more recognizable as it appears in the Activision home cartridge adaptation for the Atari VCS, *Dragster*, programmed by David Crane. This version was a rather blatant copy of *Drag Race*'s gameplay and graphics – only with the addition of new super-charged color graphics. ■

Safari

Sega/Gremlin

With its austere black and white graphics and lush jungle scene backdrop, the wild animal action of *Safari* was released by San Diego-based Gremlin Industries in November 1977 – just two months after the company was acquired by Sega.

WELCOME TO THE JUNGLE: *Safari*'s leafy green cabinet – and wildly elaborate monitor glass.

In Safari, you control a wild-game hunter deep in heart of the African jungle. You have ninety seconds in which to take down four vicious creatures as they charge out from behind trees to attack you. Your hunter is equipped with a rifle and a safety hut, but as soon as he steps out onto the jungle floor – he's fair game for the animals as well.

The hunter is controlled by two joysticks, one for his direction and one to aim and fire the rifle. Each savagely bitmapped beast – snake, lion, boar, and vulture – carries its own point value for the kill. The round is set on a timer and extended play is awarded if your score reaches 3,000 points. But watch out! If an animal attacks you, you'll lose precious time to kill. ■

Starship 1

Atari

Starship 1, a space age shoot-'em-up with 3D visual perspective and realistic ship controls, was a hit in arcades in 1977. The futuristic cabinet – designed by resident industrial design visionary, Mike Jang – features an oversize sculpted monitor bezel that incorporates the game marquee as well as the control panel. The stylized side art graphics depict a starship firing at an enemy spacecraft as it explodes in a blinding flash – multicolored trails swirling behind.

You are the captain of Starship 1. From a first-person perspective, you dodge planets and engage attacking enemy spacecraft with both targeted laser fire and powerful photon torpedoes to earn points. Achieving a specified score gives you extended play in hyperspace. The player navigates the ship with a realistic yoke-style steering column and fires the lasers and torpedoes with buttons located on the yoke and control panel.

Although the actual game graphics were rendered in black and white, *Starship 1* employed a new visual trick becoming increasingly popular in video arcade games. As opposed to standard uprights where the monitor is mounted vertically at view level, the *Starship 1* monitor was mounted horizontally in the cabinet with the playfield reflected up through a half-silvered mirror. With the game graphics now "floating" within the cabinet bezel, it was possible to place a detailed background graphic behind the playfield – enhanced by a hyperfuturistic blacklight glow – giving the visual illusion of complex color graphics. This technique was also used with great success in arcade games like *Asteroids Deluxe*, *Space Invaders Deluxe*, and *Warrior*. ■

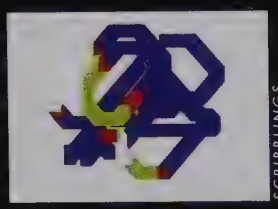
SELECT GAME

1978

Over **14 million** microprocessors are produced this year – Nolan Bushnell leaves Atari and incorporates the **Pizza Time Theater** chain of family entertainment centers – Coleco loses nearly **$27 million** on the Telstar videogame system – Over **900** people commit mass suicide at Jonestown...

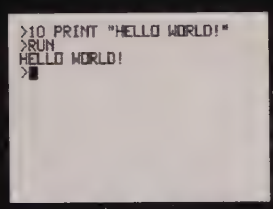
The Professional Arcade

Bally (a.k.a. Astrocade, Bally Computer System)



SCRIBBLINGS

GUN FIGHT



BALLY BASIC

BALLY BASIC KEYPAD OVERLAY

Bally/Midway – the Chicago pinball wizards who made history with such revolutionary coin-operated arcade videogames as *Galaxian* (the first full-color game), *Gorf* (the first multi-scene game), *Gun Fight* (the first microprocessor-based game), and the classic arcade smash *Pac-Man* – decided to enter into the booming home console market in 1978 with the introduction of The Professional Arcade.

Designed by programmer Jamie Fenton – working with Dave Nutting Associates under contract to Bally – The Professional Arcade was a cassette-based game system engineered with a Zilog Z-80 microprocessor, 4K RAM, 8K ROM, and four pre-programmed games – *Gun Fight*, *Checkmate*, *Calculator*, and *Scribblings*. The system shipped with two pistol-grip controllers that featured a multi-directional spinner knob on the top – fusing the functionality of both a traditional joystick and paddle controller. The console was also equipped with a novel keypad interface that allowed data input into the system. Fenton and her team later implemented a BASIC interpreter in a game cartridge called *Bally BASIC* in which instructions could be entered into the "computer" using the keypad with a special overlay. This revolutionary interface inspired the first-ever batch of "homebrew" games, which were created and traded by a network of loyal amateur programmers – saved onto standard audio cassettes.

The first version of *Bally BASIC* shipped with cassette and programming manual, and required the purchase of a separate audio cassette interface called the "BASIC Expansion Kit" that included a tape library of programming demos alomg with the tape interface. The next version of *Bally BASIC* (later renamed *Astrocade BASIC*) came with the audio cassette interface built-in.

The speed of the next generation cassette interface was increased from 300 to 2000 baud, which allowed for considerably more data to be stored on each cassette with dramatically shorter load times. The new *Astrocade BASIC* also introduced "Music Processor Commands," which gave budding electronica stars direct control of the system's powerful sound chip to create original synthesized musical compositions that they could save and replay on audio tape.

To support the dedicated hobbyist community that emerged a number of newsletters were distributed to Bally enthusiasts including *The Arcadian*, published by Robert Fabris from 1978 to 1984, and *The Astrocade Underground*, published by ABC Hobby Craft. Both publications included features, game reviews, updates on new game development, information on upcoming peripherals, and code for programming your own BASIC games on the system.

Other official Bally game cartridges were released on 8K "cassettridges" including the arcade hits *280 Zzzap!* and *Sea Wolf*, as well as classic games like *Panzer Attack*, *Brickyard*, and *Amazing Maze*.

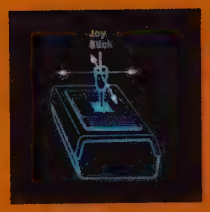
As the result of stiff competition from the more popular Atari VCS, Intellivision, and Odyssey 2 consoles, Bally lost a whopping $10 million on the system in 1979 and decided to sell The Professional Arcade to Astrovision of Columbus, Ohio. The company – comprised mostly of loyal Professional Arcade enthusiasts – repackaged the system and released it in 1981 as the Bally Computer System, which shipped complete with the *Bally BASIC* cartridge. In 1982, the company changed the name to Astrocade and marketed the system as such until it was discontinued in 1985. ■

IMAGE: RIGHT: VAN BURNHAM

Bally
COMPUTER
SYSTEM
INSERT CASSETTE
Bally
videocade
RESET
EJECT

Odyssey²

Magnavox



In 1977, Magnavox announced its next generation home videogame system designed around the new MUGS-1, a game chip that could play 24 different videogames – including racing and combat games – in full color. Like the Odyssey 2100 released in Europe, the Odyssey 5000 was to be a dedicated four player system with detachable controllers.

But following the debut of the Fairchild Channel F and Atari Video Computer System, it was obvious that full-color programmable home videogame systems were not only the wave of the future – they were the new industry standard. As a result, Magnavox decided to scrap plans for the Odyssey 5000 in favor of developing a fully programmable home console – the system that would evolve into the Odyssey².

But the road to programmability was a rocky one, and there were a few points along the way when the Odyssey² project was nearly killed. Fortunately for millions of gamers around the world, the system had a number of fans; Odyssey creator Ralph Baer was among them. When Baer heard rumors of the project's potential demise, he hopped a plane to Fort Wayne to get Magnavox management back on the bandwagon – and made a critical argument that secured the fate of the system.

As a result, the Magnavox Odyssey² was finally released in 1978 with the fervent tagline: "Its only limitation is your own imagination!" – and that was just the beginning of what would become the most notoriously hyped product in history. The Odyssey² was engineered with the Intel 8048 microprocessor (inspired by the Fairchild F8) and featured an alpha-numeric membrane keyboard with which players could select game options or program the computer with *Computer Intro!* The system also had some of the best joysticks ever engineered – a self-centering 8-way joystick that was, incredibly, blister-free. But perhaps the most striking feature of the Odyssey² was the console itself, a futuristic study in modern design, sculpted in matte silver. The aesthetics of the system alone more than justified the $199 price tag.

Game cartridges for the system were released exclusively by Magnavox and were programmed by one man – Ed Averett – who was no doubt one of the most prolific programmers in the industry with over twenty five titles to his credit. In fact, the only Odyssey² games *not* created by Averett were *Killer Bees*, the arcade port of *Turtles*, and Ralph Baer's unreleased *Pinball*. Additional third-party cartridges released in the US for the Odyssey² included *Popeye*, *Q*bert*, and *Super Cobra* by Parker Brothers, as well as *Atlantis* and *Demon Attack* by Imagic – all extremely or ultra rare.

Even though the system enjoyed great success in the US, the system was much more popular in Europe where it was distributed by Philips – Magnavox's parent company – as the Videopac.

In 1983 it became apparent that the booming home videogame market of the early '80s was beginning to wane. Even with the release of The Voice, an advanced voice synthesis module, the Odyssey² was starting to lose its already marginal market share to next generation home videogame systems like the Atari 5200 and ColecoVision. As a result, Magnavox began to develop its own next gen system, code named: Odyssey³.

The Odyssey³ Command Center would ship with 32K of memory and the capability for advanced high definition game graphics. The system would also play the entire library of Odyssey² games as well as the new HD cartridges. The keyboard was also redesigned; gone was the alpha-numeric membrane keypad, replaced with a real computer keyboard and built in joystick mount for arcade-style gameplay. The Odyssey³ Command Center was hyped to the media and previewed at CES. Sadly, it was never released.

Avid collectors still search for the few prototypes that were manufactured, and the Odyssey³ (now considered vaporware) has become one of the "holy grails" for Odyssey otaku who are convinced that they do actually exist. ■

ODYSSEY²
SPACER

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UFO!
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INVADERS
C CONFLICT!
HELICOPTER RESCUE!
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00 ICE HOCKEY 00
HOCKEY!
8 BALL
0000→ ????? 0001
K.C. MUNCHKIN!
1
COMPUTER GOLF!
MONKEY
00
00 1 2 3 4 5 6 7 8
00 03:00 00
FOOTBALL!
0000→?????? 0003
AXE HITE!

EXCITING ARCADE GAMES!

SPEEDWAY! SPIN-OUT! CRYPTO-LOGIC!

You're racing a really mean machine against the clock... not to mention a pack of high-speed cars.

Test your reflexes! Spin-Out offers explosive off-the-wall action around a hazardous enclosed track!

THUNDERBALL!

A wildly realistic pinball game! Thunderball! has all the action including thumper bumpers and "shifting flippers" you can move to cover additional area. This computerized pinball game does everything but collect your quarters...

SUB CHASE!

Low-flying jets hunt for enemy subs lurking in neutral waters! And you have full control of plane altitude, submarine depth, and speed. Game variations include forward, vertical, and aft trajectory patterns. On-screen digital readouts for scoring.

COSMIC CONFLICT!

You are the commander of the CENTURION, an Earth Federation starship guarding a remote corner of the galaxy. An alien invasion fleet has penetrated the galaxy's outermost defenses! If you do not destroy it, Earth will be enslaved!

SHOWDOWN IN 2100 A.D.

The ultimate in electronic shoot 'em up games! You control movement of the gunfighter up, down, and across the screen. Shoot six times and reload. But beware! There is an endless variety of obstacle patterns, ricocheting bullets and even a dramatic death scene!

OUT OF THIS WORLD! HELICOPTER RESCUE!

You're inside the capsule of an electronic spaceship. The mother ship orbits the planets as you maneuver down to the surface.

This daring helicopter rescue mission is a race against time!

CHALLENGING EDUCATIONAL GAMES!

COMPUTER INTRO!

This cartridge turns your Odyssey² into an electronic teacher of computer theory and technology. Learn how to program and run a real microprocessor computer in an assembler language. But remember. This game is not for everyone!

DYNASTY!

The origins of Dynasty is the ancient Chinese strategy game of GO, which was first played by the nobility. Dynasty is deceptively easy to learn, but its infinite variations make it profoundly addictive!

ACTION-PACKED SPORTS GAMES!

COMPUTER GOLF!

A nine-hole, par 36 electronic golf course for one to four players. Realistic electronic golfers hit long drives down the fairway then chip up to the green. The screen changes automatically to show a close-up of the green itself. Fore!

ALPINE SKIING!

This authentic electronic simulation of world class championship skiing is so realistic you can actually hear your skis cut through the powder as you traverse the slopes! The computer generates over 195,000 different runs!

HOCKEY! SOCCER!

You captain a full team of ice men. Battle for the puck at the face-off. Fake out the goalie and score!

Use your head (and feet) to score in this computerized version of one of the most popular games in the world.

VOLLEYBALL!

Fast authentic action with two regulation six-player teams! The ball is served from outside the court. The receiving team can pass the ball among the players or even spike a shot! Play against another player or the computer itself.

CHALLENGER SERIES!

PICK AXE PETE!

Meet Pick Axe Pete, the legendary prospector who strikes it rich in Misty Mountain Mine. Be ready for bouncing boulders, fast action, locked doors, secret keys, and disappearing ladders on ten different playing fields.

K.C. MUNCHKIN!

The more Munchies your Munchkin munches, the harder it gets yo keep your Munchkin from getting munched up by one of the Munchers! How many Munchies can your Munchkin munch before your Munchkin's all munched out?????

MONKEYSHINES!

Computerized monkeys climb, jump, and swing along televised monkey bars. Chase them. Tag them. But don't get tagged back or you're out of the game. Five distinct games. Loads of monkey business that'll make you go ape!

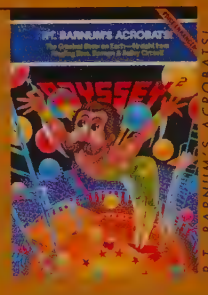
UFO!

Armed with a laser cannon and protected by an energized force-field, your Earth Federation battle cruiser prepares for battle. Three mysterious enemy ships enter your sector. UFOs will disintegrate if hit by your laser...

THE VOICE!

ATTACK OF THE TIMELORD!

An unexpected power surge plunges your time machine into the forbidden dimension of Spyrus the Deathless – Timelord of Chaos! You'll hear the taunts and threats of the Timelord himself as his awesome armadas pursue you!



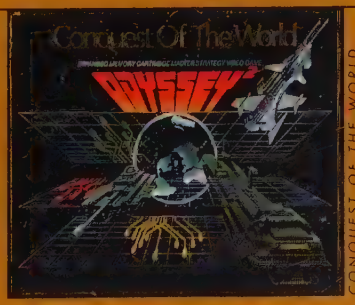
P.T. BARNUM'S ACROBATS!

The Greatest Show on Earth – straight from Ringling Bros. Barnum & Bailey Circus! You are under the Big Top along with flying acrobats who must pop three rows of colorful balloons that are dancing back and forth high above their heads...

MASTER STRATEGY SERIES!

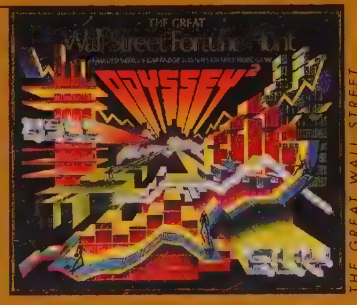
QUEST FOR THE RINGS

A total evolution in game design, *The Quest for the Rings* combines state-of-the-art computer technology with advanced board game concepts to create a startlingly realistic alternate world of adventure and excitement. You come to the screen in the role of a wizard, warrior, changeling, or phantom – completely equipped with enchanted swords and magical spells. Players work as a team to recover the ten precious Rings of Power.



CONQUEST OF THE WORLD

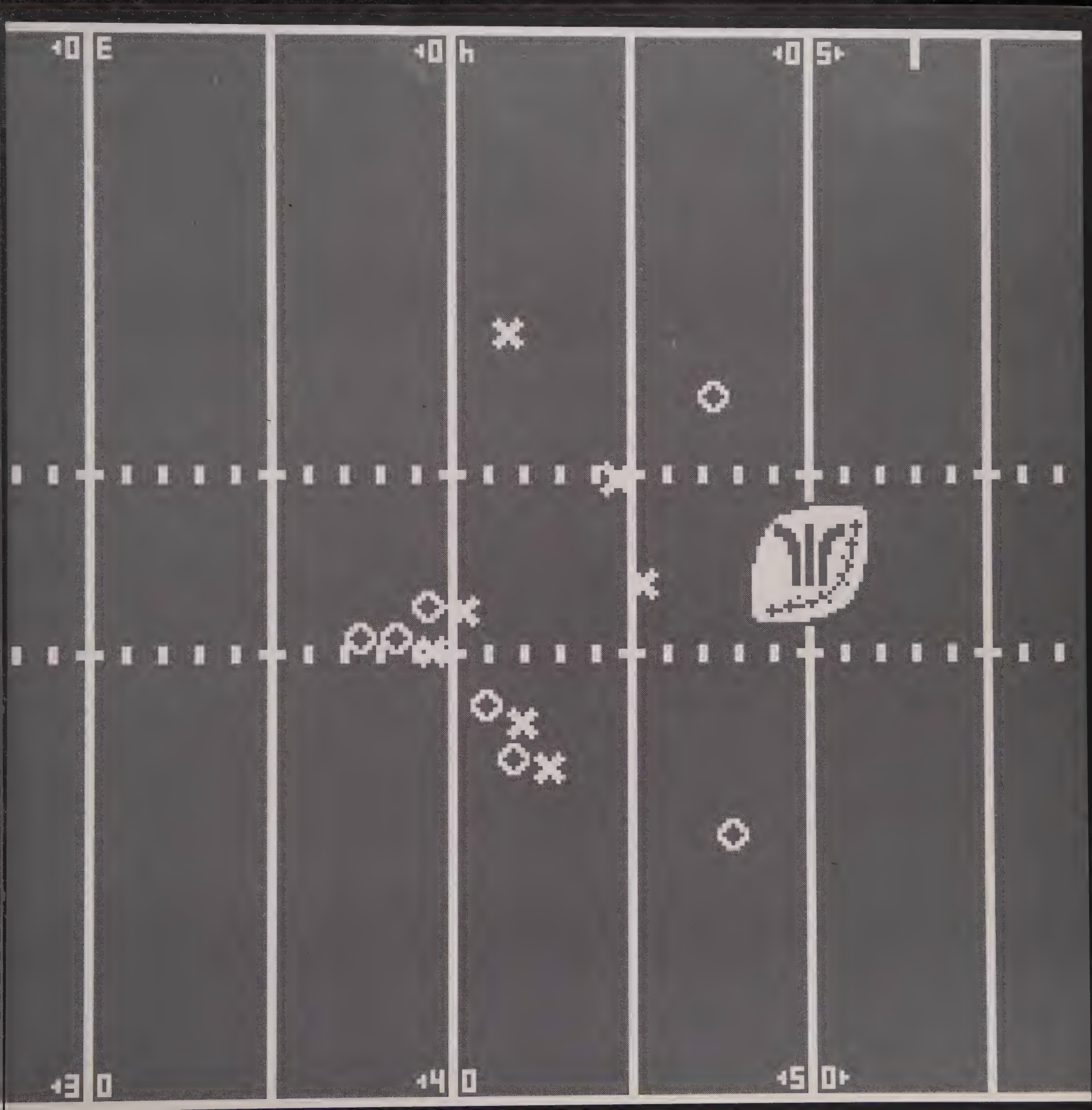
In *Conquest of the World*, you're in the midst of a world-wide power struggle indicative of current economic and political conditions that exist throughout the world. Action-packed battles between tanks, airplanes, and submarines take place while strategic maneuvers are mapped out on the game board.



THE GREAT WALL STREET FORTUNE HUNT

You start off with $100,000. How much you end up with in *The Great Wall Street Fortune Hunt* is up to you in this computerized investment world.

IMAGES: LEFT: SCREENSHOTS COURTESY THE ODYSSEY HOMEPAGE!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Atari Football

Atari

From the ashes of a game called *Xs and Os* rose *Atari Football*, considered by many hardcore sports fans to be the first true video sports game. Engineered with the first "trak-ball" rolling control interface and programmed with the first scrolling playfield, the videogame was also technologically ahead of its time. Created by Dave Stubben (Steve Bristow did the preliminary work on *Xs and Os* prior to *Tank*), *Atari Football*'s fast action, realistic simulation of the football team dynamic, and adrenaline-fueled interactive gameplay – running down the field could cause players to break a sweat as they frantically pounded the trak-ball – required endurance as well as strategy to win.

Atari Football was engineered with a Motorola 6502 8-bit microprocessor running at 750 KHz, and released in both a two and four-player cocktail cabinet. For a quarter, players get ninety seconds of play time – so for a full game, be prepared to pony up at least a full roll of coins. Players control the quarterback as the other members of your team (displayed as Xs or Os) run one of four plays for defense and offense – the Sweep, Keeper, Bomb, or Down and Out – each selected by the press of a button (each offense has a corresponding defense). The clock stops when you run out of bounds, throw an incomplete pass, or the ball is intercepted. The playfield, which resembles a coach's scribblings during a halftime locker room huddle, slowly scrolled from endzone to endzone as the teams worked their way toward a first down. The strategy for the game involved mastering the game's elaborate set of plays and maneuvering your quarterback to either run the ball or pass it downfield (no kicking plays or field goals were allowed) in order to score a touchdown.

THE BEST OFFENSE: Play-by-play strategy for *Atari Football*.

Released at the height of the 1978 pro football season, *Atari Football* swiftly became one of the most popular videogames in bars and arcades across the country, and broke all existing coin-op sales records. As a result, *Atari Football* was, for a brief moment in time, the best-selling game in the US – until *Space Invaders* stole its thunder later that year. ■

PARENTAL ADVISORY EXPLICIT GRAPHICS

Continued from page 159

1994

▶ Following Senate hearings, The **ESRB** (Entertainment Software Rating Board) adopts an independent rating system established by the !DSA to monitor videogame content.

1996

▶ id Software releases ***Quake***, its highly anticipated follow-up to the ultra-violent shoot-'em-up *Doom*. The game features enhanced multi-player action which allows hundreds of "clans" to compete online.

1997

▶ Under intense pressure from the ESRB, Capcom is forced to cut scenes from the intro sequence of ***Resident Evil*** for the US release due to their graphic content. Gamers are outraged by the decision.

1998

▶ Running With Scissors introduce ***Postal***, a murder massacre that is swiftly pulled from CompUSA shelves after it is denounced by US Postmaster General, Marvin Runyon.

1998

▶ The carnage comes full-circle when Interplay introduces ***Carmageddon***, a modern take on the *Death Race* theme – complete with optional "Splat Packs." ■

Avalanche

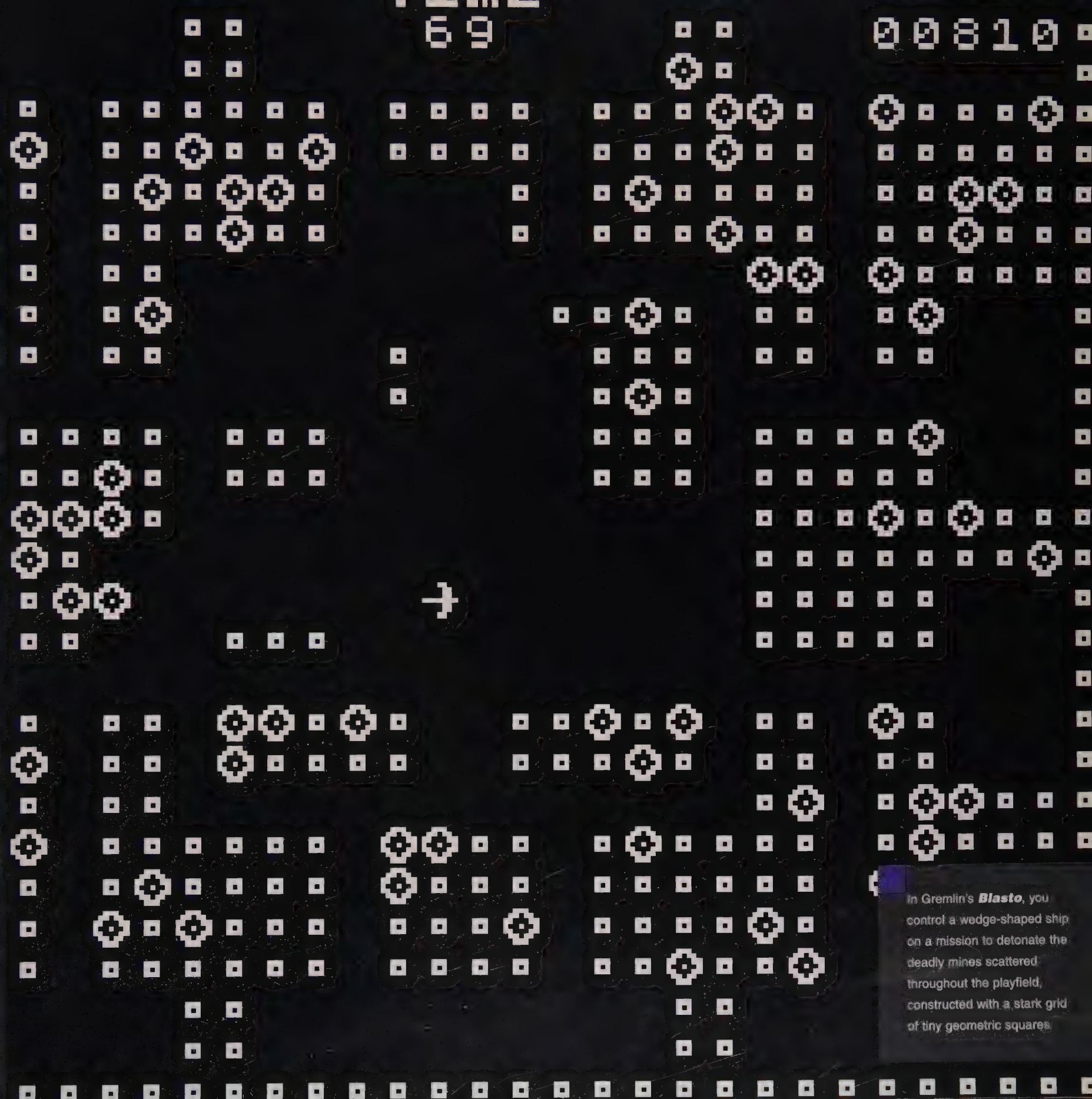
Atari

The simple austerity of black-and-white 8-bit videogame graphics predominant in the mid to late seventies often exudes an elegance that rivals even the most sophisticated 128-bit modern masterpiece. The graphic elements of the gameplay, now reduced to their most basic forms of repeated geometric patterns and binary abstract shapes, assume a timelessness that is betrayed only by a thin faded layer of once colorful transparent film or the worn paint of its now ancient cabinet.

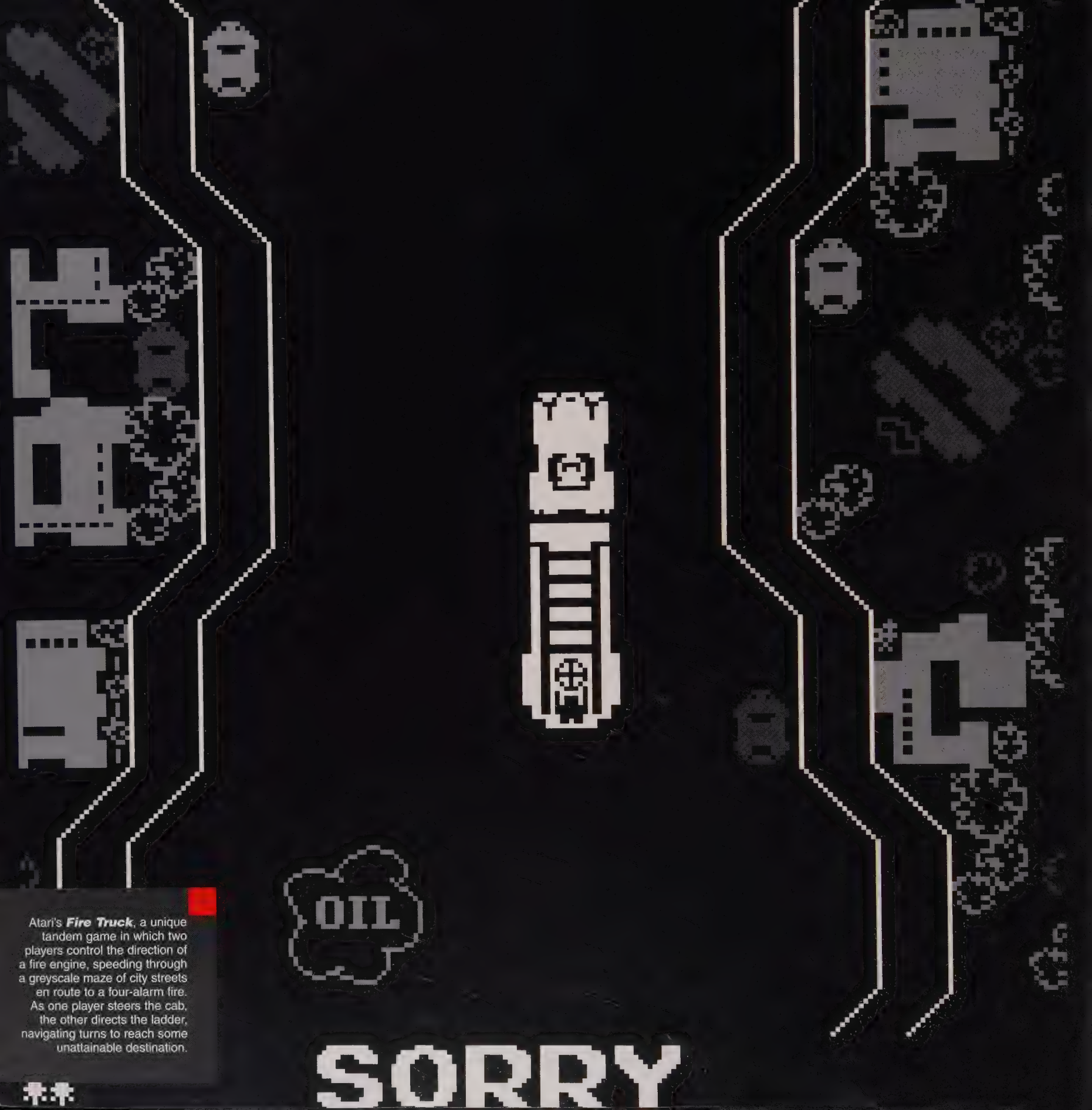
Avalanche, designed by Dennis Koble for Atari, is just such a game. As if the elements of *Breakout* were to suddenly fall apart, you control a stack of paddles used to catch bitmapped boulders as they fall down from the top of the screen. In this challenging game of reflexes, the visual representation of the game itself – ball, paddle, abyss – transforms into a gameplay that is is overwhelming in its straightforward sense of purpose.

KABOOM!

As a testament to the game's timeless appeal, *Avalanche* was later reinvented by former Atari programmer Larry Kaplan in 1981 as Activision's *Kaboom!* – likely one of the most addictive games ever released for the Atari VCS. In *Kaboom!* the gameplay is nearly identical to the original, only now the rocks are replaced by bombs, dropped by a mad bomber. Still, your task couldn't be more clear. ■



In Gremlin's ***Blasto***, you control a wedge-shaped ship on a mission to detonate the deadly mines scattered throughout the playfield, constructed with a stark grid of tiny geometric squares

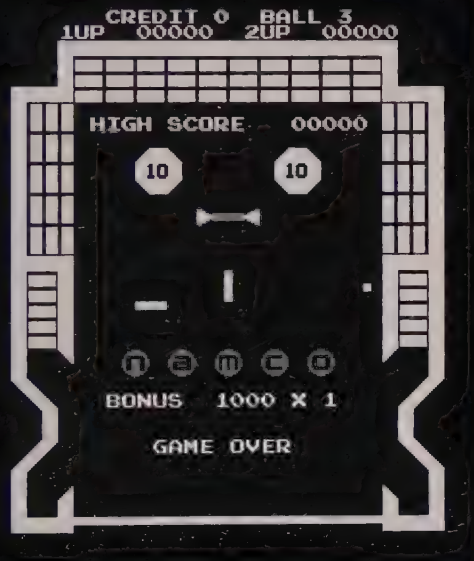


Atari's ***Fire Truck***, a unique tandem game in which two players control the direction of a fire engine, speeding through a greyscale maze of city streets en route to a four-alarm fire. As one player steers the cab, the other directs the ladder, navigating turns to reach some unattainable destination.

Gee Bee

Namco

It all started in 1955 when Nakamura Manufacturing was founded by Masaya Nakamura in Tokyo, Japan. The fledgling amusement company began operations running children's amusement rides on the rooftop of a Yokohama department store. In 1958, the company was reorganized as Nakamura Manufacturing Co. – a name later shorted to a composition of its component parts: Namco.



After producing amusement rides for department stores throughout Tokyo, Namco released various coin-operated amusement games including *Racer* – a primitive mechanical driving simulator that consisted of a car suspended over a scrolling roadway – in 1970. But in 1974, the company leapt into the coin-operated videogame arena when it acquired the exclusive rights to distribute Atari games throughout Japan.

In 1978, Namco America was established in California. That same year, the company released its first original video arcade game, an enigmatic hybrid of *Breakout* and *Video Pinball*, called *Gee Bee*. ■

Space Invaders

Taito

In 1978, an unassuming videogame hit US shores like an electronic tsunami – altering the course of history, revolutionizing an industry, and giving teenagers across the nation the excuse they so desperately needed to cut class. *Space Invaders* was developed by Japanese pachinko turned videogame developer Taito and licensed to Bally/Midway for US distribution. Designed by Toshihiro Nishikado, *Space Invaders* soon became a global phenomenon – little did they know that the game would forever change the fate of the videogame industry.

Back in its homeland, the game was so popular that entire arcades dedicated to *Space Invaders* were opened throughout Tokyo. It was played so much, in fact, that the game even caused a nationwide yen coin shortage that would momentarily cripple the Japanese economy.

Although the cocktail version of the game displayed only simple red, green, and white graphics on its monochrome monitor (the surface was enhanced by delicate strips of colored overlays), the upright version displayed a more impressive environment. Floating within the elaborate cabinet – covered with looming black alien creatures, their shadows highlighted by a slight sliver of red light, and featuring a brilliant blue monitor glass marquee – suspended over a murky alien planetscape on the surface of a half-silvered mirror was a sinister squadron of alien forces, marching relentlessly toward you. Your lone ship is the only hope to stop the imminent invasion. The player controls a horizontally moving laser base which shuttles back and forth below four large bunkers – the only shield that separates you from the attacking waves of the alien fleet. Fire missiles to destroy the approaching army – but watch out! – the more invaders you shoot, the faster they descend, slowly advancing down the screen to the ominous beat of the amplified mono soundtrack.

The Midway version of the game, engineered with an 8080 microprocessor, was capable of producing 224 horizontal lines by 256 blocks. In addition to the CPU, the mother board contained 16 2708 RAM chips and 8 ROM sockets, and utilized an additional daughter board for the audio and I/O interface to the cabinet – which was available in both an upright and cocktail model.

The control panel featured five buttons: left, right, fire, and one or two-player selection. The cocktail model used a joystick instead of buttons to control the direction of the laser base, as did the original Taito model.

The gameplay consisted of shooting all fifty-five space invaders before they reached the planet's surface. Points were awarded for each hit (10, 20, or 30 points), and bonus points would be awarded for shooting a tiny spaceship that would appear randomly at the top of the screen.

Shortly after its release, Atari licensed the home cartridge rights to the game and in 1980 released *Space Invaders* for the Atari VCS – the game that would transform the then troubled system into an unprecedented success. Millions of kids – and parents – rushed out to buy the system just so they could play the game from the comfort of their shag-carpeted family rooms.

To this day, *Space Invaders* remains one of the all time classic arcade videogames – and is responsible for bringing the game industry out of the dark, smoky, back-alley bars it had since been relegated to and back into pizza parlors, bowling alleys, and malls across the country and around the world. ■

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Space Wars

Cinematronics

BY CHRIS HUDAK

In a decade of bright, busy, colorful videogame cabinets painted like circus clowns, beckoning like leering midway hucksters, *Space Wars* was an instant visual oddity in any arcade – an imposing, monolithic, hulking cabinet that stood brooding in the corner, a leather-clad bruiser lurking in a disco with evil on its mind. Those gamers who ventured in for a closer look weren't in for much reassurance. Where one might expect to find the large, friendly, round FIRE buttons of *Space Invaders* were matter-of-fact keys straight from a computer workstation, square and functional – two sets of control keys (thrust, fire, left and right rotational keys, and a dubious new option marked "Hyperspace") flanked a dense pad of yet more keys with decidedly un-fun designations such as: CLOSED UNIVERSE, NEGATIVE GRAVITY, BLACK HOLE. It didn't look like an entertaining quarter's-worth of electronic space warfare – it looked more like something with which to fight a real space war.

Created by MIT student Larry Rosenthal as his master's thesis (based on the idea that he could build an economical hardware platform to run the classic PDP game *Spacewar!*), *Space Wars* was engineered with a custom RISC processor board constructed of TTL logic chips and Rosenthal's proprietary "Vectorbeam" display technology – all licensed to Cinematronics after graduation. Not a bad start for the soon-to-be millionnaire. The game was an instant hit and stands today as one of the great two-player arcade videogames, with goodies you won't find even in modern games.

Asteroids, *Lunar Lander*, *Gravitar*, *Space Duel*, *Major Havoc*, *Tail Gunner* – these vector-based arcade beauties and many more all trace their lineage back to *Space Wars*, which presented players with a deceptively simple scenario: two opposing spacecraft out to pulverize each other for no adequately explored reason (budding Trekkies always opted for the twin-nacelled ship that looked like the U.S.S. Enterprise, of course). In addition to self-explanatory controls like Thrust and Fire, *Space Wars* also gave players Hyperspace, a last-ditch, one-key escape from certain annihilation. The good news was that the hyperspace jump would instantly flip one's ship to a new random location; the bad news was that said "new location" could be in the middle of a

stream of enemy projectiles, in the path of some troublesome asteroid that tumbled about the screen, or deep within the gravity well of a black hole. Not to mention, the hyperspace option was only available to ships in pristine condition.

Speaking of condition, *Space Wars* also gave arcade-goers the revolutionary new concept of "damage" – strafe the enemy as he zipped by and you might "wing" his ship, shearing off one of his engines, and subsequently degrading his speed and maneuverability, as well as his hyperspace drive. It could get worse: an especially dire hit could deprive the enemy of both engines, thus reducing his ship to an uncontrollable nosecone, tumbling through the black void at the whim of obstacles and a nearby gravity well, unable to navigate. The biggest insult – or triumph – was if you managed to destroy your foe while in such a crippled condition; at that point, your only hope was a gut-level sense of physics and a well-timed shot, or perhaps a wandering asteroid taking out your enemy as their attention narrowed on finishing you off.

Space Wars' strangest and most compelling feature, though, was its ability to customize the gameplay environment with the central keypad. With a few keystrokes, players could shape the universe and its laws to their whim: a star in the middle, a neutron star, or a black hole? Strong, zero, or negative gravity? (That black hole's gravity well was always an excellent source of slingshot tactics, and could fill the screen with a deadly shotgun-cone of deflected firepower.) Closed or open universe? It was an imposing menu of scary escargot if you were a timid gamer, and a shop full of candy if you were feeling adventurous; often, people playing *Space Wars* would spend more time arguing over the agreed conditions than they would playing the game.

Space Wars – with its minimalist, monochromatic vector visuals – is to this day proof positive that raw performance and detail still make for a more compelling game experience than the flashiest color-splashed graphics. Sadly, the original Vectorbeam monitors for these giant cabinets are very persnickety and delicate, and difficult to keep in playable condition. If you happen to find an operational *Space Wars* machine, grab it like it was the last Sno-Cone in Hell, and remember – the fight ain't over until the nosecone explodes. ■

IMAGE: RIGHT: COURTESY ARCADE@HOME

1979

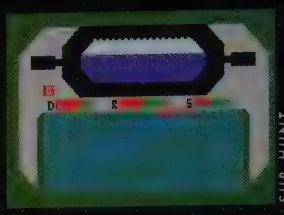
Bally suffers a loss of $10 million on The Professional Arcade and sells the system to Astrovision — Motorola introduces the 68000 16-bit microprocessor — Based on strong sales of the PET, Commodore's revenues hit nearly $71 million — US home computer sales reach a total of 600,000 units...

Intellivision

Mattel Electronics

MAJOR LEAGUE BASEBALL

ASTROSMASH

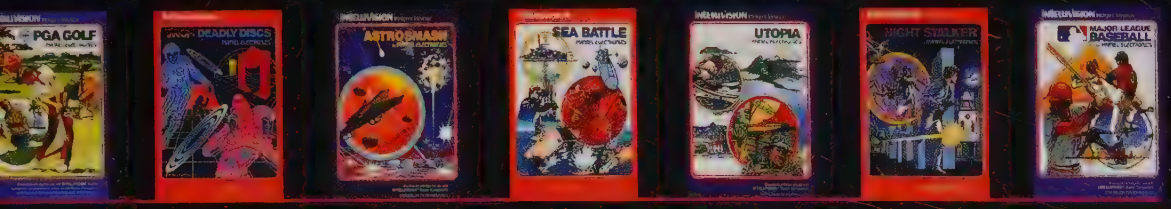

SUB HUNT

BY STEVEN JOHNSON

Test-marketed in Fresno, California in late 1979 and officially released by Mattel Electronics in 1980, the Intellivision home videogame system was the second cartridge-based system to make significant inroads into the American consumer market. Developed by APH Technologies for Mattel, the Intellivision – or "Intelligent Television" – was conceived to be a powerful and expandable game platform, positioned to compete with the reigning Atari VCS.

Despite a blundering marketing campaign, Mattel eventually sold three million units, and over a hundred games were released for the platform – with more than half released by third-party developers. Unlike other game consoles since, the Intellivision didn't reel in buyers with a "killer app" such as *Donkey Kong* for ColecoVision or *Mario Bros.* for the NES. Instead, Mattel aggressively pushed the system's technical superiority over a single game title – a revolutionary new marketing strategy adopted by subsequent systems.

In its battle to overpower the Atari VCS, Intellivision introduced the consumer public to the arms race of technical specs that would later become a standard in the videogame world. We now take for granted



the Moore's Law-fueled improvements that define each console generation – increased bit-depth, graphic resolution, memory, sound capabilities, etc. – but in the late seventies, this rapid-fire progress was by no means a given. The last box we'd bought for our living rooms – the television – had made only one significant technological advancement in forty years. As a result, the Intellivision became the first digital consumer product to make a compelling case for forced obsolescence.

This wasn't just the vicissitudes of fashion: the Atari VCS simply wasn't as powerful as the Intellivision. With its 16-bit microprocessor and high-resolution graphics, the Intellivision was by far the superior platform. But the problem that Mattel faced was that the very idea of competing technical specs wasn't yet a part of the popular vernacular. You couldn't throw off references to the superior graphics of the new new thing and assume that consumers would understand the premise of faster chips and improved collision-detection matrices – it simply wasn't enough to announce that you were winning the arms race. You also had to explain exactly what an arms race was in the first place.

The solution that Mattel proposed to remedy this problem stands as one of the most beautifully clueless in the history of advertising. How to sell people on the notion of better graphics and more realistic gameplay? George Plimpton, of course. You can almost imagine the ad agency's pitch: "The whole *Paris Review* thing will be perfect for selling thirteen-year-olds on the merits of *Space Battle* and *BurgerTime*. And who knows – maybe we can get Norman Mailer to help out when we ship that new boxing title."

Presumably, the logic went more like this: Mattel decided to convey the superiority of their gaming platform as an increase in "intelligence"; some of the Intellivision's flagship titles were sports games; George Plimpton was one of the few publicly recognized intellectuals of the day, and had actually written quite a bit about sports. Ergo: Plimpton's our man!

Intellivision also introduced another "feature" that would become commonplace in subsequent videogame generations: the vaporware computer add-on. While Mattel did successfully ship the Intellivoice – a product that added vaguely intelligible synthesized spoken words to the gameplay of special voice-enhanced titles – the company also made countless unfulfilled promises to ship a keyboard that would turn the Intellivision into a functional home computer. With 64K of dual port dynamic RAM and its own 6502 processor, the keyboard component would finally fulfill the promise of expandability.

The product's release was so heavily hyped (and so relentlessly delayed) that Mattel was finally forced under government pressure to ship a token version that was for all intents and purposes useless so many years after the fact – dashing the hopes of millions of Intellivision owners who had harbored dreams of filing recipes on their home videogame systems. Of course, the specter of the combined console/computer continues to haunt the videogame industry as nearly every major platform released since the Intellivision's heyday has promised some sort of computer add-on. Atari. Coleco. Nintendo. Sega. All have attempted to integrate home computer capabilities into their home videogame systems. And all have failed. Miserably.

Although the videogame industry has obviously failed to learn from Mattel's mistakes, it should be noted that the Intellivision campaign did end – for once and for all – the short-lived tradition of hiring boozy literati to promote *Donkey Kong* ports. This, too, comes with a certain measure of regret. It's not hard to imagine writers like Brett Easton Ellis waxing nostalgic over Sonic the Hedgehog's high-velocity thrills or Cormac McCarthy rhapsodizing over all the pretty horses galloping in the latest *Zelda* intro. Still, there's reason for hope: if there's one thing that could lure Thomas Pynchon out from a lifetime of self-imposed anonymity, it's the Sony PlayStation 2. Especially after they ship that new keyboard. ■

"I find Intellivision more sophisticated and lifelike." George Plimpton
ASTROSMASH

TELELINK I
STAR RAIDERS
STATISTICS I
SCRAM
ENERGY CZAR
STOCK ANALYSIS
ASTEROIDS
MISSILE COMMAND
ATARI 800

Atari Home Computers

Atari

By 1978, the original VCS design team was hard at work developing a new advanced chip set to be used in Atari's next generation videogame system. With their high resolution graphics and powerful sound capabilities, the chips would be superior to anything else on the market. At the time, Ray Kassar – president of Atari's consumer products division – was closely watching the incredible success of the Apple II family of personal computers, especially Apple Computer's impressive first year profits. He decided that it was time for Atari to cash in on the home computer revolution as well.

DIGITAL INK: Concept sketch of the Atari 800 home computer.

And so, Kassar commandeered the new chip development – and repurposed the technology to be used exclusively with what would become Atari's new line of home computers. The new computer division was quickly organized in trailers on the Atari lot, and immediately began work on the first two systems – now code named Candy and Colleen. Based on the MOS 6502 8-bit microprocessor, these new systems were to be powerful home computers with superior graphics and sound capabilities. Both systems would be expandable with a large assortment of peripherals – joysticks, modems, printers, and disk drives – which would communicate through a custom system bus called the "SIO" (Serial I/O), which was a primitive version of the USB (Universal Serial Bus) standard. Using the new advanced graphics chip set – consisting of ANTIC, CTIA, PIA, and POKEY chips – the system was capable of producing up to 128 colors (later upgraded to 256 colors using the new GTIA chip) with dynamic four-channel sound. This new line of Atari home computers would have spectacular graphics compared to the other systems that were available in 1979.

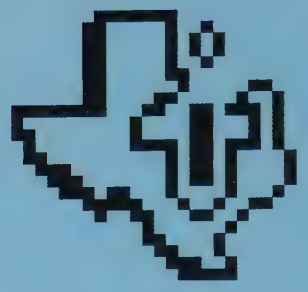
The Atari Home Computer line debuted at the Winter Consumer Electronics Show (CES) in 1979. Jerry Jessop, former engineer at Atari, writes: "The first official shipment of the Atari 400/800 was on August 29th 1979. These were hand built pilot run units to Sears that needed to be in stock by September 1st so they could be included in the big fall catalog. The units were placed in the Sears warehouse and then immediately returned to Atari, after the 'in stock' requirment had been met."

The first production units – Atari 400s followed by 800s – were shipped to Sears stores in November. Atari then mounted a comprehensive advertising campaign that featured the Atari 400/800 home computers and actor Alan Alda – preaching the advanced technology, comprehensive software library, and the ease of use of the systems.

The Atari 400/800 line was canceled in 1982 and replaced by the sleek new 1200XL. Unfortunately, the 1200XL had no external expansion capability and few system enhancements over the original 400/800 line. As a result, consumers flocked to purchase the remaining Atari 400/800s before the supply sold out. The 1200XL was later replaced by the Atari 600 and 800XL line of computers, which addressed the 1200XL's shortcomings and also included a Parallel Bus Interface for external expansion peripherals.

In 1984, Warner sold Atari to Jack Tramiel, founder of Commodore Computer, who made the home computer division his top priority. ■

IMAGE: LEFT: COURTESY ATARI HISTORICAL SOCIETY



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HOME COMPUT

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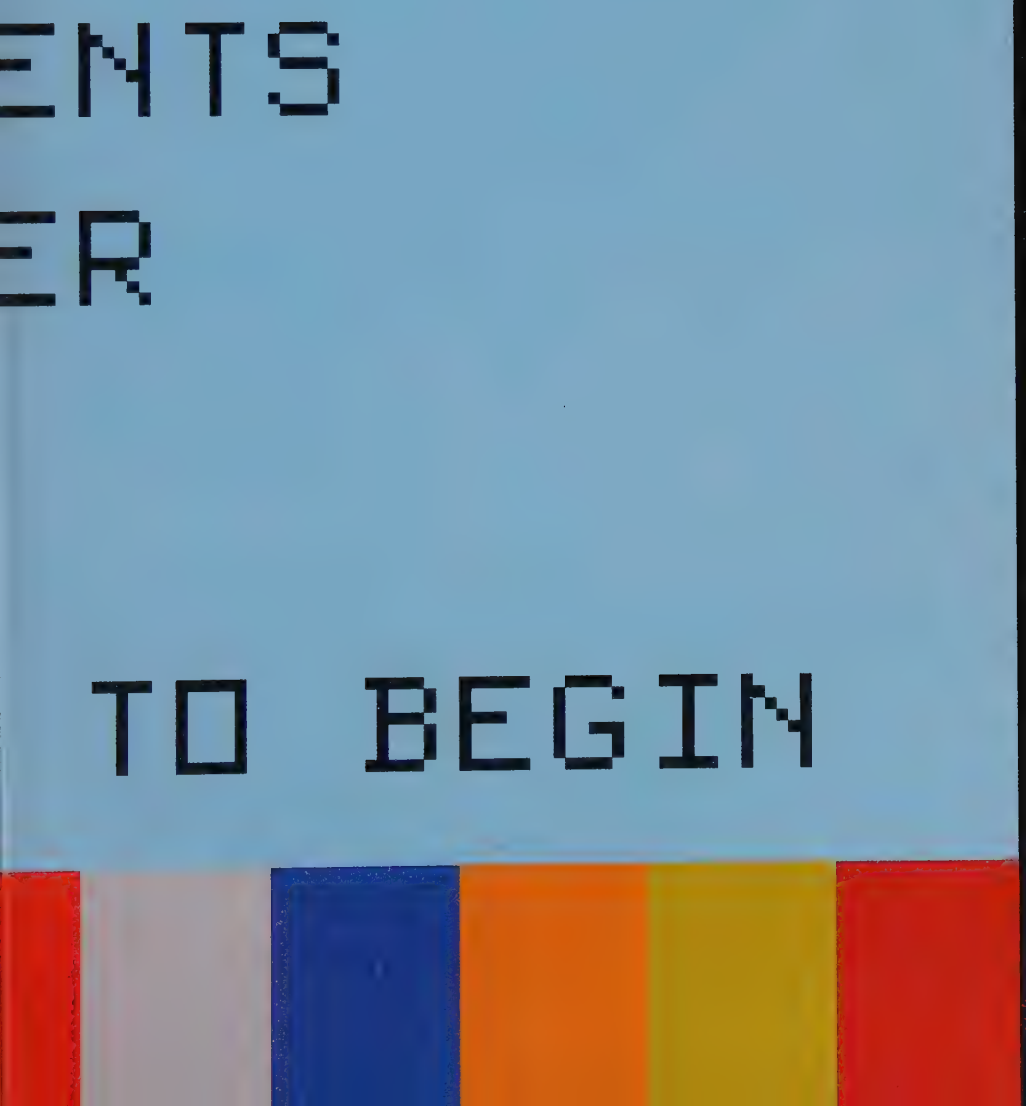
TI-99

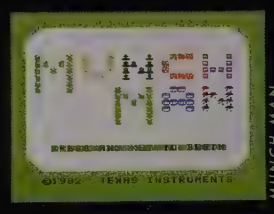
Texas Instruments



Texas Instruments was founded in 1930 as Geophysical Service, an independent company contracted by the world's leading oil companies to perform geophysical exploration with reflection seismography. The company changed its name in 1951 to Texas Instruments in order to expand and diversify its operations. In 1954, the company was the first to mass-produce a silicon transistor and design the world's first commercial transistor radio. Later that decade, a TI engineer named Jack Kilby designed the integrated circuit – an event that will revolutionize the technological landscape.

Texas Instruments entered the mounting home computer revolution in 1979 with the introduction of the original TI-99/4 personal computer.

The TI-99, with its powerful 16-bit TMS9900 microprocessor, TMS9918 graphics chip, and 256 bytes of RAM, could display up to 16 colors and was capable of advanced display functions that created brilliant game graphics. Additional peripherals available for the TI-99 included joysticks, a cassette tape drive, floppy drive, speech synthesizer, optical scanning reader, and modem. ■



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ROIDS

Asteroids

Atari

BY TOM VANDERBILT

Videogame cabinet art of the 1970s and 1980s, a graphic anomaly held over from the days of pulp novels and pinball machines, offered a lurid come-on that usually bore little resemblance to what was on screen – an air-brushed comic-book fantasy strangely out of joint with the colder age of pixels. This was particularly true of *Asteroids*, whose cabinet art depicted a Flash Gordon-esque fighter streaking through an asteroid field rife with menacing rocks and vivid explosions.

The actual look of *Asteroids*, however, was less Pop Art than Bauhaus, a minimalist 2-D radar screen comprised of clean lines and angular geometry. There was precious little representation to *Asteroids* – the ships and rocks were mere blueprints, and the black space contained within their own architectural parameters was visually no different from the black space outside. It was a perfect metaphor for the programming architecture of videogames themselves, the binary world where information was either "on" or "off"; in *Asteroids*, objects and space were one of two things: inside or outside, black or white. *Asteroids*, spawned from research on *Lunar Lander* (a number of *Asteroids* machines were issued in cannibalized Lander cabinets) – as well as two prototype versions, *Planet Grab* and *Cosmos* – was Atari's vector graphics breakthrough, a harbinger of games such as *Battlezone* and *Red Baron*. A later raster version called *Blasteroids*, despite its more "sophisticated" graphics, could not rival the original. It was as if not enough had been left to the imagination.

Asteroids' graphic purity extended to its mechanics of gameplay, which melded Eastern metaphysics with a kind of Sisyphean struggle. "*Asteroids*," observed the novelist Martin Amis in his little-known book *Invasion of the Space Invaders*, "is one of the more mystical of the video games." There was an almost spiritual sense of purpose to breaking the rocks down into smaller and smaller rocks, and then into nothingness, until the screen was very nearly all black, as if one had just raked a yard or chopped a cord of wood; the sense of accomplishment was short-lived, of course, as the ensuing asteroid shower would simply grow sequentially. The best players had a Zen-like quality to their movements. Rather than blast away indiscriminately – thus filling the screen with smaller, faster rocks – they would chip away at single large rocks, carefully weaving in and out of the paths of the others.

The epochal success of *Asteroids* – with some 70,000 units released it eclipsed *Space Invaders* and briefly held sway as the most popular coin-op ever – can be attributed more to the experience of playing *Asteroids* than to the game's graphics or conceptual ingenuity. Unlike *Space Invaders*, whose Stalinist columns marched inexorably downward as the player moved right or left in a spiralling web of claustrophobia and futility, the wraparound, 360 degree universe of *Asteroids* offered a liberating sense of expansiveness. Rather than cower under a bunker, the *Asteroids* player could take matters into their own hands, thrusting off for some far corner or turning the pursuit on one's attacker. On many nights, sitting at a drink-circle stained "cocktail" version of *Asteriods* or plugging away at a stand-up whose controls had been worn smooth by use and whose illuminated coin-return slots were pock-marked with cigarette burns, having cleared away the bulk of rocks I would simply engage the thrusters and the steering controllers simultaneously, spinning out endlessly, like the elder high-schoolers down the block doing donuts in the parking lot, with an incandescent vapor trail rather than burning rubber on asphalt. The *Asteroids* ship was my car, in a sense. Sometimes, the screen as empty and black as a rural highway at night, I would simply press and hold thrust and take off toward the top of the screen, emerging again at the bottom, and doing it again – in love with the feeling of movement and the illusory boundlessness of that wrap-around screen, sending off a trail of shots simply to glimpse Newtonian principles at work.

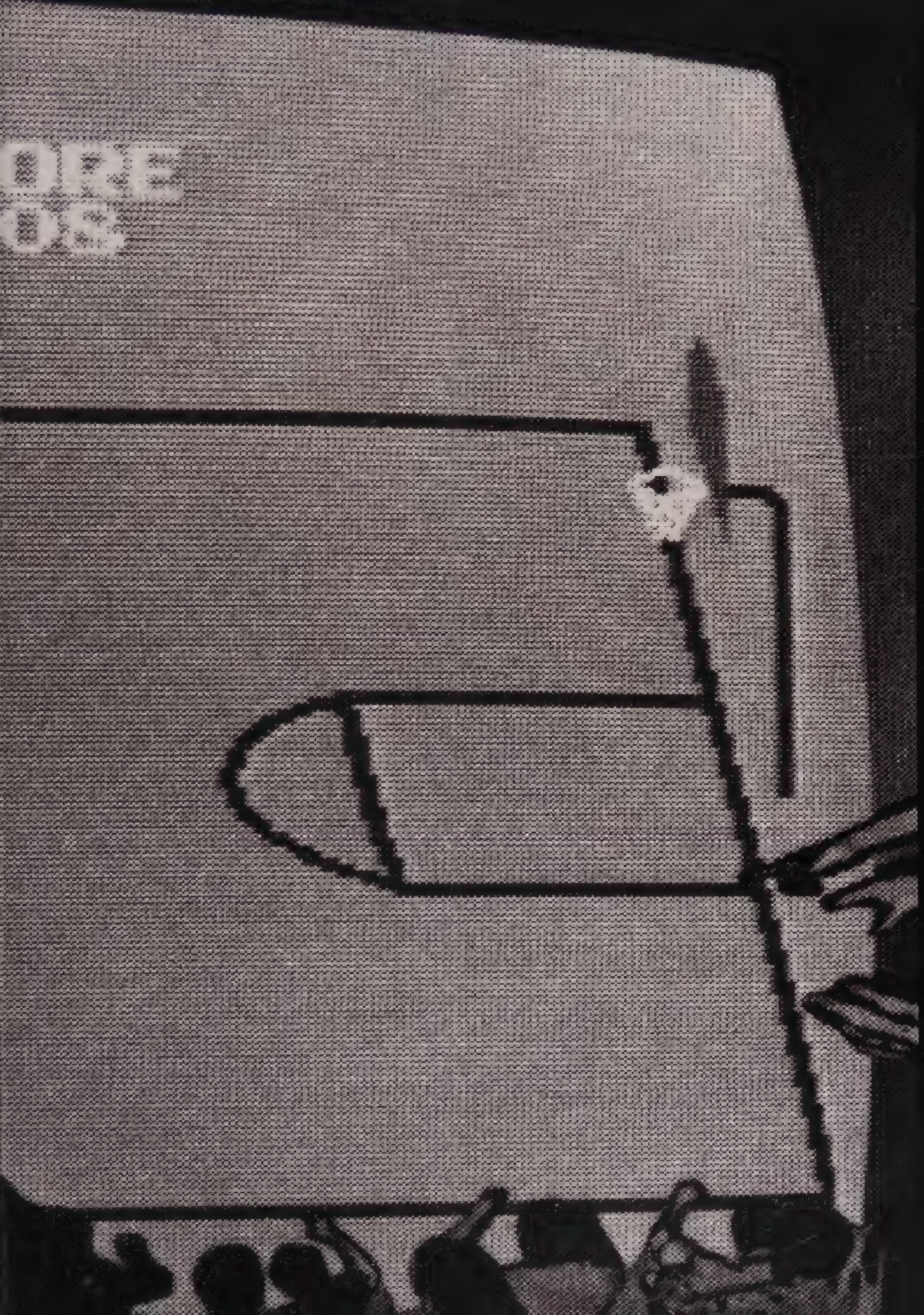
Just as the generals of World War I were unable to envision that the recently invented airplane would be used for bombing, the programmers of *Asteroids* did not imagine a style of play that would score well over the 90,000 they had estimated as players' upper limit (*Asteroids*, it should be pointed out, was the first game that allowed the entry of initials for its Top 10 players). The "lurkers," as they would come to be known, would clear the field of all but one rock – preferably a slower, larger rock – and then wait for the small saucer to emerge (Atari programmer Ed Logg, co-creator of *Asteroids* with then vice-president of engineering Lyle Rains, recounts that they dubbed the smaller saucer Mr. Bill, and its larger sibling Sluggo). The player, sitting in the margins near the scores, would then either shoot Mr. Bill head-on or, using the wraparound, from "behind."

Lurking, while a perfectly rational way to accumulate points (and the myriad ships needed for later rounds, when the field would grow so thick with rocks that a single shot would destroy an entire asteroid, a necessity Logg entered to avoid slowing the frame rate), left me a bit cold and seemed a bit unethical, like sniping rather than engaging in battle. Even Logg himself admitted to "lurking" for a bit but was unsuccessful; as he recounted in an interview, however, his main efforts at lurking were done before he had added a one-second pause between the small ship's entry and its first shot: "People felt it was too harsh to get shot before you could even tell where he was." If the pause was like some kind of Geneva Convention amendment to make the conduct of war somehow more civilized, lurking turned that bit of civility into a strategic opening. Perhaps the lurkers were calling the lie on the notion that battle could be civilized. For a while, I practiced an alternative version of lurking, which involved saving one rock and then thrusting across the screen at top speed, waiting for the saucer to emerge and then strafing it with a trailing burst of shots, using mobility to reduce its pin-point accuracy. However, waiting for the saucer's high-pitched siren as the machine's heartbeat bass pounded away at its most frenetic pulse would inevitably become tedious. I preferred to clear that last rock, bringing the curtain up on the next performance, immersing myself in those clusters of rocks, whose jagged shapes would still haunt the screen inside my closed eyes as I tried to sleep – electric sheep counted in blackness as dark as space. ■

02:02
SCORE
022

Basketball

Atari



Basketball was introduced by Atari in May 1979. This one-on-one basketball game featured graphics so realistic "it's like you were slam-dunking the tie-breaker in the last seconds of an actual game." Controlled by a 6502 microprocessor, the black and white animated players, playing in a "three-dimensional" basketball court, even wore authentic '70s-era basketball uniforms – including matching tube socks.

Played between two players pitted side-by-side against each other or one player against the computer-controlled "robot player," the game interface consisted of a Trak-Ball for direction and jump/shoot button for each player to control.

After the start button is pressed, the game automatically sets up for the jump ball to the tune of "Sweet Georgia Brown" – with the roar of the crowd cheering in the background. The player who grabs the ball then controls his man as he dribbles, dodges the defense, and tries to get in position to make a shot. The defensive player could either block the shooting player or make an attempt to steal the ball for a fast-break down the court to shoot and score.

The game's oversize cabinet, with its bold red, orange, and yellow UV-printed panel graphics, featured a monitor bezel that depicted a cheering full-color stadium crowd that perfectly framed the action taking place on the screen within. The dynamic graphics and fast-paced gameplay of Atari's *Basketball* set the standard for nearly every sports game to follow. ■

Galaxian

Namco

Following the release of their first arcade videogame *Gee Bee*, Namco released *Galaxian* – the first videogame to display graphics in three-channel RGB color – in 1979. Engineered by Namco in Japan and licensed to Bally/Midway for US release, *Galaxian* truly revolutionized the game industry with its innovative use of full-color graphics.

In *Galaxian*, a convoy of menacing alien enemies is attacking the Earth. Your mission: destroy the aliens. The player controls a defender Galax ship that moves horizontally across the bottom of the screen, shooting its laser fire up into the squadron of multi-colored aliens that hover within a twinkling black starfield. The Galax ship fires at the phalanx up above, out-maneuvering the enemy escort ships that break formation to fly down and attack.

This variation on the classic *Space Invaders* theme was the first to introduce attack formations – enemies that would break off from the marching rows of invaders to swoop down toward the ship – a popular gameplay device that was later used in such classic games as *Phoenix*, *Radarscope*, *Galaga*, and *Gyruss*.

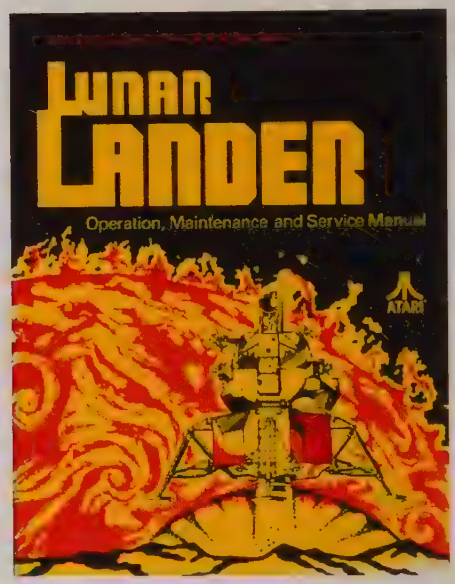
Of all the game's characters, the Galaxian flagship – also known as the "Galaxip" – is without a doubt the most ubiquitous. The ship appeared as a special attacker on higher levels of *Galaga* and also made a guest appearance as a bonus award in such classic Namco games as *Pac-Man*, *Super Pac-Man*, and *Dig Dug*. *Galaxian* was later released for numerous home videogame platforms and was included as a special bonus level in both Namco's *Ridge Racer* and Midway's *Mortal Kombat 3*. ■

With its intergalactic cabinet art, ***Galaxy Wars*** was released by Universal in 1979. This *Space Invaders* clone included an added level of difficulty in that players now needed to avoid an asteroid belt along with the alien invaders.

Lunar Lander

Atari

Lunar Lander was first programmed in the mid-seventies as a text-based simulation played out on a PDP mini-computer and teletype. Players controlled a lunar module that they had to successfully navigate and land safely on the moon's surface – using nothing but a string of numeric values for altitude, fuel level, and directional rotation to gauge their descent.



Then in 1979, the brilliant minds at Atari engineered a graphical version of this computer classic for the arcade entitled *Lunar Lander*, featuring the first use of Atari's latest innovation: XY technology, also known as vector graphics. This high-resolution black and white monitor technology – pioneered by Cinematronics in titles like *Space Wars* and *Warrior* – drew images onscreen using an electron beam as opposed to raster scan in order to create intensly bright yet crisp game graphics.

Lunar Lander led the way for such popular Atari vector games as *Asteroids*, *Battlezone*, and the color vector classic, *Tempest*. ■

Rip Off

Cinematronics

BY CARL STEADMAN

The first co-operative two-player game, Cinematronic's *Rip Off*, designed by Tim Skelly, might best be known for the name on its marquee. Yes, pirate ships really do "rip off" the "radioactive fuel pods" that you and another player attempt to defend. Still, there it is, the black-and-blue 3D marquee boldly proclaiming "RIP OFF." Do you put a quarter in the slot?

Rip Off's titular self-referentiality would for the first time begin to challenge the insular, self-enclosed world of the videogame, where tortured narratives are stretched thin to give dialectic motive to concepts unique to the gaming experience, such as the "bonus round" or "extra life" – less suspensions of disbelief as efforts to bury the masturbatory repetitions of hand on joystick within a false hermeneutic. Not until years later, with *Crazy Climber*'s "Nichibutsu" billboards and *Pole Position*'s "Atari" roadsigns, would arcade titles give that slight but knowing wink to the means of their own production. *Q*bert*, perhaps, would complete the process, with the "@!#?@!" speech balloon making the game's cartoon-inspired artifice so readily apparent, at last giving an on-screen acknowledgment to the coin-fed escape that fuels the addictive nature of the videogaming experience. ■

SCORE
000
VECTORBEAM

IMAGE: COURTESY ARCADE@HOME

Speed Freak

Vectorbeam

Following the incredible success of his goliath creation, *Space Wars*, Larry Rosenthal began to grow increasingly disenchanted with the whopping 50% royalties that he was receiving from Cinematronics. Rosenthal, like Nolan Bushnell before him, felt he deserved a bigger piece of the arcade action. When attempts to reconcile with co-owners Jim Pierce and Papa Tom Stroud failed, Rosenthal packed up everything, including the only known copies of the op-codes needed to program the CPU board, and set up shop as Vectorbeam – leaving a young programmer named Tim Skelly alone to reverse-engineer the board and save the now crippled Cinematronics.

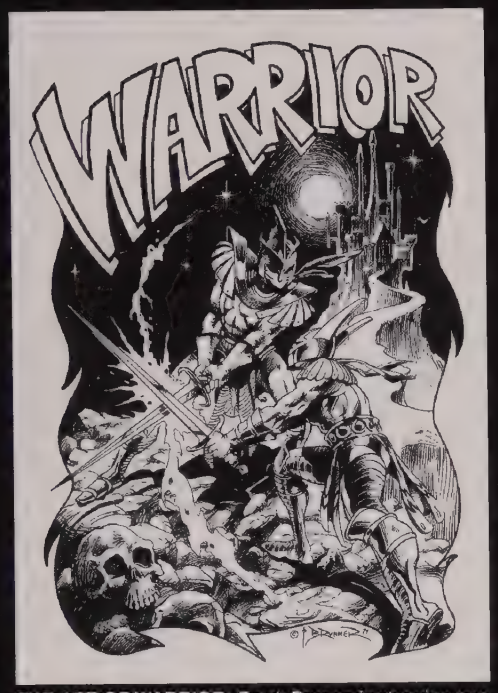
One of the first titles to be released by Rosenthal's new videogame venture was *Space War*, a technically superior version of Cinematronics' hit *Space Wars* with a refined hardware platform, more reliable monitor, and space-age cabinet graphics. Soon after, Vectorbeam released *Speed Freak*. This fast-paced three-dimensional driving simulator was the first to feature oncoming cars and a four-speed gearbox. The player controls a speeding car driving down a desolate desert road. You must avoid both the traffic and roadblocks while passing by moving scenery that includes cows, cacti, and hitchhikers. Points are gained for speed, but if you crash, your windshield shatters across the screen.

Following his departure, Rosenthal was sued by Cinematronics' owners. In an out-of-court settlement, Cinematronics ended up buying back Vectorbeam – along with all hardware rights and patents – for a cool million. Rosenthal may have made out like a bandit, but it was Pierce and Stroud who were the real winners – they bought Vectorbeam with their own money and now owned the patents. ■

Warrior

Cinematronics/Vectorbeam

Tim Skelly started work on the game *Warrior* in 1979 after completing his first two arcade videogames for Cinematronics, *Starhawk* and *Sundance* – a miraculous accomplishment in light of the chaos he inherited in the wake of Larry Rosenthal's departure from the company prior to his arrival. He had no hardware. No development tools. Nothing but a legal pad, pencil, and a Hex listing of *Space Wars*.



THE ART OF WARRIOR: Frank Brunner's stunning pen and ink illustration for the *Warrior* sales flyer.

Skelly had unknowingly walked right into a black hole – one from which no arcade videogames were ever expected to escape from alive. Rosenthal had made sure of it. Fortunately for Cinematronics – and its co-owners, Jim Pierce and Papa Tom Stroud – the young Skelly quickly surmounted an incredibly steep learning curve using his knack for Hex op-codes and a relentless drive to prove that he could, in fact, program arcade videogames despite the odds.

After conquering the mechanics of the custom Vectorbeam board – built entirely with TTL logic – Skelly soon had a working development station. Even so, his first videogame, *Starhawk*, was written on legal pads and then converted into electrons using Cinematronics' Teletype machine.

When asked about the company's reaction to his first programming efforts, Skelly recalls: "The night I got a spaceship up on the screen, company execs got out of their beds to come see what I had done. To emphasize how important this event was, one pointed out that he left his girlfriend as well as his bed to come see the show. Asses were saved that night. ANY game would have been fine with them."

When Skelly finally began work on *Warrior*, his design strategy was to exploit the strengths of vector displays — the smooth rotation, scaling, and crisp lines – and create an original game that refined the gameplay of attacking one's opponent. His influences at the time were *Gun Fight*, *Space Wars*, and *Stormbringer* – a "sword and sorcery" book written by Michael Moorcock. Luckily, Skelly chose to combine these discrete elements – sword wielding knights, vector displays, and combat games – in the most fantastic way to create *Warrior*, now considered to be the first one-on-one fighting game. "I never thought of *Warrior* as being the first in a new genre of game," Skelly says, "because at that time, *every* game was a genre of one."

With its intense on-screen vector graphics of two futuristic warring knights – superimposed onto a colorful backdrop of swirling stairs and deadly pits – and dynamic cabinet artwork created by artist Frank Brunner, *Warrior* was no doubt the most dynamic and beautiful game to emerge from Cinematronics until the company released the future of arcade games: the laserdisc epic *Dragon's Lair*. ■

IMAGE: LEFT: FRANK BRUNNER

Interview:

Tim Skelly

Tim Skelly is widely considered one of the superstar videogame designers of the Golden Age. His signature style inspired a generation of gamers and helped define an era. As a programmer for both Cinematronics and Gottlieb, he designed numerous popular arcade games including *Star Castle*, *Reactor*, and *Warrior*.

Tim has since done design and art direction for Sega Technical Institute and Incredible Technologies, where he created the seminal "Mech" designs for the popular *MechWarrior* universe. Skelly has also acted as a designer and interface consultant around the world, and was one of the first researchers in the Microsoft User Interface Research Group.

What games were you designing before you came to Cinematronics?
I was programming original games for the Polymorphic Systems 88 in Kansas City. I had taught myself BASIC and created a few interesting titles including *MazeBomb*, *Star Thief*, *Space Pirates*, and a conversion of *Oregon Trail* called *Street Gang!*

What was it that inspired you to go into coin-op?
I played bar games. *Pong*, *Pong*, *Pong*, and, oh yes, *Circus* – a clever *Breakout* knockoff where you had to bounce clowns into balloons. I also got a chance to play Atari's *Starship 1*. I got to know the operators. When it looked like the Poly-88 thing was going belly-up, they gave me a copy of the directory issue of *RePlay*, and I sent my resume to every game company in California.

What was it about Cinematronics that appealed to you?
I can't say anything about Cinematronics appealed to me beyond the fact that they were offering me a job. El Cajon is a hot, desert town, and Cinematronics was a tiny company in the back of an industrial park. The view was of a garbage truck depot.

Continued on page 315 ▶

1980

Sony introduces the **Walkman** portable cassette player — Over **725,000** desktop computers are sold worldwide — **Ronald Reagan** is elected President of the United States – Nintendo of America estimates that videogame sales will reach **$330 million** this year — Warner's share price rises **35%**.

Activision

Graphics inspired by Memphis – a bold geometric style introduced in 1981 by an Italian design group that included Ettorre Sottsass and Studio Alchymia – became a trademark of Activision's print design.

BY NICK MONTFORT

Four of Atari's strongest assets – David Crane, Alan Miller, Bob Whitehead, and Larry Kaplan – defected in 1979. Frustrated with the lack of recognition and compensation at Atari, they decided to team up and program cartridges for the VCS on their own. Their company, Activision, would be the first third-party cartridge developer in history, and the first to prominently credit its programmers. The group officially incorporated Activision in October 1979 and quickly got to work developing incredible videogame cartridges, pushing the graphic capabilities of the Atari VCS to their limits.

The people who conceived and programmed games were, up until 1980, largely anonymous techies, often not even credited in the packaging. In contrast, Activision's founders sought to create a sort of videogame star system – a cult of the game designer. They decided to feature the designers' names and pictures prominently on the box. As a result, over ten thousand fan letters poured in each week.

"Activision is the only [videogame] company of any size that creates all of its own work from scratch, without licensing concepts from the arcades." So said James Levy, a music industry veteran who became Activision's first president, in a 1984 interview in *Antic* magazine.

But "from scratch" may be a bit of a stretch. Activision's first release, *Dragster*, released in 1980, was directly copied from the Kee Games arcade videogame, *Drag Race*. Even then, some of David Crane's nice touches made *Dragster* – the very first non-Atari cartridge sold for the VCS – a huge success for the fledgling company. The 1981 lineup of Activision knock-offs included Crane's *Freeway*, a *Frogger*-like game that was the first Atari cart to animate 24 sprites at once, and Larry Kaplan's *Kaboom!*, co-opted from the Atari coin-op game *Avalanche*, which was also released that year.

These imitations did play well, but they aren't why Activision is remembered. Consider instead the 1982 hit, *Pitfall*. This platform game helped to define the genre, inspiring games like *Super Mario Bros.* and countless others. The prolific Crane, who created *Pitfall*, borrowed code bits from his earlier sideways-scrolling *Laser Blast*. A bitmapped running man named Pitfall Harry along with relentless rolling logs, killer crocodiles, swinging vines, deadly scorpions, tar pits, and lost treasures were set together in a challenging arrangement. The game was a jewel, a perfect world incised in a mere 4K of code. Over the years, more than four million *Pitfall* cartridges would be sold. It held the #1 Billboard ranking for 64 weeks and remains one of the top-selling videogames of all time.

I bought two. The second one, purchased when I was an undergrad, cost me $1 at the thrift store. When I picked it up, I thought I'd reminisce about the game and toy with it for a few minutes. During the next few days, a friend and I spent more than 40 hours trying, again and again, to collect every treasure before the allocated twenty minutes ran out. We worked through the night, passing the joystick back and forth. We mapped out the territory, devising different routes, and felt victory slip away time and time again. Finally, Harry froze in the air. Time had run out, and there was still so much ground to cover. We decided to put the cartridge away for another few years. Next time, we'll try a more challenging route – one that might lead us victory.

Another 1982 game, *River Raid*, by Carol Shaw, was going to be set in space at first. This setting was nixed – too ordinary – and a river was added instead. Then, Shaw couldn't manage to paint a convincing boat using the 2600's pixels. So she made the player's "man" a plane. The game – the first with vertical scrolling – was a hit. Bob Whitehead's intense game *Chopper Command*, reminiscent of Williams' popular *Defender*, was his biggest hit. Crane also introduced the racing game *Grand Prix* that year, while Steve Cartwright unveiled *Barnstorming*, a unique stunt-flying experience that featured barns set against a beautiful sunset.

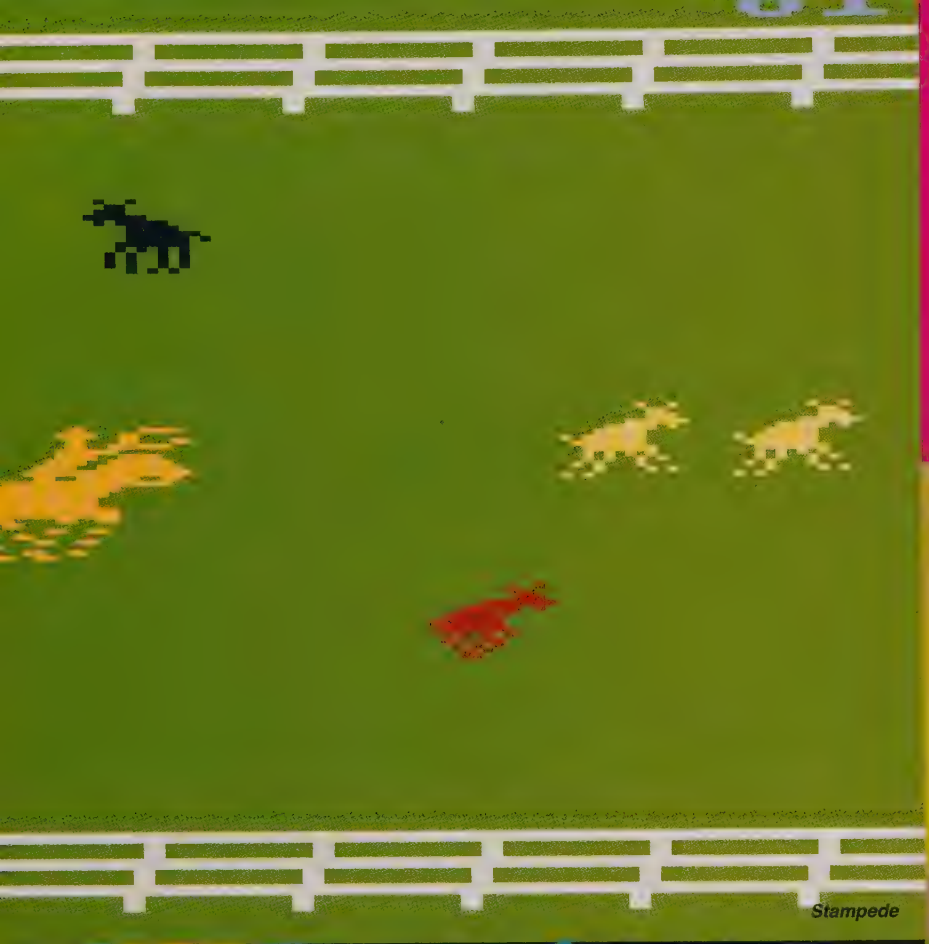
But likely the most significant achievement of Activision was the fact that they prevailed in one of the most controversial videogame lawsuits of all time. Atari wasn't flattered by this upstart company's top-notch VCS carts. Atari sued Activision in 1980 for a host of crimes including copyright and patent infringement. But Activision stood their ground – proving that competition had its place in the market – and allowing an entire generation of software developers to follow in their wake. Atari's razor-and-cartridges model was shattered. As other platforms started to gain a foothold in the market – and a new breed of game developers like Imagic came along – Activision started to develop for more systems, releasing a handful of Intellivision games in along with its 2600 titles. But in 1983 Activision attained the startup dream – IPO – just in time for the great industry crash. Although Activision was hit hard, they never gave up, going on to craft more carts, develop computer game hits, and even flirt with electronic literature. Today – after weathering rough financial times – Activision is one of the few Golden Age game developers who survived, and it continues on as a powerful force in videogaming. ■

Barnstorming

Megamania

Steve Cartright

Alan Miller



Stampede

David Crane

Bob Whitehead

Laser Blast

River Raid

JOIN THE ACTIVISION TEAMS!

Many Activision games awarded high-scoring players with a special insignia — the coveted Activision patch. Consulting the various game manuals would reveal what score needed to be achieved in order to become a member of these elite player organizations. If you succeeded in achieving the required score, all you needed to do was send a snapshot of the TV screen displaying your winning high score, along with your name and address. Six to eight weeks later, you'd be the coolest kid on the block.

Game & Watch

Nintendo

In 1980, a Japanese toy and videogame company launched a series of handheld mini game systems that would soon take the kids in America, and the entire world, by storm.

Yamauchi Nintendo & Co. was founded in Kyoto in 1889 by Fusajiro Yamauchi to sell his exquisitely handmade hanafuda cards – small playing cards printed with elaborate images of the moon, deer, birds, plum blossoms, rain, wind, and other natural motifs, each with their own distinct meaning and point value. Yamauchi's cards, made from mulberry bark and block-printed with natural inks, were among the most beautiful of their kind and quickly became the most popular cards in Kyoto.

Hanafuda cards were used to play many traditional Japanese games – from simple matching games to a more complex card game similar to bridge. The cards were also used to play a game called *Oicho-kabu*, a blackjack-style game played in high-stakes gambling parlors run by the Japanese mafia, also known as *yakuza*. Interestingly enough, the name yakuza originated from this very hanafuda game. In Oicho-kabu, three cards are dealt to each player. The last digit of each card counts as the player's total score, and a hand of 20 – the lowest score – is equal to zero. One losing combination is 8-9-3, or ya-ku-sa. And so, the term caught on as a moniker for organized crime – symbolic of those that were worthless to society. But in spite of this negative image, the yakuza were extremely powerful and gambling quickly spread throughout Japan. With the rise of the gambling parlors came an increased need for decks of hanafuda cards – consequentially, Nintendo prospered.

At the dawn of the twentieth century, Nintendo's business evolved from *hanafuda* to include Western-style playing cards, or *karuta*, which were now in high demand owing to the growing popularity of Western card games in Japan. In order to maximize sales, the company expanded its distribution from small Nintendo-owned shops to regional tobacco and gift stores.

In 1951, Yamauchi changed the company name to Nintendo Playing Card Co. Ltd. and moved the corporate headquarters to a central Kyoto location to modernize operations and mass-produce new plastic-coated playing cards. Soon, Nintendo signed licensing agreements with such well-known brands as Disney, and began to manufacture a new range of character-based playing cards that featured images of Mickey Mouse and Donald Duck for kids. Nintendo's distribution network was again expanded to include department and toy stores throughout Japan – business boomed.

GAME & WATCH GALLERY: Handheld retro-gaming updates for the over 100,000,000 Game Boys of the world.

In 1970, Nintendo – now run by Fusajiro's ambitious great-grandson, Hiroshi – was interested in expanding operations further into children's games and toys, and launched a new Games division whose research and development was headed up by one of Yamauchi's most trusted employees, Gunpei Yokoi. Yokoi, who had a background in electronics, was excited about the new product possibilities. He quickly demonstrated his creative brilliance with the Ultra Hand, a whimsical expandable arm with a gripping hand that sold over one million units. The series grew to include the Ultra Scope periscope and Ultra Machine ball-toss.

Following the success of the Ultra game series, Yokoi hired Masayuki Uemura from Sharp to assist him in developing a new project called the Beam Gun. The Beam Gun consisted of a light gun that utilized opto-electronics in connection with solar cell targets that detected the gun shot. The product was a tremendous success, and the technology was later adopted into large arcade shooting galleries – also known as Laser Clay Ranges – throughout Japan. Nintendo also began to develop a 16mm film-based projection system used with the Beam Gun technology to create a virtual shootout experience in such arcade games as *Wild Gunman*.

In 1976, Hiroshi Yamauchi decided to expand into the videogame market to compete with American companies like Atari and Magnavox, who were all making a killing in the nascent industry. Nintendo's first microprocessor-based home videogame, the Color TV Game 6, was a dedicated game console that played six variations of TV Ping-Pong. Following the system's success, Yamauchi declared that Nintendo would exclusively sell videogames instead of toys. Yokoi and his main development team – now known as RD1 – were asked to create something new. Their answer to the challenge was the Nintendo Game & Watch.

Launched in 1980, Game & Watch was a battery-operated handheld game system that consisted of a small mini-console with a black and white LCD screen (often with printed overlays to simulate color background graphics) and control interface. Games like *Fire* and *Parachute* challenged players with simple tasks such as rescuing characters from a burning building or saving a lost parachutist from vicious sharks. With Game & Watch, Gunpei also introduced the now ubiquitous plus button directional pad, a control interface that is still used today throughout the entire family of Nintendo systems. The Game & Watch series would sell over 40 million units worldwide between 1980 and 1989, and lead Yokoi to develop Nintendo's next generation handheld game system: Game Boy. ■

IMAGE: RIGHT: ADDITIONAL GAME & WATCH GAMES COURTESY FREDRIK KELLÉN AND JULES URBACH

GAME & WATCH
Nintendo

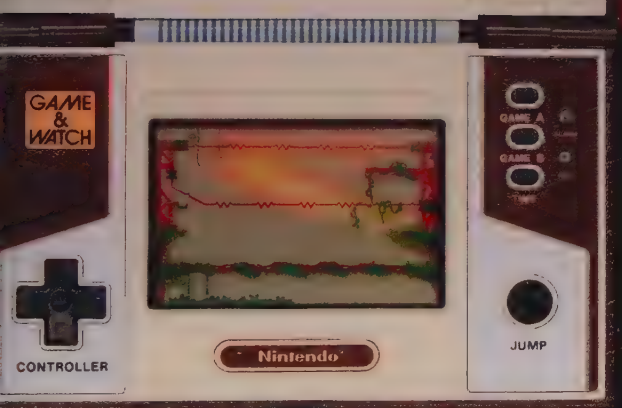
GAME & WATCH
Nintendo
MICKEY MOUSE
GAME A
GAME B
TIME
ALARM
ACL
WIDE SCREEN
© Walt Disney Productions

PINBALL

DONKEY KONG II

GAME & WATCH
BALL
LEFT
RIGHT
CRUSH!
CRUSH!
ACL
GAME A
GAME B
TIME

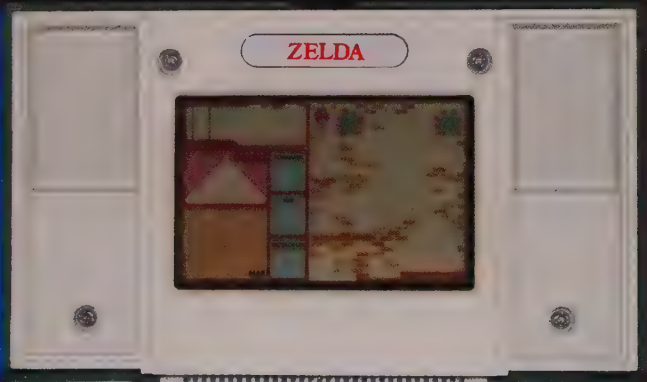
GAME & WATCH
LEFT
RIGHT
Nintendo


GAME & WATCH
CONTROLLER
JUMP
Nintendo

GAME & WATCH
ZELDA
MULTI SCREEN

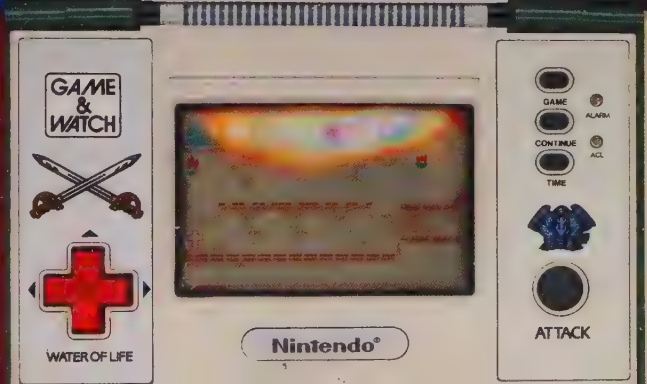
GAME & WATCH
MANHOLE

GAME & WATCH
Nintendo
FIRE
WIDE SCREEN
LEFT
RIGHT
GAME A
GAME B
TIME
ALARM
ACL


ZELDA

GAME & WATCH
JUDGE
HOUR
MINUTE
HIT
DODGE
ACL
GAME A
GAME B
TIME
1-PLAYER
2-PLAYER

GAME & WATCH
Nintendo
CHEF
WIDE SCREEN
LEFT
RIGHT
GAME A
GAME B
TIME
ALARM
ACL


GAME & WATCH
WATER OF LIFE
Nintendo
GAME
CONTINUE
TIME
ALARM
ACL
ATTACK

GAME & WATCH
MARIO'S

Battlezone

Atari

Battlezone, a hyperrealistic tank combat simulator, hit arcades in the fall of 1980. Viewed through the glowing red targeting crosshairs, the acid green wireframe world of *Battlezone* – filled with jagged mountains, active volcanos, and hostile enemy tanks – created a virtual world for players to both escape into and explore.

Championed by Morgan Hoff and later designed by Ed Rotberg, *Battlezone* was played in a first-person perspective as seen through a periscope that simulated the interior of a tank. Battles were fought within a black polygon-filled landscape strewn with pyramids and cubes to provide both obstacles and cover. A simple radar screen at the top of the display showed the current enemy positions. The myriad opponents encountered during the game included tanks of various speeds as well as intelligent missiles, and flying saucers would appear occasionally only as targets to score extra points.

Lyle Rains recalls, "One letter came in from a *Battlezone* fan who said that if you drove far enough you finally got to the volcano, and if you drove over the top of the volcano, you could go down into the crater. And he said that inside the crater there was a castle, and that you could go inside and explore the castle. Of course, none of this was true."

Created with Atari's new vector-based hardware platform, the game was so true to life, in fact, that the US Army Training Support Center in Eustis, Virginia commissioned Atari to design a specialized *Army Battlezone* edition to be used as a combat simulator. Although a few prototypes of this game are known to exist, it has been a long-standing mystery as to whether or not they were ever put into production. ■

Berzerk

Stern

BY NICK MONTFORT

Within *Berzerk*'s dystopian labyrinth the player does not play as a "man," but as a "humanoid" – trapped in a maze of twisty little passages, all different, and all filled with robots of variable speed and firepower. Designed by Alan McNeil for Stern, the object is simply to execute them one by one as you make your escape.

It's a slaughterfest, but one with bumbling robots who are more funny than fearsome. Dispatching these glitchy golems hardly seems violent. Besides, just walking around is trouble enough. As you navigate the deadly electrified maze, with walls that remind one of the board game Operation, you must move carefully. Even the slightest contact will shock the life out of you. Navigating with the joystick – which simultaneously aims the humanoid's blaster and controls his direction – can prove as tricky as dodging the robot fire.

Once the interface is mastered, though, the player can fool the dim android enemies in a number of ways. Luring them into the charged walls is one – the robots will march toward the humanoid despite obvious deadly obstructions. Walking quickly between two robot rubes is another, as it will draw them into mutually fatal crossfire.

Dispatching the robots is key, but it's also essential to escape each maze before your time runs out. Those who linger are confronted by the menacing smiley face known as Evil Otto, an indestructible enemy who makes a bouncing beeline toward the humanoid. This boss monster (the model for the default avatar in virtual community *The Palace*) simply can't be killed. If the humanoid is too near the center of the playfield, flight is futile. At best, maybe another robot or two can be killed to up the score. But there's always the simple pleasure of launching a pointless, yet strangely satisfying, fusillade into Otto's rapidly advancing grin.

Berzerk's finest moment is the instant the humanoid materializes into a new maze level. Adrenaline surges as you blast the first robot that appears right beside you and edge away from the incoming fire. But soon, challenging yet more predictable play unfolds and the initial rush subsides as taunts from a synthesized voice ("Get the humanoid!") provide entertainment of a different sort.

Berzerk also broke new ground with a chilling and unfortunate videogame industry first. On April 3, 1982, Peter Bukowski, age 18, suffered a fatal heart attack while playing the arcade game at the River Oaks Shopping Center in Calumet City, Illinois. He was the first – and, possibly, the only – videogame player to die in medias res. ■

Carnival

Sega/Gremlin

In this virtual shooting gallery, developed by Sega and released by Gremlin in the US, the player controls a pistol to shoot the targets and gain points for skill and accuracy. With its three bitmapped rows of owls, ducks, and bunnies, plus special B-O-N-U-S letters and numbered extra-bullet targets all marching under a wheel of spinning pipes – to the mind-numbing tune of Mario Lanza's classic carnie theme "The Loveliest Night of the Year" – *Carnival* is as addictive and maddening as any real life state fair shoot-out.

Step right up and take aim and rack up points by shooting out the targets one by one as they scroll by. With your limited supply of ammunition, it's imperative that you make every shot count. Developing a sure-fire strategy for quickly clearing the board is the best offense. But watch out for the bullet-eating flying ducks! They'll swoop down from their docile ranks and steal your ammo if you aren't careful.

In 1982, Coleco purchased the rights to the game and released the home version of *Carnival* as a cartridge for the Atari 2600, Intellivision, and ColecoVision systems. The Atari 2600 port also included a secret feature added by programmer Steve Kitchen – a target that, when hit, reveals the hidden initials "SK." ■

IMAGE: NEAR RIGHT: COURTESY WAYNE AHRENDT

Centipede

Atari

Atari's arcade classic, *Centipede*, was one of the most popular videogames of the '80s – and one that is often single-handedly credited with the honor of being the first game to begin luring women into video arcades across the country.

Designed by Dona Bailey – one of the only female game programmers in the industry – in collaboration with Ed Logg, *Centipede* was one of the most unique and innovative videogame concepts to hit arcades in 1981. With its endless fields of psychedelic multi-colored mushrooms, waves of killer insects, and fast-paced Trak-Ball controller, the action was both relentless and addicting.

CENTIPEDE 2000: Atari action updated for the new millennium.

The object of the game is to destroy a deadly centipede that winds itself, faster and faster, down through the maze of colorful mushrooms along with the swarms of insect enemies – spiders, fleas, and poisonous scorpions – that invade the field. But as you shoot each segment of the centipede, it breaks into smaller and smaller sections, making its destruction difficult – and blisters unavoidable. ■

Crazy Climber

Nichibutsu

Crazy Climber, conceptualized by Masao Kijima, was inspired by none other than Spiderman. Released by Nichibutsu in 1980, it was also one of the first arcade games to introduce an active motion interface to the industry. The controls consist of dual joysticks (one for each of the climber's hands) to coordinate the climbing motion of the player as he scales tall buildings while dodging falling girders, flowerpots, cans and other obstacles in an attempt to reach the top.

The playfield consists of four 200 story buildings whose names are Nichibutsu, Nichibutsu Leisure, Nichibutsu U.K. Ltd, and Nichibutsu USA Corp. – in a vanity branding strategy of shameless self-promotion later co-opted by Atari in their hit *Pole Position*.

The innovative interface of *Crazy Climber* now made it necessary for players to use actual body movements to control the action of their character onscreen. As a result, *Crazy Climber* was a somewhat primitive precursor to modern games like Sega's *Top Skater* and Namco's *Alpine Racer* that use this type of self-aware "body joystick." But most important, this new genre of fully interactive arcade games further integrated the player's movements and experience into the gameplay, and helped the industry climb to the next level of fun. "Go for it!" ■

Defender

Williams Electronics

BY NICK MONTFORT

Eugene Jarvis, a pinball and videogame junkie from Palo Alto, California, designed his first videogame, *Defender*, in 1980. In this quintessential scrolling shooter – considered to be one of the most technologically advanced games of the era – the player pilots a jet-fueled starship that uses a strafe of laser fire to attack a host of alien enemies – each with its own unique pixellated appearance and behavior – that assail the solitary spacecraft as they invade a desolate planet to assimilate its population into a race of alien mutants.

Behind all of this action, Jarvis created a field of twinkling stars that slowly drift behind the barren landscape with the aid of parallax scrolling. For this fast-paced game, Jarvis used a number of established videogame devices including "hyperspace," and even invented a few new ones. The "smart bomb" – a deadly weapon that helps the player by annihilating an entire screenful of enemies – was a revolutionary device. Jarvis also introduced a scanner located at the top of the screen that helps identify enemies and action taking place outside the playfield. The interface for *Defender* consisted of a joystick to control the starship's altitude and a myriad of buttons to control the ship's direction, thrust, and arsenal of weapons.

The hyperkinetic result, with its frenetic action, dizzying array of player contols, and dynamic sound effects, would later be recognized as one of the crowning achievements of the Golden Age and become a true videogame classic.

After graduating from UC Berkeley with a degree in Computer Science, Eugene Jarvis quickly ditched a job at Hewlett-Packard for the opportunity to work at Atari's upstart pinball division. After working on such games as *The Atarians*, *Space Riders*, and *Superman*, Jarvis was invited to move to Chicago to work for pinball giant, Williams. It was there that Jarvis finally got the chance to design a videogame – the first that Williams would release since 1973's ill-fated Paddle Ball – called Defender.

And so, he threw himself full-on into an eight-month all-computer development project in order to create a prototype for the game.

The name *Defender* had been decided early on. Yet just two weeks before his deadline – the 1980 AMOA (Amusement Machine Operators of America) convention – Jarvis still hadn't figured out exactly what it was that was being defended, or even what the backstory would be. At the time, the brilliantly animated enemies, starfield, and a few blocky "men" scattered around the mountainous alien landscape were the only components of the game. Then the answer came to him in a dream: those seemingly pointless little men, trapped on the surface of the planet below... *they* were the ones to be defended.

Working feverishly, now with the help of additional Williams programmers, Jarvis managed to fit all of these pieces into *Defender*'s 24K of memory – all driven by a 6809 processor and 6800 sound chip – just in time for AMOA. The final product was truly an incredible achievement.

Eugene Jarvis once said, "I wanted to design a videogame where the character's behavior was not merely deterministic, but incorporated higher orders of game strategy – a rudimentary artificial intelligence as opposed to artificial stupidity."

So the enemies in *Defender* each had their own AI. The "lander" enemies would lift the men (now known as humanoids) from the surface and carry them off to the top of the screen, where – unless killed on the way up – it would transform into a deadly "mutant." The mutants, flashing in a flurry of randomized motion, would quickly zero in on the player's starship and fire away in a kamikaze collision. Even if you managed to kill the lander, the starship needed to rush to the rescue, or the humanoid – although saved from mutation – would suffer a tragic fate if it collided with the planet surface. But if all the humanoids were lost, either through mutation or a high-velocity crash, the game would end with an explosion featuring all sixteen of *Defender*'s brilliant colors along with an ensemble of triumphant alien enemies.

When it was finally unveiled at the 1980 AMOA convention, the industry consensus was that *Defender* was too complex. But when the game rolled off the production line and into arcades in December, videogame players proved them wrong as it swiftly became one of the biggest money-makers of 1981. As a result, the coin-op industry finally gave *Defender* its due when they named it "videogame of the year" at the 1981 AMOA convention – beating out such popular games as *Pac-Man*.

In the years that followed its release, more than $1.5 billion dollars in quarters were sunk into 60,000 *Defender* machines and over 5 million copies of the home cartridge version were sold, making it one of the most successful videogames of all time.

After this initial arcade smash, Eugene Jarvis founded the game development studio Vid Kidz and went on to co-design two follow-ups to *Defender* – both for Williams. The first, entitled *Stargate* (later renamed *Defender II*), was a direct sequel to the game. The final game in the trilogy, *Robotron: 2084*, was more of a departure. It was designed as a fast-paced shooter whose action employed a dual-joystick design to both destroy the attacking alien enemies and save the last human family trapped on the planet surface.

Unlike most game designers of the era, Eugene Jarvis survived the great videogame crash of 1984 with his career intact. After earning his master's at Stanford, he designed yet another game for Williams entitled *NARC*. In this anti-drug themed game, Jarvis again revolutionized the industry by using a 32-bit processor for the first time. Jarvis went on to develop the popular racing games *Cruis'n USA*, *Cruis'n World*, and the recent *Cruis'n Exotica*. Today, he's still hard at work designing arcade and home videogames for the next generation of videogame addicts. ■

"...and if you play *Defender* I could be your hyperspace."

—The Beastie Boys, "Body Movin'"

Missile Command

Atari

Missile Command, a chilling look at the realities of the Cold War, was released by Atari in the summer of 1980. One of the key programmers of their hit *Asteroids*, Lyle Rains, had been put in charge of developing a new videogame in which the player had to defend five cities on the California coastline – Eureka, San Francisco, San Luis Obispo, Los Angeles, Santa Barbara, and San Diego – against a barrage of incoming nuclear missiles to save the world from certain destruction.

Rains put a young programmer named Dave Theurer in charge of designing the game. Theurer was a perfectionist, a hard worker, and most important, a genius. He was able to perfectly visualize the gameplay – the missiles, cities, and targeting – and strip out any unnecessary elements, thus creating a simple, yet disturbingly nihilistic videogame that swiftly became one of the year's most popular in arcades.

Originally entitled *Armageddon*, the game was an apocalyptic glimpse into a virtual world devastated by the harsh realities of thermonuclear war. The game was so harrowing, in fact, that Theurer suffered recurring nightmares of missiles streaking across the night sky. Theurer went on to design such hits as the Atari color vector classic, *Tempest* – but is likely best known today for his work in creating Equilibrium's image-processing software, DeBabelizer.

Missile Command managed to perfectly capture the zeitgeist of the era, evidenced in such films as *Wargames* and the real-world realities of the "Star Wars" missile defense program, and the influence of this classic game can still be seen today in videogames like *Fantavision* for the Sony PlayStation 2. ■

Pac-Man

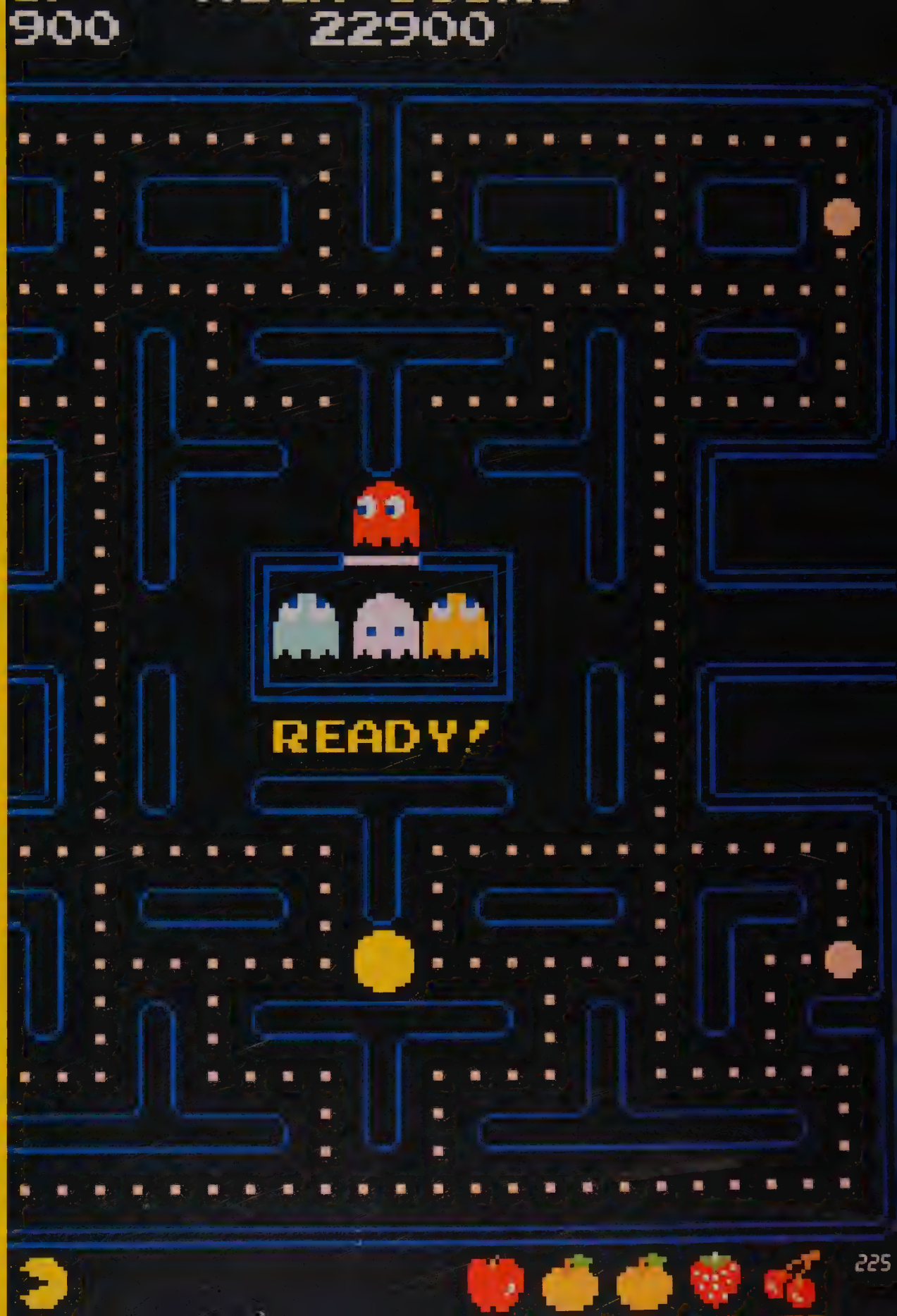
Namco

Following the incredible success of their first color arcade videogame, *Galaxian*, Namco was ready for another hit. Luckily, a young Japanese game designer named Toru Iwatani was hard at work developing a new game that would soon change the arcade world. The game was *Pac-Man*.

In *Pac-Man*, players must navigate a pie-shaped yellow spot to clear each electric blue maze of all its 240 dots and four flashing energizers to continue on to the next level of play. As Pac-Man eats the dots, four multi-colored "ghosts" named Inky, Blinky, Pinky, and Clyde relentlessly pursue him. As the gameplay progresses, various bonus fruits will appear within the maze for Pac-Man to eat for extra points. If Pac-Man is caught by the ghosts, he will disappear into a sliver of yellow phosphorescent light. But if the player consumes one of the large flashing energizer pills, the ghosts will turn blue and allow Pac-Man to eat them instead, earning up to 1600 bonus points as their disembodied eyes are sent back to their hideout where they will soon regenerate and return to the chase.

Iwatani developed complex patterns of behavior for the ghosts – a fact that has perhaps been the very root of *Pac-Man*'s lasting appeal. Although their movement seems randomized, all four ghosts follow their own individual patterns in relation to Pac-Man's position within the maze. As a result, the pattern for each maze can be memorized, allowing players to successfully and consistently clear each board in order to advance to yet higher levels of play.

In 1999, Billy Mitchell became the first player to master this arcade classic when he acheived a score of 3,333,360 in the very first perfect game of *Pac-Man* ever recorded. ■



Phoenix

Taito

Phoenix – with its dive-bombing swarms of bird-like alien enemies and twinkling starscapes – was quickly established as a seminal game in the space shooter genre. Owing to radioactive fallout on the Phoenix's nest, the mythical bird has mutated into a vicious bird of prey. Now, as these immortal birds rise from the ashes, they are allied with evil alien forces determined to steal the earth's energy.

PHOENIX RISING: Taito sales flyer for the cocktail model.

Licensed to Centuri for US release, *Phoenix* was a hit in video arcades – and was bootlegged relentlessly. With its stunning visual graphics, intense action, and extraterrestrial sound effects, the game was so popular, in fact, that Atari was quick to secure home videogame rights. Unfortunately for Atari, they weren't quite quick enough. Upstart game developers Imagic beat them to the punch when they released a similar game, *Demon Attack* – a standout title designed by Rob Fulop whose success blew away Atari's profits. ■

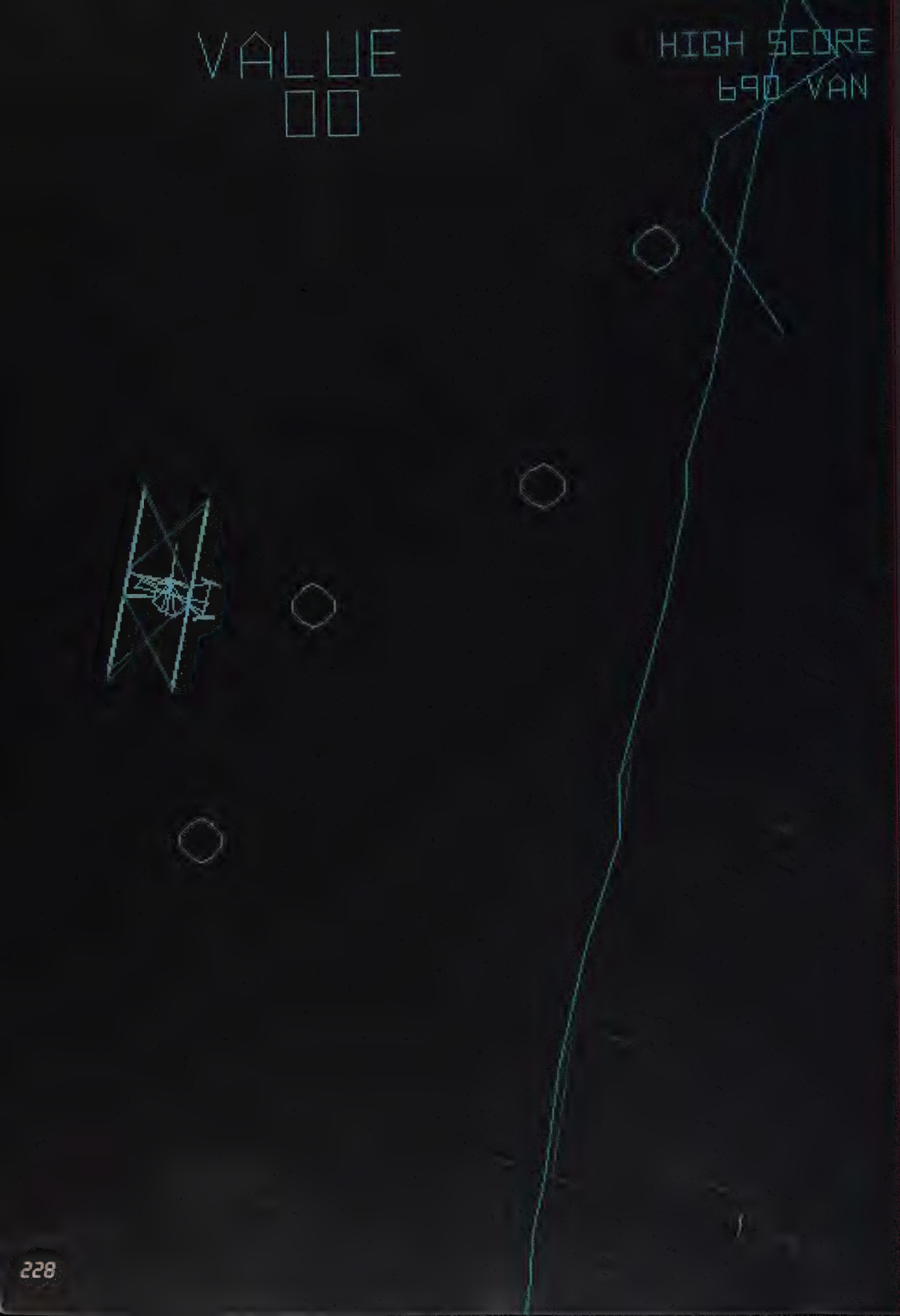
Radarscope

Nintendo

Inspired by the success of Taito's 1978 arcade smash *Space Invaders*, Nintendo began to develop original coin-operated videogames including *Othello*, *Helifire*, and *Sheriff*. Although Nintendo's entrance into the arcade arena was no doubt a success, it wasn't until the introduction of an Italian carpenter named Mario that the company would begin to evolve into the interactive entertainment empire it is today.

It all started when Nintendo released the game *Radarscope* in Japan. Despite its somewhat tired gameplay, *Radarscope* was, shockingly, one of the most popular games in Tokyo video arcades. But the most significant contribution the game has made to the history of videogames is the fact that had it not been so boring, it's quite possible that Nintendo of America would not exist today.

Following the establishment of NOA, the subsidiary's president, Minoru Arakawa, was eager to begin importing more arcade games from his parent company to sell in the United States. As a result, he placed an order for 3000 units – a very ambitious quantity – of Nintendo's latest arcade hit *Radarscope* to sell in the US. But upon its arrival, it was quickly determined that the space-age shooter wasn't the video thrill they had been expecting. Seeing the impending doom, Arakawa demanded that Nintendo send new game chips in order to convert the otherwise doomed game cabinets now sitting idly in their waterlogged warehouse. But since no new games were available, a young Nintendo designer was assigned the task of creating a new videogame for the fledgling company. That game designer was Shigeru Miyamoto, and the game he created to save Nintendo of America was none other than *Donkey Kong*. ■



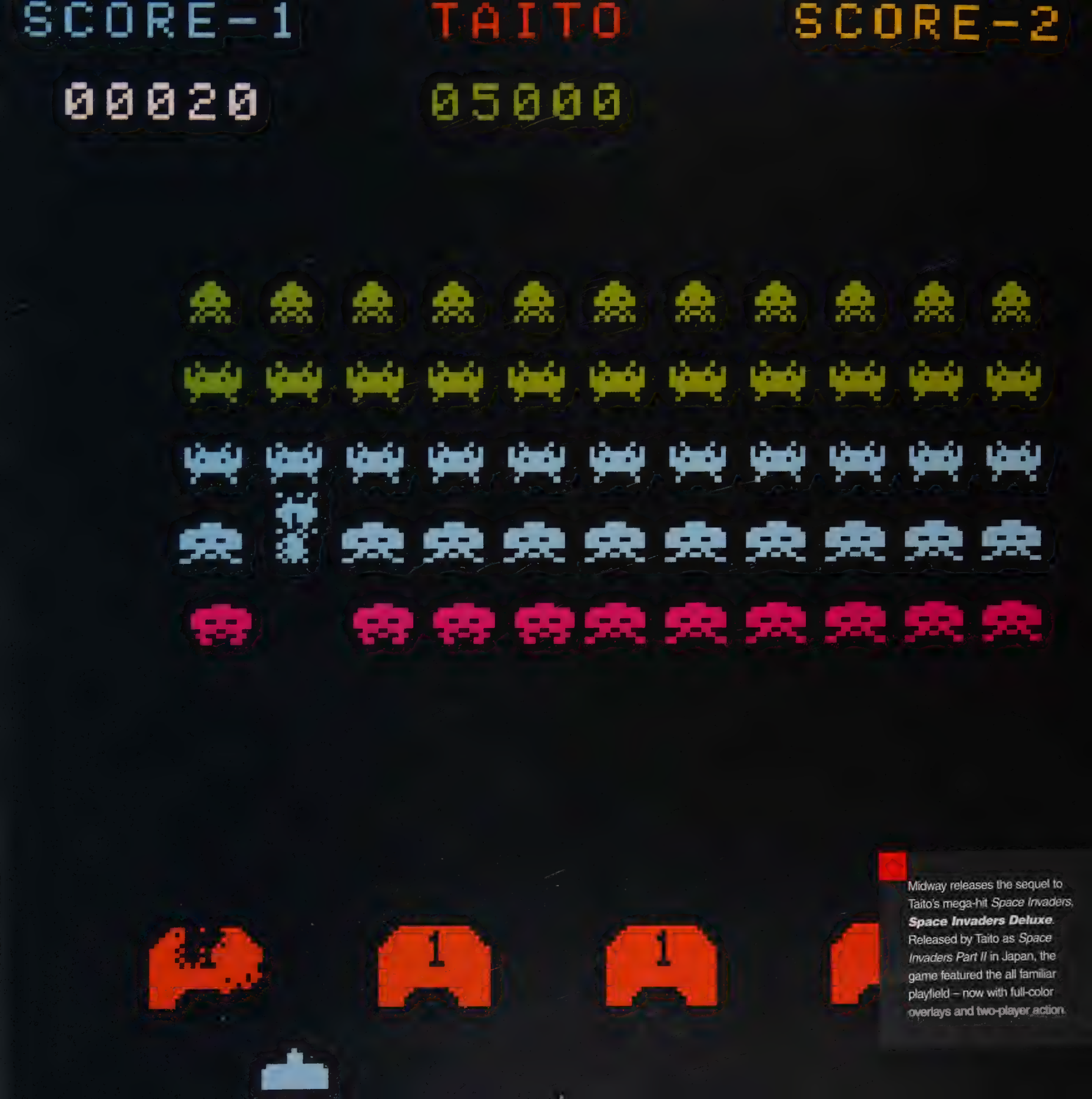
Red Baron

Atari

Red Baron – possibly the first first-person video flight simulator ever programmed – was Atari's next vector-based videogame to be developed using the 3D *Battlezone* hardware platform. This realistic aerial dogfight, with its shifting horizon line and intense enemy attacks, was played out over a treacherous three-dimensional mountain landscape.

The player is a WWI flying ace, in control of a crisp blue-framed biplane, who racks up points by shooting down enemy planes and blimps, and destroying various ground targets. As the game progresses, the speed of the enemy planes increases and the targets begin to shoot back.

Red Baron was released in both upright and cockpit models and, like *Battlezone*, was driven by a 6502 microprocessor and Pokey sound chips. In fact, most of the Red Baron upright machines were nothing more than factory conversions of *Battlezone* – with traces of its former self still faintly visible under the surface. ■



Midway releases the sequel to Taito's mega-hit *Space Invaders*, ***Space Invaders Deluxe***. Released by Taito as *Space Invaders Part II* in Japan, the game featured the all familiar playfield – now with full-color overlays and two-player action.

Star Castle

Cinematronics

Designed by Tim Skelly in collaboration with Scott Boden, *Star Castle* is perhaps one of the more well-known videogames released by Cinematronics.

The object of the game was to shoot through three rings that rotated around a central enemy base (the Star Castle) in order to hit the ship inside. Tim Skelly recalls, "The game was made much more interesting by the fact that the enemy's shots – very accurate and deadly – could not pass through the existing ring segments. This meant that by shooting out the shield, the player was eliminating the one thing that was protecting him from that nasty gun in the center."

The player scores points by hitting and destroying the ring segments as well as by shooting the enemy inside – also, a direct hit on the center ship resulted in an extra life. Also a threat to the player were deadly sparks that would shoot out from the center of the base and jump outward, moving from ring to ring. Destroying a ring segment holding a spark would cause it to float toward the player's ship forcing them to take evasive action.

With its crisp vector graphics, colorful monitor overlays, and original gameplay, *Star Castle* was a standout success for Cinematronics. ■

Stratovox, developed by Taito of Japan, was one of the first videogames to feature true synthesized speech. The object of the game is to prevent the abduction of your astronauts – "Help me! Help Me!" – lined up vertically on the right of the screen by invading aliens.

1UP 00
HIGH SCORE
2UP
GAME OVER

1981

The premiere issue of *Electronic Games*, the first videogame enthusiast magazine, is published – Warner/Amex launches a new cable television channel that plays nothing but music videos called MTV — Nintendo of America estimates that videogame sales will reach $465 million this year...

Pac-Man Fever

Pac-Man exploded in 1981. America was on the cusp of what would become known as the Golden Age of videogames – a time when *Pac-Man* was king, status was determined by your high score, and videogames were blitzing the world. That year, approximately 250 million games of *Pac-Man* were being played on over 100,000 *Pac-Man* machines in arcades every week – fueling a craze that swept through pop culture like an electronic dot-eating tsunami – and sending *Pac-Man* fast on its way to becoming the most important game of the twentieth century.

The flood of *Pac-Man* branded merchandise that followed the game's release included everything from Aladdin Pac-Man lunchboxes, glittery iron-on "Pac-Man Fever" t-shirts, "I brake for Pac-Man" bumper stickers, Chef Boyardee Pac-Man pasta, *How To Win At Pac-Man* strategy guides, Pac-Man breakfast cereal, collectible Arby's Pac-Man tumblers, Pac-Man sleeping bags, Hippity-Hops, drum kits, birthday party theme sets, plush toys, trading cards, candy, novelty phones, wind-up toys, board games, and even a Pac-Man cartoon on ABC's *Saturday Supercade* – all licensed by Bally/Midway Manufacturing Co.

Add this up along with the myriad home videogame ports released by Atari; knock-off carts like *Escape*, *K.C. Munchkin*, and *Jawbreaker*; handheld games by Coleco, Entex, and Tomytronic; official arcade spin-offs including *Ms. Pac-Man*, *Baby Pac-Man*, *Jr. Pac-Man*, *Super Pac-Man*, *Pac-Land, and Pac-Mania*; shameless rip-offs like *Hanglyman*, *Mazeman*, *Piranha*, and *Puck-Man*; plus enough bogus bootleg Pac-Man merch to fill warehouses from Taiwan to Trenton – and one quickly realizes that there was much more to this craze than simply a popular arcade videogame…

Pac-Man Fever was now an officially licensed global phenomenon.

The secret to *Pac-Man*'s staggering success was found not in the high scores of the kids who relentlessly sank their milk money into the games – but in the fact that *Pac-Man* provided the much needed mascot for our new high-tech pixellated world of tomorrow. As a result, *Pac-Man* became the first breakthrough game for the industry – and the first true icon of the videogame age.

Pac-Man was the first videogame to transcend the demographic of hardcore teenage arcade rats and computer engineering geeks. The game appealed to an audience far broader than industry pundits had ever dreamed possible. Everybody loved *Pac-Man*. Kids, teens, college students, moms, dads, doctors, lawyers… even Wall Street executives. It seemed that nobody was immune to the appeal of *Pac-Man*'s hypnotic blue haze as office workers of every gender and profession filled game rooms to maximum capacity. In arcades across the country the most dedicated fans seemed to be the lunch hour videogame jockeys who descended upon downtown arcades for their daily dot-munching fix – with not a single teenage truant in sight.

Seemingly overnight, the game had become the number one entertainment attraction in the world, and everybody wanted in on the action. In video arcades, pizza parlors, supermarkets, country clubs, cocktail lounges, and family rooms across the country – the "Wocka-Wocka" roar of Pac-Mania had become the universal anthem of a new videogame generation.

Soon enough, *Pac-Man* began to creep into the mainstream media as magazines, newspapers, and the six o'clock news all began to feature trend pieces on everyone's favorite yellow technological fad. Even primetime was cashing in: on an episode of the award-winning comedy series, *Taxi*, Alex becomes so addicted to *Pac-Man* that he is sent to videogame rehab. And in a memorable episode of *Diff'rent Strokes*, Arnold is shoveling breakfast cereal into his mouth so fast that Mr. Drummond says, "Arnold, you're eating so fast, you look like Pac-Man!" Canned laughter ensued, as did the rush of coins into the cashbox.

But Pac-Man Fever reached a fever pitch when Columbia recording artists Buckner & Garcia released a single entitled "Pac-Man Fever" – a song about a young Pac-Man player headed to the local arcade. This search for validation in the form of a high score was a theme that every vidiot could relate to, and "Pac-Man Fever" was quickly thrown into heavy rotation on radio stations across America. In 1982, Buckner & Garcia released a full-length album of arcade songs entitled *Pac-Man Fever* that included "Do The Donkey Kong" and "The Defender." Unfortunately, none of their follow-up singles achieved the level of success that the group had earned with their signature hit, and Buckner & Garcia soon faded into obscurity along with all the other one-hit wonders of the '80s.

Pac-Man was first hero of the Golden Age – a pixellated messiah sent to convert the masses to the silicon sect. As its legacy, *Pac-Man* introduced a new breed of game characters that would become the future heroes – and licensing giants – of the interactive entertainment universe. Mario, Sonic, and a little yellow pocket monster named Pikachu will all forever be in his debt. ■

IMAGE: PREVIOUS: COURTESY MARK DAVIDSON/THE BASEMENT ARCADE (BASEMENTARCADE.COM); FAR RIGHT: COURTESY VIDEOGAMES.COM

In 1999, videogame legend **Billy Mitchell** became the first player to master the ghosts of this arcade classic when he achieved a score of 3,333,360 points at Funspot Arcade in the first perfect game of *Pac-Man* ever recorded.

"The thing with *Pac-Man*, is that you've
got to decimate, before you're decimated.
It's just like life." —Jeff Spicoli, Fast Times at Ridgemont High

IMAGE COURTESY UNIVERSAL STUDIOS

WAR GALAXY
INTERNATIONAL
SCOREBOARD

Twin Galaxies

Established by Walter Day on November 10, 1981 in Ottumwa, Iowa, the Twin Galaxies arcade was just a small-town arcade in a storefront shop on Main Street USA – little did he know that it would soon become the most famous arcade in the world.

Walter Day – a visionary and videogame fanatic – had been collecting high scores for over a year at arcades all across the midwest – mostly as a hobby, but also because he felt compelled to honor the new superstars of the videogame world, the ace players who sunk rolls of quarters and blistered their fingers on their favorite arcade games in order to achieve the ultimate high score.

When Day realized that nobody was keeping an official list of the nation's high scoring players, he volunteered to perform the service for the industry – an offer that the game magazines, media, and manufacturers gratefully accepted. He dubbed his list the Twin Galaxies International Scoreboard. So now, as the official videogame scorekeeper to the world, Day and the Scoreboard helped turn game playing into an organized sport – complete with its own set of official rules, tournament settings, world records, and a brand new breed of adrenaline-fueled joystick superstars.

Now as the primary generator of news coverage for the videogame industry, Twin Galaxies – and its relentless media pundit, Walter Day – supplied the videogame magazines and the mainstream media with updates on the current high scores on every arcade game, news stories profiling the world's best players, and high-profile media events to further fuel the videogame phenomenon. The media frenzy that ensued reached a fever pitch in November 1982 when

SCOREKEEPER TO THE STARS: Walter Day at Twin Galaxies arcade in 1981.

Life magazine visited Twin Galaxies to capture sixteen of America's best videogame players in a photograph for their special issue, "The Year In Pictures." Then, in January 1983, ABC's *That's Incredible* came to Ottumwa to film the world's top players competing in the first ever Videogame Olympics. As a result, Twin Galaxies became an intergalactic arcade celebrity.

In recognition of Walter Day's achievements, and the positive publicity that he generated for the videogame industry, Governor Terry Branstad and Mayor Jerry Parker joined the AMOA and Atari in officially naming Ottumwa – and the infamous Twin Galaxies arcade – "The Videogame Capital of the Universe." ■

IMAGE: LEFT: COURTESY CARY HAHN; RIGHT: COURTESY THE OTTUMWA COURIER; FAR RIGHT: COURTESY WALTER DAY

Interview:

Walter Day

Walter Day is widely recognized as the patron saint of the videogame age. Acting as a cheerleader for the videogame industry and scorekeeper to the world, Walter has organized events that have defined the Golden Age and preserved its history.

Walter is the editor of *Twin Galaxies' Official Videogame & Pinball Book of World Records* – the official book of records listing the high scores on arcade videogames, pinball, home videogames, and network games. So.

How did you first get involved in the videogame industry?
I fell in love with videogames when I became addicted to playing *Space Invaders* in 1980. Then I got hooked on *Pac-Man*. I considered it a challenge to break my own high score again and again, so I went on the road in order to find great *Pac-Man* players who could teach me tricks. As I travelled from arcade to arcade, I began to create a high-score database of all the games. This repository of scores evolved into the Twin Galaxies Intergalactic Scoreboard.

What was it that inspired you to open Twin Galaxies?
It was an excuse to play more and more videogames. By the time I opened Twin Galaxies in 1981, I was working on personal high scores on many games, including *Gorf*, *Make Trax*, *Centipede*, and *Berzerk*.

What was the first high score on the official scoreboard?
I had already gathered high scores from fifteen different states – from California to Illinois – before the "Official Scoreboard" was established on February 9, 1982. However, the first score to come in on our first day of activity was from Casey Murphy in Goodlettsville, TN for *Galaga*.

What is your favorite videogame?
My three favorite classic titles are *Tutankham*, *Make Trax*, and *Centipede*. ■

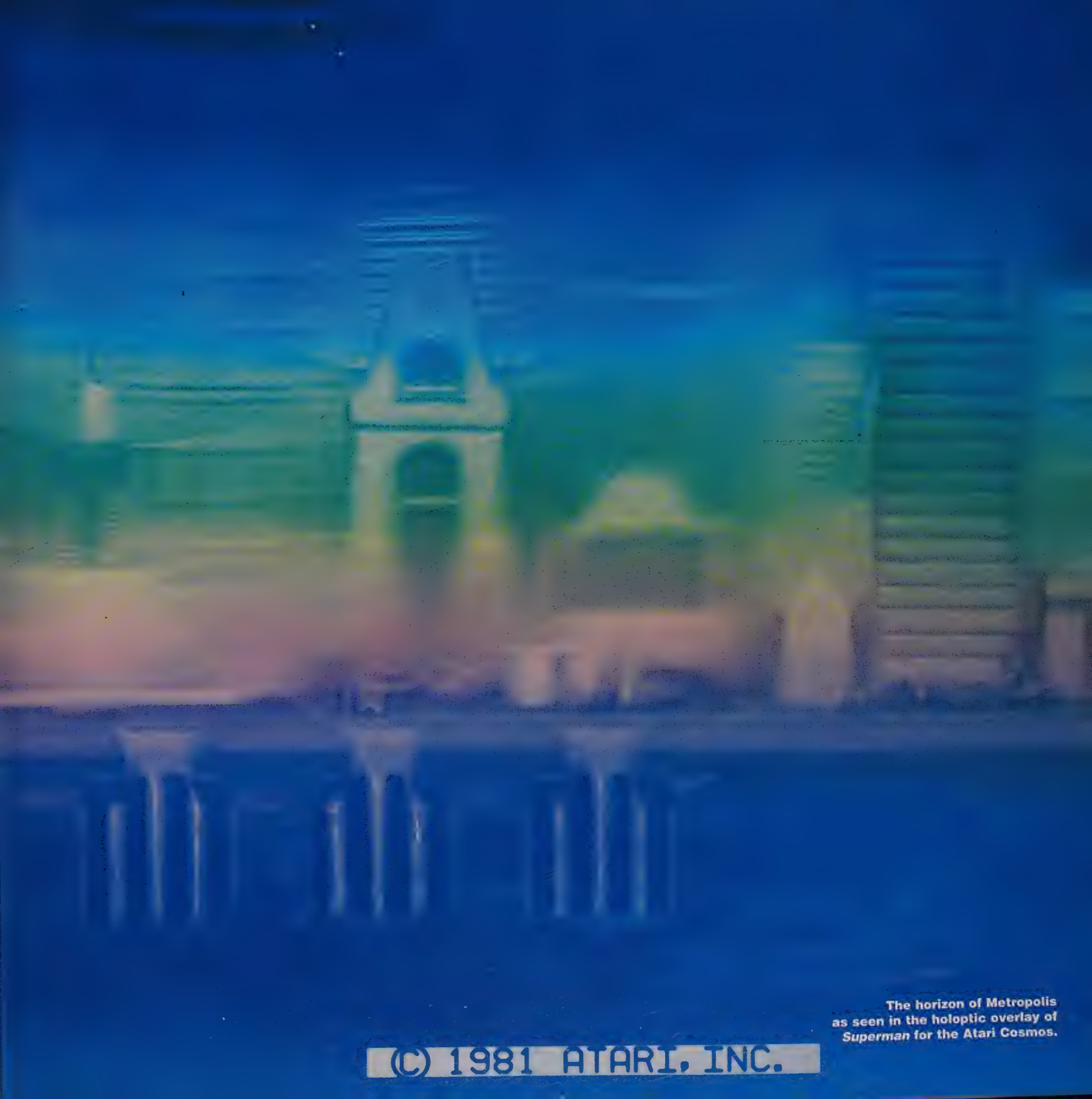
Cosmos

Atari

In early 1978, Atari began an exploration in interactive holography introduced by the creator of Pong, Al Alcorn, along with Atari engineers Harry Jenkins and Roger Hector. The project was called Cosmos. This innovative new game system, based on the COPS411 microchip, consisted of a portable tabletop videogame that featured three-dimensional "holoptic" graphics on an LCD playfield and dynamic sound effects. Atari realized that Cosmos had the potential to reinvent the home videogame industry.

Cosmos was announced at Toy Fair in 1981 and touted as the hottest breakthrough in the history of electronic games. The programmable videogame system, with its ground-breaking new holographic technology, was slated to launch with eight plug-in cartridges including *Asteroids*, *Destroyer*, *Outlaw*, *Space Invaders*, and *Superman*. But Cosmos would, sadly, never see a toy store shelf.

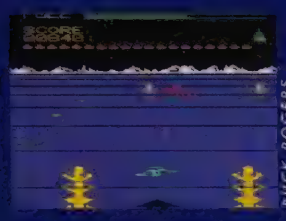
The restrictions placed on R&D following the Warner takeover finally began to take its toll on the Cosmos project. On top of that, there were rumors that Ray Kassar had lost his faith in Cosmos – as well as the future of holographic technology – and decided to focus Atari's marketing efforts on the Atari VCS. ■



The horizon of Metropolis as seen in the holoptic overlay of *Superman* for the Atari Cosmos.

(C) 1981 ATARI, INC.

ARCADIA



Commodore VIC-20

Commodore

Following the success of the Commodore PET, Jack Tramiel unveiled a stripped-down personal computer system at the summer CES Show that would take the home computing world by storm. It was called the Commodore VIC-20. The system – designed around the MOS 6502 microprocessor – featured 5K RAM, keyboard, and built-in cartridge interface – all for the unbelievably low retail price of under $300. It was a breakthrough for the computer industry, bringing the power of home computing, as well as arcade-quality videogame graphics, to the consumer for less than the cost of most home videogame consoles.

Originally designed by engineers Bill Seiler and John Feagans, the VIC-20 – built around the 6560 video interface chip – was originally conceived as a low-cost color home computer. When the team learned of Commodore's desire to market just such a machine (another engineer, Bob Yannes, was working on a similar, yet more videogame-oriented system), they shifted their development efforts into high gear.

The VIC-20 prototype previewed in 1981 was built at the last minute using the 6560, some surplus 1K chips, an old calculator casing, and spare PET parts. Since the team had no name for the new system, it was simply called the MicroPET. They then modified a few PET games to display color on the VIC's display, and shipped it off to Vegas. It was the hit of the CES show floor.

The original VIC-20 design was introduced in Japan at Seibu Department Stores as the VIC-1001, and was later launched in the US and Europe as the VIC-20 (the number 20 was chosen simply because it sounded "friendly" – it has no connection to any technical feature whatsoever). The system itself came packaged in a silver box complete with power supply, RF modulator, and the owner's manual entitled *Personal Computing on the VIC-20: A Friendly Computer Guide*.

THE VIC-20: Image from the *Programmer's Reference Guide*.

Some of the optional peripherals available for the system included the external "Datassette" tape drive, disk drive, modem, light pen, joysticks, and voice-synthesis module. An impressive library of over 160 game cartridges were also released for the VIC that included ports of popular console games from the likes of Atarisoft, Imagic, and Parker Brothers – as well as original videogames developed by Commodore.

The first VIC-20s landed on store shelves just in time for Christmas 1981. Parents flocked to buy this new affordable computer system for their kids at K-Mart, Kay-Bee, Toys "R" Us, and Sears stores nationwide. Commodore's choice of non-traditional computer retail outlets was a brilliant distribution plan that made the VIC-20 truly one of the most accessible home computer systems ever made. During that year, production peaked at over 61,000 systems a week and by 1982, sales would reach over $305 million – making the Commodore VIC-20 the first microcomputer to sell over 1 million units.

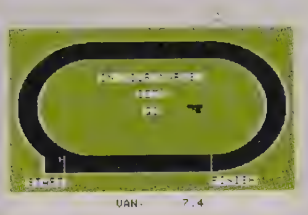
The Commodore VIC-20 quickly became one of the most popular home computers ever made, owing mostly to the fact that it was the first color computer to break the critical $300 price point. The system competed directly with the $499 Atari 400 in the US – but with its incredibly low price, it quickly claimed the lion's share of the market. Television and print campaigns for the VIC-20 featured none other than *Star Trek*'s Captain Kirk himself, William Shatner, hyping the VIC-20 as "The Wonder Computer of the 1980s."

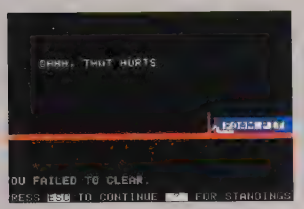
The VIC-20 introduced millions of people to the world of programming, further fueling the home computing revolution and breeding a new culture of bedroom hackers who would grow up to become the programming visionaries of today. A total of nearly 2.5 million Commodore VIC-20s were sold, but its success would soon be eclipsed by Commodore's next generation home computer that would spell the beginning of the end for VIC – the Commodore 64. ■

IMAGE: LEFT: COURTESY BORIS VAN SCHOOTEN

IBM PC

International Business Machines





***Olympic Decathlon*, one of Microsoft's first consumer videogame software releases, was introduced in 1981.**

In the summer of 1980, representatives of IBM met for the first time with co-founder of Microsoft, Bill Gates, to discuss Microsoft writing a new disk operating system, DOS, for IBM's new top secret personal computer. IBM had been closely observing the booming personal computer market and was jonesing to launch a new computer system. It's rumored that the company had even considered buying Atari in order to commandeer their 400/800 line of personal computers. But, instead, IBM decided to develop a new operating system to release on their own. The secret project was referred to by the code-name "Project Chess," with the new computer known only as "Acorn." A team of engineers led by William Lowe were assembled to develop Acorn and dispatched to sunny Boca Raton, Florida.

In August 1981, IBM held a press conference in New York City to introduce their new personal computer, now renamed the IBM PC. The system, based on a revolutionary open architecture, ran on a 16-bit 4.77 MHz Intel 8088 microprocessor, and shipped with 16K RAM (expandable to 256K), a 160K single-sided 5.25" floppy disk drive, built in MS-DOS, and a 12" monochrome monitor. The system was initially sold exclusively through Computerland stores and Sears Business Centers for the retail price of $2,880. The system sold nearly 675,000 units.

Although personal computers were nothing new, what set the IBM PC apart was its software. And MS-DOS was only the beginning. The program, a new operating system inspired by CP/M, was the first foray by fledgling software company, Microsoft, into the world of the mass-market PC. Little did they know how much they would grow.

Microsoft was founded in 1975 by Bill Gates and his longtime friend, Paul Allen, to write software for the MITS Altair, the first personal computer kit available to the consumer market. Their first program, Microsoft BASIC, was an unqualified success. After terminating their exclusive license with MITS, Microsoft went on to license BASIC for the Commodore PET and TRS-80 home computers, and began negotiating with other companies including Apple Computer. The company grew and expanded from three to over one hundred employees, with annual sales exceeding $1 million.

By 1981, Microsoft had moved the company to the Pacific Northwest – Gates' and Allen's hometown – where they continued to expand. Microsoft now had a BASIC compiler for nearly every microcomputer on the market. But the company recognized early on that computer languages were only a small fraction of the software market, and soon formed a Consumer Products division. Created to develop and market retail products to the end consumer, Microsoft's first computer game releases, *Olympic Decathlon* and *Adventure*, were among the division's greatest successes. Written for the IBM PC, as well as systems like the Apple II, these games went on to build the foundation of what would evolve into the greatest software empire ever known.

Today, Microsoft is the worldwide leader in personal and business computing software, with annual revenues of nearly $20 billion, and 32,000 employees worldwide. The new Microsoft Games division – including Microsoft's PC, Xbox, and online games businesses, and such popular franchises as *Return of Arcade*, *Flight Simulator*, *MechWarrior*, and *Age of Empires* – is now one of the largest computer game publishers in the world. But in the fall of 2001, the company will change the face of videogaming with the introduction of the Xbox, its first home videogame console, which will capitalize on the company's software expertise and advanced technology to usher in the next generation in home videogames.

IBM is today the world's largest information technology company, and a leader in e-business and computer systems. As for the IBM PC, four months after it was introduced, *Time* magazine named the new computer "Man of the Year" – the first time the award was ever bestowed upon a silicon-based life form. ■

IMAGE: RIGHT: COURTESY IBM

IBM

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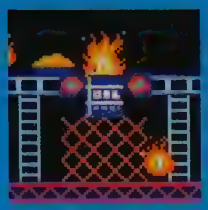

Donkey Kong

Nintendo

BY STEVEN L. KENT

Judged strictly by its gameplay, *Donkey Kong* is certainly one of the all-time classic games – but throw in the mystery, history, and court battles that evolved around it, and *Donkey Kong* is likely the most intriguing videogame ever made.

In 1980, with thousands of unsold *Radarscope* machines sitting in their Seattle warehouse, Nintendo of America president, Minoru Arakawa, called on Hiroshi Yamauchi, chairman of Nintendo in Japan, asking for a miracle to save the arcade games – as well as his company.

Yamauchi turned to Shigeru Miyamoto, a recent Nintendo hire. A banjo-playing Bluegrass-loving kid with a Beatles haircut, Miyamoto was anything but a typical Japanese overachiever. Hired as Nintendo's corporate artist, Miyamoto had a degree in industrial design and wanted to make toys. When Yamauchi asked him if he could design videogames, he said he would love to.

Yamauchi assigned Miyamoto to work with Gunpei Yokoi – the late dean of Nintendo's engineers and designer of the original Game Boy handheld videogame system – to design a new game to rescue NOA. That game was *Donkey Kong*. The consummate tinkerer, Yokoi was the engineer who powered Nintendo's transition from *hanafuda* playing cards to videogames and had designed the company's first toys and arcade games – including the ill-fated *Radarscope*.

In those early days, Miyamoto knew little about game hardware and its limitations, so it became Yokoi's responsibility to remind Miyamoto of such things. In later interviews, Yokoi said that he liked Miyamoto and thought he had good ideas. The entire *Donkey Kong* team consisted of Miyamoto, Yokoi, two programmers, and one person to do the music. Because Nintendo of America already had nearly 2,000 *Radarscope* machines sitting in their inventory, Yamauchi asked Yokoi to package *Donkey Kong* as a conversion kit to be installed in the unwanted machines.

Miyamoto says that he had wanted *Donkey Kong* to be the first videogame with a story. The idea was that an ape escapes from its owner and steals his girlfriend, Pauline, spiriting her off to the top of a construction site. The player must then brave barrels, fireballs, and cement pies in an effort to rescue her.

By the time *Donkey Kong* arrived in the United States, Ron Judy and Al Stone, Nintendo of America's sales reps, were threatening to leave the company. Nintendo arcade games didn't sell, and they were going bankrupt trying to represent them. Arakawa promised them that this next game would be different. But when they heard that the name of this new miracle game was "Stubborn Gorilla" Judy and Stone almost quit on the spot. But after seeing Nintendo employees play the addictive game, they decided to give Nintendo – and *Donkey Kong* – one last chance.

They ended up selling over 80,000 *Donkey Kong* machines in the US alone, making them all multi-millionaires.

But the *Donkey Kong* story does not end there. MCA Universal – parent company of Universal Studios who released the 1976 film *King Kong* – sued Nintendo claiming that the game infringed on their *King Kong* copyright. As the pending court action heated up, MCA Universal president Sidney Sheinberg also threatened dozens of companies that had signed licensing contracts with Nintendo – including Coleco who was planning to launch the home version of *Donkey Kong* with their upcoming ColecoVision system – into settling out of court.

But Nintendo of America's outside legal counsel – and later NOA Chairman – Howard Lincoln, was undaunted. In his book *Game Over*, David Sheff describes a scene in which Lincoln tells an enraged Sheinberg straight to his face, "We have no intention of settling." Sheinberg vowed that Nintendo would regret their defiance and replied, "I view litigation as a profit center."

When the case finally came to trial, MCA Universal claimed ownership of the name "Kong" and sought damages estimated at $5 million. In his testimony, Miyamoto told the court that he did not intend to steal the *King Kong* image – he had simply looked up the American word for "gorilla" in a Japanese-to-English dictionary and happened to like the word "kong." (Rumors still persist that the game was originally entitled *Monkey Kong*. If so, this would hurt Nintendo's original claim.)

In the end, the case was decided not by Miyamoto's testimony, but by MCA Universal's arrogance, and Howard Lincoln's unwavering belief in their case. He sought to prove that MCA Universal didn't even own the rights to *King Kong* and therefore had no grounds to claim copyright infringement. Lincoln discovered that in 1975, MCA Universal had sued RKO Pictures, producers of the original *King Kong* released in 1933, claiming that the movie was over 50 years old and that the name "King Kong" had fallen into the public domain, free from copyright protection – a fact that subsequently destroyed Universal's case and motivated the judge to award damages of $1.8 million to Nintendo.

With the lawsuit out of the way, *Donkey Kong* went on to become the second most popular license of the Golden Age of videogame arcades – surpassed only by Namco's *Pac-Man* – and introduced the world to a little Italian carpenter-turned-plumber named Mario.

But more important, *Donkey Kong* launched the career of one of the videogame industry's most prolific designers, Shigeru Miyamoto, who went on to design such legendary videogames as *Super Mario Bros.* and *The Legend of Zelda*. It also secured Nintendo's fate as the multi-billion dollar global interactive entertainment empire responsible for such successful products as the Nintendo Entertainment System, N64, Game Boy Color, and Pokémon – as well as their upcoming 400MHz videogame system, GameCube. ■

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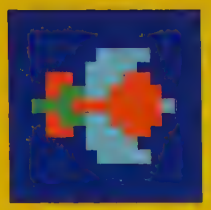


Frogger

Sega/Gremlin

Originally developed by Konami and released in the US by Sega, *Frogger* is no doubt one of the most loved arcade videogames of the '80s. Its classic characters and theme have made it a favorite among gamers of all ages.

In 1981, *Frogger* leapt onto the videogame scene with its pixellated green graphics and addictive gameplay – miraculously transforming legions of hardcore gamers into log-hopping lunatics. The goal of this platform game is to transport your frogs safely across a busy highway packed with lanes of speeding cars and trucks, over a treacherous river filled with hungry gators and diving turtles, and home to the lily pads up along the top of the screen. Bonus points are earned for eating flies and escorting lady frogs home along the way. Finally, when all five frogs are safe on their lily pads, the level is cleared and the player advances to the next screen – now with even faster cars and yet more deadly enemies in your path.

THE FROGGER: George joins the *Frogger* Hall of Fame in *Seinfeld*.

Although the gameplay was relatively simplistic, the complex strategies, tricks, and programming bugs rampant in *Frogger* made it one of the more challenging games for the advanced videogame player to master. For example, the game was capable of generating a random "kill screen" – a screen engineered to end the game (usually found on the very last level of play when the program has run out of code to execute) at any point in the game, thus making it impossible to successfully navigate the frog across the river and, as a result, impossible to clear the board – no matter what a player's skill level or score. However, some of *Frogger*'s bugs worked in the player's favor with invisible bonuses, secret passages off-screen, and tricks making it possible for experienced players to rack up even higher scores.

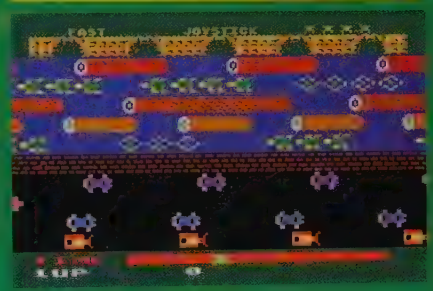
Frogger was so popular that the game was ported to nearly every home videogame system released in the '80s and '90s – Atari VCS, Intellivision, Atari 5200, ColecoVision, Commodore 64, SuperNES, Genesis, Game Boy, as well as the Mac and PC all have their own version of this arcade classic. Even today, the game has been recently revamped by Hasbro Interactive and re-released under their new Atari label as *Frogger* and *Frogger 2*, now for modern game platforms including N64, Sony PlayStation, and Sega Dreamcast.

Frogger is so deeply embedded in the American cultural consciousness that a 1998 episode of the hit TV sitcom *Seinfeld* was dedicated to the little green lily leaper. In the episode "The Frogger," the character George Costanza attempts to rescue a vintage *Frogger* arcade videogame – on which he holds the all-time high score of 860,000 points – from a local pizza parlor that is now going out of business. He becomes so obsessed with saving the game that he resorts to stealing the machine in order to forever preserve his place in the *Frogger* Hall Of Fame. The episode ends in a hilarious scene that has George wheeling the generic wood-grain laminate Sega Convert-A-Cabinet across a busy Manhattan street, as he dodges cars and delivery trucks – hopping back and forth between lanes of traffic as the game's theme music plays merrily in the background – in his final desperate attempt to deliver *Frogger* safely to the other side. ■

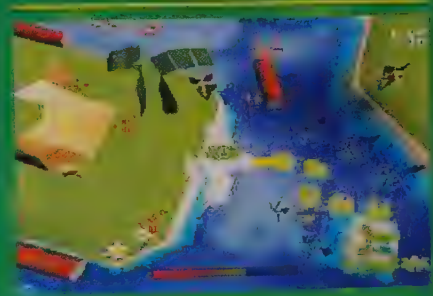
The Evolution of *Frogger*

Its numerous appearances on home videogame systems following the arcade release in 1981 have made *Frogger* one of the most timeless games of the videogame age. Here's a collection of *Frogger*'s most memorable home versions...

▲ *Frogger* makes its 8-bit home videogame debut in 1981, in a cartridge released by Parker Brothers for the Atari VCS.



▲ *Frogger* then received a much-needed makeover for the next generation Atari 5200 in 1982. Though the graphics were fantastic, the new interface was not.



▲ Then, in 1998, *Frogger* took the leap into three dimensions in Hasbro's latest update on the arcade classic for modern platforms with the release of *Frogger 3D* and *Frogger 2: Swampy's Revenge*.

IMAGE: NEAR RIGHT: COURTESY COLUMBIA TRISTAR TELEVISION

Galaga

Bally/Midway

Developed by Namco, Ltd. and licensed to Midway for US distribution, *Galaga* was released as the follow-up to its interstellar 1979 arcade hit, *Galaxian*.

Galaga – with its multiple stages, bonus levels, new "double shooter" capability, and advanced enemy AI – was a dramatic improvement in both concept and gameplay over its predecessor. Although the spirit of this fast-paced space shooter was firmly rooted in the legacy of the *Galaxian* universe, they added many facets to the game design that made for an infinitely more exciting, challenging, and addictive player experience. *Galaga* featured new levels – increasing in both speed and difficulty as the game progressed – which consisted of waves of attacking alien armadas and a new "Challenging Stage" that allowed players to score up to 10,000 bonus points a pop. *Galaga* soon became a favorite in arcades around the world, and inspired such popular arcade sequels as *Galaga '88*, *Gaplus*, *Galaxian 3*, and *Attack of the Zolgear*. ■

Gorf

Bally/Midway

In 1981, Bally/Midway released a brave new entry into the brand new world of synthesized arcade speech. Designed by Bally Professional Arcade programmer, Jamie Fenton, *Gorf* was a mix of proven videogame scenarios combined with a revolutionary new audio chip that boldly declared "I am Gorf."

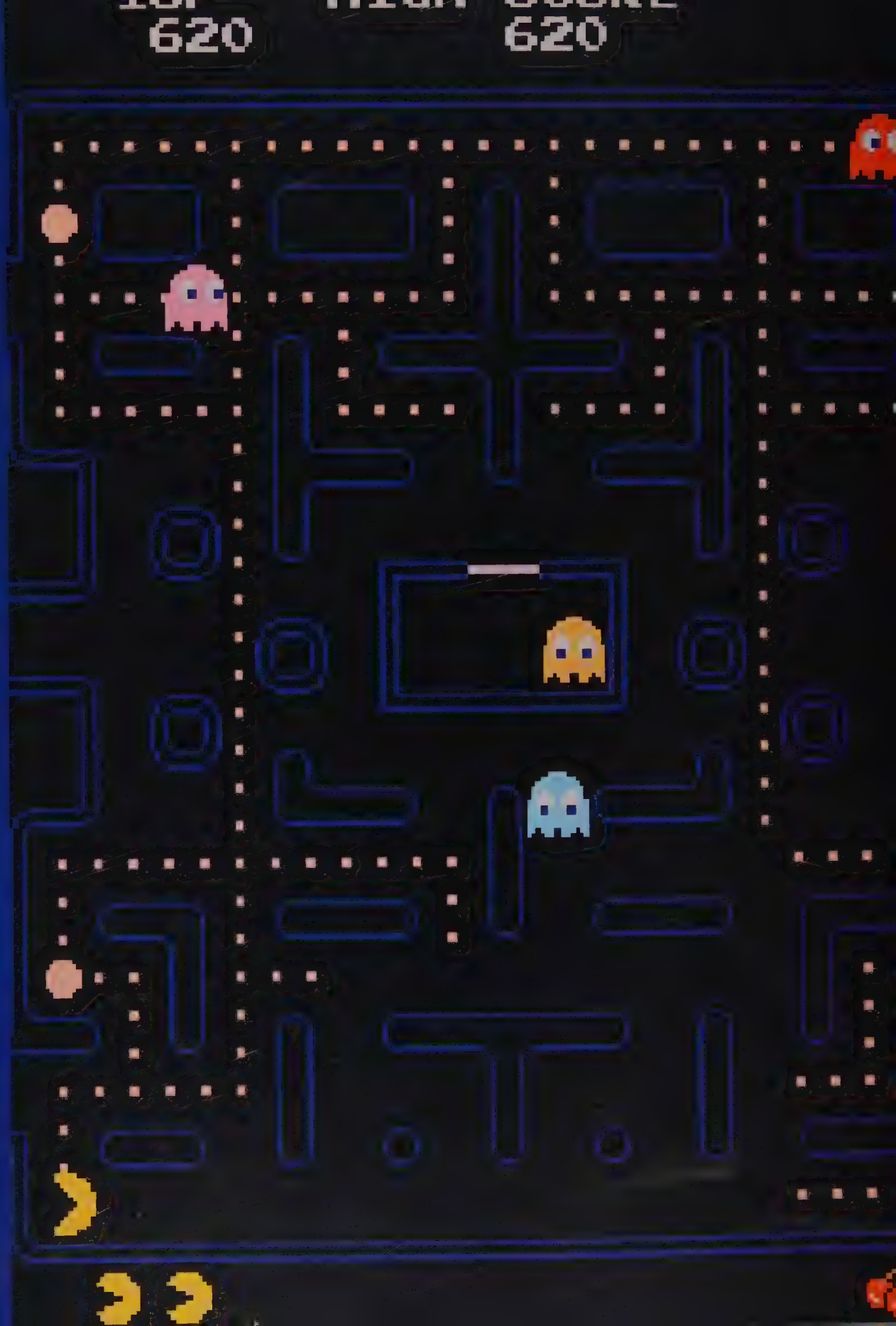
Your goal is to defeat the Gorfian Empire as you defend your planet in five distinct stages – the first instance of separate play levels in arcade history. The first mission is derivative of Taito's *Space Invaders* with a phalanx of alien enemies marching down. The second, Laser Attack, pits the player against two squads of five dive-bombing spaceships, each firing long laser beams. The third level is similar to *Galaxian* (the name was changed for the home console version owing to licensing issues) with an armada of swooping ships. In the fourth stage, the player fights a series of aliens that spiral toward the player, shooting fire-balls in a deadly space warp. And in the fifth mission the player finally faces the evil Gorfian Flagship – break through the ship's outer defenses to fire a shot directly into the reactor core, and the universe will be saved. Long live Gorf. ■

Hangly Man

Nittoh

Nittoh's *Hangly Man* – whose name is possibly derived from the Japlish mangling of the word "hungry" – is perhaps one of the more ambitious, if not more original, bootlegs of Namco's hit *Pac-Man* to flood arcades in 1981. But this game – with its malformed and often invisible blue mazes, ghosts, dots, and flashing power pellets – is far too similar in theory to the original to be interesting. Nittoh even included the original, and considerably less catchy, Namco character names of the ghosts Inky, Blinky, Pinky, and Clyde – Kimagure, Oikake, Okoboke, and Machibuse – a point that makes it all the more forgettable.

Infinitely more inspired was GL's quirky *Pac-Man* conversion, *Piranha* – a game that replaced Pac-Man with a nasty red flesh-eating fish. Crawling crabs were also substituted for the classic cherry bonus, and the four ghosts were transformed into undulating multi-colored squid, swimming within a wavy blue underwater maze. As far as bootlegs went, this game was truly original – and infinitely more interesting than "official" spin-offs like Bally/Midway's *Pac-Man Plus* could ever hope to be. ■



In ***Jump Bug***, developed by Hoei and released by Rock-Ola, you control a cute red VW Bug that must jump through eight challenging scenes – from a city skyline, to ruins, to underground caverns – collecting money bags and jewels along the way.

Kaos

Game Plan

BY WILLIAM CASSIDY

In 1983, Illinois pinball manufacturer Game Plan Inc. entered into the videogame arena to bring *Kaos* to the world... or at least to the tiny diner in southern Ohio where I fell in love with it.

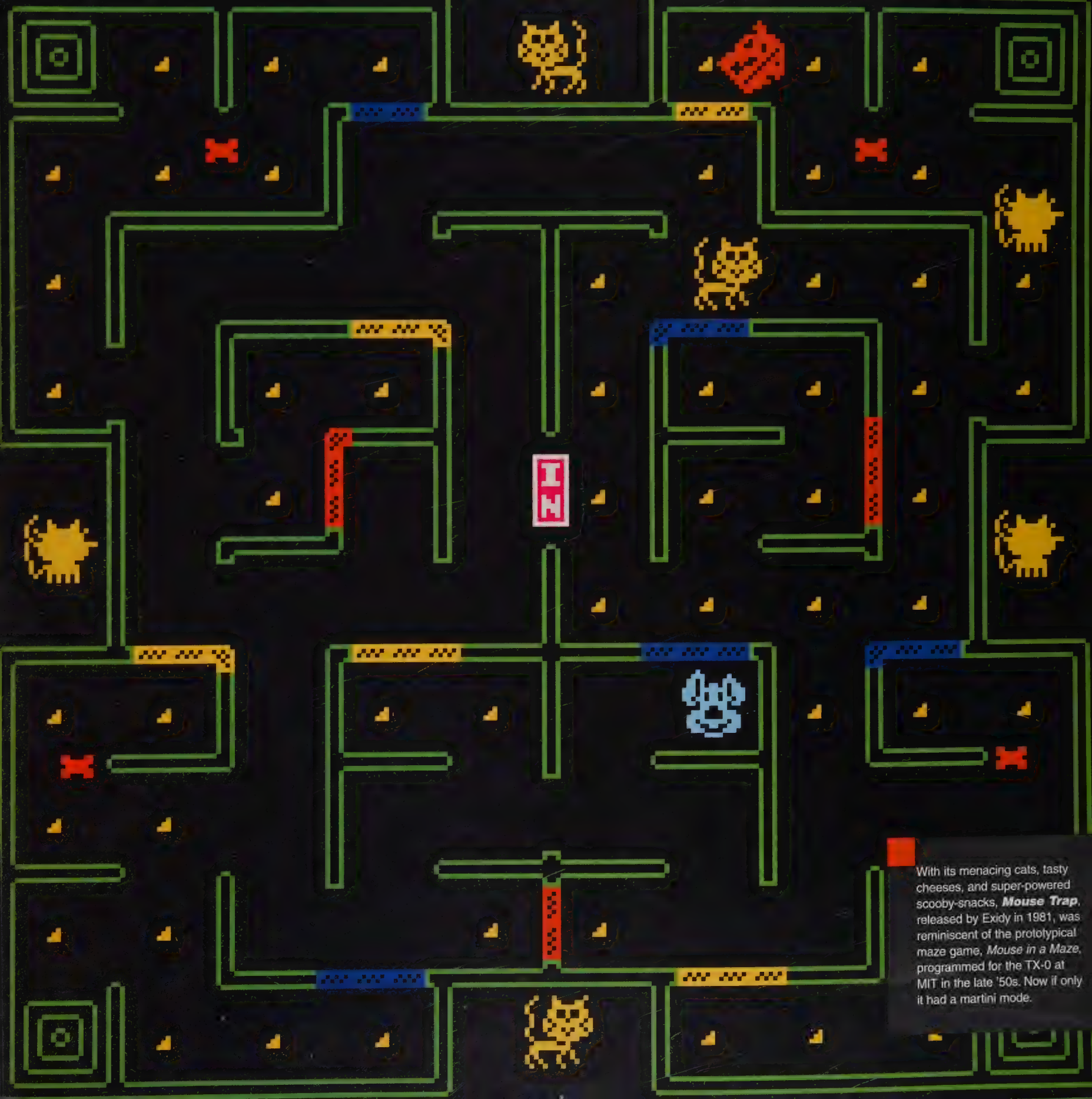
Kaos hails from a time when videogames did not, strictly speaking, need to make one bit of sense. You control a little red-haired man who runs around on moving platforms, grabbing rolling coins (you can tell they're coins because they have huge dollar signs on them) before they fall off the bottom of the screen. If a coin tumbles off into the abyss, it turns into a nasty green dragon (well, I can see how that... HUH?), who will happily devour your little red head before burping contentedly. Luckily, all hope is not lost, for at the top of the screen are "Ergs" — pyramids with eyes — which when touched, fry you with a lightning bolt. Ordinarily this wouldn't be particularly beneficial, but after the lightning strikes in *Kaos*, you'll be a king! Now armed with a tiny sword, you can turn those pixellated wyrms into dragon-kebabs. But beware! Like all video power rushes, your royal status lasts only precious seconds, and then it's back to being a coin-grabbing shmo. Isn't that always the way? Oh, and don't touch the sides of the screen on the first 3 levels, or you'll be electrocuted.

You see that realism wasn't a high priority for the game designer. Coins? Pyramids with eyes on them? Sounds like someone at Game Plan spent too much time staring at the back of a $1 bill. But maybe I'm wrong. Maybe it's a metaphor. That little guy could be a bitmapped symbol for the average Joe, madly pursuing the money doled out by upper management, as he tries desperately to avoid the dragons of idleness, struggling to attain the... um, whatever. On second thought it's probably just a game. But it sure is a lot of fun. ■

1981 was no doubt the year of the maze. In Universal's ***Lady Bug***, you are a speckled ladybird who warbles through a garden strewn with delicate flowers to munch, while avoiding the deadly beetle bugs along the path by ducking through the green revolving doors scattered throughout the maze.

In Taito's ***Lock 'N Chase*** you control the crooks who must collect coins and bags of loot while avoiding the cops. Originally created by Data East, the game was designed for its cassette system and later converted to a dedicated hardware platform.

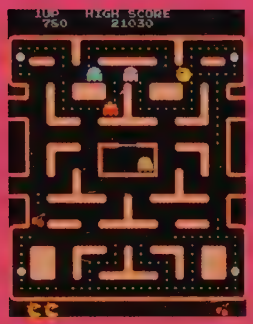
In William's ***Make Trax***, you control a paintbrush that paints paths within a maze. As you attempt to color all the paths, you are chased by two goldfish that you can only crush with a paint roller. Occasionally, a creature will run through the maze, leaving footprints on the path that must be repainted.

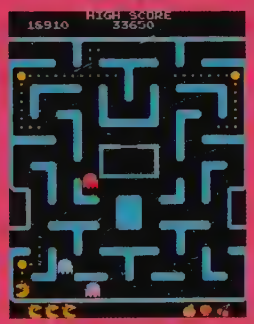


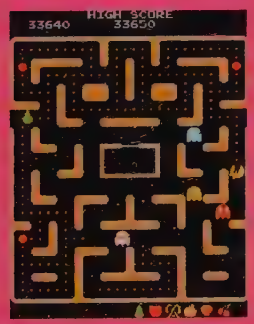
With its menacing cats, tasty cheeses, and super-powered scooby-snacks, ***Mouse Trap***, released by Exidy in 1981, was reminiscent of the prototypical maze game, *Mouse in a Maze*, programmed for the TX-0 at MIT in the late '50s. Now if only it had a martini mode.

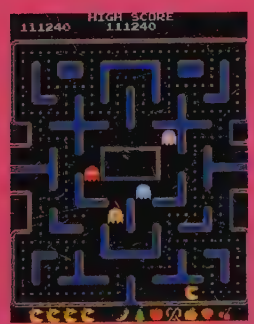
Ms. Pac-Man

Bally/Midway









Although *Galaga* was no doubt one of the most successful arcade sequels of the era, nothing comes close to rivaling the cultural impact and industry-wide influence of *Ms. Pac-Man*. Introduced in 1981, this follow-up to the stunning success of Namco's *Pac-Man* was one of the most unlikely arcade hits of the Golden Age.

Unlike *Pac-Man*, designed by Namco in Japan, *Ms. Pac-Man* was created by Bally/Midway in Chicago in collaboration with General Computer (under license from Namco). The sequel, which was actually an enhancement kit wired to an original *Pac-Man* PCB, was designed in an obvious attempt to lure more female gamers into the nation's arcades.

Beyond the fact that the player now controlled Pac-Man's significant other – an identical yellow spot done up with lipstick, a beauty mark, and red bow – the sequel broke new ground in both gameplay and graphics. In *Ms. Pac-Man*, the single static maze was replaced by four multi-colored mazes, each of a different design, that rotated every few screens. In addition, the fruit bonuses – cherries, strawberries, peaches, pretzels, apples, pears, and bananas – now playfully bounced around the maze instead of appearing in the same static spot over and over again, a change that added a second element to the chase and made for a much greater challenge.

But what was so surprising was that the game – with its gender-specific intermissions on themes of love, marriage, and motherhood – was equally loved by the BMX-riding boys club as it was by the scores of satin be-ribboned girls that flocked to play the pink and blue machines.

In reality, its intense fast action and challenging mazes made *Ms. Pac-Man* an absolute must-play not only for die-hard Pac-maniacs, but for every hardcore videogame player – regardless of their sex. In high-score competitions hosted by Twin Galaxies, *Ms. Pac-Man* soon became the supreme arcade challenge – as well as the ultimate test to determine a videogame player's ability.

Walter Day, founder of Twin Galaxies once said, "No self-respecting videogame addict during the Golden Age would admit to *not* playing *Ms. Pac-Man*... Having a good *Ms. Pac-Man* score was necessary to prove yourself."

According to Ben Gold, videogame superstar and winner of the *That's Incredible* Videogame Oly[illegible] in 1983, "Whoever holds the title on *Ms. Pac-Man* is the heavyweight champion of the world." If that is true, than the undisputed videogame world champ was none other than Chris Ayra, a Miami native who scored nearly 875,000 points at Johnny Zee's in British Columbia back in 1985.

But in 1998, a Canadian named Rick Fo[illegible] finally beat Ayra's long-standing world record with a score of 910,350. This achievement led to the infamous rivalry between the American team of Chris Ayra and Billy Mitchell (the now legendary *Pac-Man* champion), and the team of Canadians – a challenge that ultimately resulted in Billy Mitchell's perfect *Pac-Man* game at the Funspot Arcade in 1999. "We felt that the Canadians were Johnny-come-latelys and needed to be put in their place." So said the handsome and always diplomatic Mitchell.

If nothing else, the fact that the relentless quest for a high score on this game still endures today is a testament to its timeless appeal. Following its release, *Ms. Pac-Man* was ported to nearly every home videogame and computer system available. Then in 1998, *Ms. Pac-Man* was included in Microsoft's *Revenge of Arcade* as well as Namco's *Namco Museum* series for PlayStation and Nintendo 64. A new version was later released for the Game Boy Color, in one of the most faithful renditions to be found outside of MAME.

But in the year 2000, Namco finally released a modern update of this classic with *Ms. Pac-Man Maze Madness* – a 3D platform game starring the always glamorous Pac-World princess – for the Nintendo 64, Sony PlayStation, and Sega Dreamcast. ■

IMAGE: FAR LEFT: COURTESY NAMCO

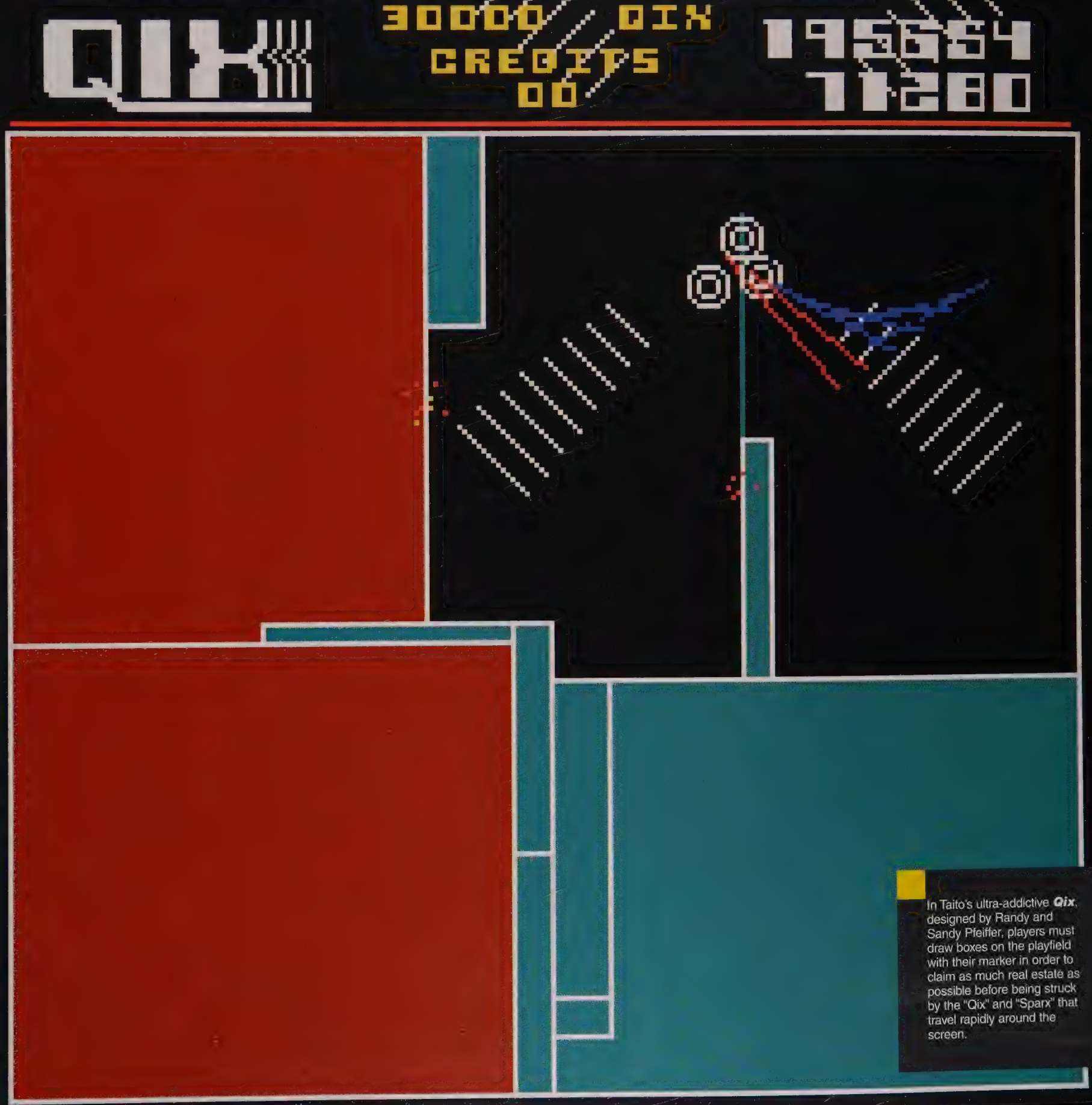
Pleiads

Centuri

In *Pleiads* – Centuri's follow-up to the hit arcade game *Phoenix* – you control a spaceship that must do battle against attacking waves of alien hordes, destroy their mothership, and then successfully pilot your ship home by landing it at the end of an obstacle-filled runway. *Pleiads*, like Midway's *Gorf*, was a hybrid of sorts, incorporating various elements of *Phoenix*

along with new game scenarios and dynamic onscreen graphics – including a scrolling starfield, satellite tracking dishes, swift enemy ships, and a distant spiral galaxy. For the attract screen, each letter of the game's title burst onto the starfield with a booming explosion of smoke and debris. The combined effect made for an exciting and visually appealing shooter – infinitely more elaborate and graphically complex than its predecessor.

Unfortunately, *Pleiads* did not achieve the same level of success. The game was later ported to the ill-fated Arcadia 2001, and, as a result, never saw much action on the home console front. But instead, you can enjoy this exciting game in a java version now on the World Wide Web. ■



In Taito's ultra-addictive ***Qix***, designed by Randy and Sandy Pfeiffer, players must draw boxes on the playfield with their marker in order to claim as much real estate as possible before being struck by the "Qix" and "Sparx" that travel rapidly around the screen.

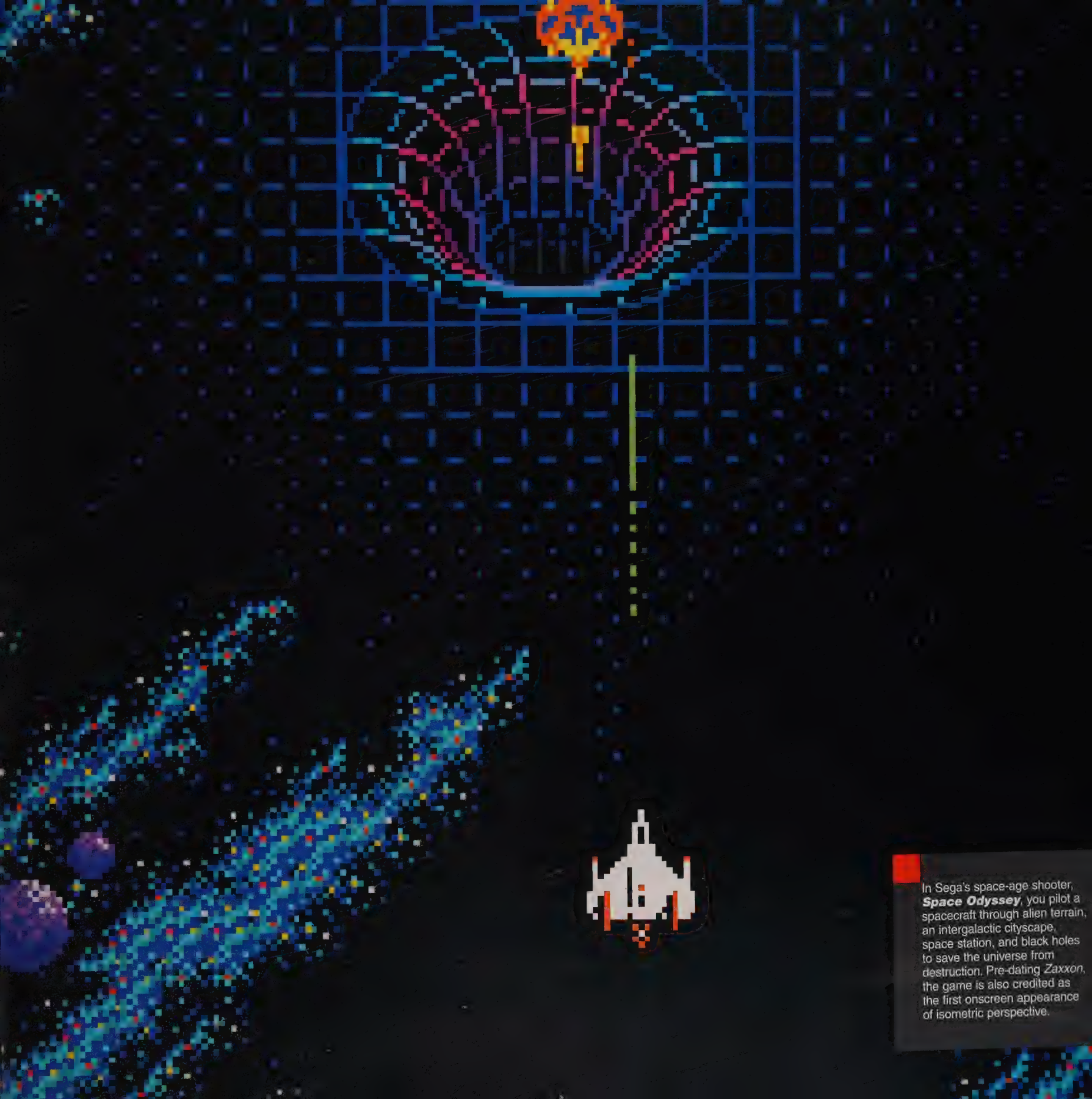
Scramble

Konami

In 1981, Konami released *Scramble*, a futuristic scrolling shoot-'em-up in which you attempt to invade the evil Scramble System. The player pilots his or her spacecraft through a dangerous obstacle course of mountains, caverns, and meteor showers – all while being bombarded by enemy fire. You must shoot down your attackers and bomb the enemies' grounded missile bases and fuel tanks to score extra points and gain needed fuel.

Licensed to Stern for US distribution, *Scramble* was a smashing success, with $20 million in sales its first two months of release. But four weeks after the game's introduction, a company called Omni Video Games began to market a bootleg version of *Scramble* originally entitled *Scramble*. Omni's game not only shared the exact title, it also was virtually idential in both gameplay and design to the Konami hit – the only point that differed from the original was Omni's bargain basement price.

Omni was swiftly sued – and defeated – in what became a landmark copyright case. The historic point was that for *Scramble*, Konami had registered the gameplay and graphics as an audiovisual work (game developers had traditionally registered a game's source code as a literary work), in a brilliant move that inherently protected both the underlying source code as well as the sequence of images and sounds the game displayed. Previously, would-be videogame pirates could simply reverse-engineer a game and replicate its gameplay using their own original source code – without actually infringing on the manufacturer's copyright. But the case of *Stern v. Kaufman* forever changed the way that videogames and their creators are protected under copyright law. How *Cosmic Avenger* got around this point, however, still remains a mystery. ■



In Sega's space-age shooter, ***Space Odyssey***, you pilot a spacecraft through alien terrain, an intergalactic cityscape, space station, and black holes to save the universe from destruction. Pre-dating *Zaxxon*, the game is also credited as the first onscreen appearance of isometric perspective.

1400
SCANNER

Stargate

Williams Electronics

BY BOB PARKS

An excess of confusing buttons, along with a disorienting number of enemies and their weapons puts Stargate on a much steeper learning curve than its predecessor, *Defender*. While cruising amid this mess in your tiny ship, it's tough to remember that even in space, even in 2050, when hunted by mutants and munchies alike, life is still best conducted by reason, self-sacrifice, and continued vigilance to the radar screen. To finally master this game is rewarding, even enlightening.

Eugene Jarvis codesigned Stargate with Larry DeMar, and sold it to Williams in 1981. By that time, Jarvis had left Williams and started the design company Vid Kidz with DeMar. (A few of Stargate's enemies – Yllabians and Irata – are backward spellings of Williams' main competitors at the time, Bally/Midway and Atari.) To challenge devotees of *Defender*, the duo added more enemies, along with Hyperspace and Inviso buttons. But the game is still best played with a cool head as there's little room for panic moves.

Take the Smart Bomb, a seeming global fix-all button first invented in *Defender*. Although the key destroys every enemy on the screen, it's better employed pragmatically to remove the high-point Pods many layers into battle. The Hyperspace key – that red herring at the bottom center of the control panel – is worse; it's as chancy as Russian roulette with half the chambers full. In a moment of danger, Hyperspace inevitably drops you into more dire straits somewhere else in the universe, surrounded by an Armada of Yllabian Space Guppies.

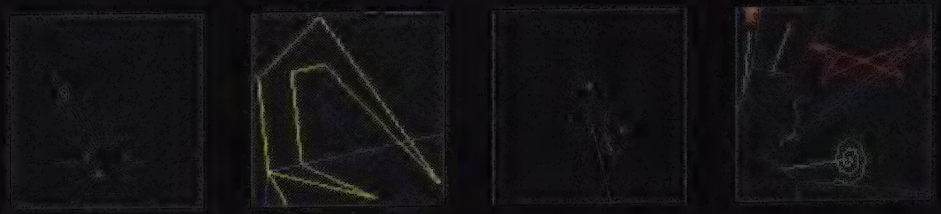
Despite Stargate's daunting number of control buttons, strategies for overcoming the Calvinist interface led its players to warm up to the game quickly – and as many as 27,000 units were produced. Mastering Jarvis' controls is like learning to touch type, and takes almost as much dedication. But what a joy to know the keys by heart.

Whenever I played, I found that the inevitable swarm of enemies clustering all around was best conquered though Inviso, evidenced by a painful callous on my right thumb. I could totally disappear, leaving the clustering, heat-sinking Yllabians to crash into my invisible craft. Yet beyond Inviso, it turns out the most wisely expendable resource you have is your own vessel – and to paraphrase Nathan Hale, my only regret was that I had but five lives to give for my humanoids.

The smartest way to get beyond 100,000 points is to cruise around carefully avoiding the green mutant enemies, willing to die at the drop of a hat. Then patiently wait for the warble signaling a mutant abduction of one of your humanoids, and rush to save its life. Pulling along several bodies while defending your turf can be quite a challenge, but if you manage to grab five men and pass through the glowing rectangle in the center of the screen – the Stargate – you can gain as many as 50,000 points at one crack. This strategy, a more rigorous path than mere point-and-shoot, is not apparent to those new to the game. But if you let your race perish, and allow the planet to self-destruct, there is no clear route to progress. And to die alone in space is not a reasonable option. ■

Tempest

Atari



BY STEVEN L. KENT

Dave Theurer, one of the most respected game designers of his time, did not dream up *Tempest* entirely on his own – he got the idea out of a book. Atari kept a book of potential themes for videogames (gleaned from brainstorming retreats) as a resource for designers to browse between projects. Theurer, who had just completed the hit arcade game *Missile Command*, was inspired when he read an entry about making a version of *Space Invaders* from a first-person perspective.

Theurer decided he would need all the processing power he could get to pull-off his concept for *First-Person Space Invaders*. To get the needed power, he built it using infinitely more efficient vector graphics. He began the project using the standard black-and-white technology that was used in games such as *Asteroids* and *Battlezone* – but when an experimental color XY generator became available, Theurer made the jump.

The new technology proved somewhat unstable. The XY generator created beautiful colors and created fast-moving, sharp images, but it had a fierce overheating problem. Once, as Theurer tested his game, the monitor simply turned off. When he went to see what happened, he found six transistors lying on his workbench. They had melted the solder holding them to the board.

Overheating was just the beginning of the problems Theurer would encounter. It took him only six weeks to write the preliminary version of *Tempest* (the game consisted of only 21K of Assembly code). But when he unveiled the game at an Atari meeting, Gene Lipkin and Frank Ballouz, the two top executives at Atari coin-op, said the game looked just like *Space Invaders* from a different perspective (what did they expect from a project with an internal code name like *First-Person Space Invaders*?) and told him to kill the project.

It was at this point that Theurer went metaphysical and described a nightmare he'd had in which he saw monsters coming out of a hole in the ground. "You had to kill them before they got out of the hole or they would kill you," Theurer told them, "I can take *First-Person Space Invaders*, put it on a flat surface, wrap that surface around to make a cylinder, and rotate the cylinder to make a different game out of it."

Lipkin and Ballouz finally gave Theurer the go ahead, and he went to work on what would soon become one of the crowning achievements of the early eighties arcade Golden Age.

In the preliminary versions of *Tempest*, players used a dial to rotate a well filled with enemies. Theurer changed the design when he discovered that the rotating well made players nauseous. In the new version, players controlled a "gun" at the top of the well. The final design took nearly a year to complete. Dave Theurer soon discovered that *Tempest* was attracting a lot of attention around Atari as lines of employees wanting to play the game started to form outside his office.

Tempest – or *Vortex* as it was initially called – was one of the fastest and most challenging games of its time. The goal of the game was to shoot flippers (red Xs), fuseballs (multi-colored balls), pulsars (yellow lines with deadly shocks), and other enemies as they tried to climb up out of the geometrically formed tubes. The player's only weapons were a crab-like C-shaped polygon that spun around the top of the tubes shooting at the enemies down below and a "superzapper" smart bomb that killed everything in sight.

More than any game before it, *Tempest* gave players visual and aural payoffs for exceptional performance. Once you cleared all the enemies from a level, you heard a loud roar as the game sucked you down the tube in a lightspeed-esque hyperspace jump that – assuming you cleared a safe path – led you into to the next level's tube. Theurer even created a brilliant display of fireworks that would flash onscreen as players input their initials beside their high score.

Following *Tempest*'s release in October of 1981 – with the video arcade industry now in its $5 billion boom – arcade owners were very excited about *Tempest*. But then, how could they resist? Arcades were still in their glory days of pitch dark rooms – highlighted only by the hazy glow of the machines. So with its flashy multi-colored graphics and fast action, *Tempest* was destined for success.

As for the home console market, a port of *Tempest* was rumored to be in development for the Atari 5200 back in 1984 – but, unfortunately, it was never released and exists only as an unfinished prototype today. In 1994 Atari Corporation finally released a solid remake of the game designed by Jeff "The Yak" Minter for the ill-fated Jaguar (one of the few games for the system that didn't "totally suck") called *Tempest 2000*. Minter again updated the game for Atari in 2000 with the release of the Nuon-enhanced DVD game *Tempest 3000*.

Although some games may have overshadowed the success of *Tempest* during the Golden Age, it has since emerged as one of the most memorable games – and is today among the most coveted by classic videogame enthusiasts. ■

In Pacific Novelty's ***Thief***, you must drive a car around a maze collecting stolen cash while being pursued by the police – but watch out! – a run in with the law will cause your car to explode in a fantastic burst. Actual police band radio banter serves as the soundtrack in this classic cops 'n robbers maze game.

THIS PAGE IS DEDICATED TO SEAN EDEN

Turbo

Sega

Turbo marked the first real progresssion in racing games since Sega introduced the hit, *Monaco GP*, in 1979. For *Turbo*, Sega took the gameplay of *Monaco GP*, the first to introduce color along with an aerial perspective, one step further – adding a three-dimensional perspective along with realistic scrolling scenery graphics as you speed along; a vast improvement over *Speed Freak*'s glowing phosphorescent cows.

In this punishing cross-country event you must race your Formula-1 car through city streets, rolling hills, oceanside palisades, twisting country roads, narrow bridges, dark tunnels, and slick icy roads as you pass the other cars and avoid collisions for continued play. Changes in road conditions affect the handling of the car and make it easy to lose control, so be sure to keep a firm grip on the wheel. Ambulances will occasionally approach you from behind to increase the challenge, so get out of their way – but quickly duck behind to gain some much needed passing ground.

Available as an upright or cockpit model, *Turbo* is equipped with gear shift, steering wheel, gas pedal, and red LED instrument panel – complete with tachometer. ■

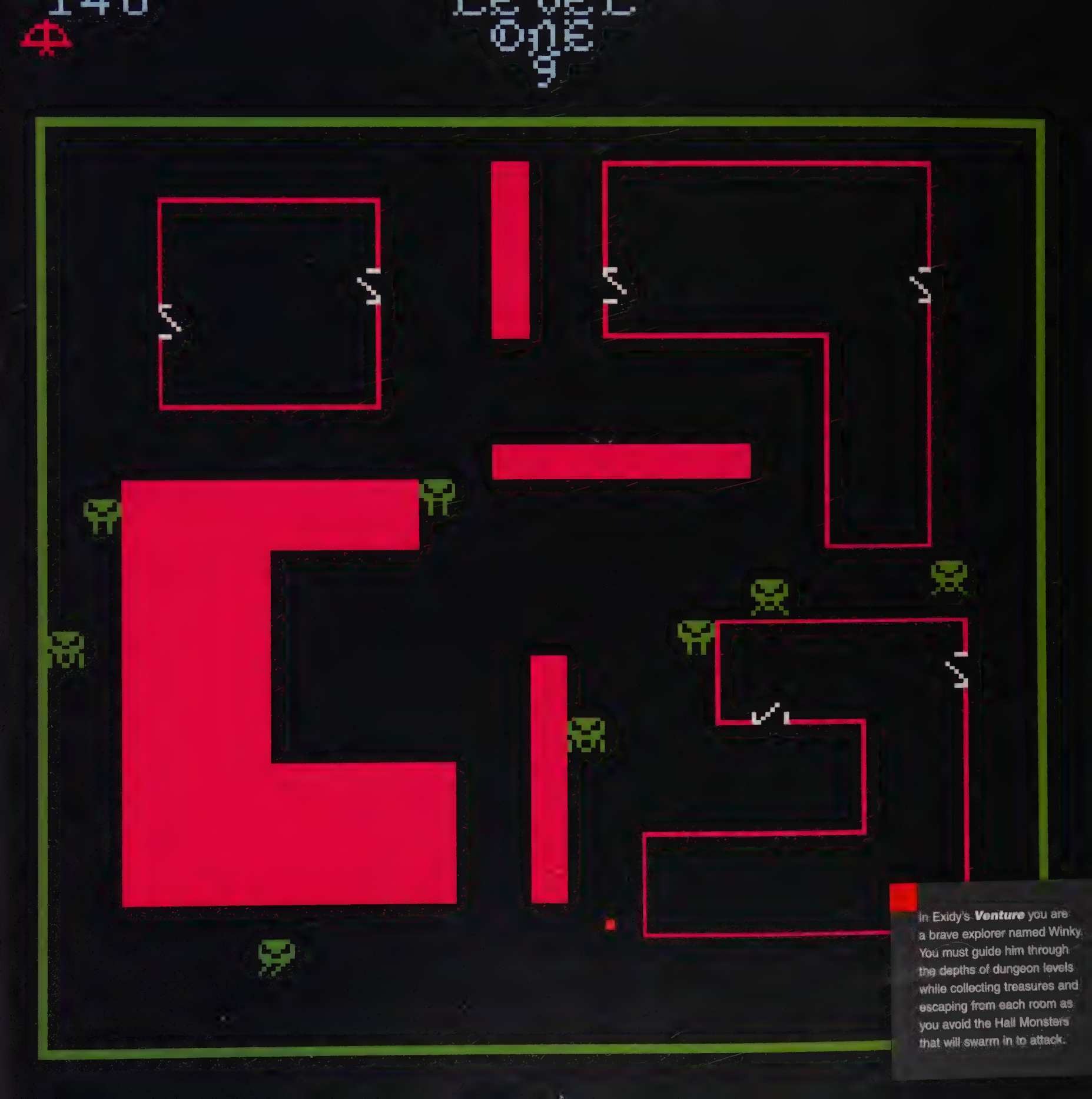
Vanguard

Centuri

In *Vanguard* – one of the first multi-directional scrolling shooters – you pilot a swift rebel spaceship that must navigate an intergalactic planetscape, shooting enemy ships as you avoid deadly alien terrain surrounding you, including giant mountains of crystalline cubes, caverns of spiky rods, and fields of glowing blue pods infested with swiftly moving blobs. As you progress through the landscape you can fly your ship through pulsating "energy pods" that energize your ship with a forcefield (you'll hear "Vultan's Theme" from *Flash Gordon* as you fly through) that transforms you into an invincible flashing fighter capable of crashing into your attackers unharmed.

The game's musical score also featured the popular theme from *Star Trek: The Next Generation* at the start of the game.

The interface consists of four buttons that allow you to shoot in four directions. As your ship moves from sector to sector, accompanied by a synthesized voice announcing the name of each territory entered – Rainbow Zone, etc. – you must shoot down the enemy ships and avoid the obstacles to progress into the next sector. A tracking screen at the top indicates which sectors of your mission have yet to be cleared. As you fly, you must also pay close attention to your fuel supply, which is slowly depleted as the game progresses. If you run out of fuel, your ship will crash. To refuel, simply fly through an energy pod or shoot down some enemy ships. Once you reach the final sector, you will encounter the "boss" – protected by two shifting walls with small holes that you must shoot through. If you successfully destroy the boss to complete the mission, you start over again with a new route and an increased level of difficulty. ■



In Exidy's ***Venture*** you are a brave explorer named Winky. You must guide him through the depths of dungeon levels while collecting treasures and escaping from each room as you avoid the Hall Monsters that will swarm in to attack.

In 1981, Atari released ***Warlords***, a medieval death match that pits four players against one another, each trying to protect his or her own castle with a single shield while destroying all of the opposing castles with spinning fireballs.

Wizard of Wor

Bally/Midway

BY JOE FIELDER

While other early arcade games such as *Gorf*, *Stratovox*, and *Sinistar* had synthesized speech, Midway's *Wizard of Wor* was positively verbose. In a flat, Stephen Hawking-like voice, the Wizard taunts players who dared enter his mazes with such memorable lines as, "Thorwor is red, mean, and hungry for space food" or "Burwor hasn't eaten anyone in months" and the classic "If you destroy my babies, I'll pop you in the oven. Ha ha ha!" Scary stuff indeed.

As a "Worrior" (a gun-toting astroman), you progressed through a series of 2D dungeon mazes, blasting through the evil Wizard's menagerie of blue, yellow, and red monsters. Clearing a screen full of "Worlings" caused the Wizard's favorite maze monster to appear – a butterfly-like beast that scrambled around the maze quickly looking for an exit. Destroying him awarded the shooter a double score for every kill in the next maze. Every few levels, the Wizard himself appeared through an unnerving combination of lightning bolts and random teleportations. Shooting him caused the screen to erupt into flashes of epileptic glory, likely the most satisfying "cinematic" for a boss fight of the time.

Not just a single player experience, *Wizard of Wor* allowed two people to either cooperate or compete at the same time. A common strategy for the game was to have two players wedge themselves into a corner so that each had his back covered by the other, and both would begin firing as fast as they could until all the Worlings were gone. This tactic worked well up until the stage known as The Pit, in which there were no maze walls to hide behind and the Worriors were left open inside a large, empty rectangular space. Since your weapon could only fire one shot at a time, you had to wait for your ray to travel all the way to the other side of the screen before you could shoot again. Anyone who survived The Pit without losing a life was worth his weight in quarters. ■

IMAGE: RIGHT: COURTESY JEFF GERSTMANN

IMAGE: PROMOTIONAL STILL FROM *TRON*
COURTESY WALT DISNEY PRODUCTIONS

1982

Gronk! Flash! Zap!

On January 18th, 1982, *Time* magazine hit newsstands across the country with a bold cover story that read "Gronk! Flash! Zap! Videogames Are Blitzing The World" – an event that single-handedly ushered in what is known as the Golden Age of videogames. On the surface of the cover story "Games That Play People" written by John Skow, was a profile of Steve Juraszek, a fifteen-year-old videogame prodigy who had recently scored over 15 million points on Williams' challenging arcade game *Defender* in a marathon match that took place in his favorite pizza parlor – an accomplishment that, up until then, was considered an impossible feat. *Defender*, with its five-button interface and lightning-fast action, was no doubt among the most difficult games of the era. Most players were lucky to survive the first minute, let alone endure for the sixteen hours Juraszek waged intergalactic war on his mutant alien attackers.

DAWN OF THE GOLDEN AGE: The January 18, 1982 issue of *Time* Magazine.

Along with Juraszek, the article profiled the arcade culture that had overtaken malls, clubs and amusement centers across the country and talked about numerous videogames, from *Asteroids* to *Pac-Man*, as well as the over 20 billion quarters that were poured into them in 1981 alone.

But the real story being told was not Juraszek's – it was that of a nation swept up by the greatest technological innovation to hit popular culture since the dawn of television: videogames.

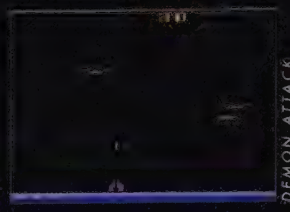
Home videogames. Arcade videogames. Mini handheld videogames small enough to fit in your back pocket. Tiny blips of electronic light projected into the eyeballs of popular culture. These were the new addictions of America's youth, an unstoppable force that had swept through mainstream media and Main Street USA in a massive raid on the collective consciousness – and, seemingly overnight, the glowing white phosphorescent blips of *Pong* had magically morphed into what was now a six billion dollar industry.

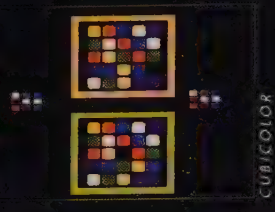
However, the historic significance of the videogame phenomenon is not found in the financial gains of the industry players that earned record profits in the early '80s, but in the fact that the Golden Age of videogames marked the point in history where we shifted from an analog society to a digital culture.

This transition, one that rewired and upgraded the technological consciousness of the nation and the world, prepared us to move forward from the static realm of Parcheesi, pneumatic tubes, and push-buttons into today's dynamic Internet economy saturated with interactive entertainment, ATMs, and digitally enhanced interfaces to control our every whim and desire – all from the comfort of our 1500MHz DVD-enabled home computers. ■

IMAGE: DAN McCOY/RAINBOW

Imagic





Imagic was founded by nine former Atari and Mattel mavericks who shared the belief that there was fame and fortune to be made in the videogame software business. It was a brand new industry, full of opportunities for anyone who possessed the technical prowess to program games and enough guts to take the risk.

The saga of Imagic – and their meteoric rise to the top – started with a man named William F.X. Grubb, former VP of marketing for Atari. In 1980, Activision had won a major battle in the cartridge wars – Atari's lawsuit over alleged patent and copyright infringements had been thrown out, confirming that it was now possible for an independent game developer to survive and succeed in the videogame industry. By the end of the year, Activision had rung up over $65 million in sales – $13 million of which was pure profit. Not bad for a start-up, even by Silicon Valley standards.

These events were certainly not lost on Grubb. He resigned from Atari and founded a compay, New West Marketing, which would act as a consultant to these new independent software companies – including Activision. However, the more familiar he became with the business, the more he realized that there was enough room in the marketspace for other developers as well.

One day, Grubb got a call from Dennis Koble, a programmer at Atari who was thinking of starting his own software company. Koble had designed such classic coin-op games as *Sprint 2* and *Avalanche*, and was growing tired of Atari's oppressive treatment of their creative talent. He also had the experience and technical savvy to program console games. A week later, Grubb met with Jim Goldberger and Brian Dougherty – two engineers at Mattel Electronics who confided their own ambitions of leaving to design Intellivision compatible software. With these contacts, Grubb knew he had all the elements he needed to launch an independent software company and began to seek private investors. He raised two million in seed capital, and recruited two additional Atari engineers, Rob Fulop and Bob Smith.

So the team of ten formed Imagic Incorporated, based in Saratoga, California. What distinguished Imagic from their colleagues at Activision, however, was their plan to market software for both the Atari 2600 and Mattel's Intellivision. They bet that with an expanded catalog of games, Intellivision could at last gain some of Atari's market share. Imagic also vowed to produce games that were graphically superior to those from Atari, and package them in eye-catching boxes to stand out from the crowd.

In the summer of 1982, Imagic released their first three game titles – *Demon Attack*, *Star Voyager*, and *Trick Shot*. Although all three were initially programmed for the Atari 2600 only, Imagic promised that Intellivision versions would not be far behind. All of the Imagic games released were packaged in distinctive metallic silver boxes, each with a spectrum of stripes to identify which system the game was designed for – bright red stripes for the Atari 2600 and royal blue for Intellivision titles. The cartridges themselves featured shiny silver labels with color-coordinating stripes, as well as a distinctive flat molded handle with Imagic's logo embossed on the top.

The games were a smash.

Demon Attack, designed by Rob Fulop, was a space-age shooter loosely based on Taito's hit arcade game, *Phoenix*. Fulop was a programmer who had achieved legendary status when he hacked his own digital signature deep in the code of *Missile Command* for the Atari VCS. It was a very cool trick, as well as one of the earliest known software "Easter Eggs" (undocumented features or hidden treats) that are today an industry standard.

Demon Attack – with its armada of giant winged aliens – was a game whose detailed graphics and fast-paced gameplay were truly outstanding. The only problem was that Atari had already secured the home rights to *Phoenix* and they were more than a little upset by the release, and subsequent success, of *Demon Attack*. Atari quickly filed suit against Imagic. Atari agreed to settle out of court under undisclosed terms and allowed Imagic to continue marketing *Demon Attack* for both the Atari 2600 and Intellivision home systems.

Imagic went on to release an impressive stable of games for the Atari 2600, Intellivision, and ColecoVision systems including *Atlantis*, *Beauty & the Beast*, *Cosmic Ark*, *Dragonfire*, *Fathom*, *Fire Fighter*, *Microsurgeon*, *Nova Blast*, *Solar Storm*, *Subterrainea*, *Swords & Serpents*, *Tropical Trouble*, and *Truckin'*. Imagic also holds the rare honor of being one of the few companies to ever release third-party games for the Magnavox Odyssey² in the United States – *Atlantis* and *Demon Attack* – both packaged in rare black boxes with yellow stripes. These games were produced in limited quantities, and are among the most collectible and desirable titles for the Odyssey² system.

Even though Imagic enjoyed initial success, it was not enough to sustain them through the crash that would soon hit the videogame industry head on. After a failed IPO in 1983, Imagic lost most of its core staff and slowly began to fade to a shadow of its former greatness. Imagic shut down operations soon after, and became but a brilliant memory for gamers and collectors around the world. ■

Take a fantastic virtual voyage inside the human body in Imagic's *Microsurgeon*, where you must cure a critically ill patient.

Atari 5200

Atari

BY KEITA IIDA

The year is 1982. Though Atari was enjoying continued success in the booming home videogame market – with Atari, Inc. racking up over two billion dollars in sales this year alone – they were already busy planning a successor to the sovereign Atari 2600, an advanced new videogame system that would maintain Atari's dominance in the industry throughout the next generation of console wars, where it would do battle with Mattel's Intellivision and Coleco's upcoming ColecoVision.

The videogaming public got its first glimpse of Atari's top secret work-in-progress – code-named "PAM" or the more mysterious "Video System X" – at the winter CES show in Las Vegas where Atari reps were confidently declaring victory before the battle had even begun.

The company was justified in its optimism. Beneath the system's sleek black exterior lurked the power of a 6502C microprocessor with 16K RAM designed specifically to play arcade-quality games. The heart of the machine was, in fact, an Atari 400 computer, considered one of the most powerful low-cost personal computers of the era. The benefits of this hardware decision was that virtually no additional resources were required for developing the technology within the system, not to mention that its similarity to the Atari computer line allowed for easy porting of existing software between the two systems – a strategy not unlike that of Microsoft for the release of their upcoming Xbox videogame console.

Aside from the unparalleled graphics and sound capabilities of Atari's next generation console, the system – now called the 5200 SuperSystem – had many features that set it apart from the rush of home consoles released in 1982. The controllers included an analog joystick with 360° rotation, dual fire buttons, and numeric keys reminiscent of the Intellivision keypad controller – complete with game overlays. Like most of Atari's systems, the 5200 also had an expansion port to connect future add-ons – and, like all the rest, it was never used.

Externally, the machine owes much of its design aesthetic to the aborted remote control Atari 2600 system, the 2700. At the top of the sleek black unit is a storage compartment to house the joystick controllers. The placement of the "Start," "Reset," and "Pause" buttons (the ability to pause a game during play was an industry first) on the controller itself eliminated the need for extraneous keys on the console. All of these design features gave the 5200 a modern and streamlined look.

Following its release, the Atari 5200 SuperSystem was, shockingly, not the immediate hit everyone had expected. Unfortunately, the ColecoVision – nearly its equal in graphics capability – beat the 5200 to market complete with a packed-in port of Nintendo's smash arcade hit, *Donkey Kong*, thus guaranteeing the system a huge holiday season. Meanwhile, the Atari 5200 suffered manufacturing delays and only a small trickle of units made it onto store shelves for the crucial pre-holiday rush.

The software selection available for the 5200 at launch consisted mostly of proven, yet somewhat tired, videogame classics that failed to capitalize on the 5200's wealth of audio and visual talents. Titles such as the packed-in *Super Breakout* (later switched to the more provocative *Pac-Man*) as well as games like *Galaxian* and *Space Invaders* failed to generate the level of excitement needed to convince gamers that this was the "next wave" in home videogame consoles.

To make matters worse, Atari's attempt to revolutionize the joystick turned into a tragic failure – with the virtues and shortcomings of the 5200's "advanced" controllers still a topic of heated debate to this day. The analog controllers never caught on with consumers because they do not self-center. What this means is that there is no way to come to an immediate stop. Games like *Star Raiders*, *Pole Position*, and *Soccer* were engineered to take full advantage of the analog controller and displayed dramatically improved gameplay. Unfortunately, most other videogames required precise movements – so, for example, preventing Pac-Man from roaming aimlessly around the maze was a trick that even veteran game players had difficulty pulling off.

But soon after the system's release, Atari began to complement the 5200 library with fantastic new gems like *Qix*, *Vanguard*, *Robotron: 2084*, *Space Dungeon*, *Pengo*, and *Ms. Pac-Man*. Atari also was fortunate to have dibbs on hit arcade games marketed by its successful coin-op division, which brought arcade hits such as *Centipede*, *Dig Dug*, and *Pole Position* home. Although the machine did not attract the type of interest from third party software companies as that of its predecessor, some outstanding titles came from outside Atari: *Ballblazer*, *Gyruss*, *Miner 2049'er*, *Montezuma's Revenge*, *Pitfall II: Lost Caverns*, and *Wizard of Wor* are among the many standout titles.

Even the controller fiasco began to improve as peripheral makers began offering more reliable and responsive controller alternatives such as Wico's acclaimed Command Control joystick. But by the time the Atari 5200 was finally beginning to shine, it was too late. The great industry crash was well under way, and the 5200 joined the likes of ColecoVision, Intellivision, Vectrex, and the others as the once booming home console market came crumbling down. As a result, an inordinate amount of promising games such as *Tempest*, *Xevious*, *Track & Field*, *Millipede*, and *The Last Starfighter* never saw the light of day.

Among contemporary video game historians, the debate rages on as to the reason for Atari's failure with the 5200. Some point to the unreliable and unresponsive controllers, while some blame the plummeting prices of home computers like the Commodore 64, Atari 800XL, and TI-99. They believe that most consumers opted to spend $300 on a home computer that could *also* play advanced games instead of shelling out $299 for a glorified game machine. Still others maintain that there were simply too many home videogame systems ▶

jockeying for parents' disposable income. Finally, there are others who claim that the heated battle between the ColecoVision and Atari 5200 took its toll on both companies – with Atari pulling the plug on its system while Coleco sought salvation with the disastrous ADAM computer. While each of the above theories has its own merits, the main reason for the 5200's untimely demise is clear: Atari simply held on to the 2600 for too long.

When Atari should have been devoting ad and research dollars to their stellar new system, they foolishly continued to devote the lion's share of their resources to a five-year-old system that was clearly on its death bed. When Atari should have been aggressively marketing the 5200 and developing exclusive content for the system, most hot game properties – such as *Battlezone*, *Vanguard*, and *Kangaroo* – were simultaneously released for the 2600 and 5200 with almost all advertisements jointly promoting both systems, giving consumers no incentive to upgrade.

By refusing to acknowledge the saturation of 2600 games and not focusing their efforts on their own next-generation system, Atari unknowingly put the brakes on the long-term health of the videogame industry. Eventually, the glut of heavily discounted software that ensued made it impossible to get consumers to pay a premium for new releases – let alone buy a new game system.

Those who blame the company for destroying the videogame industry fail to recognize that any market leader would have encountered the same problems as Atari. Given that this was a brand new industry – with no precedent to use for guidance – who could have predicted that in 1982 the whole market would come crashing down? Third party software heavyweights including Activision, Imagic, CBS, and Parker Bros., and hardware manufacturers like Mattel and Coleco are equally responsible for the industry's failures and lack of long-term strategic planning.

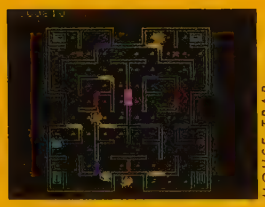
In the end, the legacy of the Atari 5200 is that of the failed successor to a legendary machine – but gamers who have experienced the 5200 SuperSystem know better. So get your hands on one, fire it up, and drop in almost any cartridge. You'll soon see the Atari 5200 for what it really is: a videogame system that has some of the best ports of all your favorite arcade hits. ■

380

ColecoVision

Coleco

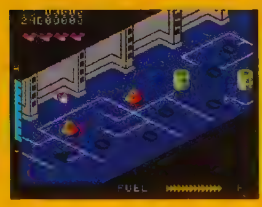
DONKEY KONG



MOUSE TRAP

SMURF: RESCUE IN GARGAMEL'S CASTLE

SPACE FURY



ZAXXON

Following the release of their Telstar dedicated home videogame systems in the late '70s and inspired by the incredible success of the Atari 2600 and Intellivision systems – not to mention the imminent introduction of the next generation Atari 5200 – Coleco decided to reenter the fray with the release of the ColecoVision.

This cartridge-based home videogame system, based on an 8-bit Z-80 microprocessor, featured 8K RAM and 16K of VRAM, which allowed it to display a whopping 32 sprites and up to 16 of a total of 32 colors simultaneously on-screen. With its three-channel sound and gorgeous arcade-quality graphics, ColecoVision was recognized as the most technologically advanced home console to date. Considering that Coleco had also wisely licensed Nintendo's arcade smash *Donkey Kong* to include as the pack-in cartridge, odds were on the ColecoVision to win the next wave of console wars.

The ColecoVision was released in the summer of 1982, in plenty of time for the holiday season, at the suggested retail price of $199. The system itself consisted of a low black console with an expansion slot in front and a recessed controller housing on top, similar to the Intellivision. The controllers themselves featured dual fire buttons, a stubby round joystick, and 12-button keypad.

Coleco planned a number of add-on peripherals to take advantage of the built-in port, including an Atari 2600 cartridge adapter (Expansion Module #1) that would allow the legion Atari 2600 owners to play their entire library of game cartridges on Coleco's system – an important point that seemed to be lost on Atari when they engineered their own next gen system – and home computer module (Expansion Module #3) that would include a plug-in memory console and tape drive. In fact, Coleco was among the few hardware manufacturers to ever actually follow through on their claims of expandability as most all peripherals announced for the system actually managed to see the light of day at the local Kay Bee, Kiddie City, or Toys 'R' Us.

In addition to the Atari 2600 adapter and add-on computer module – also known as ADAM – Coleco released a number of custom arcade peripherals including a realistic driving controller (Expansion Module #2) that shipped with Sega's classic racing game *Turbo*, a roller controller to play games like *Slither*, and the goliath Super Action joysticks that featured extra buttons and advanced functions for playing sports games like *Super Action Baseball* and *Rocky Super Action Boxing*.

But the ColecoVision's most impressive feature, aside from its graphics and expandability, was the stable of licensed arcade game titles released for the system. With its high resolution arcade-quality graphics, coin-op games like *Donkey Kong*, *Mouse Trap*, *Popeye*, *Q*Bert*, *Ladybug*, *Venture*, and *Zaxxon* were almost as good as the real thing – especially when you could play them all from the comfort of your favorite yellow bean bag chair.

Following its release, the ColecoVision was an instant success, selling out its first production run of over 500,000 systems. Kids deciding between a ColecoVision and Atari 5200 that holiday season needed look no further than the monitors up above – *Super Breakout* had nothing on *Donkey Kong*. You can guess what was on my list that year. And I certainly was not alone. By Christmas, over one million ColecoVisions had been sold, and over eight million cartridges had flown off store shelves.

Other popular games released for ColecoVision included *Smurf: Rescue In Gargamel's Castle* and *Buck Rogers: Planet of Zoom*. Apparently, the only drawback to the system was found in its pernicious power supply, a huge two pound 4-pin monster that had a nasty habit of overheating and blowing out the whole system. Despite this flaw, the ColecoVision was a great success, selling over six million units in just three years. But it was soon eclipsed by Coleco's next great success: Cabbage Patch Kids. Sadly, the cuddly cute fad also spelled the end of the line for Coleco, forcing them into bankruptcy in 1988. ■

COLECO
VISION
TM

Vectrex

Vectrex

General Consumer Electronics

VECTREX OVERLAYS

In 1979, an engineer named Jay Smith designed the first LCD cartridge-based handheld videogame system called the Microvision. Developed by his company, Smith Engineering, and released worldwide by Milton-Bradley, the system was a success earning $8 million in its first year of production.

By 1981, Smith was hard at work on his next big project, a small self-contained vector-based home videogame system. Vector graphics were nothing new to arcades: games like *Asteroids*, *Battlezone*, and *Rip Off* had used vector technology (also known as Quadrascan, Vectorbeam, or XY) with great success. But to apply this ultra-sharp high resolution display technology – where an electron beam moves in straight lines across the screen – to a home videogame system would be impossible without also supplying the vector monitor itself.

As a result, the compact system (about the size of an original Apple Macintosh) included its own 9" black and white vector monitor within the portable black console. The system – called the Vectrex – was based on a 6809 microprocessor running at a clock speed of 1.5MHz. The Vectrex also contained a single self-centering joystick and 3" speaker to showcase the powerful AY-3-8912 sound chip.

Originally optioned to Kenner, the system was finally licensed to General Consumer Electronics. Following its debut at the summer CES show in Chicago, the Vectrex was released for the retail price of $199 in 1982.

Since *Asteroids* was no doubt the most popular vector-based game in arcades, the system shipped with its own built-in *Asteroids* clone called *Minestorm*. Additional games were supplied on small plug-in cartridges that came with colorful acetate overlays that fit over the monitor screen to both reduce flicker and give the illusion of color graphics, just as Cinematronics had done with its own black and white vector-based arcade games like *Star Castle*.

Most of the games released for the systems were conversions of popular vector-based coin-op arcade games, including what seemed to be the entire library of Cinematronics' titles: *Space Wars*, *Star Castle*, *Rip Off*, *Armor Attack*, *Solar Quest*, and *Starhawk*. If only they had licensed *Warrior*! Other popular games included *Bedlam*, *Berzerk*, *Flipper Pinball*, *Fortess of Narzod*, and *Scramble*.

There were a number of peripherals released for the system including a light pen, 3D Imager, and silver padded carrying case. GCE had also announced plans for a computer keyboard and BASIC cartridge, as well as a touch-sensitive screen – but neither was ever released.

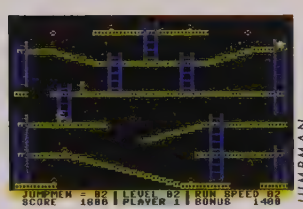
In 1983, GCE and the Vectrex were acquired by Milton-Bradley who continued to market it through 1984. Unfortunately, the industry-wide depression soon took its toll on the Vectrex and forced the company to dump the revolutionary system at bargain basement prices. But the high production costs of the Vectrex spelled serious losses for Milton-Bradley and it was discontinued shortly thereafter. Fortunately, all rights for the system reverted to Smith Engineering who have since graciously allowed the free distribution of Vectrex cartridge ROMs, overlays, and manuals – keeping the system alive in the hearts of collectors and videogame enthusiasts around the world. ■

Commodore 64

Commodore

BY NICK MONTFORT

M.U.L.E.



JUMPMAN

THE LAST NINJA

ATTACK OF THE MUTANT CAMELS

The Commodore 64 was in many ways a brainy video game console, successor to the bare-bones VIC-20. The VIC-20, released in 1981, was fun and easy to set up, but with only 5K and a 22-character-wide screen it was somewhat limited in its capabilities. But in 1982, Commodore released a home computer system that was compatible with all the VIC-20's peripherals and with a capacious 64K: the Commodore 64. Housed in an identically shaped brownish-grey keyboard console, the 6502-based C64 featured three-voice sound and SID, the first audio synthesizer for a home computer. On-screen, it could handle eight programmable sprites and up to sixteen colors.

Although no disk drive was included, buyers were lured by the incredibly low price of around $200 – and might be led to believe they could do without the high-priced peripheral. After taking the bait, they'd find out that the cartridge slot and tape drive capability weren't enough and would pony up for the noisy, plodding 1541 disk drive, which was more expensive than the C64 itself. With a one bit data path, that drive didn't seem much speedier than tape: loading a game could take about as long as a washing machine's rinse cycle.

The C64 was, for a brief time, overlooked by consumers. But soon, sales picked up, and stayed strong throughout the early to mid '80s. All told, about 20 million units were sold, making the C64 the best-selling home computer in history. Companies quickly ported games over for this swelling market. Within a year of the computer's rollout, a hundred games had been converted. In 1985, the C64 was noticed oversees as the UK magazine *ZZap! 64* launched, dedicated completely to C64 videogames.

Early C64 successes were the strategy game *M.U.L.E.* programmed by Danielle Berry (1983, Electronic Arts). Another standout was Chris Gray and Peter Liepa's *Boulder Dash* (1983, Gray Matter), a scrolling, sprite-filled masterpiece. David Crane's *Ghostbusters* (1984, Activision), slicker than his Atari 2600 version of that game, was also a hit the following year, along with Will Wright's *Raid on Bungling Bay* (Broderbund). Of all the original C64 games, the biggest hit ever was *The Last Ninja*, released by the UK's System 3 in 1987. This dynamic 3D fighting game wasn't actually the last *Last Ninja* as three sequels followed.

The C64 had games galore, and it also had something else: the scene. One of the great uses to which a C64 could (and still can) be put is the coding of demos. These are spectacular multimedia extravaganzas that bust all expectations – even those of knowledgeable programmers. A huge underground culture grew up, mostly in Europe, to craft and appreciate these demos, even holding parties to both celebrate the art of the C64 and compete for top honors.

One great demo and game coder was Jeff Minter, a.k.a. "The Yak." He'd cut his teeth on the VIC-20, then started a videogame company called Llamasoft. He churned out many unusual titles for the C64 including *Attack of the Mutant Camels* (1983), *Revenge of the Mutant Camels* (1984), *Sheep in Space* (1984), *Mama Llama* (1985) and *Return of the Mutant Camels* (1987). Many of the C64's more mainstream titles made their way onto other platforms like the Atari 800 and the Apple II, but Llamasoft games will always be considered C64 originals. ■

**** COMMODORE 64 BASIC V2 ****

64K RAM SYSTEM 38911 BASIC BYTES FREE

READY.

ZX Spectrum

Sinclair Research

BY NICK SWEENEY

At one extreme, everything changes – all the games I once played on my Sinclair ZX Spectrum now fit on a single silver disk. Often I play them again, emulated and miniaturized, as a diversion from work – almost as if a sliver of my childhood had been preserved, and then restored. At the other extreme – things stay the same. Across Russia and eastern Europe, people still use locally built Spectrum clones to exchange messages via 2400 baud modems. Call it a legacy system, and then some.

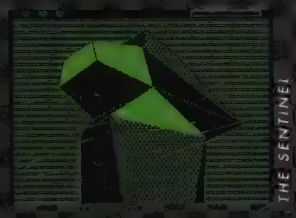
The Sinclair story begins with the man himself, the apotheosis of what the British call "boffins" – intelligent and full of ideas, but semi-detached from reality. Balding, ginger-bearded, and bespectacled, Clive Sinclair appeared every bit the mad professor, brimming with nervous energy poured out into speculative projects. The press christened him "Uncle Clive," the eccentric old relative in the garden shed. A generation older than Jobs and Wozniak, he'd cut his teeth in the early days of transistors, beginning with wireless sets and amplifiers, before designing the first practical pocket calculators in the early '70s. By 1980, though, with the electronics business suffering against Japanese competition, he had turned his attention to computers, launching the ZX80, and followed a year later with the ZX81.

With characteristic irony, the success of these first consumer micros was accidental – both of the machines were cheaply built one-kilobyte wonders, designed mostly to fund Sinclair's other projects. Yet in spite of their limited capabilities, their low cost – at less than £100, a fraction of US imports such as the Commodore PET and TRS-80 – helped them sell in huge volumes. Buoyed by this mass-market appeal, Sinclair introduced the Spectrum in 1982. This slender black box – with funky rubber keys, and rainbow flash at one corner – became the repository of nostalgia for the first generation in Britain to own computers. It also earned Sinclair a knighthood – Uncle Clive was now a Sir.

IMAGE: LEFT: ICK SWEENEY; CENTER RIGHT: COURTESY SINCLAIR RESEARCH LTD.

SKOOL DAZE

KNIGHT LORE

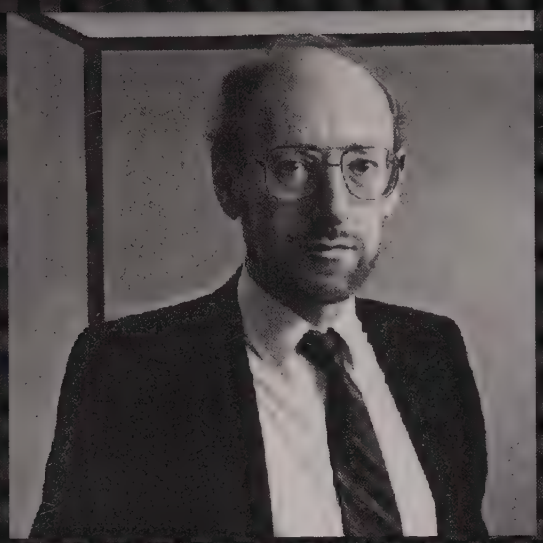

THE SENTINEL

With 48K RAM and 16K ROM in its classic incarnation, the "Speccy" represented a huge advance on the earlier Sinclair machines. Built around a 3.5MHz Zilog Z80A processor, with a slow but functional BASIC interpreter and 8-color display, it altered the perception of computers in Britain. Almost unwittingly, the hobbyists' poster child had now created a machine for users who cared more for software than hardware. Within months, new games-oriented magazines were offering reviews, tips, and cheats – writing for a new generation of back-bedroom programmers, self-taught in the intricacies of Z80 machine code, and barely old enough to drive the cars they'd bought with the proceeds of their work.

Those early years saw their fair share of arcade videogame conversions. But the best Spectrum games had an exuberant originality, from the classroom hijinks of *Skool Daze* and Matthew Smith's homicidal toilets in *Jet Set Willy*, to the dystopian test-tube genetics of Automata's *Deus Ex Machina*. And then there was Ultimate Play The Game, a game developer that redefined the nascent platform genre from the unlikely suburban backwater of Ashby de la Zouche.

Ultimate – formed by Chris and Tim Stamper, two brothers with a background in hacking arcade machines – came across as the men among boys as a result of its famed aloofness from the incestuous Sinclair press, distinctive full-page ads, and matte-black boxes. The games they developed redefined the technical capabilities of the Spectrum, while never losing sight of raw playability. When *Knight Lore* appeared at the end of 1984, with its stunning isometric 3D landscape, the rest of the industry was left scrambling to catch up – even though Ultimate had held back the game's release for nearly a year so that it would not eclipse the rest of their catalog.

Even with this impressive catalog of games, the Spectrum was hardly suited to playing them – its sound was limited to a weedy one-channel beep, while the display could only support two color attributes in each eight by eight pixel block. In contrast, its main rival, the Commodore 64, boasted dedicated processors for both audio and video. Yet somehow these system constraints managed to work in the Spectrum's favor by forcing game authors, like their arcade predecessors, to concentrate on the meat rather than the trimmings. Denied the sprite capability and audio



BRIT BRAIN TRUST: Sinclair Research Ltd. founder and former British Mensa chairman, Sir Clive Sinclair.

fidelity of the American machines, many Spectrum programmers turned instead to 3D vector-based graphics and the monochrome silence of outer space.

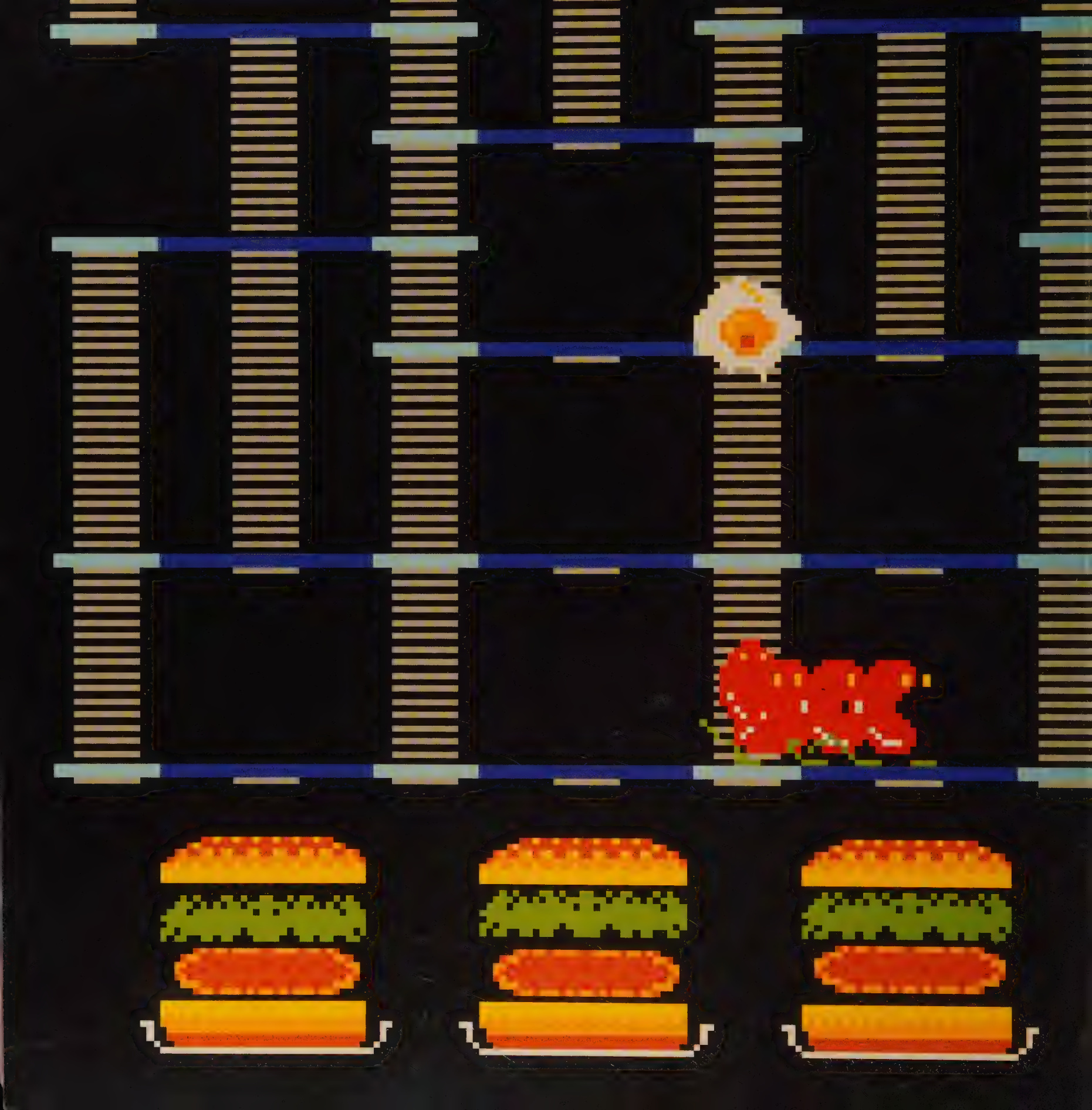
Braben and Bell's *Elite*, first written for the BBC Micro, remains the standout classic of the starfield genre – but native Spectrum games such as *Starstrike*, *Tau Ceti*, and the archly comic *Dark Star* testify to the strength of British 3D programming and its 8-bit origins. In similar terms, groundbreaking games such as *Driller* and *The Sentinel* provide the first, tentative appearance of the vector-filled, first-person perspective made ubiquitous by *Doom*.

Like silent movies, or radio dramas, the best games of the Spectrum era compensate for the limitations of the machine by courting players' complicity. Desaturated and hauntingly quiet, these games make their impact not upon the screen but in the intimate recesses of the imagination. Small wonder that those who spent much of their early life with held breath, as games loaded shrilly from cassette tape, feel compelled to document it with such thoroughness. As for the developers, the hard apprenticeship of the intensely competitive Spectrum market bore rich fruit – and helped establish the disproportionate influence of British software companies. Both Eidos and Psygnosis trace their origins to the Sinclair era, as does Rare, spun off from Ultimate as the Stampers turned their attention to the emerging console market.

And yet, this success was never matched by Sinclair himself. The business-oriented Sinclair QL (for "quantum leap"), was a commercial failure – the C5 electric car an unmitigated and humiliating flop. And so, in the spring of 1986, facing imminent bankruptcy, Sir Clive sold the company to Alan Sugar's Amstrad, along with the rights to the Sinclair name.

The contrast was truly stark.

A former London street trader, Sugar was a pure-bred entrepreneur, more concerned with unit sales than quantum leaps: "At Amstrad," he once said, "we just want your money." While he successfully consolidated the position of the Spectrum for the remainder of the decade – until the superior 16-bit hardware of the Amiga and Atari ST took its toll – the spirit of the boffin had given way to that of the businessman. In those later years, licensing deals too often took the place of innovation. But, even so, nothing could ever detract from the awe and euphoria felt in those early years of the Sinclair Spectrum – and the way in which they call out to the eternal silence of those infinite spaces. ■



BurgerTime

Data East

BY JUSTIN HALL

Picture a giant blue scaffold, its levels supporting the many ingredients of a supersize hamburger. Four all-beef patties. Large lettuce leaves. Big buns. Running around on the complex scaffold, you see a chef – a short little man in giant white puffy hat – jogging over the various parts to send them down to the level below, one by one, to build the ultimate burger.

Now that starts to sound pretty weird! But just wait. Chasing the chef is a giant gyrating hot dog, a fat fried egg, and an ornery slice of dill pickle. Out of context, this might seem strange – but in the somewhat surreal world of videogames this scene is not only normal, it is one of the all-time arcade classics.

BurgerTime, created by Data East and licensed to Bally/Midway, reinvented the platform genre in the appetizing realm of fast food. You play Peter Pepper, a short-order chef who is trying to build some tasty burgers. You run up and down the ladders between levels trying to reach each of the ingredients as a host of fiendish foodstuffs relentlessly jog along after you to try and spoil your supper. But the enemy artificial intelligence is often deceptively arbitrary. As the number of fast foods begin to gang up behind you, they will suddenly split up, take random turns, and leave your trail at precisely the moment you suspect you've been surrounded.

But there are many ways for you to outmaneuver Mr. Hot Dog and Mr. Egg. If your enemies get too close, you can throw a pinch of pepper at them, temporarily paralyzing them as they turn brown – just long enough for you to slip away. You only have a limited amount of pepper, however, so it is imperative that you find wily ways of avoiding and annihilating these foods, or else you must revisit the center of the screen where bonuses like ice cream, coffee, and french fries will give you extra pepper to help fight your foes.

With its attractive palette of sharp primary colors, *BurgerTime* takes its visual cues from fast food packaging themes – yellow slices of cheese and leafy green lettuce leaves bounce around as red hot dogs and yellow yolks trot all around you. It's like a happy meal gone horribly wrong. Each of the arcade cabinets displays different art variations – the Data East cabinet featured a line of various foods while the Bally/Midway version prominently featured the giant hot dog chasing Peter Pepper. While the standup cabinet version was certainly the most common, a sit-down cocktail cabinet was also released. But each arcade cabinet had the same simple controls consisting of a four way joystick and a pepper button.

There are also reports of the existence of a rare vector-based *BurgerTime* – a hacked version of the game that uses vector graphics to display the flashy foods. Official sequels to the game include *Diner* and *Super BurgerTime*, as well as the rumored, yet unreleased, *PizzaTime*.

BurgerTime was licensed to Mattel Electronics who released home versions of the game for the Intellivision, as well as systems including the Atari 2600 and Apple II under the M-Network software label. The game was also licensed to Coleco for release on the ColecoVision. *BurgerTime* was later released by Data East for the Nintendo Entertainment System, and a version entitled *BurgerTime Deluxe* was also created for the Game Boy handheld videogame system.

In *Super BurgerTime*, the elegant surrealism of the first game is taken one step beyond. In the first screen you see a fantasy landscape, a castle poised on a faraway hill. It is eight years later and Peter Pepper is ready for a new culinary challenge. Now the cast of enemy edibles includes some maligned vegetables – onions, carrots, and a pea pod hurling pea – that attack you along with your pals Mr. Hot Dog, Mr. Egg, and Mr. Pickle. Only now, you're building burgers between two towers of a castle. As if they could make building giant hamburgers on scaffolds any more surreal. ■

Dig Dug

Namco

BY LAUREN FIELDER

The concept of *Dig Dug* was simple: gather fruits and vegetables to earn healthy points, dig tunnels, avoid ghosts, pump Pookas and Fygars full of air until they burst, and get out before something falls on your head. The game's name was modest, too, *Dig Dug*. The perfect model of alliteration with just a touch of onomatopoeia. The name is impossible to forget – the act of doing, the act of having done.

The amusement value of *Dig Dug* has always been widely recognized, from its arrival on the arcade scene in 1982 to collector circles today. The game's fast pace, cute characters, catchy sound effects, and addictive gameplay ensured that success. The original coin-op was created and developed by Namco of Japan, and then licensed to Atari for US distribution, as well as ports for the Atari 2600, 5200, and 7800 home videogame systems. Versions also appeared on the Commodore 64, Apple IIe, NES, and the *Namco Museum* collections for Sony PlayStation, Nintendo 64, and Sega Dreamcast.

But the heart of *Dig Dug* can only be identified in retrospect. What wasn't so apparent in the early eighties was the potential staying power of Pooka – the round bubble character with goggles. The main character, wearing an antiquated conceptualization of a "space suit" with his deadly pump, and the fire-breathing dragon known as Fygar are both unremarkable compared to Pooka, who has since appeared in the backdrops of numerous Namco games in the US and overseas.

In 1975, when Sanrio established its Hello Kitty brand in US stores, they also introduced American pop culture to a fashion the Japanese commonly refer to as *kawaii*, or "cute style." Pooka, with its minimalist styling and detached, yet charming personality perfectly embodied this new super-cute sensibility. With Pooka's popularity in Japan, as well as its timeless appeal to die-hard *Dig Dug* fans, it is astounding that the game has not evolved from these roots in order to capitalize on the Pokémon and cute-crazed videogame audiences of today. Perhaps, for purist's sake, that is for the best. ■

In Data East's ***Disco No.1***, you are a rollerskating geek who shows off his roller-disco prowess to win over the ladies. With its themes of superior dance skill, *Disco No.1* was a precursor to modern dance games like *Bust-A-Groove* and *Dance Dance Revolution*.

Donkey Kong Junior

Nintendo

When I was eleven years old, I would sneak away from my usual Saturday afternoon hangout, the Cherry Hill Mall Supercade, disobey my parents' strict orders, and traverse the seemingly deadly highway overpass of Haddonfield-Berlin Road for the chance to spend a few glorious hours within the hyperactive neon-trimmed interior of Bally's Great Escape. There I would stand – illuminated by the glowing marquees of the arcade games that surrounded me – lost in the lush jungle world of my favorite videogame, *Donkey Kong Junior*.

In Nintendo's sequel to last year's smash arcade hit *Donkey Kong*, the tables are turned as the once righteous Mario has kidnapped the great Kong and locked him in a cage. The player controls Donkey Kong's progeny, the diaper-clad Donkey Kong Junior, who must now save his papa.

In this challenging platform game, there are four distinct levels in which you must climb, jump, and run in order to reach the top and free your father. In the first, you must climb vines, traverse platforms, jump deep waters, and escape the steel traps as you cross the sceen, grabbing fruit along the way, until you finally shimmy up to the top and save Donkey Kong. However, even if you succeed, Mario steals him away to the next level. In the next level, you must shuttle eight keys up chains to unlock the shackles that hold Kong's feet. As you climb, drop fruit on both the traps and the birds to score extra points and rid the board of enemies. When you finally return all of the keys to their locks, Donkey Kong and Mario fall to the ground – but even after a solid kick in the pants, Mario kidnaps the great ape yet again. In level three, you are attacked by a flock of killer dive-bombing Do-Do birds. Use the springboard to launch yourself up to the moving platform. Time it carefully, and hang onto the rope until you reach the bank of vines where you must dodge the birds and their deadly eggs to make it to the top. But your efforts are for naught as Donkey Kong is swiftly carried away. After repeating level one, only now with increased difficulty, you will find yourself on the way to Mario's secret hideout where you encounter a fantastic array of pulsing electrodes that bleep and bloop their way down through his lair on secret cables and conveyors that thwart your advances. They usually succeed.

Over the years, the Donkey Kong universe has gone through many iterations. However, *Donkey Kong Junior* remains as the single instance of Mario cast as nemesis – and the game where the two lead characters go their separate ways.

With its erratic red and blue snapping traps, dive-bombing dodo birds, luscious fruit bonuses, and lush foliage, *Donkey Kong Junior* was a dramatic departure from the industrial steel-girdered playfield into the pixellated platform-filled jungle that would become the setting for DK's newest adventures including the arcade follow-up *Donkey Kong 3*, as well as *Donkey Kong Country* for the Super NES and the sprawling three-dimensional world of Rareware's lavish remake for the Nintendo 64, appropriately titled *Donkey Kong 64*. But the steel girders would soon return as the backdrop for the next in the series of Donkey Kong-inspired games where Mario makes his heroic return – Shigeru Miyamoto's classic *Mario Bros.* ■

TOP
000400
HIGH SCORE
101200
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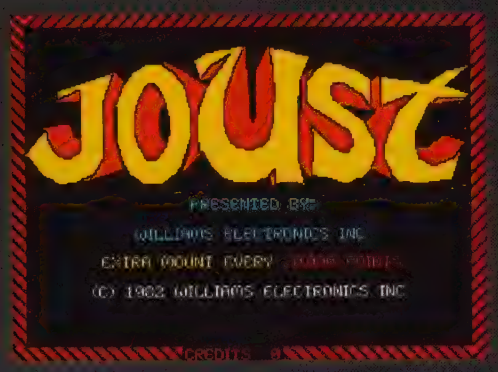
BONUS
L

1982

Joust

Williams Electronics

In *Joust*, you control a futuristic medieval knight, mounted on a colorful winged ostrich, who emerges from a transporter and takes flight to joust in battle against dark enemy knights on buzzards that slowly fill the sky. Your only weapon is your lance – so, in combat, the highest mount wins. When the dark knights are knocked from their mounts, they spontaneously transform into tiny spherical eggs that float down to rest on one of the many rocky platforms suspended above the deadly lava pool. Navigate the ledges and pick up the eggs to prevent them from regenerating into the next generation of evil knights. But watch out! A fiery hand can reach up from the lava to grab a mount who dares fly too low.



Aside from its brilliantly original theme, *Joust* was also one of the first truly collaborative arcade videogames for two players. Although fun in single-player mode, the two-player mode allowed two people to play simultaneously – each knight on his or her own mount – jousting as a team to destroy enemies and collect eggs in an exciting tag-team effort. However, the only flaw was that a collision detection device was never programmed in order to prevent the two apparently good knights from killing *each other*. As a result, even players starting out with the best of intentions run the risk of their match degenerating into a free-for-all deathmatch following an "accidental" collision with their former partner. So much for teamwork. ■

The ever challenging "Egg Wave" where your goal is to pick up as many eggs as possible before your enemies hatch.

Jungle King

Taito

Jungle King, originally released by Taito in 1982, was an entertaining riff on the classic Legend of Tarzan theme – now in a perfectly paced and visually complex parallax side-scrolling platform game. As the game begins, the player hears Tarzan's trademark call blasting through the single channel amplified speaker – "Ahhh-ahahaaaa–ahahahaa!" The game featured four levels – jungle vines, sharks, boulders, and the deadly cauldron dance where you must save the virgin from the clutches of her primitive cannibal captors. The gameplay was somewhat similar to various platform games of the era, but the combined effect was truly original.

GEORGE OF THE JUNGLE: Taito's tame version of the original game, now renamed *Jungle Hunt*.

However, soon after *Jungle King*'s release, Universal – the same company who threatened to sue Nintendo over *Donkey Kong*, and lost – threatened legal action against Taito. Universal claimed copyright infringement for their character Tarzan and sought damages. Unfortunately, Taito caved under the pressure. They modified the game and renamed it *Jungle Hunt* – replacing the loin cloth and flowing hair with a safari jacket and pith helmet. ■

Kangaroo

Atari

In Atari's *Kangaroo* – the original "Punch the Monkey" – you play a boxing mother kangaroo who must save her joey from naughty monkeys who have kidnapped him and locked him in a cage. You hop around the screen punching the enemies, bells, and the bonus fruits to score points as you avoid the apples thrown at you by the cheeky monkeys.

To reach the joey, you must climb the ladders between branches, hop, and jump from platform to platform to rescue him from his primate captors. The monkeys will try to thwart your efforts by throwing apples either overhand or underhand – high or low – so you must duck or jump accordingly to keep from being hit. The monkeys will also drop apple cores from up above, so you need to either dodge or punch them to score points. Other bonus points are scored by punching the various fruits and vegetables that appear, including cherries, strawberries, pineapples, and tomatoes – more fruits will appear if a bell is rung.

If the mama kangaroo gets close to one of the monkeys, she can punch him out. But you need to watch out for the boxing gorilla who will attempt to steal mama kangaroo's boxing gloves.

The game consists of four different levels. The first features three separate floors connected by ladders. The second level also contains platforms that you must jump across in order to reach each ladder. In the third level, the cage in which baby joey is held is supported by an entire stack of monkeys. To save him, mama kangaroo must repeatedly punch each monkey in the stack until the cage is lowered down where you can reach him. Finally, in the fourth level, the monkeys just go ape shit with the apples. ■

Developed by Irem and licensed to Williams, ***Moon Patrol*** is a unique space shooter where you control a moon buggy, exploring the surface of an intergalactic alien moon. The gameplay consists of dodging boulders, mines, and craters as you are relentlessly attacked from above by hostile enemy spaceships.

1982

Mr. Do

Universal

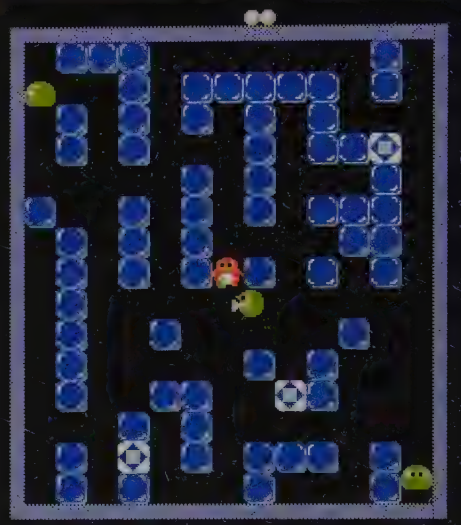
Mr. Do!, *Mr. Do's Castle!*, *Do Run Run!*, *Mr. Do's Wild Ride!*, *Mr. Lo!*... Not since *Pac-Man* has an arcade game inspired such an impressive array of spin-offs, sequels, and rip-offs.

Released by Universal Co. Ltd. in 1982, the original *Mr. Do!* was based somewhat on the basic physics of Namco's *Dig Dug*. You are Mr. Do, a magical circus clown who burrows beneath the earth's surface carrying a crystal powerball. You must dig paths underground to avoid the monsters and collect cherries along the way. You can destroy the monsters by throwing a deadly powerball or dropping apples on them. Also, if you manage to capture the letters E-X-T-R-A you will earn yourself a free man, and snagging the Diamond will even earn you a free game.

Mr. Do must clear the board of monsters or eat all the cherries to move on to the next level. Once all the monsters appear in the maze, their home can be collected as a bonus prize. Be careful! If you get this special prize, a tough boss monster and his four goons will appear – but when the boss is finally killed, his goons turn into tasty apples. Mr. Do Yum Yum! ■

Pengo

Sega



In *Pengo*, you play a cute little penguin waddling around in a maze of frozen ice blocks. You must slide the blocks across the playfield in order to crush all of the fat furry Sno-Bees that chase you around the maze. But watch out! The Sno-Bees will sting poor Pengo if they get too close. You can electrocute them by trapping them against an outer wall. But additional Sno-Bees will hatch from flashing ice blocks, so before they emerge you must quickly kill them by crushing the ice block. To destroy it, you push another block into it – shattering the block and "icing" any Sno-Bees that are trapped inside.

To earn extra points you can align the diamond blocks within the playfield for a bonus of 10,000 points – however, aligning them against the outer wall will earn you only 5,000 points.

Pengo features animated intermissions between levels in which a group of happy penguins dance, imitate Space Invaders, and play a cocktail arcade videogame. Too cool. ■

Prepare to qualify! Developed by Namco and licensed to Atari for release in the US, ***Pole Position*** – the ultimate arcade driving experience where you race a high-performance Indy car around the Fuji Speedway while avoiding hazards and other cars – was named arcade game of the year in 1983.

In 1982, Nintendo released ***Popeye***, with characters licensed from King Features Syndicate's popular cartoon. As Popeye, you collect hearts thrown from Olive Oyl as you avoid your nemesis Brutus. Spinach power-ups let you turn the tables.

Pop Flamer

Jaleco

Japan Leisure Co., otherwise known as Jaleco, released *Pop Flamer* in 1982. In *Pop Flamer*, you control a flame-throwing goggle-wearing mouse that must pop red balloons throughout the staggered levels of the playfield and torch the attacking monsters with your pink flames. But be careful! If you are hit by the electro-shock wave emmitted by Haradon, the Pop Flamer becomes paralyzed. During play, your flaming distance becomes gradually shorter as you run out of fuel, so you must replenish your supply by popping more balloons.

SEPARATED AT BIRTH? Taito's too-cute dino twins – Bub and Bob – shown above in their 1986 arcade classic *Bubble Bobble*, bear a striking resemblance to one of the enemies in *Pop Flamer*.

Drinking the power drink located at the bottom of the screen will transform you into a killer Super Mouse and allow you to swallow the now mutated monsters. If you manage to pop all of the balloons, you will be rewarded with mind-numbing music as you enter the next round.

A home version of *Pop Flamer* was ported to the Sega SG-1000, Sega's first home videogame system, and released only in Japan in 1983. Sadly, this bizarre yet charming videogame never quite made it to the United States. ■

Q*bert

Gottlieb

BY WARREN DAVIS

I am constantly amazed at the fondness people have in their hearts toward *Q*bert*. I was glad it was successful when it first came out, but I never expected it to be remembered after this many years. It's an honor to have been able to touch the lives of so many people in a positive way, and for that I will always be grateful.

*Q*bert* was the love child of three people: Jeff Lee who did the graphics and created all the characters, David Thiel who did the sounds, and myself. I was the game's official designer and sole programmer. Back in those days, programmers generally tended to be the game designers since they had to actually implement the game. Many people contributed ideas while we were developing *Q*bert*, and I had to be the filter who decided which ideas were worthy and which were not. Since *Q*bert* was my first game – and started out as a programming exercise – "worthy" usually meant "easy to implement."

Jeff created most of the characters in *Q*bert* before there was even a game. I'm pretty sure Jeff also gave all the characters their names, with the exception of Q*bert himself who wasn't named until the game was completed. Dave created all the sounds and was the one who came up with the idea of using the random phonemes of a speech chip to make Q*bert speak gibberish. Contrary to modern myth, he is speaking only gibberish. Nothing was ever programmed to be said specifically, with the exception of "Hello, I'm turned on" when you power the game up and "Bye-bye"at the end of a game. All three of us constantly gave each other input during the creation of *Q*bert*, and we all enjoyed and respected each other's ideas, which is what made the development process so much fun.

The Creation of Q*bert

I was new to Gottlieb in 1982 and had learned the ropes by helping one of our programmers with his game. I was looking for a game of my own to do when I saw that another programmer, Kan Yabumoto (who would later do *Mad Planets*), had filled a screen with hexagons consisting of 3 differently colored diamonds. If you chose the right colors, each hexagon seemed to be a 3-dimensional cube. Kan had filled the screen to its edges with this pattern, but for some reason, when I looked at it I envisioned a lot of the hexagons removed so it would look like a pyramid of cubes suspended in space. Then I thought of balls bouncing down the pyramid. This was really a thought of convenience, since every time a ball landed it had two choices of which way to bounce.

Two choices means one bit and that meant in one byte I could determine a ball's path. It was a purely scientific endeavor since I wanted to learn to program randomness and gravity. It was a nice exercise and nothing more.

Once I programmed a pyramid with balls randomly bouncing and falling, people started to comment on how cool and 3-dimensional it looked. So I kept playing with it. Jeff Lee had created a bunch of characters thinking that they might possibly be used in a game. I thought the orange one with the big nose would make a good player character as he looked kind of helpless. Jeff had originally intended that he would shoot out of his nose. He even wrote up a game description and called it *Snots and Boogers*. However, I liked the idea of the player hopping around trying to avoid bouncing obstacles. Also, I was trying to do something a little different, and there were a lot of games then that involved shooting. Still, a few people tried to get me to have the character shoot. I resisted, but I think there were people at Gottlieb who always thought I would eventually put that in. Because of that, the name *Snots and Boogers* was sometimes attached to it, mostly as a joke, but the proponents of flying the snot-bombs were ultimately disappointed. My name for the game during its development was *The Cube Game*. I know, pretty boring. The name *Q*bert* came much later and is a story in itself.

In implementing the player character, it seemed natural to me that you'd want to move the joystick along diagonal lines, since every time you jump, you're either jumping up or down. So I implemented it that way. But as people came along to play it, they got very confused. I'm still not sure why. They wanted Q*bert to be able to hop from side to side. I stuck to my guns on that one too.

One night, I was sitting at my desk playing with what I had so far, which was Q*bert hopping around the pyramid avoiding balls. It was fun, but it wasn't a game yet. There was no goal, and no way to move from round to round. Sitting behind me was Ron Waxman, our VP of Engineering. Ron can be a very intimidating person, but once you get to know him he's a pussycat. He would do this thing occasionally at night – just sit behind someone and silently watch them work. It's a little unnerving, but I had gotten used to it. So I was just playing with what I had, wondering what to do next. The entire development of the game was very much like that. There was never really a master plan. I would implement something and then start to think, "Ok, what should we put in next?" Out of nowhere, the voice of Waxman behind me said, "What if the squares change color when he lands on them?" This struck me as a particulary brilliant idea, and that is the moment when *Q*bert* actually became a game. ▸

PLAYER 1
300
CHANGE TO:
LEVEL: 1
ROUND: 1

PLAYER 1
1500
CHANGE TO:
LEVEL: 1
ROUND: 1
@!#?@!

*Q*bert* was written in 8088 assembly language and was started with a framework supplied by Tim Skelly for the game *Reactor*. When we started the game, we were working in Bensenville, in a "think tank" kind of environment. At some point during the development of *Q*bert*, we were moved from Bensenville to Gottlieb's main pinball plant in Northlake, Illinois. For development, we used the first available IBM PCs when they came out. The floppies held 180KB and the hard disk (when it was finally available) held a whopping 1 MB! The game program was downloaded to our own hardware through the PC's bus. Where the arcade games had ROM, the development system had RAM. I seem to remember that images still had to be burned in ROM all the time.

For a while I had a monitor sitting on a table with some wires connecting it to the game hardware. The joystick was mounted to the bottom of a plastic bucket mounted upside down. This may have been why people had trouble with the joystick being at a diagonal. Because the joystick was attached to a bucket, they kept trying to straighten it out! Eventually, as production increased, game developers got actual game cabinets to develop with, but when *Q*bert* was started, *Reactor* wasn't rolling off the production lines yet.

I'm still amazed at how great all the characters in the game look. This is considering that Jeff had to plop down each pixel in each image one at a time. There were no drawing tools like the ones we have today. Each character was a 16 x 16 pixel grid (Coily was actually made up of two 16 x 16 blocks). One of the little things Jeff did was make an image of Q*bert with his knees bent so he actually absorbs the shock as he jumps from cube to cube. This kind of thing, though small, helped the characters come alive.

The same can be said of the game's sounds, which contributed enormously to its appeal. Dave's work was just brilliant. From the pitiful sound of Q*bert plunging off the pyramid, to the clinking sound the game makes when you drop a coin in the coin slot, Dave was a master at using sound to enhance the game experience.

One other thing should be credited and that is the knocker that would bang the cabinet after Q*bert disappeared from the bottom of the screen after a plunge. This was the idea of Rick Tighe, one of our technicians. He put a standard pinball coil in a test cabinet so that I could trigger it at the appropriate time. I didn't actually like the knocking quality of the sound. I wanted more of a thud, so it would sound like a sack of potatos being dropped. With a little experimentation, we found that a small piece of foam glued to the right spot produced what I thought was the perfect thud. Unfortunately, the gluing of the small piece of foam was deemed too labor intensive for production and wasn't done. But the effect was still fantastic. The knocker was controlled by a dip switch, so an arcade operator could turn it off.

I think the programming of *Q*bert* started in April of 1982. By June or July, it had evolved to the point where it was put on the schedule as an actual game. The game took about four months to complete after that and production began in October or

November of 1982. When the game was on test, we would go to arcades and watch people play it. Most people thought it was cool. Some didn't. Some people found it natural and easy to play. Some didn't. Almost everybody hated the fact that you could jump off the pyramid and die. Some people would put their quarter in, jump off the pyramid three times in a row, and not even realize why their game was over! Normally, this would be grounds for changing the game so you cannot possibly die without knowing why – but I didn't do that. Because for some reason, those people saw other people playing the game with ease and came back to try again.

Tweaking the gameplay was extremely difficult because although some people just got the knack of it quickly, most people at Gottlieb thought it was too fast. So I kept slowing it down so it started slow enough to allow people to learn it. Unfortunately, once it was released, those who got the hang of it were able to stay on it for hours at a time. This was one of the great aspects of the golden age of video arcade games – the ability to stay on a machine for many hours for 25 cents. Many people aspired to do this and were treated like heroes when they succeeded. Alas, those days are gone.

How Q*bert was Named

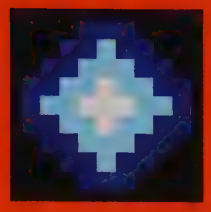
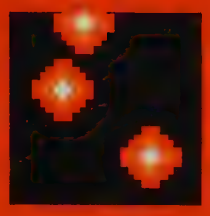
As best as I can recall it, we had a meeting to name the character, since I resisted coming up with a name. Management saw licensing possibilities and wanted something cute. Howie Rubin, VP of Marketing, wanted the name of the game to be what was in the cartoon balloon when Q*bert dies, the gibberish swearing. Most everyone thought this was the stupidest idea we'd ever heard. How are you going to talk about it when the title is unpronouncable? But he was adamant, and a bunch of engineering samples actually went into arcades with that cartoon balloon in the marquis as the game's title. After this test, Howie seemed to agree that the game should have a real name and it should be the name of the character.

We passed around a list to everyone in the company to suggest names for the player character. We got about fifty. The only one I remember is Arnie Aardvark. I don't know why I remember that one because it seemed so absurdly inappropriate. In fact, none of the suggestions on the list really worked. So we had another meeting and someone was playing with the word "cube." Someone else suggested "Hubert" since it was a real name and rhymed with cube in a way. Then someone else had a brainstorm and wrote "Cubert" on the blackboard.

Everyone kind of liked the sound of it and we were all sitting there nodding and getting used to it, when I think it was Rich Tracy, our art director, who rewrote it as "Q-bert." Somehow the asterisk got stuck in there and we all knew we had found it. It felt right.

It's hard to imagine a bunch of grown men sitting around a conference table throwing out ridiculous sounding names at each other, but that was the reality of it. Sometimes, in the midst of meetings, I would take myself out of the discussion and listen to it as if I was a complete outsider – and I'd have to laugh at how goofy everything sounded. It was a fun time. ■

827
990
BONUS
390
TO GO
13
COOL
DOWN
CORE
HIT
CONTROL
RODS
SHIPS
1
DECOYS
3

Reactor

Gottlieb

Tim Skelly – frustrated with the low pay, long hours, and the same lack of royalties that drove Larry Rosenthal away – left Cinematronics and set out on his own as a freelance game designer. D. Gottlieb & Co. – a successful Chicago pinball company who desperately wanted to break into videogames – was the first to give him a call. They needed a sure thing, and Skelly was it.

In August 1981, he relocated to the windy city to start working on his next big project, Gottlieb's first coin-op videogame. His idea was to create a new type of game, something that would stand out from the sea of shooters and myriad maze games of the era – something totally new. As part of his research, Skelly regularly visited arcades, both to play new games and watch the players. During one such visit, he realized that although there were a million games where you had to either shoot or eat something, there weren't any games in which you had to actually *hit* something. And, from that, the concept for *Reactor* was born.

"I was in love with the idea of a non-aggressive game in which you simply push opponents away instead of blasting them," Skelly said in a 1982 interview with *JoyStik* magazine.

Originally entitled *Ram It* and later changed to *Expander*, and finally renamed *Reactor* – the game went through numerous iterations before Skelly finally settled on the final concept and gameplay. In *Reactor*, the player uses his ship to deflect enemy particles into a lethal reactor wall without getting knocked into the wall himself. As you play, the reactor core is slowly expanding, which forces you to hit the enemy particles into sets of control rods located on the outer wall to cool it down. The player can also use energy to make the deflections more powerful or use decoys to fool the enemy particles.

A prototype – complete with trackball controller and hard-rock theme by David Thiel – was built and test marketed in local video arcades. Unfortunately, *Reactor* was a bomb.

The game was simply too hard – too cerebral. Players couldn't seem to "get" the basic premise and were baffled by the gameplay. So Skelly and his team went back to work to refine the game. With a few minor alterations – including on-screen hints, faster action, and a new rapid fire feature – the game was finally released in 1982.

Based on the Intel 8088 processor, *Reactor* was a complex and visually dynamic game. To master the game requires a delicate balance of skill and strategy – understanding the mechanics and using your resources to the greatest benefit. As the game progresses, the reactor core continually expands, decreasing the size of the field. In the beginning, the core is rectangular in shape and expands out, forcing the player closer to the reactor walls. But as the game progresses, the core is replaced by a swirling vortex. Once caught, the deadly vortex would draw the ship into its center to be destroyed.

Reactor was a mild commercial success, selling only one thousand units, but its legacy lives on as being one of the truly original games of its time. And in the videogame age, that was truly an accomplishment. ■

IMAGE: FAR RIGHT: COURTESY TIM SKELLY

1982

Interview with Tim Skelly

Continued from page 207.

What was the environment like at Cinematronics?

During the time it took for me to drive from Kansas City to El Cajon, Larry Rosenthal had packed up every bit of development hardware and every scrap of paper he had ever scribbled on. He transported same to Oakland, CA, where he and (former head salesman of Cinematronics) Bill Cravens set up their own company which became Vectorbeam. Larry recommended I be hired because an incompetent warm body was just what he needed. It covered his getaway and gave him hope that no new product would emerge from Cinematronics any time soon.

What were the limitations you faced working with Vectorbeam technology?

First, there was no circuitry to zero the program counter at start-up, meaning the code could start executing at any point in memory. Second, there was this problem with the Vectorbeam technology itself. Rather than having a controlled, consistent raster, code written by the programmer was responsible for the position of the electron beam at all times. This meant that if an error occurred, the beam could strike parts of the monitor tube other than the surface phosphor coating. If this happened, the entire system just blew apart – electronics damage, burnt out displays, etc. – but we did get some bitchin' electron scatter effects on the screen before it blew. It would have been great in a game...

Which of your videogames means the most to you personally?

For me, *Warrior* is the game I'd want to be known for – based on appearance alone. Looking back, I'd have to say that *Warrior* represented my first ad-hoc research on what makes interfaces fun to use. As such, it was the beginning of what became my second calling – fighting for less crappy, and even good, computer-human interfaces. ■

Robotron: 2084

Williams Electronics

In 1981, following the phenomenal success of his game *Defender*, star programmer Eugene Jarvis felt that he wasn't being adequately compensated for the value of his work. As a result, Jarvis quit Williams to found his own videogame development company with Larry DeMar: Vid Kidz. After *Stargate*, the first sequel to *Defender*, *Robotron: 2084* was the next game in the series designed by Vid Kidz exclusively for Williams Electronics.

In *Robotron*, you are a Superhuman, sent to save the last human family – trapped on the planet's surface – from the Robotrons. These deadly robot androids convert humans into evil electronic zombies called Sinister Progs. The Robotrons belong to five classes: Grunts, Brains, Enforcers, Tanks, and Hulks – each with different strengths and capabilities. In each stage, you must destroy an array of enemies that swarm around you. To defeat them, you must use your mutant powers to zap the Robotrons, Quarks, and Spheroids with deadly energy pulses.

Robotron was one of the first videogames to use dual 8-position joysticks to control both your direction and weapon fire. This freedom of movement combined with the fast-paced action made *Robotron: 2084* one of the most exciting and challenging games of its time. ■

The Adventures of

Robby Roto!

Bally/Midway

Following the release of *Gorf* in 1981, Jamie Fenton began work on her next arcade videogame revolution for Dave Nutting Associates and Bally/Midway, an underground digging adventure called *The Adventures of Robby Roto!* released in 1982. As Robby Roto – a round red blob wearing a miner's helmet – players must dig under the earth to rescue hostages, battle evil monsters, and find buried treasure.

In a recent interview with AGH, Nutting states, "Conceptually, Robby Roto was right on, you'd be surprised at the fervent calls we got from those who played it. But it was a very complex game and those that played it found themselves on the defensive – most were intimidated."

Even so, the game enjoyed an intense cult following that played the 2000 units Bally produced, inspiring Robby Roto's copyright holder, Jamie Fenton, to release the ROM into the public domain in 1999 so classic gamers can enjoy it today. ■

In Bally/Midway's ***Satan's Hollow***, a harrowing arcade videogame in which you fight terrifying winged demons, you must build a bridge straight to hell in order to do battle with the Prince of Darkness himself – all to the tune of Wagner's "Ride of the Valkyries."

Sinistar

Williams Electronics

Released in 1982, *Sinistar* – engineered with the capability for advanced speech synthesis and full stereo sound – was a technologically sophisticated videogame. Designed by the team of Sam Dicker, Jack Haeger, R.J. Mical, Noah Falstein, and Richard Witt, *Sinistar* was built on a platform that included a Motorola 6809 and five PCBs, as well as two sound boards – one each for left and right channel stereo effects in the cockpit model.

The object of the game is to destroy the Sinistar. You must mine Sinisite crystals by blasting them off Planetoids and pick up the crystals in order to fill your bomb bay with Sinibombs. Only with enough Sinibombs can you destroy the Sinistar. As you mine, Worker ships from the planet Sporg are busy building an evil Sinistar – a skull-like android death star that comes to life with a sinister voice saying "Beware, I Live!" The Sinistar will then taunt you with phrases like "I am Sinistar!" and "Run, Run, Run!" as it relentlessly pursues your ship. You must then battle enemy Warrior ships that attack you from all sides as you bombard him with Sinibombs. If you succeed in defeating Sinistar, you will hear a bone-chilling scream as it explodes. If you fail, you will be crushed in his steely jaws.

As for the development team, not only did R.J. Mical go on to co-found Amiga, he also designed the Atari Lynx – the first color handheld videogame system. "I've done a lot of things in my career," said Mical, "but *Sinistar* is perhaps one of the things of which I am most proud." Although the game never quite matched the success of other popular Williams titles, *Sinistar* drew a rabid cult following that still thrives today on the Internet. Yes. Sinistar lives. ■

Time Pilot

Konami

■ BY NICK MONTFORT

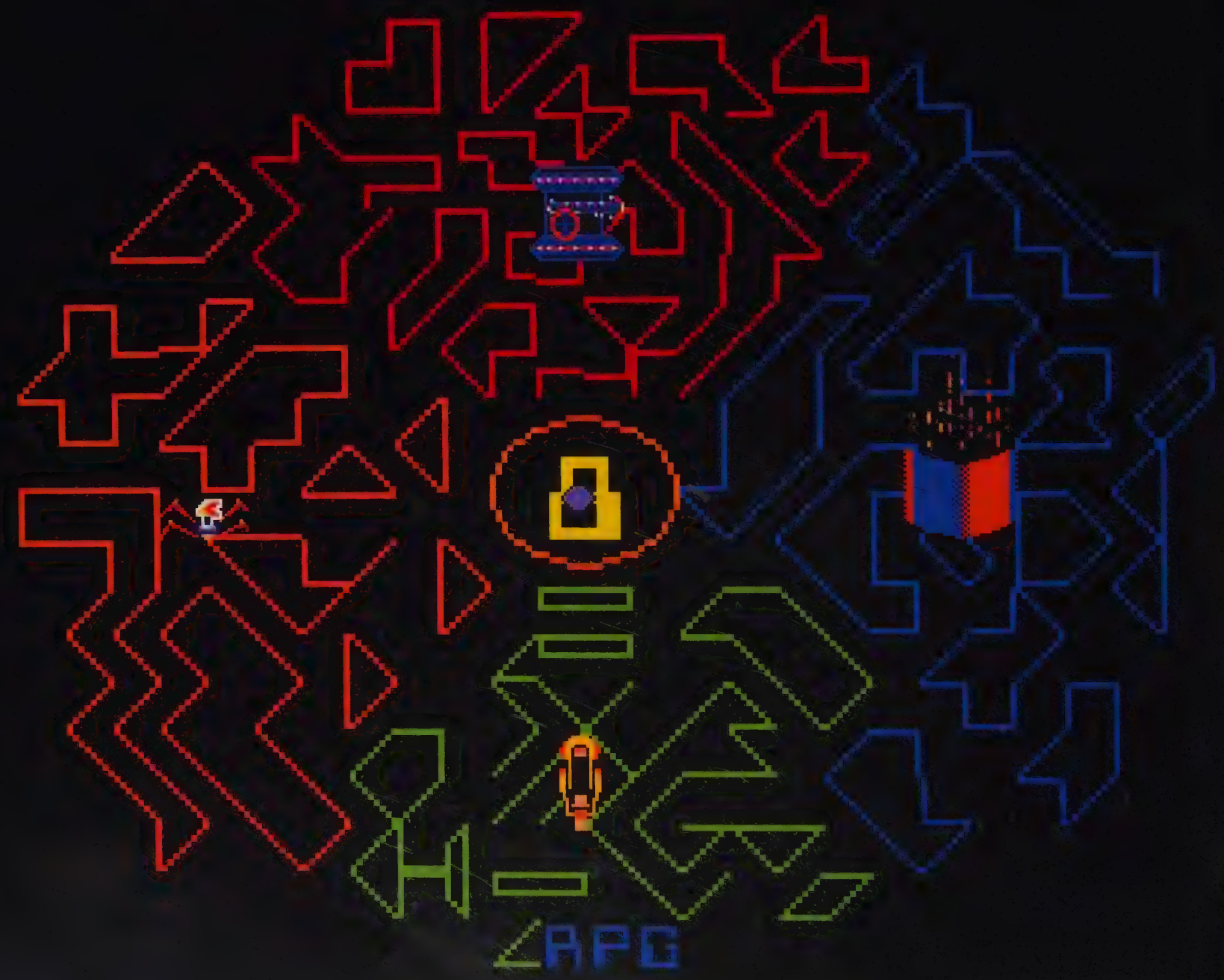
Time Pilot – famed videogame designer Yoshiki Okamoto's first game – was a hit for Konami as well as an enduring arcade favorite. In *Time Pilot*, the player pilots an aircraft as it time travels through different eras in the history of aerial combat – fighting World War I biplanes, World War II bombers, Vietnam-era choppers, Mig fighters, and futuristic alien spacecraft as you rescue fellow pilots and avoid the enemy fire.

In a 1997 interview, Okamoto said that he designed his debut game surreptitiously. His boss had assigned him to do a driving game in which the player earns a license by steering along wacky roads. Okamoto, who was not a fan of the concept, had suggested a flying game instead. His idea was shot down. So he diligently reported progress on the driving game each day – but in reality, the game he was developing was *Time Pilot*.

Licensed to Centuri for US release, *Time Pilot* was similar in format to *Bosconian* and *Sinistar*, both released the same year. But aside from the stationary central fighter, *Time Pilot* was in a league all its own. With its dynamic 360º parallax scrolling clouds, fast-paced dogfight action, and seemingly indestructable "boss planes" at the end of each level, *Time Pilot* was truly an original.

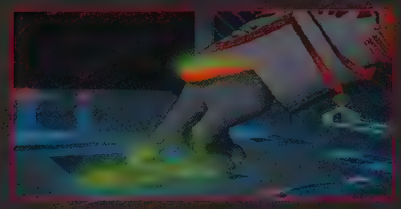
In 1984 Konami released a follow-up entitled *Time Pilot 1984*, now with missiles added to the player's arsenal. But the original, which warped the temporal continuum to appear in 1999 on the Sony PlayStation, is adept at another sort of time travel. Occasionally, a pounding tune will invade my mind as I walk down the street – the 1982 wave, starting up all over again. ■

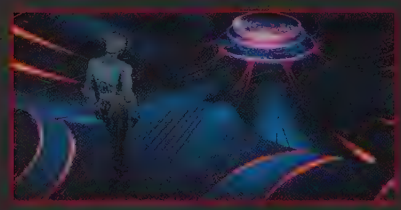
TRON



Tron

Bally/Midway





Scenes from the stunning computer-generated virtual world of Disney's *Tron* – the original motion picture that inspired the popular Bally/Midway arcade game of the same name.

In 1982, Disney released a science fiction thriller that stunned the nation with its breakthrough special effects. The film, directed by Steven Lisberger, was a glimpse inside a computer world never before seen – never before *Tron*. Starring Jeff Bridges and Bruce Boxleitner, *Tron* is the story of Kevin Flynn, a video arcade owner and former programmer for software giant ENCOM who has turned to hacking in order to prove that before terminating him the corrupt company stole his videogame program *Space Paranoids* – now the world's most popular arcade game – for which Flynn isn't getting any credit, or reward.

Flynn repeatedly attempts to hack into ENCOM's advanced computer security system – the Master Control Program – in order to find evidence of the theft on the company's mainframe, when suddenly he is magically transported into the virtual world of the MCP. Within this neon-drenched computer-generated world, slave programs are controlled by the oppressive MCP who forces them to abandon their users. Rebel programs who refuse to obey are sentenced to compete in a series of deadly gladiatorial contests on the Game Grid until they "de-res."

Now trapped in the system, Flynn's only hope is to find Tron – a rebel security program – to help him destroy the evil Master Control Program and restore freedom in the virtual world.

Tron was the first feature film to incorporate high-tech computer-generated imagery to simulate the futuristic videogame-inspired electronic world of the MCP – as envisioned by renowned artist, futurist, and designer Syd Mead. Scenes were shot in black and white and composited with complex background graphics in order to achieve a fantastic 3D-rendered hyper-intense computer look.

Following the film's debut, Bally/Midway released the arcade videogame *Tron* – complete with virtual Game Grid, glowing ultraviolet graphics, and fluorescent blue joystick. The game followed the themes of the movie as players chose between four of the film's famed contests – Light Cycles, Grid Bugs, Tanks, and the MCP. When all four contests were completed, the player would advance to the next stage until they finally reached the level of USER.

The arcade version of *Tron* was soon followed by *Discs of Tron* – with an environmental cabinet that immersed the player in the day-glo world of the MCP. ■

IMAGES: RIGHT COURTESY WALT DISNEY PRODUCTIONS

Tutankham

Konami

Tutankham, introduced by Sega in 1982 and licensed to Konami that same year, was an intriguing maze game in which you control an archaeologist searching for treasures in King Tut's tomb. You must collect keys and other objects – while avoiding deadly cobras, birds, and bats – to unlock the vault that will lead you into the next level.

The trick of the game is that you are only capable of firing to the left and right, not up or down – so any enemies above or below must be avoided or outrun. Each screen also contains warp portals that will carry you away to another part of the maze if you are in dire straits. However, as in Asteroids, there is no telling if this will, in fact, improve your circumstance.

Although there were vague similarities to *Berzerk* and *Frenzy* in the behavior of enemy AI, *Tutankham* was a significant departure in both graphic detail and theme. In 1983, Parker Bros. licensed the game and released it as a cartridge for myriad home console platforms – no doubt to capitalize on the popularity of another famous archaeologist named Indiana Jones. ■

With its crazy alien monsters and little green men, Bally/Midway's ***Wacko*** starred Kapt. Krooz'r – who also appeared in *Kozmik Krooz'r* – defending the galaxy against space mutants. To add to the mayhem, the bizarro arcade game came in a wacky cabinet with an asymmetrical marquee and tilted control panel.

1982

Xevious

Namco

Xevious, developed by Namco in 1982 and licensed to Atari for US release, was a graphically sophisticated videogame built on a powerful architecture of three Z80 microprocessors. In one of the first vertically scrolling shooters, you pilot a Solvalou Super Spacecraft that flies at a fixed altitude throughout the lower half of the playfield. Your mission is to destroy the many installations and air fleets of the Xevious, an alien army that has invaded your home planet – Earth.

As you fly low over lush forests, rivers, fields, oceans, and deserts, enemy attackers attempt to destroy you with ground and air attacks. You must target and bomb the enemy's ground bases – including pyramids, domes, and citadels – that fire from below, as well as secret underground bunkers, mobile bases, tanks, bombs, and the Andor Genesis Mothership as you shoot missiles at a phalanx of enemy ships that attack in waves. To add to your score, you can uncover hidden markers for extra points. Adding further challenge to the game are the adverse weather conditions – a crystal snowstorm will occasionally engulf the screen, forcing you to either avoid or destroy the deadly snowflakes to survive.

Designed by Masanobu Endoh, *Xevious* was programmed with the capability of adjusting the difficulty level based on the skill level of the player – if a player began to master tactics to defeat a particular enemy, the program would self-correct to send out a new wave of yet undefeated enemies to attack. Endoh also included a special Easter Egg in *Xevious*, a firing sequence that will display the message: "Namco: Original program by EVEZOO." His initials, in Solvalou secret code. ■

1982

Zaxxon

Sega

■ BY TOM VANDERBILT

The rise of videogames in the 1970s, as Alain and Frederic Le Diberder point out in their book *L'Univers des Jeux Video*, brought back a Renaissance impulse to create mathematical and optical systems for depicting reality: after all, the artificially constructed view was the point of origin for all games. And few titles were as instrumental in advancing the concept of videogame perspective as Sega's 1982 arcade blockbuster, *Zaxxon*. As one of the first 3D games based on raster technology – creating graphics frame by frame – *Zaxxon* featured a striking, richly detailed "isometric" perspective.

The player, piloting something resembling an F-16 fighter, is called upon to penetrate an enemy fortress filled with imposing brick walls, electrified force fields, radar dishes, gas tanks, anti-aircraft missiles, and other bits of Cold War infrastructure. After flying through several hostile enemy installations, and defeating a fleet of alien fighters in space, the player would finally face *Zaxxon* himself, a squarish robot boss straight out of *The Day the Earth Stood Still*.

However, the novelty of *Zaxxon* was in its view, a landscape pitched somewhere between *Galaxian* and *Defender*. In most video games, one simply had to avoid enemies or bullets – and the built environment was merely graphic background. But in *Zaxxon*, one also had to avoid the flight into terrain, and so in addition to shooting at communications facilities and knocking out missile silos, one had to keep an eye on the aperture in the wall ahead, sending shots out in advance to gauge one's altitude. It was a Renaissance moment for videogames, a reordering of the way we thought the onscreen world should look. ■

Zookeeper

Taito

Hold that tiger! In Taito's exciting animal adventure *Zookeeper*, you control Zeke the zookeeper who must rescue his girlfriend Zelda from the animal-infested Zoo. *Zookeeper* has multiple levels – each with its own unique gameplay – where Zeke must cage wild animals, jump platforms, and leap over the packs of charging wild animals in order to reach the escalator and score a bonus zookeeper.

On the first level, Zeke must trap the loose animals – including elephants, moose, snakes, rhinos, camels, and lions – by building a brick wall around them as he collects bonus items like watermelons, clover, root beer floats, strawberries, and ice cream sundaes that appear onscreen. Zeke must continue to replace the brick wall as the animals break it down in an attempt to escape. If they do manage to get loose, a special net will appear that Zeke can use to recapture them and send them back behind bars. Bonus points are awarded at the end of each round for every animal captured.

Following this level, Zeke must jump from platform to platform while collecting bonus items and avoiding the coconuts thrown down by a mischievous monkey to finally reach Zelda. The third level repeats the gameplay of the first, only now there are twice as many animals for Zeke to contain – and the animals seem to move twice as fast. The last challenge is to jump over a herd of wild animals in order to reach the escalator that will take you up to Zelda, earning you an extra zookeeper before you start over – now with increased difficulty.

As a result of its wildly comical graphics, savage sounds, and fast-paced gameplay, *Zookeeper* has become something of a cult classic for collectors today. ■

In Cinematronics' **Zzyzzyxx** – one of the company's only raster videogames – the player must move the character through shifting rows of red bricks as he gathers gifts including lollipops, rings, and flowers for Lola – his beautiful yet high-maintenance love.

1983

There are now an estimated [redacted] personal computers in use in the US — Bjarne Stroustrup of Bell Laboratories invents the **C++** programming language — **Toys 'R' Us** is founded — Atari, Inc. officially renames the VCS the [redacted] as it reaches a total of over 25 million units sold worldwide

Starcade

BY DAMON CLAUSSEN

It was the fall of 1983. I was in junior high, thirteen years old, and obsessed with arcade videogames. This love for arcade games had grown ever since the late seventies when I was first introduced to *Space Invaders* at the local arcade in Burbank. It seemed like every couple of months, a new game could be found at the local arcade. There were so many games – so many choices on how to spend your quarters – it was hard for a teenager in an arcade to choose.

Allowance time would come around, but I still needed an after-school fix for arcade games. But the Atari 2600's graphics just didn't cut it. ColecoVision had some great ports of arcade games, but it had a limited selection. As it turns out, the next best thing to being at the arcade was watching one on TV. I'm talking about the classic early-eighties videogame game show, *Starcade*. So, every week, I would make the effort to get home by 3:30 pm to watch the show and see what games were being featured. I knew the fun was about to begin when I heard the *Starcade* theme song, accompanied by the starscape flythrough – which looks very similar to the Windows stars screensaver. It was no doubt ahead of its time.

I was in pure bliss when they cut to the first wide shot of the backstage game room. The host, Geoff Edwards, and two contestants were gearing up to play *Starcade*. The room they were in was filled, no, bursting from wall to wall with arcade games of every sort. Some games I had never even heard of. Oh, the opportunity to be a contestant on that show would be incredible. So every week I watched the show – it didn't matter to me if shows were repeated, at least I got to see the game room again. I remember seeing a call for contestants at the end of the show credits one day. So I talked with my Mom about the idea of me becoming a contestant on the show. She was very supportive (as always) and made sure I filled out the mailing address information correctly. Stamped, addressed and mailed, the contestant postcard was mailed off to the land of *Starcade*. There wasn't a phone number to call, only the address. Would the mail get to them? Would I ever hear back? Time passed, and about month later (it seemed like a year to me), I received a postcard from the *Starcade* people at JM Productions, extending an invite for contestant auditions. They were looking for single and family contestants. I knew my dad wouldn't be able to get off of work, but perhaps my Mom might go for the idea. The auditions were Saturday October 22 – three days before my birthday. I told my Mom about it and, fortunately, she said yes. So we booked a flight to San Francisco for the audition.

Upon arrival in the city by the bay, I remember an arcade not far from our gate in the airport terminal. We had some time to kill before check-in, so a few games of *Dragon's Lair*, *Journey*, and others were played. At this point, I needed all the practice I could get!

We checked in at JM productions, received our audition application, and were told to come back in an hour for the next group's audition. It was about lunch time, so my Mom and I walked down to the nearest fast food place to eat and fill out the forms. I remember being so nervous filling out the application that I had my Mom do the writing while I answered the questions. I believe part of my logic behind this was that if the writing was actually legible, then I might improve my chances during the audition.

The audition itself was held in a soundstage. I remember it being well air conditioned, that the walls were neutral gray with lighting hung from above, and that one solitary videogame – *The Empire Strikes Back* – sat toward the front of the room. There were about 60 people auditioning for the show in our group that hour. Marie Shepherd, the contestant coordinator was the person in charge. I remember others in the front of the room, they may have been the director, James Caruso, and the writer Mavis E. Arthur, I'm not sure. The audition consisted of answering questions direct from the questionnaire. I was so nervous, but my nervousness was pushed aside by the strong need to be on the show. Suddenly, I heard my name and stood up in the crowd. The next few minutes seemed like seconds. They asked me what my favorite episodes were of *Starcade*... and then the dreaded question, "What is the most interesting thing about you?" I had put on the questionnaire that I did voice impersonations of Mr. Lizard. I was an avid imp with making strange voices and Mr. Lizard was a favorite of mine. I had seen a Cheech and Chong movie featuring Paul Reubens (a.k.a. Pee-Wee Herman) who played a resident of a mental institution. While wearing a straight jacket, Reubens did a very strange voice, sort of with a growl, and said to Cheech, "Mr. Lizard, care for a hamburger?" That stuck in my head, and became part of my impersonation bit. Long story short, they liked my voice of Mr. Lizard, as did the group of others auditioning. After the first part was done, they asked me to come toward the front of the room and play the arcade game. I was still very nervous, and this was the test to see how I would do in front of an audience and a camera. They had a studio camera propped next to the game and asked me to play the game. So I did.

On November 10, 1983, a letter arrived from *Starcade* with a big CONGRATULATIONS! We were selected to be contestants on the show. We were set to shoot our episode in December. We RSVP'd with JM Productions and made the flight reservations.

Taping was to be on either Monday, December 19th or Tuesday, December 20th. We arrived in San Francisco on Sunday and spent a few hours playing arcade games together at Pier 39. I felt it was my duty to expose her to as many games as possible, call it Videogame 101. She did fabulous and that was the first time I saw *Thayer's Quest*, as well as *Three Stooges*. My Mom's favorite game that evening was *Gorf* and *Elevator Action*.

We arrived the next morning at the studios and were led into the sacred game room. This room was

JOURNEY

where all the games were stored. This also was the room where the start of the show took place. Arcade games lined up in rows, scattered everywhere. The endless rows of glowing machines continued into yet more games, some I never even knew existed. There were about forty of us in the room, each playing a game (set on free play) for a limited amount of time. We recorded our score, and rotated to the next game. This lasted for about 30 minutes. My Mom was very stealth in her strategic thinking. She said I should relax and not play as well, that way we would be put with lower level players and win for sure. I went for the idea and played my worst games ever.

We were introduced to the host, Geoff Edwards, the crew, and the man himself – the voice of *Starcade* – Kevin McMahan. It was great to finally put a face with the voice. We did a run through from the game room to the main set. We were told where to stand during the intro of the show as well as the general rules of the game. There were several other teams there, but we didn't know who our opponents were yet. We left and returned the next morning for the taping of the show.

Backstage, we were treated with a haircut and caked with makeup. There were a couple of shows before ours, so we waited in the green room. Naturally, they had a ColecoVision – with yet more donuts. We then got a chance to meet other contestants, and finally met our opponents, Arnie and Brenda Hill. They were from Oregon and I quickly started asking Arnie about his favorite arcade games. He told me his best game was *Star Wars*. I was a strong *Star Wars* player as well, but wasn't sure how good this guy could be at that game. At this point, we didn't know what games would be played during our show as they rotate the game selection for each show.

Finally, it was time. The *Starcade* crew called us in and we were positioned in the game room for the opening of the show. Geoff Edwards was there and with a little set up, the show was on its way. Geoff Edwards did his spiel, after which we all clapped and headed out toward the game arena. My nerves weren't bad, but all of a sudden, I forgot the way to the main room. Even though I was following my Mom (who was hustling down the hallway), I still wasn't sure if it was to the left or right. If you ever see the episode, pay close attention to my body actions at the crossing – there is a good amount of hesitation. Fortunately, I made the right choice (to follow my Mom), and all of us made it to the front stage area. Introductions were next. The host picked me first, of course. Somehow, I successfully answered his questions about myself – name, city, age, and what things I like. Everything seemed fine until he asked me who was standing next to me. It took me a couple seconds to come up with the right answer – "This is, uhhhh, my Mom." Geoff of course took advantage of my nervousness and made the requisite smart-ass-game-show-host comment.

After the introductions were done, we shook hands and went to our respective podiums. The audience at home was informed of the "Mystery Game" and then the first question was asked, "In *Galaga*, how can the player's ship move: A. Across the bottom only, or B. Across the bottom and sides?" Bzzzzt. My opponent Arnie buzzes in and chooses B. Wrong Answer, Arnie! As a result, I got to choose the first videogame to be played, *Donkey Kong 3*. I played the game and scored 12,800 points in 30 seconds. Arnie scored 12,500. Needless to say, it was a very close game.

Then the second question was asked, "In Amidar, how many paint rollers are there: A. 4 or B. 5?" I knew the game, but still wasn't sure. I buzzed in and guessed A. 4. Wrong answer, Damon! Arnie gets to pick this time. He chooses *Elevator Action*, and selects his Mom to play this one. She does her best, scoring 150 points. I select my Mom to play this game, she does an awesome job, scoring a whopping 350 points. I must admit that both Moms did a great job with such a funky game. (On the way back to the podiums, Geoff incorrectly states that Arnie's Mom, Brenda, beat my mother at *Elevator Action*.)

At this point, scores indicate that we are in the lead as we get to play the "Name the Game Board." I was secure about my ability to identify videogame screens, but hoped that my Mom would be receptive of my Jedi mind power. I went first and guessed *Crystal Castles* correctly. My Mom was next, and chose correctly between *Dig Dug* and *Mr. Do*. Next was my turn, *Ms. Pac-Man*, then my Mom guessed correctly between *Mission X* and *Zoar*. (Wow!) She knew the first one, but the second was definitely a wild guess. Way to go, Mom. After that we received some cool stuff – gold jewelry and a bionic chair (oooooh).

Now the final game was to be played. This last question was very crucial to answer. Geoff asks, "In Mario Bros., what color is Mario's shirt: A. Blue or B. Red?" Bzzzzt. Arnie answers correctly, B. Red, and gets to choose the next game. Guess what, it's *Star Wars*! Arnie gears up for battle, chooses the medium level of difficulty, and rocks away with a decent score. Now it's my turn. Geoff informs me that Arnie didn't go to the third level like he said he would. Maybe Geoff isn't so bad after all. I grip the yoke harness tightly and launch into battle. Flying through the glowing vector-filled abyss of deep space I pluck Tie-Fighters from the stars, tagging Darth Vader's ship a few times, all while avoiding the deadly enemy fire. The game is moving so fast, but I'm able to position my targeting cross-hairs accurately and blow everything away faster than I ever have in my history of Jedi gaming. I seriously kicked Arnie's ass. The Force was with me.

We return to the podium and the final scores are announced – I won by a staggering 12,000 points. Whoohoo! Geoff Edwards compliments me on my *Star Wars* playing ability, and I manage to muster up a sincere "Thank you." I can't stop smiling. We shake hands with Arnie and Brenda, and now face the final challenge to win the grand prize, *Mr. Do*.

To win, I had to score a certain amount of points on either game within 30 seconds. The choices of games were *MotorAce USA* and *Juno First*. I had very little experience with either game, but decided on *Juno First*. Geoff explained the strategy for the game and the clock started. I shot the enemy ships, avoiding their fire. Everything was going smoothly until – SMASH!!! One ship down, five seconds gone, and the clock was still ticking. With not much time left, I shoot continuously at the horizon line in hopes that more ships will fall into my line of fire. Suddenly, a burst falls near me. I hit it with my lasers opening up what looks to be an astronaut. If I get that, I'll win for sure… Wth two seconds left, I aim toward the astronaut – almost there – as I'm hit by alien lasers and explode, just as time runs out.

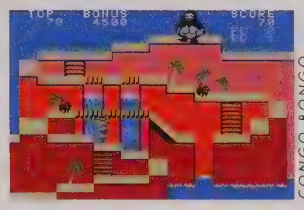
As the show concludes, the small audience runs up to congratulate us. My Mom and I head backstage to work out prize paperwork. A *Track & Field* game sits proudly in the office, so I keep it busy while my Mom handles the paperwork. After all, *Track & Field* is infinitely more exciting.

My Mom and I stayed in San Francisco that night and left the next morning for Burbank – but for the next few weeks all I could see was that Astronaut floating floating in space. ■

SG-1000

Sega

ZAXXON



CONGO BONGO

MONACO GP

In 1951, a American entrepreneur named David Rosen traveled to Tokyo following his tour of duty in the United States Air Force. Seeing incredible commercial opportunities, he founded a company called Rosen Enterprises and began to export art, photo booths, and other coin-operated games to Japan. The company expanded and in 1965 merged with Japanese jukebox manufacturer Service Games. Following the merger, Rosen changed the company name to simply Sega Enterprises – a contraction of Service Games – and entered the gaming industry as a manufacturer of electromechanical coin-operated games.

Sega's first release was a game called *Periscope*, a primitive submarine battle. Then in 1970, Sega was acquired by Gulf & Western Industries and the focus of the company was shifted exclusively to coin-operated games. With Rosen as president, the company entered the video arcade arena in 1976 with the release of such games as *Heavyweight Champ*, *Bullet Mark*, and *Fonz* – which were among the first arcade videogames to be programmed in Japan.

In 1979, Sega partnered with Gremlin to release *Head on* and *Invinco*, followed by such popular arcade hits as *Carnival*, *Congo Bongo*, *Monaco GP*, and *Frogger*. By the early eighties, Sega had expanded further into home console software for the Atari 2600, Intellivision, and ColecoVision systems. Their home cartridge hits *Turbo* (ported from the arcade videogame and packed-in with ColecoVision's driving controller), *Frogger*, and *Zaxxon* led the company to great success.

By 1983, Sega had revolutionized arcade videogames with the first laserdisc game (*Astron Belt*) and one of the first true 3D games (*SubRoc-3D*) – now it was time to revolutionize the homefront as well.

Sega released the SG-1000, their first home videogame system, exclusively in Japan in 1983. Based on a 4-bit microprocessor, the SG-1000 ran at a mere 1.2 MHz and contained 64K RAM. The system was followed by the SG-1000 II and the SC-3000 "Sega Computer." The new systems played ports of popular Sega arcade games – *Congo Bongo*, *Monaco GP*, and *Zaxxon* – as well as original games like *Doki Doki PenguinLand* and *Girl's Garden*. Although Sega's first generation game consoles were far from a commercial success, their follow-up would change the fate of the company.

In 1983, after the company was sold by Gulf & Western to a group of investors, Sega underwent corporate and creative restructuring. In 1986, Sega of America was established in California to handle US operations and sales. Sega's first release after the transition was the 8-bit Sega Master System (released as the Mark III in Japan). Positioned against the Nintendo Entertainment System, the SMS – fueled by popular games including Yu Suzuki's *Hang On*, *R-Type*, and *Phantasy Star* – succeeded in capturing 10% of the US home console market, an impressive feat considering Nintendo's ever-dominating presence. The encouraging success of the Sega Master System paved the way for future console development, and eventually led to one of Sega's greatest achievements: Genesis.

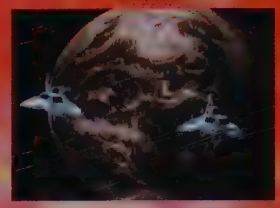
Released in 1989, the 16-bit Sega Genesis (marketed as the Mega Drive in Japan) quickly became the most popular home videogame system in the States with the help of Sega's prickly new mascot, Sonic the Hedgehog – eclipsing Nintendo's follow-up to the NES, Super NES. After Genesis, Sega went on to release the 32-bit Sega Saturn and its 128-bit dream machine – the Dreamcast – in 1999. Today, Sega remains a leading developer of online, home console, and arcade videogames. ■

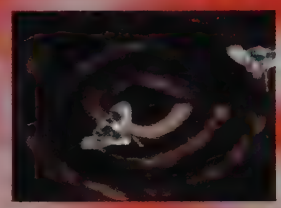
IMAGE: RIGHT: VAN BURNHAM

セガ・コンピュータビデオゲーム
SG-1000II
SEGA
SG-1000II
SEGA
SG-1000II
Computer Video Game
ROM CARTRIDGE

Astron Belt

Sega





IMAGES COURTESY THE DRAGON'S LAIR PROJECT

Bally/Midway introduced a revolutionary new videogame technology at the 1982 AMOA show that stunned the industry crowd. The game they previewed that day was *Astron Belt* – the first laserdisc-based arcade videogame.

Developed by Sega in Japan, *Astron Belt* was an interactive space-age shoot-'em-up that used video footage from a 1979 Toei sci-fi flick *Message from Space*, stored on laserdisc, which was combined with computer graphics of the player's ship, laser fire, and space mines for a stunningly realistic effect.

In *Astron Belt*, you pilot a starship through an explosive and hyperrealistic galaxy of stars and planets as you fight enemy starships across desolate alien landscapes – through tunnels, trenches, and deep space – on your way to battle the Alien Battle Cruiser.

Although *Astron Belt* was, without a doubt, the first laserdisc arcade game ever made, Sega and Bally engineers spent over a year tweaking *Astron Belt*, which kept the game from reaching US arcades until early 1984 – long after *Dragon's Lair* had already beat them to the punch. The delay cost them not only the critical arcade market share, but also the "wow" factor that made *Dragon's Lair* such a huge success.

"Bally blew it," admits Rick Dyer, creator of *Dragon's Lair*. "Luckily for us, *Astron Belt* didn't come out until four months after *Dragon's Lair*, and even then it wasn't a very fun game after all."

Bally/Midway later released a sequel to *Astron Belt* called *Galaxy Ranger*, which was just as quickly forgotten. ■

Cliff Hanger

Stern

Stern's first foray into the laser age was the now classic laserdisc adventure *Cliff Hanger*, based on the popular Japanese anime series *Lupin III*, licensed from TMS Entertainment. Released in 1983, the game was also inspired by Taito's *Lupin III*, an arcade videogame that hit Japanese arcades in 1980. In this 8080-based videogame, also based on the series, you play Lupin as he tries to steal money for his sweetheart.

In *Cliff Hanger*, you play the lovable Cliff Hanger (Lupin), a bumbling cat burglar whose beautiful girlfriend, Clarissa, has been kidnapped by the evil Count Draco and will be forced to marry him unless Cliff can save her.

Cliff Hanger consists of eight different sequences in which Cliff must fight his way past rival robbers, deadly ninjas, and Count Draco himself using only the joystick and two action buttons – HAND and FOOT – which must be perfectly timed to the subtle onscreen cues.

Consistng of dark, dynamic, and often haunting animations that were culled from various episodes of *Lupin III* – including "Castle of Cagliostro" and "Mystery of Mamo" – *Cliff Hanger* is no doubt one the most visually arresting laserdisc games of the era. However, one scene in particular – Cliff, shown hanging from a towering gallows after one of a player's lives were lost – was considered so harrowing that it was cut from later releases of the game.

But despite its beautiful anime graphics and exciting gameplay, *Cliff Hanger* was far from an arcade hit and sold only five hundred units. But if you do manage to find one, Cliff's fate is in your hands. ■

IMAGES: TOP LEFT, COURTESY THE DRAGON'S LAIR PROJECT

Cloak & Dagger

Atari

For all the mystery, suspense, and intrigue of Universal Pictures' action-packed spy flick *Cloak & Dagger*, the real-life story of Atari's *Cloak & Dagger* arcade game, originally titled *Agent X* – and why the film's *real* videogame does not exist – is infinitely more compelling.

In 1983, Atari was asked to create a new videogame that was to be featured in a film starring *E.T.*'s Henry Thomas, Dabney Coleman, and a sleek black Atari 5200. In *Cloak & Dagger*, Thomas plays Davey Osborne, an imaginative kid who hides from reality within his own elaborate videogame world, filled with characters of his own creation including Jack Flack, super-spy. When Davey witnesses the real-life murder of a secret agent (who slips him a top secret Atari 5200 cartridge called *Cloak & Dagger*) he is forced to go on the lam and find the secrets locked inside the game to save his own life.

In Atari's arcade version of the game, you play Agent X (Flack) who must progress through a series of floors to retrieve the stolen documents and destroy Dr. Boom's bomb factory. But the Atari 5200 version featured in the film never saw the light of day. Why? Although there are dozens of *Cloak & Dagger* boxes for the Atari 5200 seen throughout the movie, in reality, the game actually played in the film is the arcade version – its signal was converted and wired to a TV. However, in the film, the stunning 3D game ending that unlocked the "secret plans" was pure Hollywood magic – the real game isn't nearly as dynamic and ends with nothing more than a two-dimensional image of blueprints. But in 1984, just as the 5200 port was finally being completed, Atari was sold and its programming team laid off by Atari's new owner, Jack Tramiel. ■

Congo Bongo

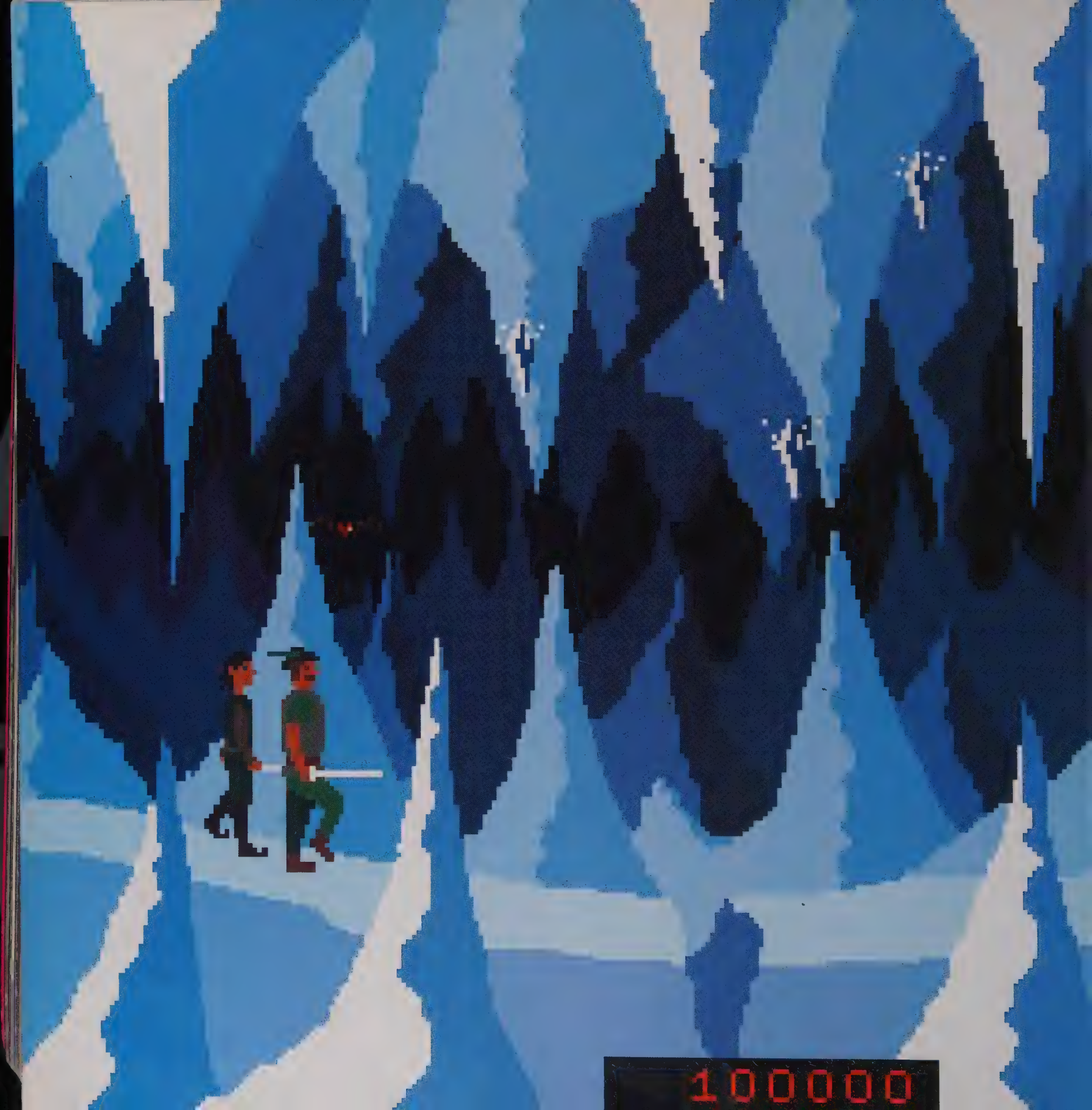
Sega

Imagine for a moment that you are a hunter, sleeping peacefully in the jungle, when, suddenly, you are awakened by a prankster gorilla named Bongo who has set fire to your tent! And so begins the story of *Congo Bongo*, Sega's hilarious jungle romp through lush jungle landscapes where you control the scorched hunter who has sworn revenge on Bongo for his mischievous monkeyshines.

The player navigates the fearless hunter through four tropical levels – Primate Plateau, Snake Lake, Rhino Ridge, and Lazy Lagoon – as he runs, jumps, and dodges his way across the colorful Congo playfield while avoiding the meddling monkeys, slithering snakes, rhinos, stinging scorpions, swimming hippos, and ferocious fish that stand between him and the beleaguering Bongo, who throws coconuts from his hideout high atop Monkey Mountain.

With its humorous intermissions, jungle soundtrack, and dynamic 3D isometric graphics, *Congo Bongo* was a huge hit for Sega and was ported to numerous home videogame consoles including the Atari 5200 and ColecoVision. ■

In Atari's ***Crystal Castles***, you play Bentley Bear, a cuddly-cute teddy bear who must gather gems found along the paths around a treacherous castles while deadly skeletons, ghosts, gem-eaters, and a witch named Berthilda try to keep you from your treasure.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Crossbow

Exidy

In Exidy's *Crossbow* – an inspired arrow-shooting adventure videogame – you play a guide, armed with a crossbow, who must escort travelers through many dangerous lands. Using your archery skills and trusty crossbow, your mission is to protect your party from the evil that lurks within each of **eight beautifully detailed scenes.**

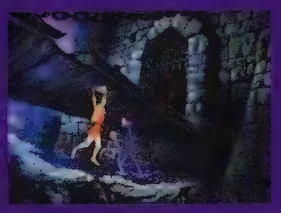
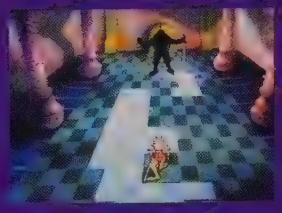
The archer must choose between the red, green, and blue paths and must survive the scene to progress to the next level. Points are awarded for each target hit depending on difficulty – hitting your target would also trigger one of over 100 different sounds from the vast audio soundtrack – and for picking up treasures found in each scene. Bonus points are awarded for each member of the party who survives, and certain levels award the player with more travelers.

Exidy's innovative high-resolution Hantarex monitor was capable of displaying up to 32,000 colors, which added up to some of the most visually stunning game graphics ever seen. The cabinet featured a mounted crossbow-shaped light gun that players used to aim and fire at the myriad targets that would appear onscreen.

Crossbow was only one in an innovative series of "alternative shooter" videogames released by Exidy in the '80s – all designed by Larry Hutcherson. The series included *Chiller* – one of the earliest examples of "survival horror," a genre that would later include such games as *Alone in the Dark*, *Castlevania*, and *Resident Evil* – as well as the equally inspired *Cheyenne*, *Crackshot*, and *Combat*. In retrospect, Exidy's shooters were ahead of their time in combining sniping action with a narrative plot in order to advance the gameplay – a convention that appears today such popular shooters as *Unreal Tournament*, *Metal Gear Solid 2*, and *Silent Scope*. ■

Dragon's Lair

Cinematronics

BY MARC SALTZMAN

As a thirteen-year-old kid fresh out of grade seven – and a full four weeks away from summer camp – life just doesn't get much better than traipsing about Toronto's Funland Arcade with a few friends and a pocket full of quarters (not necessarily in that order). But on this particular humid June day I would not find the time to feed silver into any hungry machines. You see, I arrived at my beloved hangout, only to find hordes of bodies swarming around a few game cabinets. Being the petite and curious kid that I was, I weaseled my way to the front of the crowd. When I witnessed what all the commotion was about, my jaw fell to the ground. Peeling my eyes away from the screen, I peered up to see the large letters scrawled in gold calligraphy across the marquee: *Dragon's Lair*.

Apologies all around for this nostalgic melodrama, but this really was a profound moment – for me, as well as the entire videogame industry. The introduction of *Dragon's Lair* proved to be a milestone in the history of videogames. Its debut not only served as a window to view the future of interactive entertainment, but also represented the industry's last great hurrah before it came crashing down in 1984.

Created by programmer Rick Dyer and award-winning animator Don Bluth, and released by Cinematronics in 1983, *Dragon's Lair* was the world's first laserdisc-based coin-op videogame to successfully blend animation and an arcade videogame into a single experience.

Hell, it was a bloody interactive cartoon.

The player assumed the role of Dirk the Daring, the king's bravest (but not always brightest) knight, out to rescue the princess Daphne from the clutches of an evil wizard. OK, so the story wasn't going to win any awards for creativity – nor did it do much to further the role of women in games with its clichéd damsel-in-distress plot – but the whole of the game was appreciably greater than the sum of its parts.

While fighting to reach the dragon's lair, you run, jump, and slash your way through a number of animated "scenes" that take place in and outside Mordread's castle as Dirk attempts to save Daphne who is guarded by a fire-breathing dragon named Singe. But this is not as easy as it seems. The player must follow subtle cues to move at the precise moment of action within each scene to progress further into the game – it's "Game Over" if your timing is off by even a fraction of a second.

Rick Dyer, lead designer and programmer of *Dragon's Lair*, tells me childhood stories like mine are not at all unusual. "It definitely had that kind of affect on people, but at the time we had no idea what we were creating," recalls Dyer. "We knew we had something exciting, but we had no clue it would have this kind of impact."

In 1983, Dyer founded Advance Microcomputer Systems to develop interactive games. Although Dyer had already been working on the *Dragon's Lair* concept, it didn't start coming together until he attended an AMOA show in the fall of 1982 and saw a laserdisc game for the first time.

"Bally had a game called *Astron Belt* that they were developing, and I knew right away that was how *Dragon's Lair* should look… I was committed to being first to market," says Dyer.

Dyer then approached Hollywood legend Don Bluth – creator of the hit animated films *The Secret of NIMH*, *Anastasia*, and *Titan A.E.* – and the two joined forces. Dyer recalls, "I told him we would have to finish the game in eight months or we wouldn't garner the attention of being the first." Bluth immediately accepted the challenge. As it so happened, Bluth's animated feature film *The Secret of NIMH* (released the previous year) proved to be a commercial failure – even though it was a critical success. "We needed a project to keep the group together," remembers Bluth. He continues, "I remember Rick explaining the concept of *Dragon's Lair* to me, and that was that." And so, Bluth assigned ten animators to work on the *Dragon's Lair* project, working out of his studio on Ventura Boulevard in Studio City, California.

"Everyone in our shop was excited about making the game. We all got into it – everyone was walking around showing off their scenes," recalls Bluth. "We especially wanted to make the death scenes funny – we figured that people were going to put a lot of quarters into the machines, so we thought we should at least give them a laugh if they lost."

And funny they were – our daring Dirk enjoyed a number of "creative" fatalities including being squeezed to death by a giant striped snake, crushed by huge rolling balls, and swallowed by green slime creatures, to name just a few.

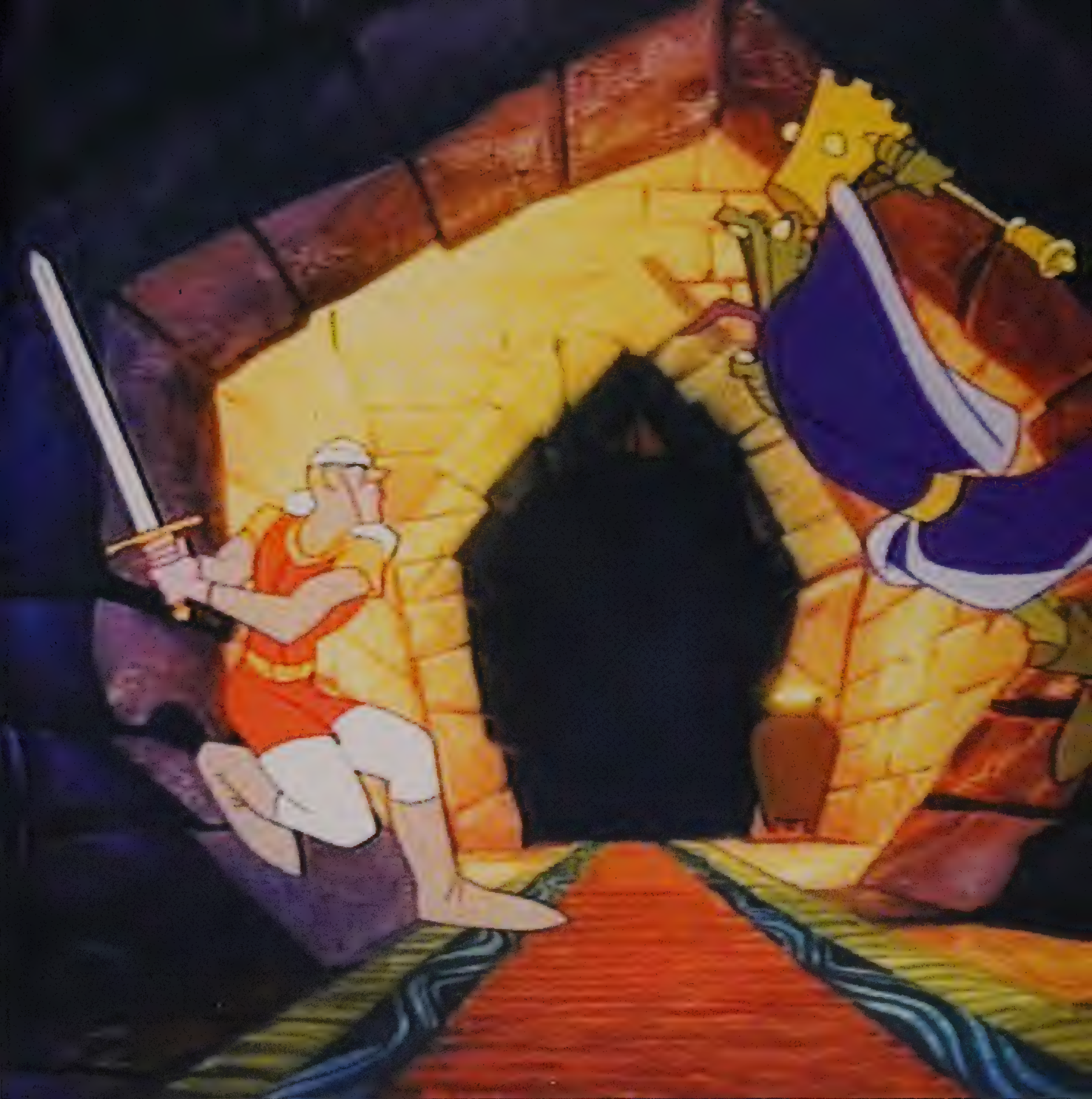
Don Bluth's studio spent approximately $1.3 million developing *Dragon's Lair* – a modest investment considering that the game grossed over $32 million by the beginning of 1984.

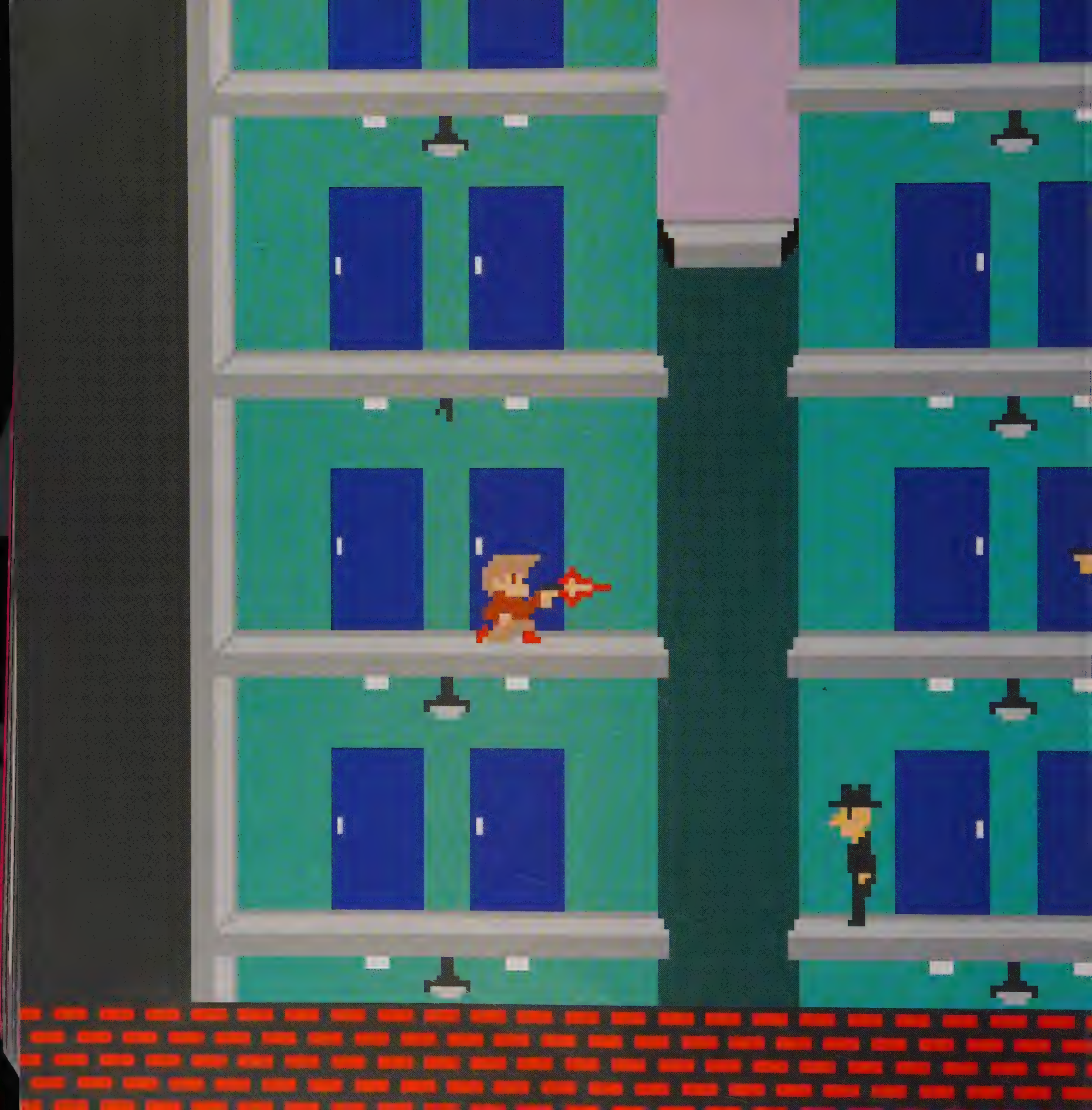
"It was an instant flash that never went out," says Dyer. "My conservative estimate is that between 250 and 300 million people have played *Dragon's Lair* in the past seventeen years."

The game is so revered that today one sits in the Smithsonian right beside *Pong* and *Pac-Man*.

After a number of successful sequels – both in the arcade and with the countless remakes for the home console market – the franchise is still a best-seller. *Dragon's Lair* is now available on DVD-ROM, is coming soon to Game Boy Color, and Blue Byte is now readying *Dragon's Lair 3D* for both the PC and Sony PlayStation 2 console. There's even rumors of a movie.

"Today, we would never get away with the airhead personality of Daphne. But come to think of it, Dirk doesn't have much more of a brain, so they're probably a good match." ■



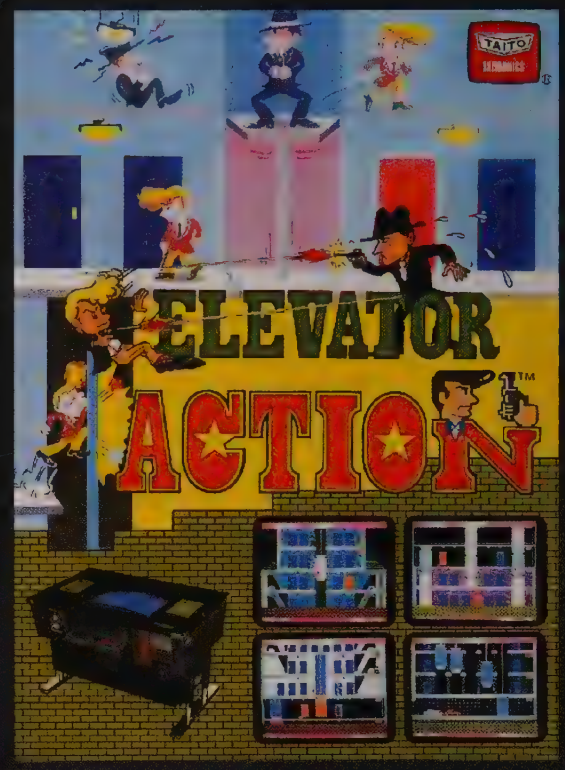


Elevator Action

Taito

BY RYAN LOCKHART

1983 was a very good year. Aside from the debut of compact discs in stores and the first American woman being launched into space, we got *Elevator Action* from Japanese arcade giant, Taito. Videogame fans everywhere donned the brown suede jacket and bright red shoes of super-spy Agent 17 (code named "Otto") to infiltrate a spy infested enemy skyscraper, blowing away a coterie of dark-suited foes while stealing company secrets.



Like every popular arcade game from that era, *Elevator Action* presented a simple premise: lead Agent 17 from the top floor of the building to his get-away car in the garage – however, the execution proved to be anything but. Agent 17 could use the many elevators and escalators to slowly descend the numbered floors, meanwhile keeping an eye out for the red and blue doors that contained the top secret documents you needed to collect in order to clear each level. The main challenge was combating the trigger-happy Men In Black who relentlessly appeared throughout the playfield by using Agent 17's full arsenal of actions – which included ducking, jumping, kicking, and shooting. To defeat the rival spies, crafty gamers would use the elevators and breakable lights to crush the goons, and the truly daring would just jump kick right into them. But, unfortunately, Agent 17 moved so slowly at times that the more advanced levels offered little more than a frustrating game experience.

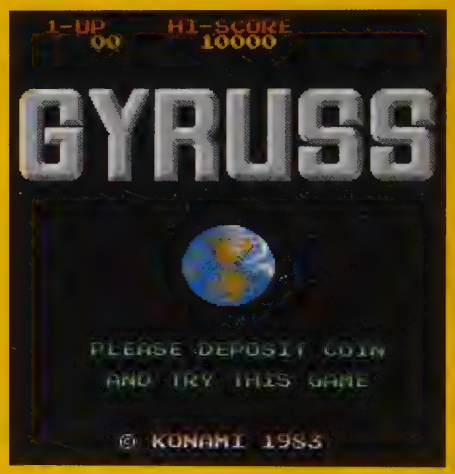
To help combat the high level of difficulty, players desperately started coming up with new "tricks" in order to gather extra men early in the game. The most popular of these was to just move up and down on the initial elevator, first taking out the lights (shooting the guards in the dark gave you more points), firing on every foe that appeared, and repeating until you had a few extra men safely in reserve. Strangely enough, this method not only took ages to work, it was almost as dangerous as just racking up points by playing through the game normally – if you took too long an alarm would go off, making the elevator harder to control and the enemy spies more aggressive.

On an interesting note, Taito released the aptly titled *Elevator Action Returns* in 1994 in an attempt to revive the franchise. Although Agent 17 was now replaced by the next generation of super-spies, the game stayed true to the original in premise. In the sequel you controlled a member of a special task force whose directive was to end an international terrorist group's plan for global destruction. Your mission was to infiltrate an enemy skyscraper – as well as an airport, underground arcade, submarine field, and missile base. But even with its improved graphics, additional weapons, and expanded gameplay, the update failed to capture the magic of its predecessor – today you are more likely to see the original *Elevator Action* (often running on Ultracade) in video arcades than its more modern sequel. As a treat for die-hard fans, the Japan-only Sega Saturn release of *Elevator Action Returns* contained a code that allowed players to access the classic game for the best of both action-packed worlds. ■

Gyruss

Konami

After the success of *Time Pilot*, Yoshiki Okamoto's next project for Konami was yet another outer space shooter – but in this game, the perspective was inverted. As in *Tempest*, the player controlled a ship that orbited the perimeter of the playfield, shooting the enemies as they emerge and spiral outward from the very center of the screen – all to the synthesized tune of Johann Sebastian Bach's "Toccata and Fugue in D Minor."



Often referred to as a hybrid of *Tempest* (for its 360° rotation) and *Galaga* (for its enemy AI patterns), *Gyruss* combined the best elements of both for a dynamic and exciting game experience. The gameplay consisted of warping to different planets in the galaxy – including Neptune, Uranus, Saturn, Jupiter, and Mars – and defeating your intergalactic foes in an attempt to reach planet Earth.

Following the release of *Gyruss*, which was an unqualified success, Okamoto requested a raise in his salary – and was swiftly fired. He then accepted a position at Capcom where he would go on to design such classic games as *1942*, *Final Fight*, and *Street Fighter II*. ■

Journey

Bally/Midway

In 1983, Bally/Midway released the arcade videogame *Journey*, inspired by the famous rock group. In the game, you must help band members Steve Perry, Neil Schon, Steve Smith, Jonathan Cain, and Ross Valory find their instruments, avoid groupies, and get to their concert on time – all to the tune of "Separate Ways," a track from the band's hit album *Frontiers*.

However, the most innovative feature of the game was not Journey's hard-rocking soundtrack – but the digitized black-and-white portraits of the five band members, awkwardly spliced onto their cartoonish pixellated bodies. For the technology that generated this digital rock 'n roll collage was created by none other than the father of home videogames, Ralph Baer.

Back in 1980, Baer had invented a camera that could snap digital images and store them into the computer's RAM. Mounted inside an arcade game's marquee, the camera could capture a player's portrait and load the image into the code in order to create a personalized game experience or customize a player's high score.

The system was licensed to Bally/Midway and a prototype game was built for testing in Chicago. The only trouble was, players took the opportunity to get a bit *too* personal. Given the inherent nature of arcade patrons, it didn't take long for the first prankster to drop his pants for the camera – dooming the technology forever. But, fortunately, Baer's innovative camera was briefly resurrected to create the digital portraits of Steve Perry and pals in *Journey*.

The concept would again lie dormant until 1996 and the release of Nintendo's Game Boy Camera, a device that plugs into the cartridge slot of a standard Game Boy to snap images that can be printed out or used to generate customized games. ■

M.A.C.H. 3

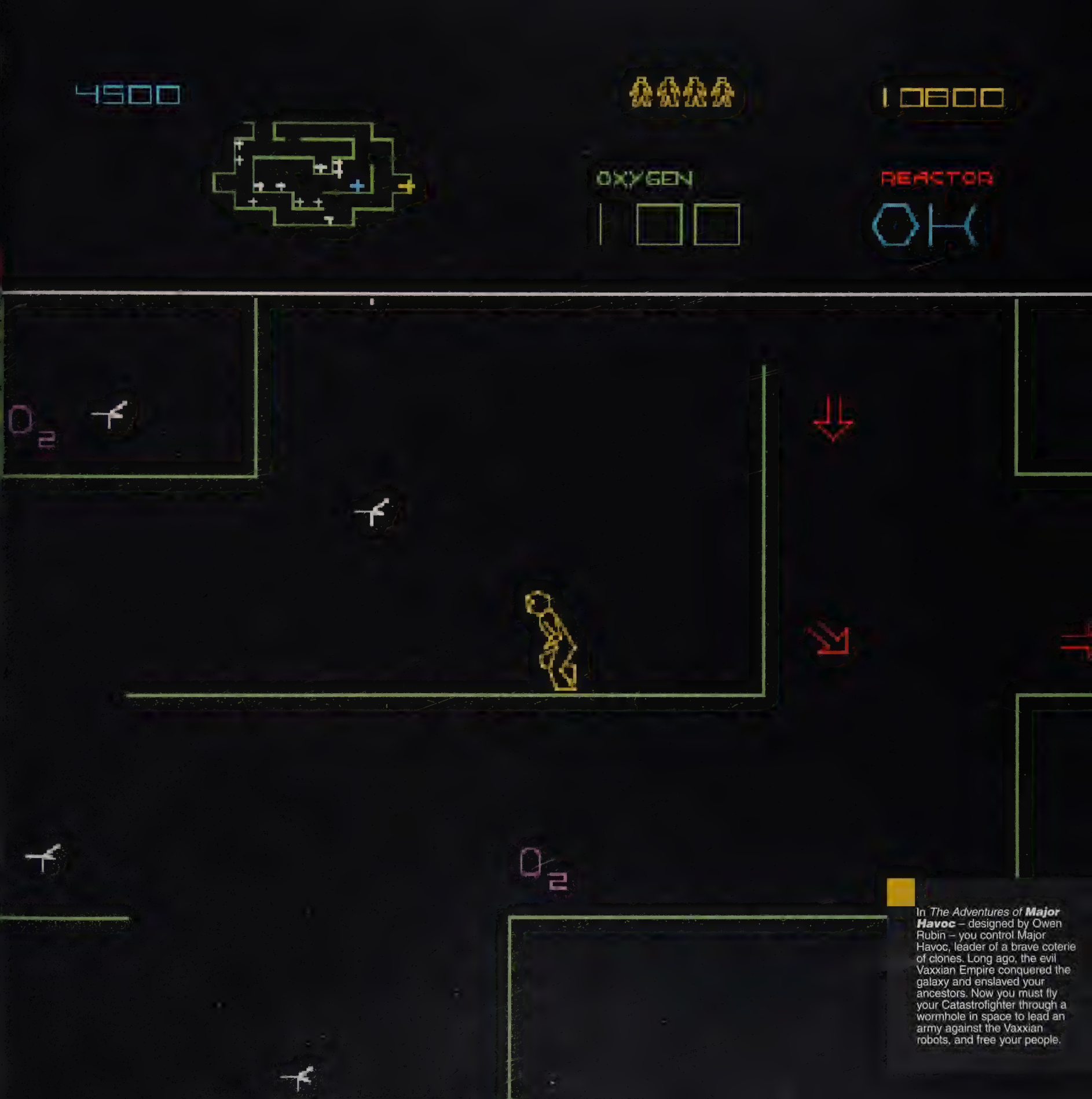
Military Air Command Hunter

Mylstar

In Mylstar's stunning laserdisc videogame *M.A.C.H. 3*, players could choose between two different mission modes: Fighter Raid or Bombing Run. Similar to *Astron Belt*, *M.A.C.H. 3* combined live video footage with CG animation in order to create an intense virtual landscape where players would pilot an F-15 fighter and engage in exciting live-action dogfights over deep canyons, highways, sparkling oceans, arid desert, dense forests, and treacherous mountain ranges.

In order to record the live background footage, a custom designed camera was mounted to the nosecone and hull of a real plane to reflect the two perspectives. To keep the laserdisc video and computer graphics synched up, the target data had to be entered one frame at a time on the laserdisc's audio track, an extremely labor-intensive process. The remainder of the games dynamic sound effects – including explosions, enemy fire, wind, and radio noise – was controlled by a 6502-based MA-495 sound board.

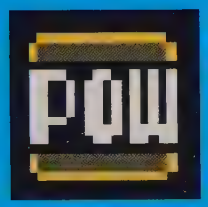
The game was a hit in arcades and won *RePlay* Magazine's prestigious "Player's Choice" arcade videogame award for 1983, and Mylstar Electronics (a division of Gottlieb) later licensed *M.A.C.H. 3* to Taito for release in Japan. ■

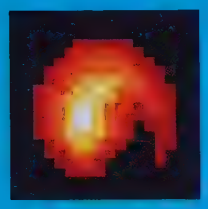


In *The Adventures of* ***Major Havoc*** – designed by Owen Rubin – you control Major Havoc, leader of a brave coterie of clones. Long ago, the evil Vaxxian Empire conquered the galaxy and enslaved your ancestors. Now you must fly your Catastrofighter through a wormhole in space to lead an army against the Vaxxian robots, and free your people.

Mario Bros.

Nintendo





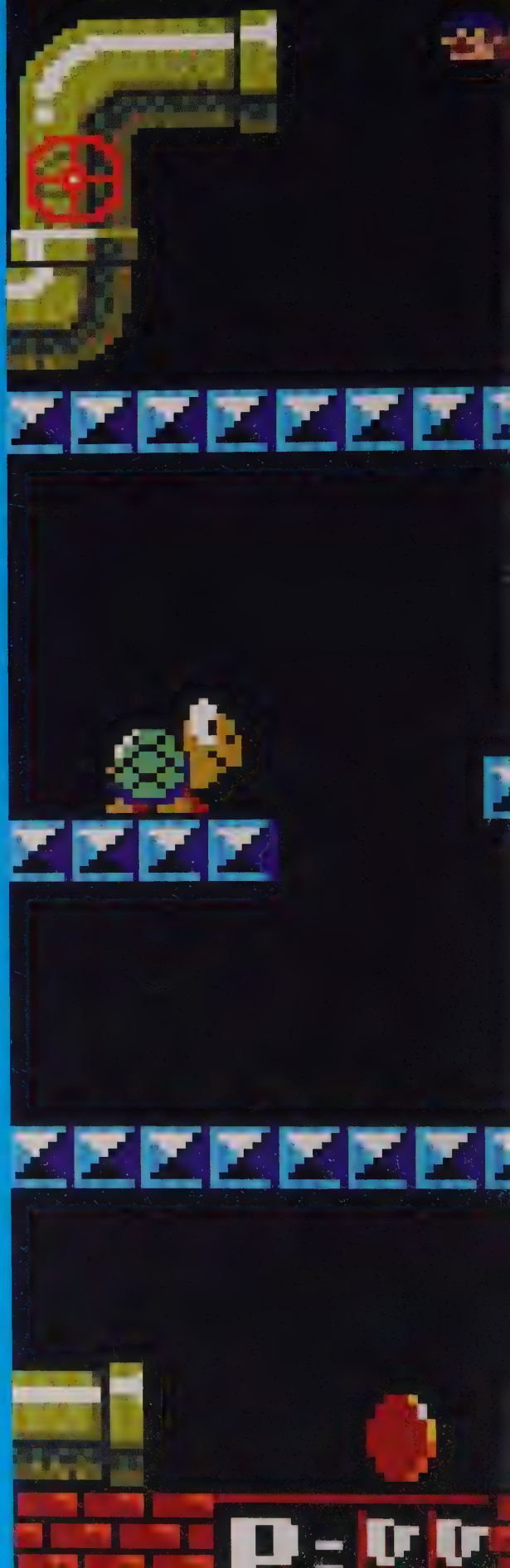
Following the stunning success of Nintendo's *Donkey Kong*, the company released a series of sequels to further build the franchise including *Donkey Kong Junior*, *Crazy Kong*, and *Donkey Kong 3* – but it wasn't until 1983 that Nintendo would discover its greatest asset with the introduction of *Mario Bros.*

Mario Bros. was not only the former carpenter's first signature title – and first gig as a plumber – the game also marked the debut of Mario's brother Luigi, who would go on to star with Mario in every subsequent release in the Mario series.

With its elaborate playfield of pipes infested with turtles, crabs, and fireballs, *Mario Bros.* was an exciting departure from the platform gameplay of *Donkey Kong*. Playing either alone or with a second player as Luigi, the players must collect the gold coins that spin across the screen while avoiding the deadly enemies that crawl out of the waterworks. But the tables can be turned by – POW! – knocking the baddies onto their backs, thus allowing the brothers to knock them off the ledges for extra points.

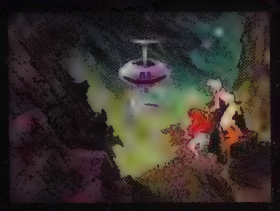
Mario Bros. was followed by *VS. Super Mario Bros.*, *Super Mario Bros. 2*, *Super Mario Bros. 3*, *Super Mario World*, and *Dr. Mario* in the arcade, as well as *Super Mario World 3* for NES, which sold over 18 million copies – the best-selling home videogame of the era – whose astronomical sales may have been fueled by the game's starring role in the 1989 film *The Wizard*.

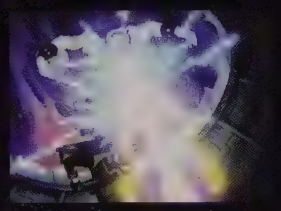
More modern entries to the series include *Super Mario Land* for Game Boy, *Mario All Stars* for SNES, *Super Mario 64*, *Mario Party*, and *Super Smash Bros.* for the Nintendo 64, *Super Mario Bros. Deluxe* for Game Boy Color, and *Mario Kart Advance* for Game Boy Advance. Fortunately, there appears to be no end in sight for the ever-expanding Mario universe. ■



Space Ace

Cinematronics





After the incredible success of their laserdisc arcade phenomenon *Dragon's Lair* – which earned over $32 million its first eight months in video arcades – the team of Rick Dyer, Don Bluth, and Cinematronics, now collectively known as Starcom (and later Magicom), were quick with a follow-up. The result was *Space Ace* – a futuristic space adventure in the style of *Dragon's Lair*. The game stars Dexter, a blonde laser wielding pubescent on a mission to save his sassy girlfriend Kimmy who has been kidnapped by the evil Commander Borf, a mastermind who is planning to destroy the universe with his Infanto-Ray.

In *Space Ace* the player chooses to play in one of three modes – "Space Cadet," "Space Captain," or "Space Ace" – depending on their level of skill. The gameplay of *Space Ace* consists of piloting Dexter's spacecraft, running through Borf's ship, and riding a motorcycle while correctly navigating the scenes. At times, Dexter can "Energize" into Dex, his hunky adult alter-ego.

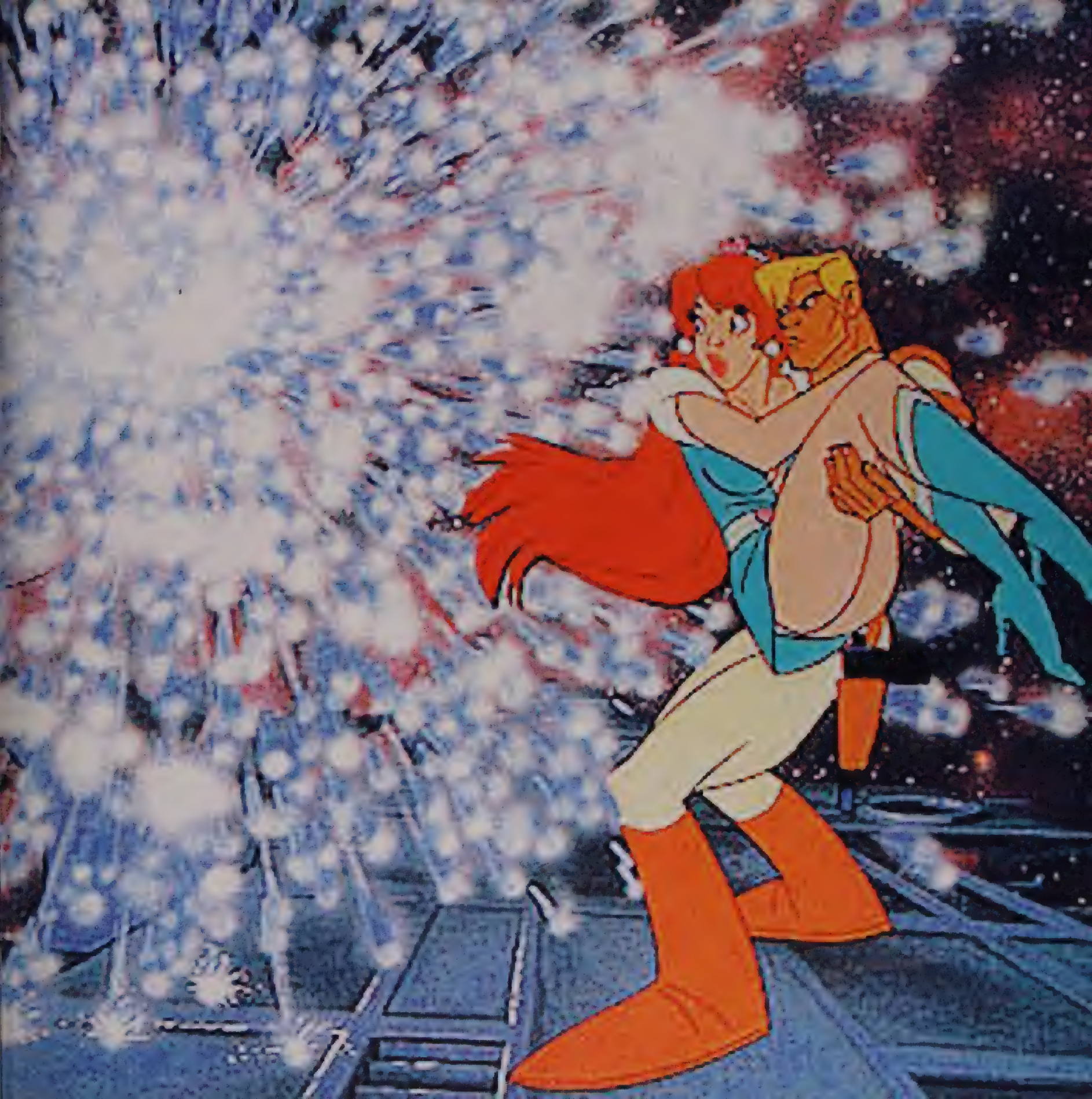
Built on the same hardware system as *Dragon's Lair* – a Pioneer PR-7820 or LD-V1000 laserdisc player synched up to the interface by a Zilog Z80 microprocessor, along with a GI U19 sound chip and LED score display – *Space Ace* machines were also equally temperamental, and notorious for their somewhat flaky operation.

But with its lush animations (each second of play required up to 24 hand-painted cels), thrilling gameplay, and rousing musical score composed by Christopher Stone, *Space Ace* was Starcom's crowning achievement – and definitely worth the premium price. Unfortunately, the game never achieved the success of its predecessor. Even so, *Space Ace* played an important role in the evolution of 3D games, and is widely considered one of the defining videogames of the eighties.

The first time I saw *Space Ace*, standing boldly at the back of Bally's Great Escape, I was hooked. The story was engaging, the pace was exciting, and Dexter was just so... cute! I would go every Saturday to play, my purple corduroy miniature Op duffel-bag loaded with quarters to feed the 50¢ game. I was good, but one day another Ace player taught me the secret moves and patterns – after that I was a *Space Ace* superstar.

Back in the day, arcade operators would put a second monitor up on top of the laserdisc games because other people loved to watch. I remember being down the shore in Atlantic City and playing *Space Ace* on the boardwalk with a huge crowd of people gathered around – just *watching*. That was one of the defining moments of the golden age for me. That moment. Feeling like a videogame star. That is exactly what the golden age of videogames was all about. ■

IMAGES COURTESY DIGITAL LEISURE



Spy Hunter

Bally/Midway

BY JUSTIN HALL

What kid didn't fantasize about being James Bond, driving a supercool sports car armed to the wheels? Designed by George Gomez, the arcade videogame *Spy Hunter* made that dream come true for a quarter.

After your sleek white sports car rolls down from the back of an undercover van, you drive fast up the scrolling road as blue thug vehicles, enemy limousines, and black helicopters give chase – wielding all manner of bombs, blades, and guns. If you take the correct turns and outrun your foes, your car will transform into a boat for the next level – complete with a new array of aquatic enemies.

Although the James Bond films were no doubt an influence on the *Spy Hunter* gameplay, the game's designers could not afford to license John Barry's Bond score. So the ominous *Peter Gunn* theme was used instead – and thus, this classic espionage tune became the signature soundtrack for the game.

Your CIA special issue G-6155 Interceptor, the Spy Hunter's vehicle, was in reality modeled after Gomez's 1983 Camaro Z-28. With a gear shift (high and low), yoke steering wheel, and gas pedal, you have control of the road. The Interceptor also comes equipped with machine guns loaded with an unlimited supply of ammo. But perhaps the greatest appeal of *Spy Hunter* is found in the range of tiny light-up buttons and switches on the dashboard, and the deadly weapons that they dispatch including smoke screen, oil slick, and missiles – enough stealth devices to make even 007 jealous.

Ultimately plotless, *Spy Hunter* is strikingly lacking in motive. You are a spy on an unknown mission, gunning down mysterious enemies and avoiding their fire. But in the end there is no evil archnemesis, no triumphant return, no sexy Bond girl waiting on a bearskin rug – only the endless rolling asphalt ahead. ■

Star Trek

Sega

BY CHRIS HUDAK

"Welcome aboard, Captain!"

In Sega's *Star Trek*, based on the classic '60s TV series, Trekkies throughout the universe were given the once-in-a-lifetime chance to play the part of Captain James T. Kirk as they pilot the U.S.S. Enterprise across the galaxy. Using this "Strategic Operations Simulator" the player must navigate the starship – using Impulse Power and Warp Drive – to defend Federation Star Bases and secure each sector by blasting alien enemies as they attack with the Enterprise's Phasers and Photon Torpedoes.

Displayed in stunning color vector graphics, the playfield consisted of the Enterprise's two primary navigation windows: a tactical top-down radar screen and a larger first-person targeting screen that boasted phaser crosshairs, and rotated 360° to "lock on" approaching Klingons and the occasional Nomad probe.

Somewhere along the line, it became conventional arcade wisdom that vector games needed to be busy – not merely lots of action, but more visual input than the player needed or indeed wanted. While not cranked up to the ludicrous levels of *Major Havoc*, *Star Trek* definitely forced the player to divide his or her attention between the two screens. Individual phaser bursts were adequate, but every *Star Trek* player knew the best strategy: get a bead on an incoming clump of Klingon warbirds (who evidently never learned about weapons of mass destruction) and fry them wholesale with proximity-fused photon torpedoes. Very quickly, as the game's speed increased, it got just plain silly – Nomad probes laying minefields like crazy, single photon torpedo shots taking out six or seven Klingon cruisers at a time – but it still worked, thanks to the immensely satisfying spin-action of the game's optical control interface, which allowed the Enterprise to whip around with the savage dexterity of a Tie Fighter on PCP.

If you could find the semi-enclosed sit-down arcade version, it was better still – you were still killing Klingons, but now you were doing it while kickin' back in the Captain's chair.

Star Trek debuted just after the release of the sci-fi thriller *Star Trek II: The Wrath of Khan*, starring William Shatner, Leonard Nimoy, and Ricardo Montalban as the evil Khan Noonien Singh – and was promoted nearly as heavily. Paramount teamed up with Sega for a number of special events, supplying real life *Star Trek* stars including George "Sulu" Takei, who – when not attending *Star Trek* conventions – made arcade appearances across the country.

As a result of the show's cult-like popularity and the game's exciting gameplay, *Star Trek* was a hit in arcades – pointy-eared geeks without number saw their fancy battle-tech on the big screen and damn near lost their minds. ■

In Atari's vector arcade game ***Star Wars***, you have your chance to join the Rebel Force. As you pilot the legendary X-Wing Fighter you can blast Tie Fighters, speed across the surface of the evil Death Star, and zoom down the trench – accompanied by authentic audio effects from George Lucas' classic film *Star Wars*.

1ST 1P WWW
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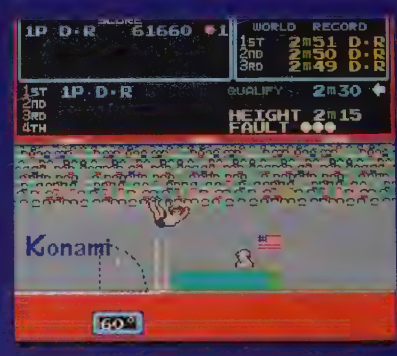
Track & Field

Konami

In Konami's classic arcade videogame *Track & Field* – introduced just in time to capitalize on the excitement of the 1984 Los Angeles Summer Olympics – players participate in track and field events to earn points, as well as medals. Inspired by Microsoft's *Olympic Decathlon*, the game introduced realistic full-color graphics and exciting two-player action to the genre. This winning combination made *Track & Field* a standout in arcades and inspired heated battles for the gold.

The adrenaline-fueled events included the 100m Dash, Long Jump, Javelin, 110m Hurdles, Hammer Throw, and High Jump. But the most memorable feature of the game was its three-button interface. Using two alternating buttons to RUN, players would furiously pound the machine to build up maximum speed – hitting the ACTION button to jump or throw at precisely the right moment. The faster a player could pound the buttons, the faster the character would run – a reality that resulted in an excessively high maintenance rate due to trashed control panels and loose PCBs.

The franchise would grow to include home and arcade games like *Hyper Olympic*, *Hyper Sports*, and *International Track & Field 2000* – introduced just in time for the 2000 Sydney Summer Olympics. ■



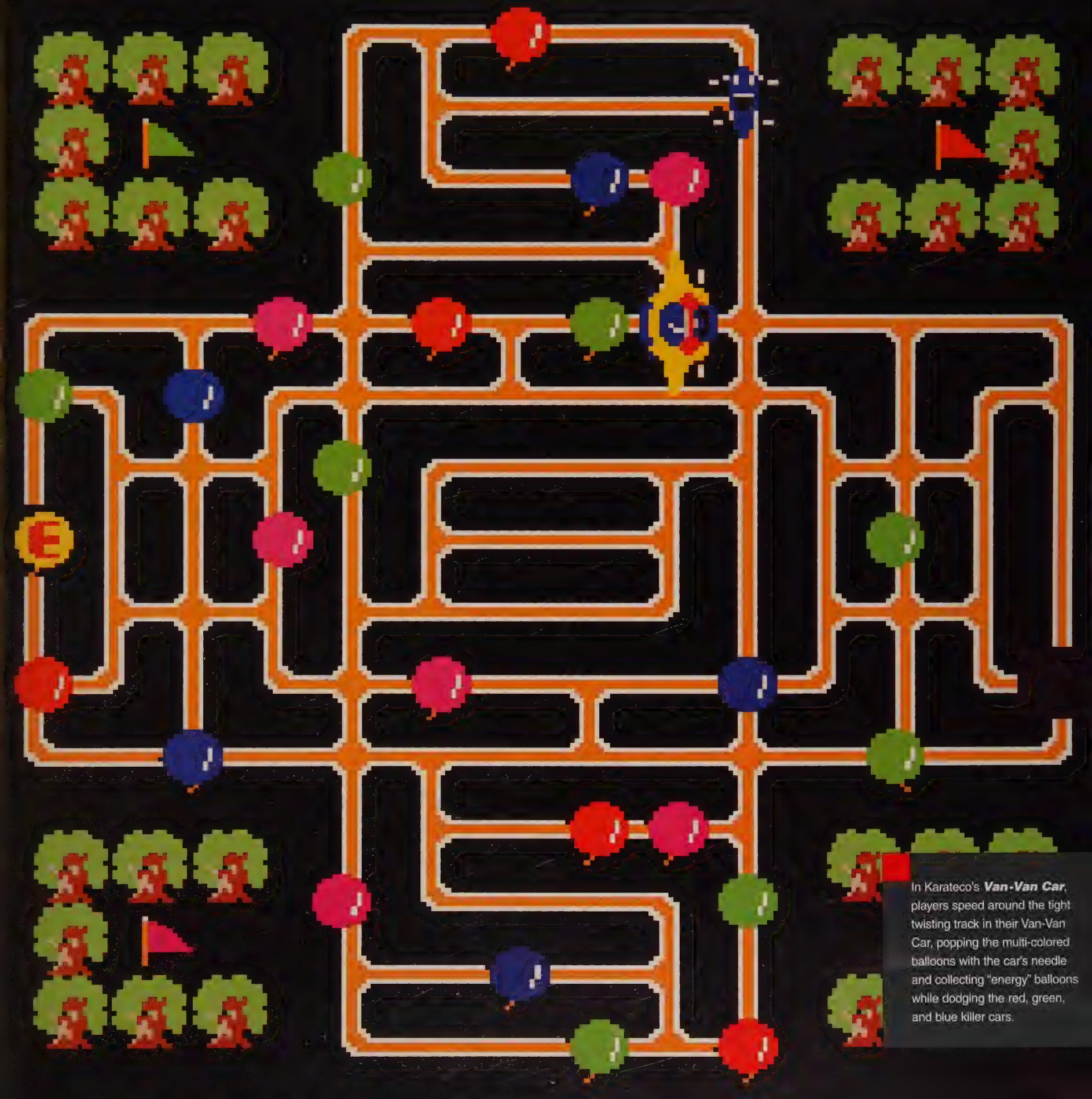
Tropical Angel

Irem

Not since the Go-Go's "Vacation" video has there been this much hot waterski action. With its stylish Memphis-inspired modern geometric graphics and tropical colors, Irem's *Tropical Angel* was the perfect embodiment of the post-MTV new wave '80s aesthetic that dominated the pop cultural landscape – and mall arcades – fueled by such institutions as Heaven, ESPRIT, *Max Headroom*, and the legendary *Miami Vice*.

In this totally tubular watersports game, set in a tropical island paradise of blue skies and cerulean oceans, the player controls Angel, a bikini-clad beauty on waterskis who must steer left and right to avoid rocks, sharks, and other deadly obstacles in the water while she performs tricks – including reverse skis, beautiful skis, and jumps – in order to score bonus points and reach the goal to become a waterski master.

Within each of the three test courses – B-Class, A-Class, and, finally, Master Class – Angel must successfully pass through six checkpoints marked with buoys within each course in order to achieve Master status. ■



In Karateco's ***Van-Van Car***, players speed around the tight twisting track in their Van-Van Car, popping the multi-colored balloons with the car's needle and collecting "energy" balloons while dodging the red, green, and blue killer cars.

IMAGE COURTESY APPLE COMPUTER

1984

Nintendo of America estimates that annual videogame sales total **$2 billion**, down over 30% from the previous year – Milton Bradley discontinues the Vectrex after losing nearly $32 million on the stand-alone home videogame system – Annual sales for Apple Computer exceed $1.3 billion

Atari 7800

Atari

In 1983, engineers at Atari began work on its next generation home videogame console – code name: Maria. Soon after, thousands of gamers were interviewed to determine what features they wanted in a new home console. The results of this extensive market research slowly began to take shape as the Atari 7800 ProSystem. Research and Development for the Atari 7800 was coordinated between Atari and General Computer Corporation, who were commissioned to design an advanced graphics chip capable of controlling over 100 onscreen sprites simultaneously with a 256-color palette. The Atari 7800 system was engineered with a custom 6502 microprocessor, 4K RAM, and was fully compatible with the entire library of Atari 2600 games.

On May 21, 1984 the Atari 7800 ProSystem was finally announced to the press. Additional features that were announced for the system included a keyboard, a high score cartridge, and a modem. But a few days later disaster struck the project when Warner sold Atari to Tramel Technologies, the latest venture of founder and former president of Commodore, Jack Tramiel. Exclusively focused on the Atari Home Computers division, Tramiel had no interest in releasing a 6502-based home videogame console. As a result the Atari 7800 ProSystem was shelved. It was this mentality that also inspired Atari to pass on the once in a lifetime opportunity to distribute Famicom, the latest home videogame console from Kyoto-based Nintendo – a system the company went on to market themselves in the US as the Nintendo Entertainment System.

Following the success of the NES, which sold over 3 million units in its first two years, Atari decided to rethink its videogame strategy and finally released the 7800 ProSystem in 1986 in an attempt to reclaim some of its lost market share. But, unfortunately, the former industry leader would never recover. ■

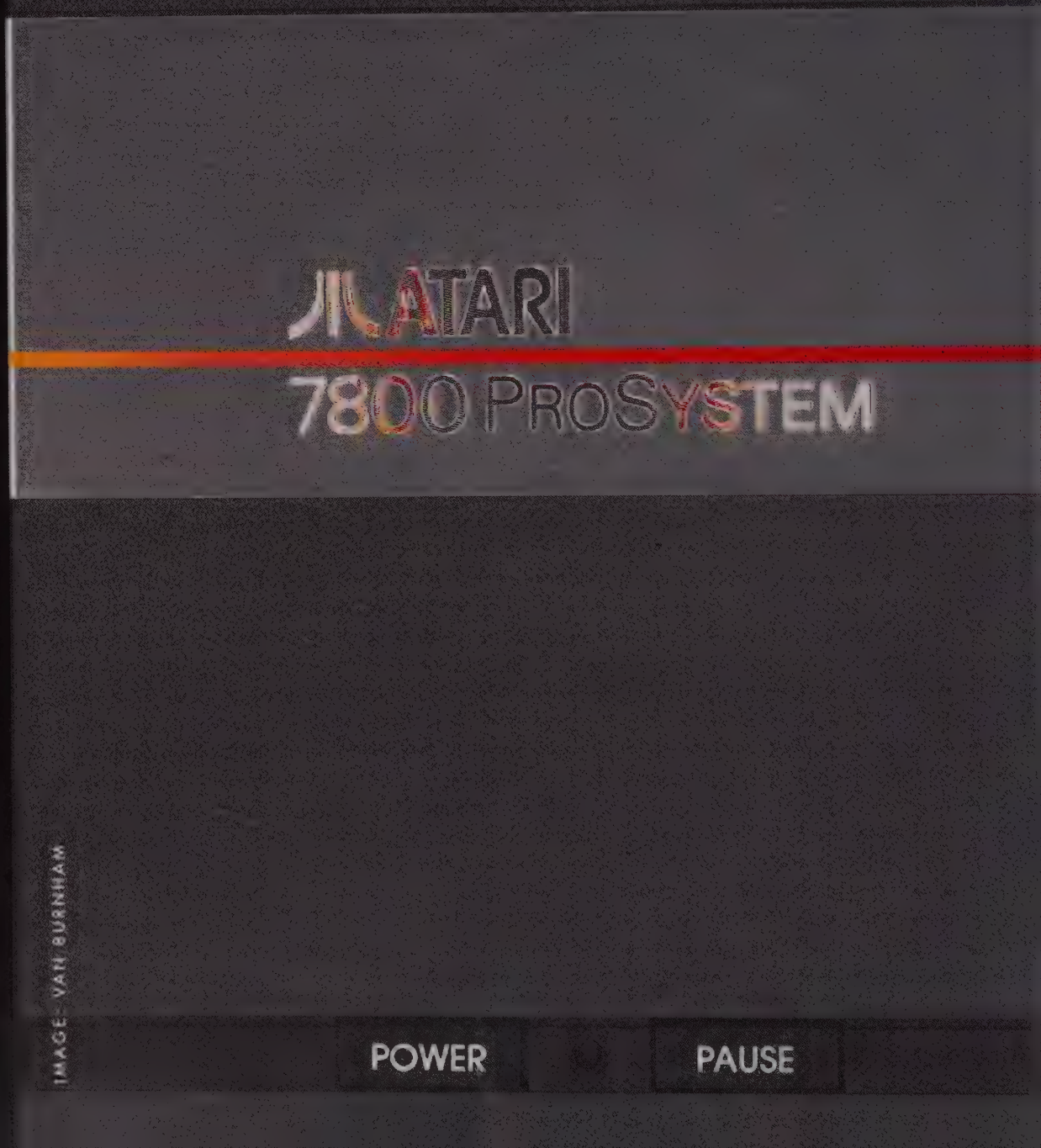
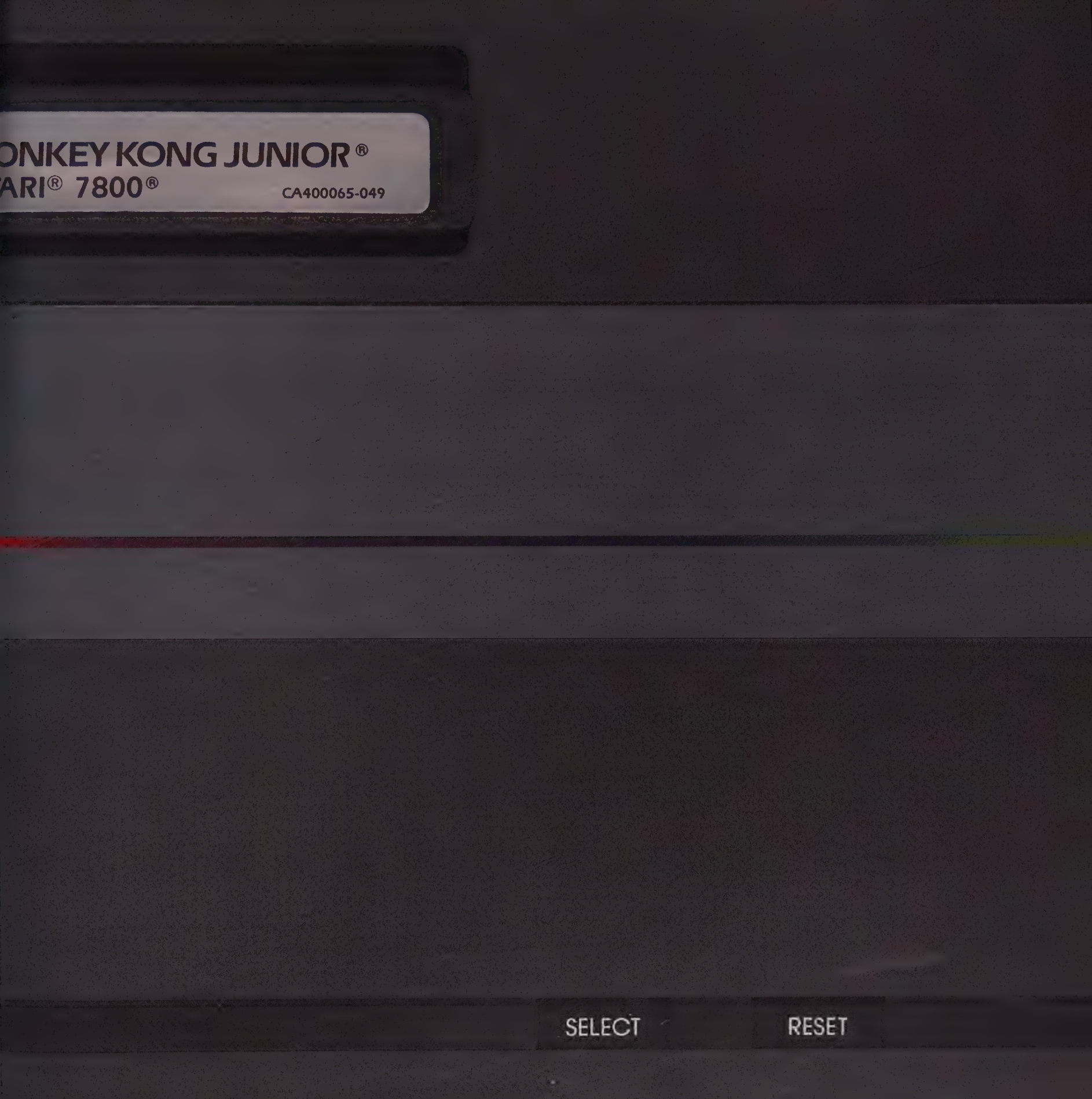


IMAGE: VAN BURNHAM


ONKEY KONG JUNIOR®
ARI® 7800®
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SELECT
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FAMILY COMPUTER
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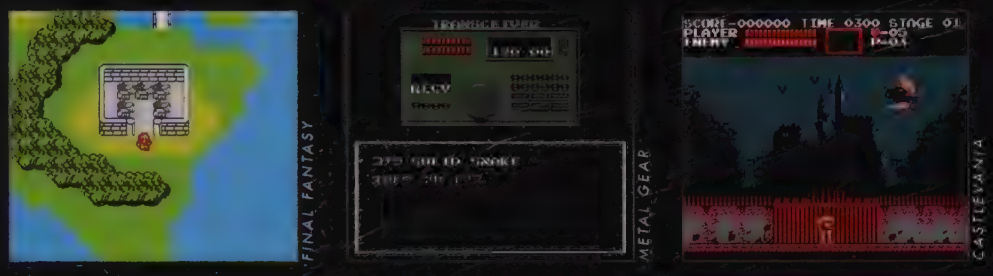
Famicom

Nintendo



In 1976, the name of the game was Pong. As a result, Nintendo president Hiroshi Yamauchi decided that it was now time for the company to expand into the home videogame arena in order to compete with American companies like Atari and Magnavox who were already making a killing in the nascent videogame industry with their Pong and Odyssey dedicated TV Ping-Pong systems.

So in 1977 Nintendo licensed the Brown Box technology and released its first microprocessor-based videogame, the Color TV Game 6, a dedicated home console that played six variations of TV Ping-Pong. It was followed a year later by the Color TV Game 15, which played – you guessed it – 15 versions of TV Ping-Pong. They also introduced a home console that played a Breakout-like game called Blok. As a result of the success of the new direction, Yamauchi declared that Nintendo would now exclusively sell videogames.

In 1982, Nintendo was enjoying success in arcades with such popular coin-operated games as *Donkey Kong*, *Popeye*, and *Donkey Kong Junior*, and had licensed the *Donkey Kong* home cartridge rights to Coleco to include the game as the pack-in cart with their new arcade-quality home videogame system, ColecoVision. But Hiroshi Yamauchi had much greater ambitions than licensing deals and arcade action.

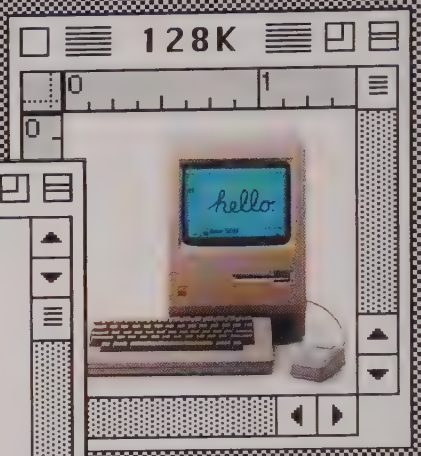
The home videogame industry had changed dramatically since the glory days of Pong. Gone were the primitive phosphorescent blips and dedicated chips – replaced by advanced cartridge-based color videogame systems like the Atari 2600 and ColecoVision that could play hundreds – even thousands – of different games. So to keep up with the competition, Nintendo needed to create something extraordinary. Led by chief engineer Masayuki Uemura, Nintendo's R&D2 team was secretly developing what would become the most important product launch in the company's one hundred year history: Famicom.

Introduced in Japan in 1983, the Famicom – or Family Computer – was a cartridge-based home videogame console based on the 8-bit MOS 6502 microprocessor, custom picture processor (PPU), and 2KB of RAM. The cute red and white system shipped with two hardwired game controllers, AC adapter, RF switch, and the comic book "Kore ga Family Computer da!" – this is a Family Computer.

The games available for the system at launch included the classics *Donkey Kong*, *Donkey Kong Junior*, and *Popeye*. Powered by an aggressive marketing campaign and a low low price of $100, the system was a staggering success, selling over 500,000 units its first two months. But six months later, disaster struck when it was discovered that a malfunctioning chip circuit was causing some games to randomly "freeze" onscreen. In response, Nintendo recalled all of the Famicoms sold and sent them to its new production facility in Uji to be refabricated with new chips. The fiasco cost the company millions – however, Nintendo's honesty, combined with their conscientious action to rectify the problem, built consumer confidence that was worth more than money; the company went on to sell millions more following the recall.

To meet the rabid demand for quality videogame cartridges for the system, Shigeru Miyamoto was given his own team – R&D4 – in 1984 to create new games for the Famicom, which over the years have included the classics *Super Mario World*, *Starfox*, and *The Legend of Zelda*. Soon after, Nintendo invited select developers to program original games for the system – including Bandai, Capcom, Konami, Namco, and Tengen – under one of the strictest third-party licensing programs in history. In return for their loyalty and sacrifice, developers' games were stamped with the official Nintendo Seal of Quality that boldly stated: "This seal is your assurance that Nintendo has approved and guaranteed the quality of this product." Words that proved to be worth their weight in gold when the Famicom was released in the US in 1985 as the Nintendo Entertainment System – popularly known as the NES – and sold over 65 million units worldwide. ■

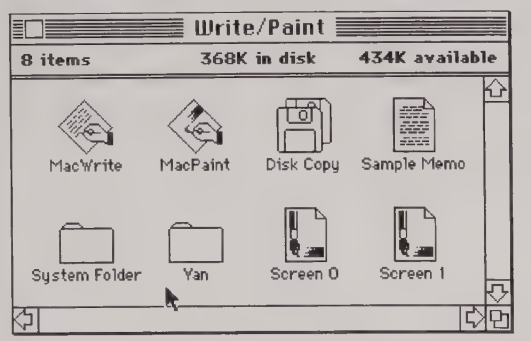
IMAGE: LEFT, VAN BURNHAM



Apple Macintosh

In January 1984, a 30-second TV commercial aired during Super Bowl XVIII to introduce Apple Computer's revolutionary new personal computer that would soon change the world. The powerful spot was directed by Ridley Scott (*Blade Runner*) and compared Big Blue (IBM) to Big Brother in George Orwell's chilling *1984* – and Apple to the nubile young heroine who shatters their reign of oppression. That computer was the Macintosh.

Following the success of the Apple II, Apple co-founder Steve Jobs was searching for the next insanely great idea to push Apple to new levels of success for the future. One day while visiting Xerox Parc – the copier giant's legendary R&D think tank in Silicon Valley – Jobs saw a demo of a new system they were developing called the Alto, the very first personal computer to feature a GUI (graphical user interface). They knew that the interface – with its easy to navigate icons, menus, and window-based "desktop" metaphor – was the future of personal computers.



OLD SCHOOL STYLE: MacWrite and MacPaint running on one of the first iterations of the Mac OS – System 1.

Apple's first response to the Alto, the Apple Lisa, was a commercial failure. But the team, led by Jef Raskin, soon followed up with the Macintosh, an unassuming and easy-to-use all-in-one home computer with a graphical user interface and "mouse" for moving the cursor and windows around on the system's built-in black-and-white screen. Based on the 8 MHz Motorola 68000 microprocessor and 128K RAM, the Mac was unlike anything the world had ever seen.

The first Mac I ever saw was over at a friend's house in 1984. I was thirteen. Her father, Robert Edmund (president of Edmund Scientific), was one of the first people in South Jersey to buy one. I think he thought we might use it to do our homework, so he let us play around with it. Right. That night we spent hours drawing detailed bitmapped reproductions of Zipperhead logos in MacPaint. Now *that* was cool.

Apparently, we weren't the only ones to think the Mac was well suited to more "creative" pursuits. Upon its introduction, Apple Computer gave 50 Macintosh Computers to creative visionaries – including Andy Warhol, Jim Henson, Maya Lin, and Sean Lennon – in order to help promote artistic uses of the new system. Since then, the Mac has been single-handedly responsible for revolutionizing the graphics and publishing industry with the advent of desktop publishing – a phenomenon that has made the Macintosh the very soul of modern print production.

As for Mac games, some of the most popular for the system included the black-and-white bitmapped adventure game *Dark Castle* and the classic strategy game *Risk* – in which you can conquer the world in your choice of either houndstooth or checkerboard patterns. ■

Trash

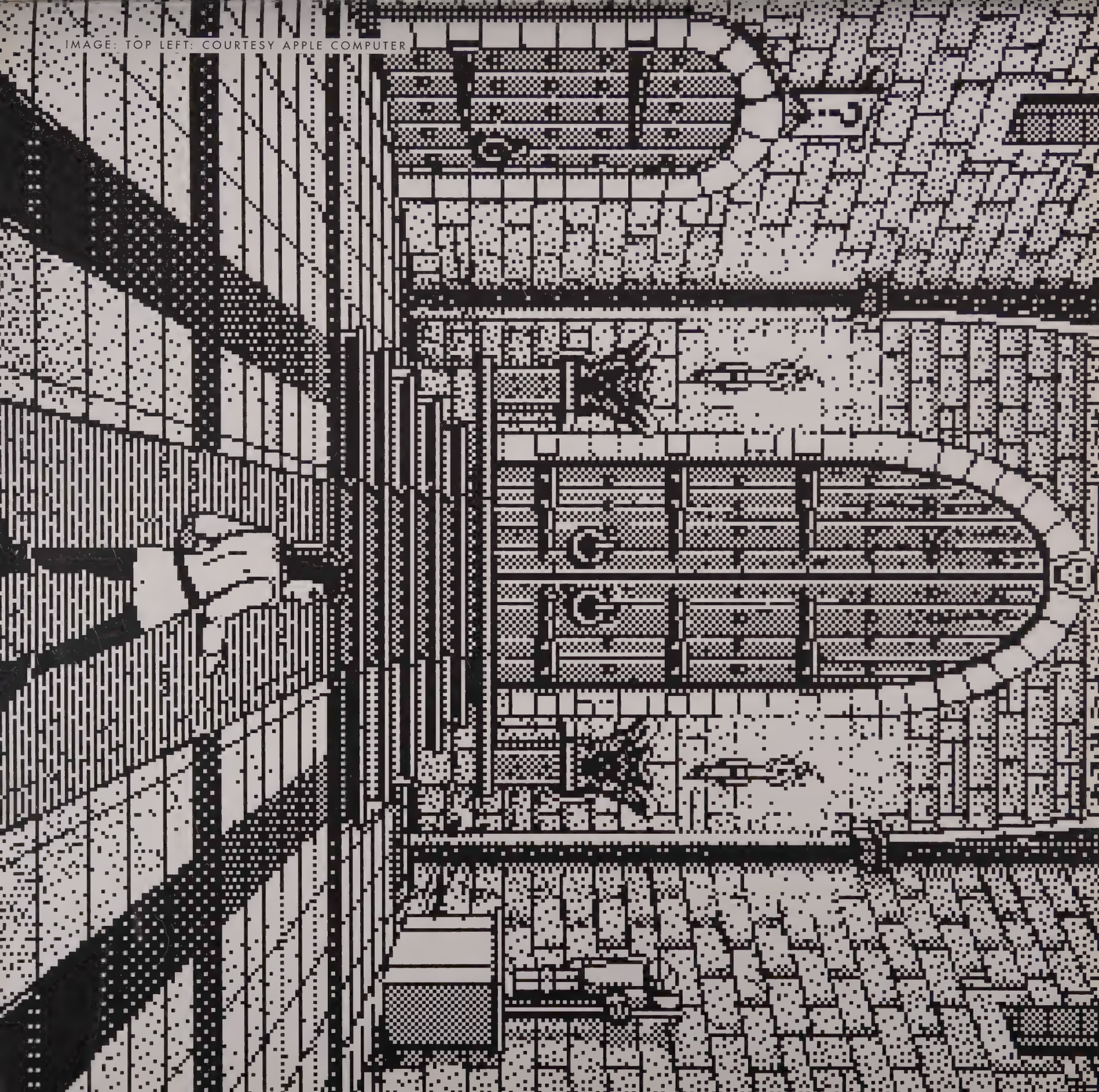


IMAGE: TOP LEFT: COURTESY APPLE COMPUTER

720°

Atari

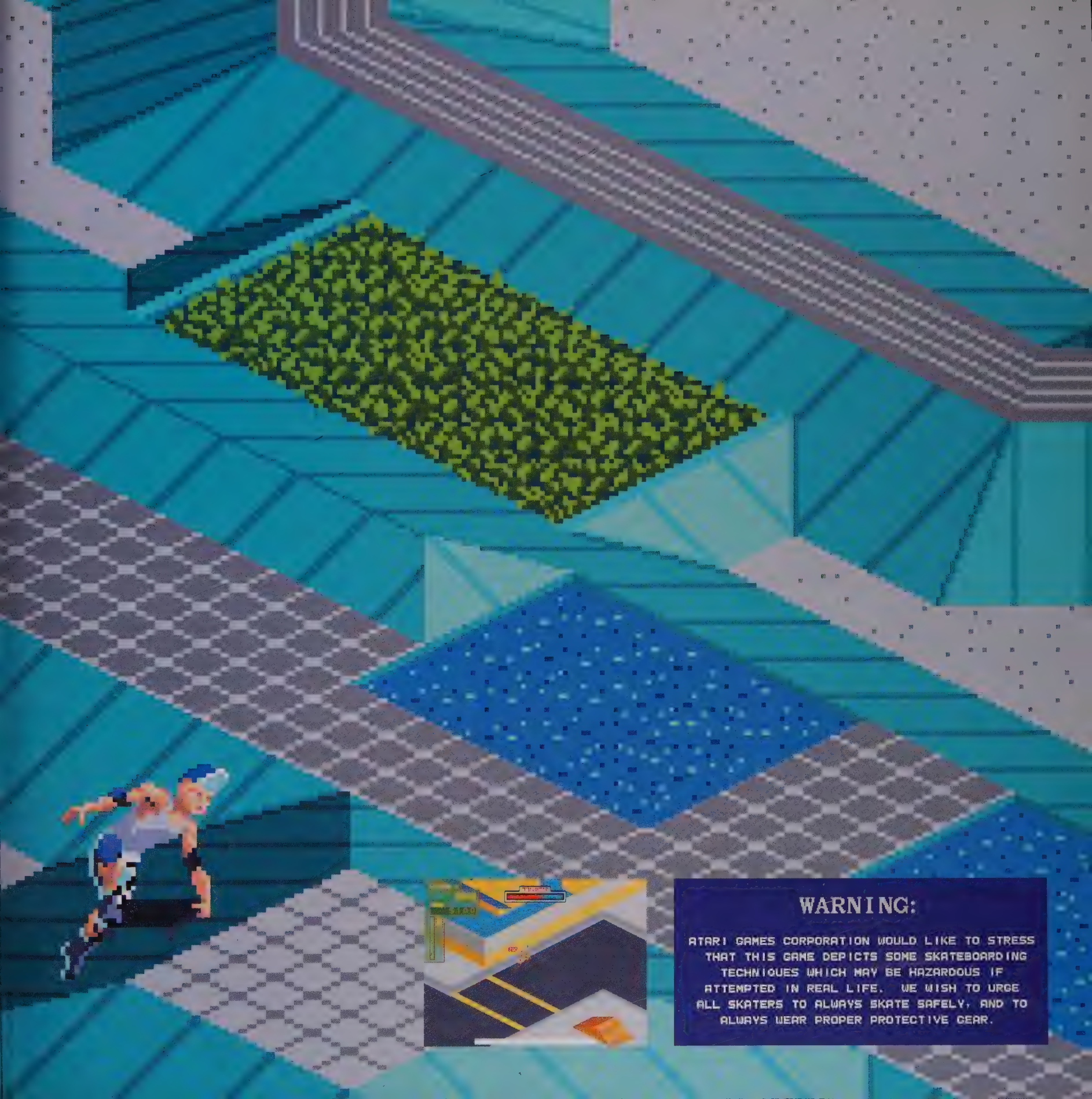
Grinding into arcades in 1984, Atari's *720°* marked the dawn of realistic skateboard simulation in videogames. With its hulking boombox cabinet (complete with two 8" stereo speakers), custom rotary joystick, contemporary "checkerboard" graphics, massive 25" high resolution monitor, and anything-goes freestyle street and ramp skate and destroy action, *720°* was the ultimate skateboarding

videogame.

The action starts in "Skate City" where the player controls a skateboarder who must pull ollies, kick-flips, and other sick tricks to earn tickets into the various skate parks in order to compete for gold, silver, and bronze medals, as well as big cash prizes. In between parks, the skater can upgrade equipment at various skate shops.

The game is set on a timer, so if the skater takes too long to cruise to the next contest, the monitor will flash "Skate or Die!" as a swarm of killer bees chase the player until he enters a skate park.

Other skateboarding games that followed in the wake of Atari's *720°* include Epyx's *California Games*, Electronic Arts' *Skate Or Die!*, Sega's *Top Skater*, and Activision's insanely popular *Tony Hawk Pro Skater* series – featuring the 900° Tony Hawk – which has sold over 4.5 million copies and is, according to collector Nate Miller, "one of the greatest games of all time." ■



WARNING:

ATARI GAMES CORPORATION WOULD LIKE TO STRESS THAT THIS GAME DEPICTS SOME SKATEBOARDING TECHNIQUES WHICH MAY BE HAZARDOUS IF ATTEMPTED IN REAL LIFE. WE WISH TO URGE ALL SKATERS TO ALWAYS SKATE SAFELY, AND TO ALWAYS WEAR PROPER PROTECTIVE GEAR.

NTENDO

Excitebike

Nintendo

Kicking off extreme motocross action from the safety of your local video arcade was Nintendo's *Excitebike* (available for the PlayChoice arcade system), the first of what would become a long legacy of motocross simulation videogames. With its bitmapped tracks, pyramid-like jumps, and pixellated freestyle stunts, the game was a long way from *Jeremy McGrath Supercross 2000*. But still, *Excitebike* was an important entry into the brave new world of extreme video sports, and marked the beginning of the long history between videogames and the adrenaline-fueled moto-x industry – a union that has proved almost as lasting and meaningful as motocross racers and porn stars.

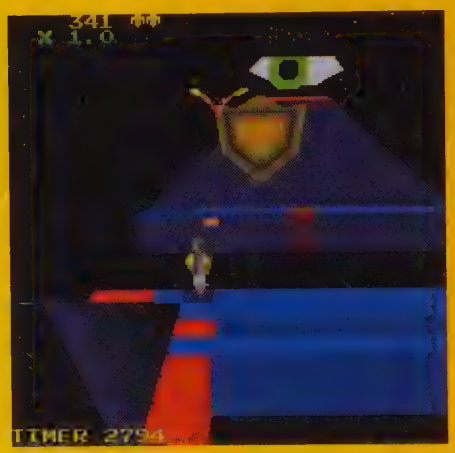
EXCITEBIKE 64: Updated for the next generation of sick tricks including this killer Cordova.

The game was later released for the NES and updated for the N64 with *Excitebike 64*, now with hyper-realistic tracks, sick freestyle stunts, and Fox-branded gear. Further securing the legacy, and cred, of moto-x games, in 1999 *Championship Motocross* developer THQ became the official sponsor of the world's richest race, the US Open motocross event, held at the MGM Grand Arena in Las Vegas. Now if they'd only include some of that post-race Moto-XXX action... ■

I, Robot

Atari

Widely considered to be among the most groundbreaking and underappreciated videogames of its time, *I, Robot* was also painfully ahead of it. Designed by Dave Theurer – the programmer who brought us *Missile Command*, *Tempest*, and the graphics converter DeBabelizer – *I, Robot*'s revolutionary polygon-based 3D graphics were an important first for the videogame industry.



Built on a hardware platform designed by Dave Sherman, *I, Robot* was engineered with Atari's patented "hall-effect" joystick. The player controls Interface Robot #1984 in an attempt to collect all of the red tiles of Big Brother's defense shield in order to destroy the evil eye. In addition, there was a play mode called "Doodle City" in which players could create patterns using the multi-colored polygons onscreen.

As with most truly important games of the era, *I, Robot* was difficult – as well as a total commercial flop. As a result, it is rumored that to dispose of 500 unsold units in the Atari warehouse, the games were loaded onto a ship bound for Japan – and secretly walked down the plank into the Pacific Ocean. ■

Karate Champ

Data East

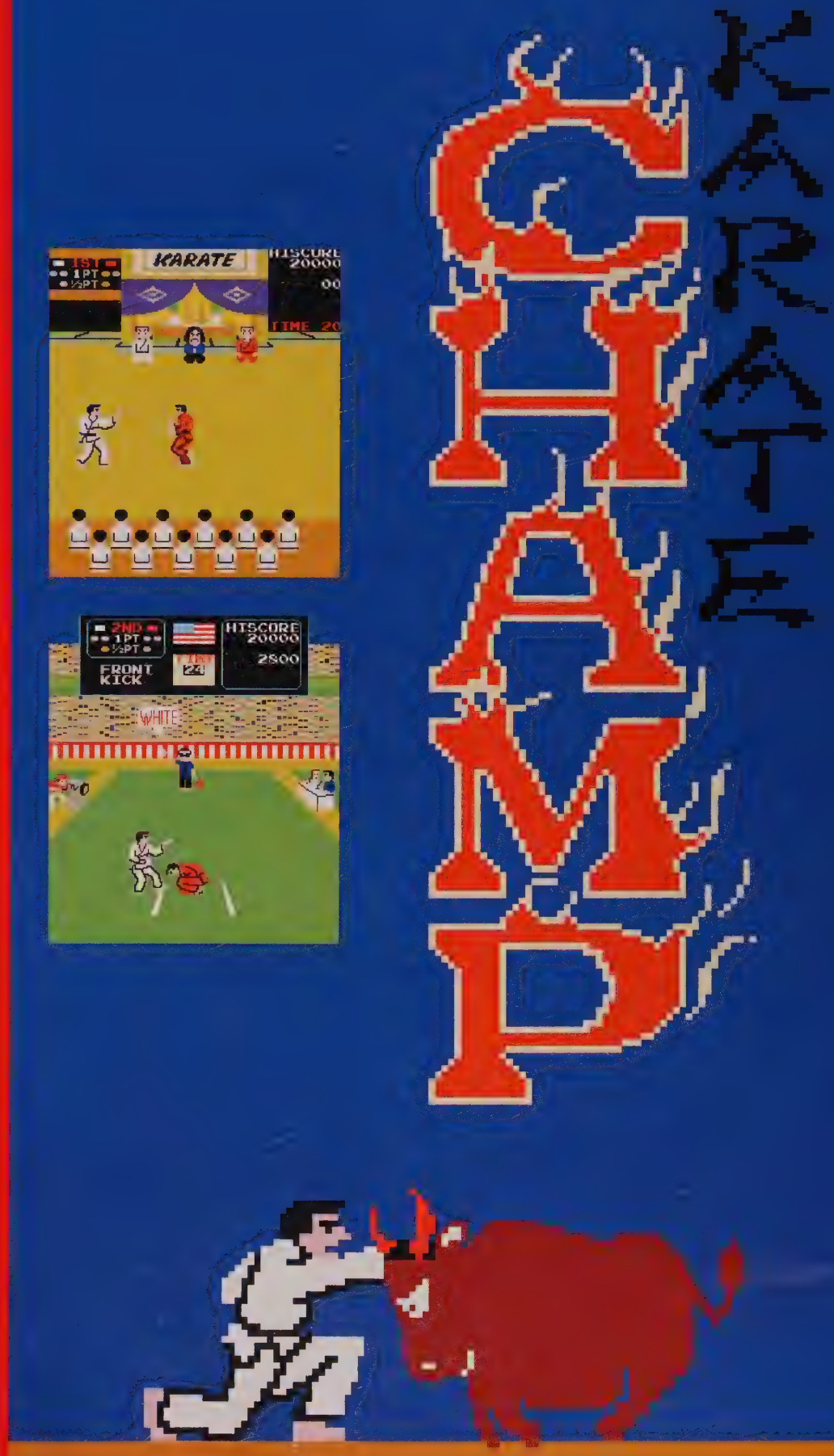
■ BY YOSHIMITSU SHINOBI

Wanna-be karate kids finally got their chance to kick some virtual ass when Data East released the awesome arcade game *Karate Champ* back in 1984 – the very first one-on-one karate fighting game. In this martial-arts masterpiece, players compete as a black-belt karate master known only as "White" who must compete against the computer or player two controlled "Red" opponent using a dual joystick interface to perform the various karate moves.

Players begin the game by first perfecting their karate skills. During the practice stage, you score points by performing each of the moves correctly – including punches, kicks, front sweeps, back round kicks, and more. From the dojo you will advance through twelve tournaments – fought in twelve different arenas – where you must defeat your opponent by scoring two points while dodging or blocking their attacks in order to advance to the next round and, finally, the championship.

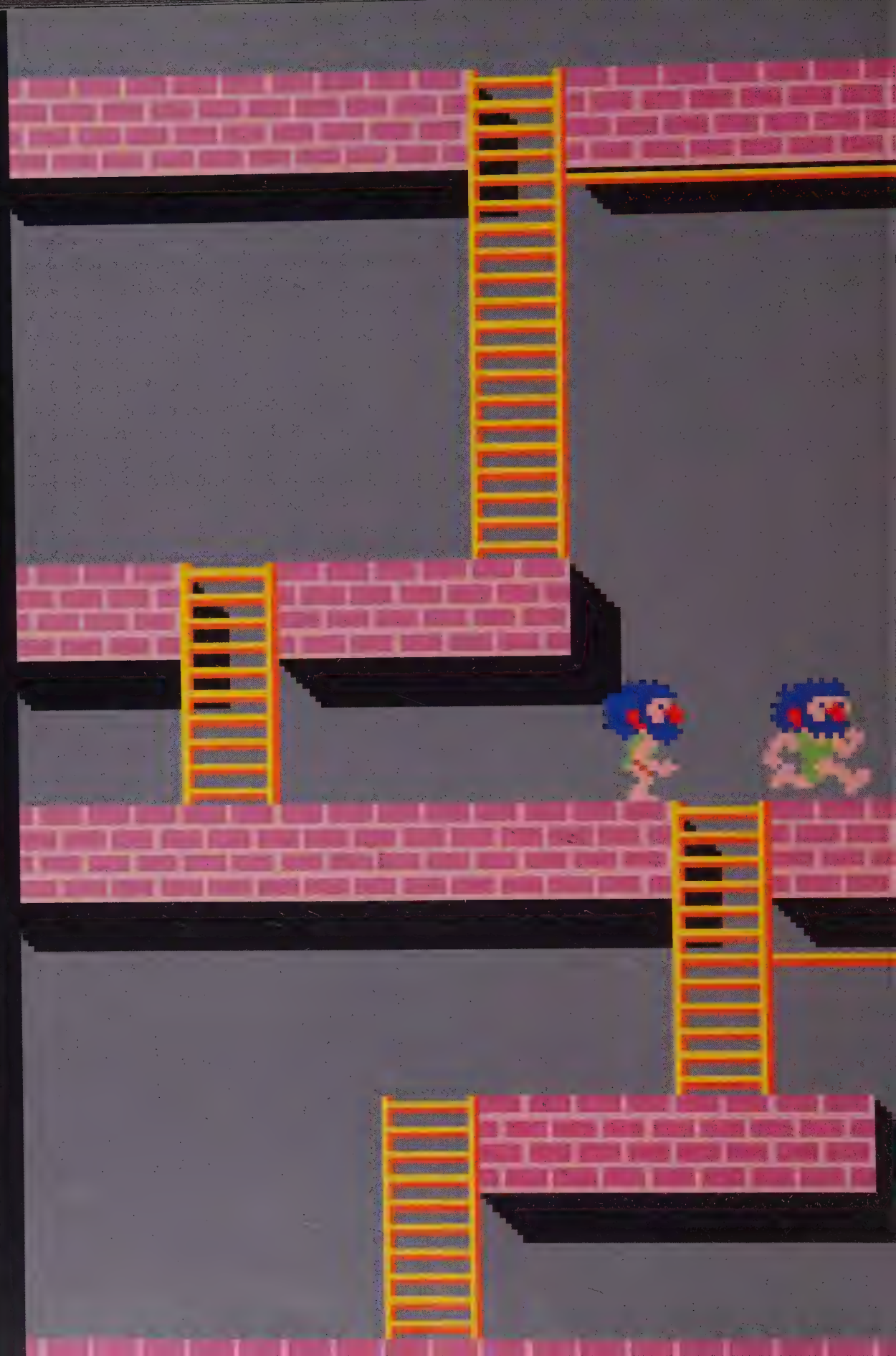
Karate Champ was a huge hit for Data East and ushered in the era of martial arts-inspired fighting games that would gain incredible popularity in the mid-'80s following the release of *The Karate Kid,* starring Ralph Macchio, as well as other popular arcade games like *Kung Fu, Shinobi*, and *Yie Ar Kung Fu.* But it wasn't until 1992 that this genre would reach the pinnacle of popularity – and notoriety – when Midway released the now classic, and highly controversial, arcade game *Mortal Kombat* – a game vehemently condemned for its graphic gameplay and ultraviolent "fatalities."

Today, some of the industry's best-selling titles fall into this category of hand-to-hand karate combat games, including Namco's *Tekken* and Tecmo's *Dead Or Alive.* ■



Lode Runner

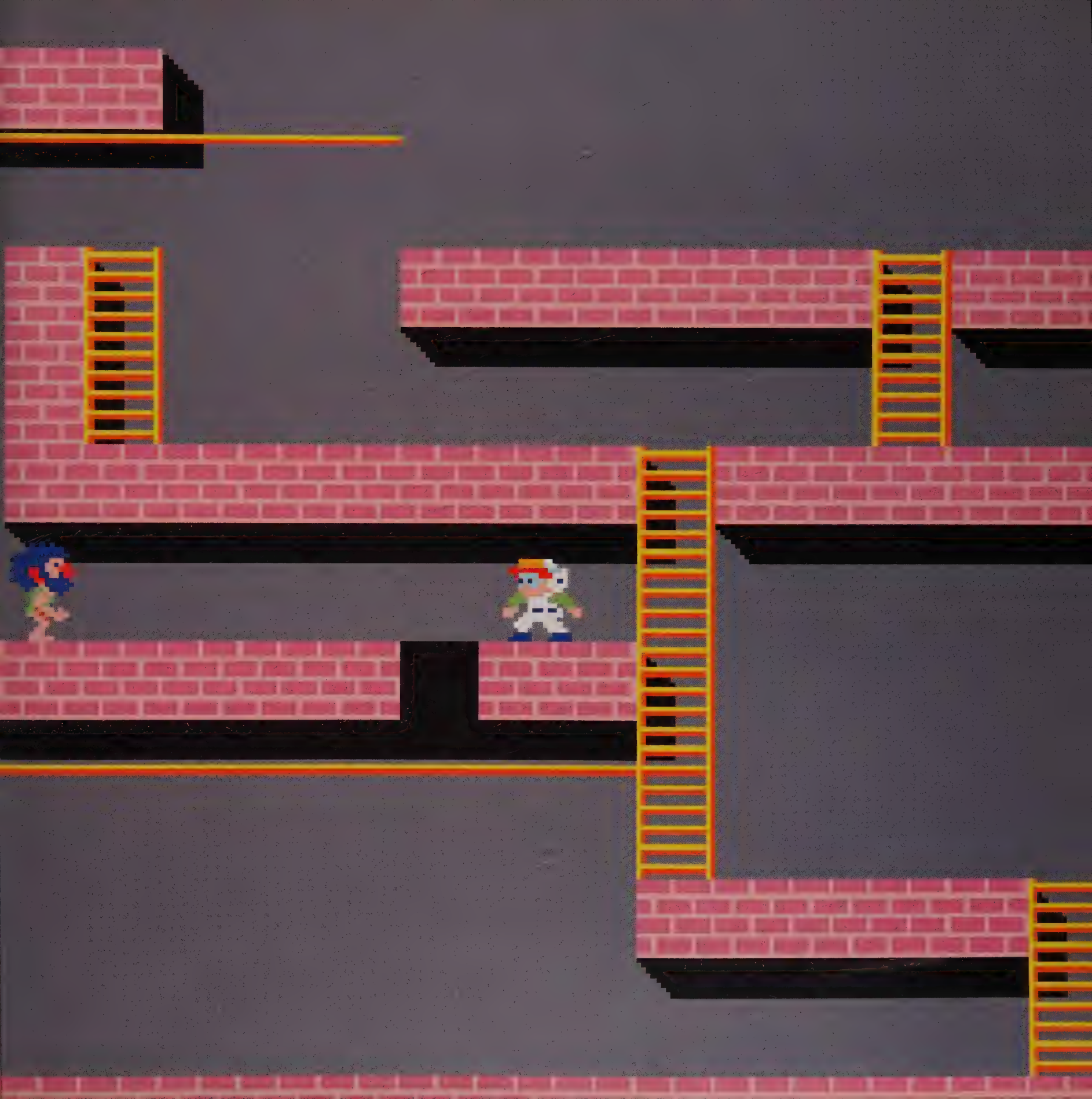
Irem



"Under the surface of barren, polluted Earth, what is left of humanity survives in man-made caverns. In such an environment, anarchy reigns and paper money has no meaning. Gold is the only thing of value, and there are those who will do anything to get it in order to buy their way off the planet."

Licensed from Brøderbund in 1984, Irem introduced an arcade version of *Lode Runner*, the classic computer game released for the Apple II, Commodore 64, IBM PC, MSX, NES, and other home systems. In this platform game, the player controls Jake Peril – the bravest and most skilled of the Lode Runners – as he runs around collecting the precious pieces of gold scattered throughout a maze of platforms and tunnels – all while being chased by the gold-hoarding Mad Monks, keepers of the desolate underground. Use your blaster to dig holes and trap the Monks and as you quickly collect the gold and make your escape.

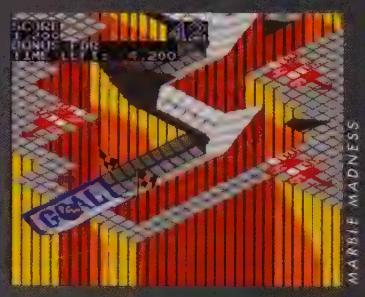
The original game was recently updated and re-released by Infogrames as *Lode Runner 3D* for the Nintendo 64, and a new PlayStation version has also been released by Natsume, combining the original *Lode Runner* and *Lode Runner: The Legend Returns*. The game now features over 300 challenging levels and new "Construction Mode," which enables players to create their own custom levels for an infinite number of play options that makes it a surefire winner for classic *Lode Runner* fans. ■



Marble Madness

Atari

IMAGE: FAR RIGHT, COURTESY SCOTT EVANS



MARBLE MADNESS

MARBLE MADNESS 2: MARBLE MAN

In 1984, Atari would release a revolutionary new videogame that would take the industry, as well as the kids in America, by storm. *Marble Madness* was the creation of an eighteen-year old programming prodigy named Mark Cerny. Even at that tender age, Cerny was already a veteran – he studied math and physics at UC Berkeley at thirteen, wrapped *Defender* at 1,000,000 points at sixteen, and landed a job at Atari at seventeen.

In the game's sales sheet Cerny is quoted, "I've played a zillion ho-hum videos. So when I got the chance at Atari Games I designed a game that I could get into… Its craziness turned out to be great fun for everybody – beginners or experts!"

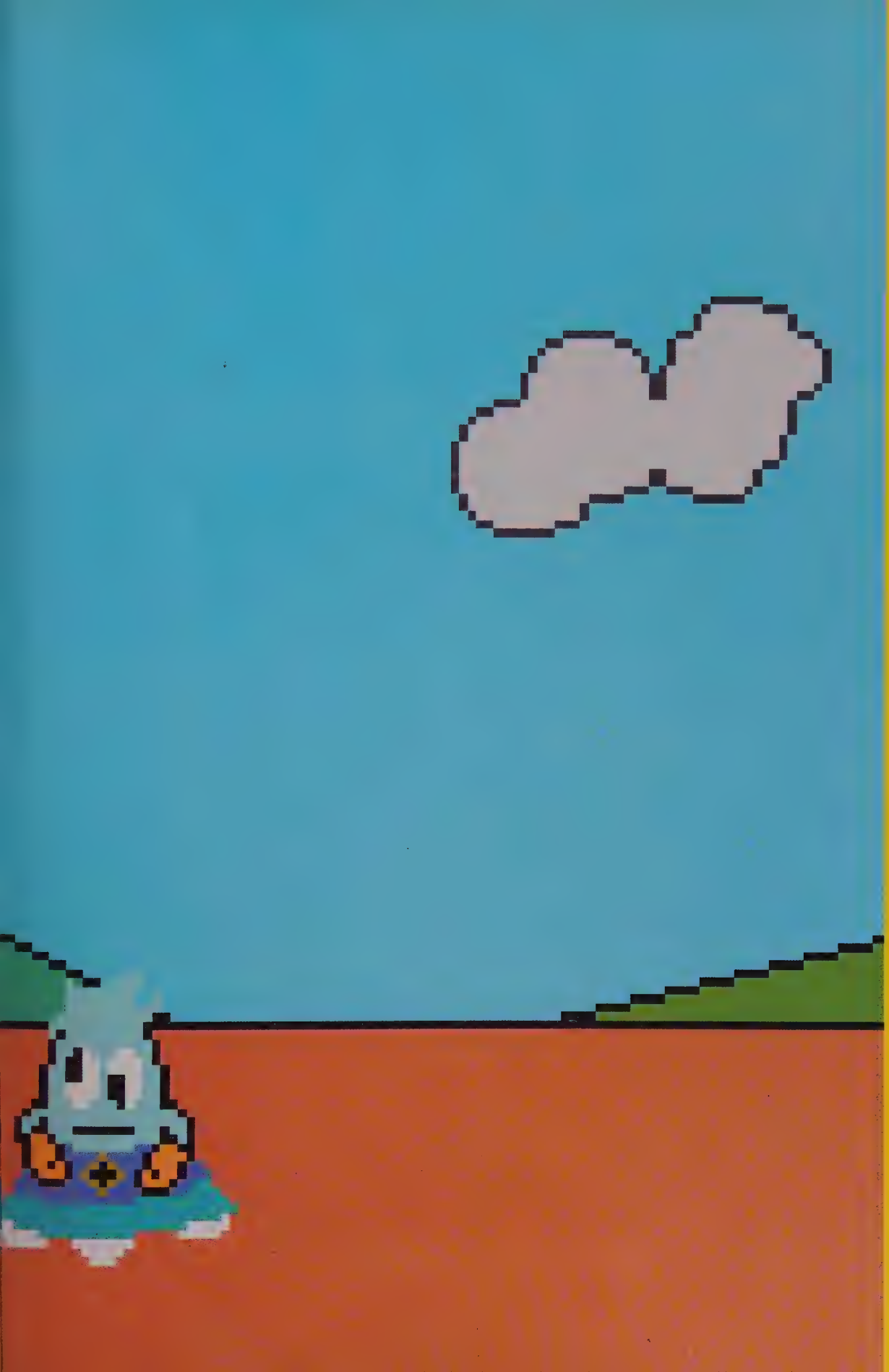
In *Marble Madness* the player controls a marble that must be swiftly and successfully guided down a three-dimensional isometric track filled with fatal obstacles, in a race against either an opponent or the clock to reach the end goal. The game's perfect balance of kinetic action, awesome 360° scrolling graphics, and killer stereo soundtrack created one of the most dynamic games to hit arcades since Eugene Jarvis' mutant-blasting masterpiece.

Although the mechanics of *Marble Madness* were fairly simple, the gameplay was far from simplistic. In order to win, the player needed to master the complex strategy and enemy AI, as well as the game's infamous interface – the Trak-Ball.

Engineered for the new Atari System I conversion cabinet – which also played host to such popular games as *Peter Packrat* and *Road Blasters* – *Marble Madness* featured dual Trak-Ball controllers that caused no end of grief for the game's rabid fans, and their fingertips.

To quote Joey Anuff, *Marble Madness* addict and co-founder of Suck.com, "That game was my own personal Vietnam... I'd play until my fingers were bloodied and blistered in an attempt to beat the ultimate wave – or my brother Ed."

In '91, a prototype for *Marble Madness 2: Marble Man* was made, including an underwater level and three-player action. Sadly, it was never released. Cerny went on to even greater fame for producing such blockbuster games as *Crash Bandicoot* and *Spyro the Dragon* at Universal Interactive. He later founded Cerny Games, where he has consulted on such popular hits as *Jak & Daxter* and *Ratchet & Clank*, among others. ■



Pac-Land

Namco

BY CHRIS CHARLA

With the huge success of *Pac-Man*, and the rush of Pac-Man Fever that swept the globe, Namco wasted little time cashing in with a variety of sequels. One of the most interesting was *Pac-Land*, which debuted a few months after Nintendo liberated Mario from single screen games into the expansive world of scrolling adventures.

Loosely based on the Pac-Man animated series (the character designs actually had more in common with the art on the Pac-Man cereal box), Pac-Land was a departure from Pac-Man in nearly all respects: Pac-Man now had arms and legs, and he wasn't confined to a maze – instead he explored the boundless side-scrolling world of Pac-Land, a cartoon world full of neat houses, maincured trees, mysterious platforms of rolling logs, and other obstacles that were ground-breaking at the time.

In *Pac-Land*, there was no joystick: just three buttons (left, right, and jump), so to run, players rapidly hit either direction button. The gameplay has Pac-Man taking various "trips" across Pac-Land, as he dodges ghosts in cars, ghosts on pogo sticks, ghosts in windows (who drop smaller mini-ghosts), and ghosts just floating around. Although there are no dots to eat, power pellets scattered around the levels give you a chance to turn the tables on the ghosts for a few brief moments. Bonus fruits also appear onscreen regularly to score extra points. During the various intermissions, Pac-Man removes his jaunty red hat to reveal a fairy who counts up the bonus time. But perhaps the most interesting aspect of *Pac-Land* is that certain stumps in the forest can be pushed aside to reveal secret areas in the game, making *Pac-Land* second only to *Super Mario Bros.* in pioneering the presence of hidden secrets within the construct of the game.

While Mario went on to become Nintendo's killer franchise, Pac-Man has remained as little more than a nostalgic mascot for Namco. But *Pac-Land* will always stand as a testament to revolutionary advances in videogaming – and to the vast virtual worlds created in its wake. ■

In Atari's ***Paperboy***, you are a delivery boy who must hurl newspapers to your customers along a sprawling suburban street, dodging obstacles like cars, dogs, and skateboarders, and throwing papers to damage the property of "non-subscriber" houses for a "breakage" bonus – not too far from reality, really.

Punch Out!

Nintendo

BY MICHAEL WOLF

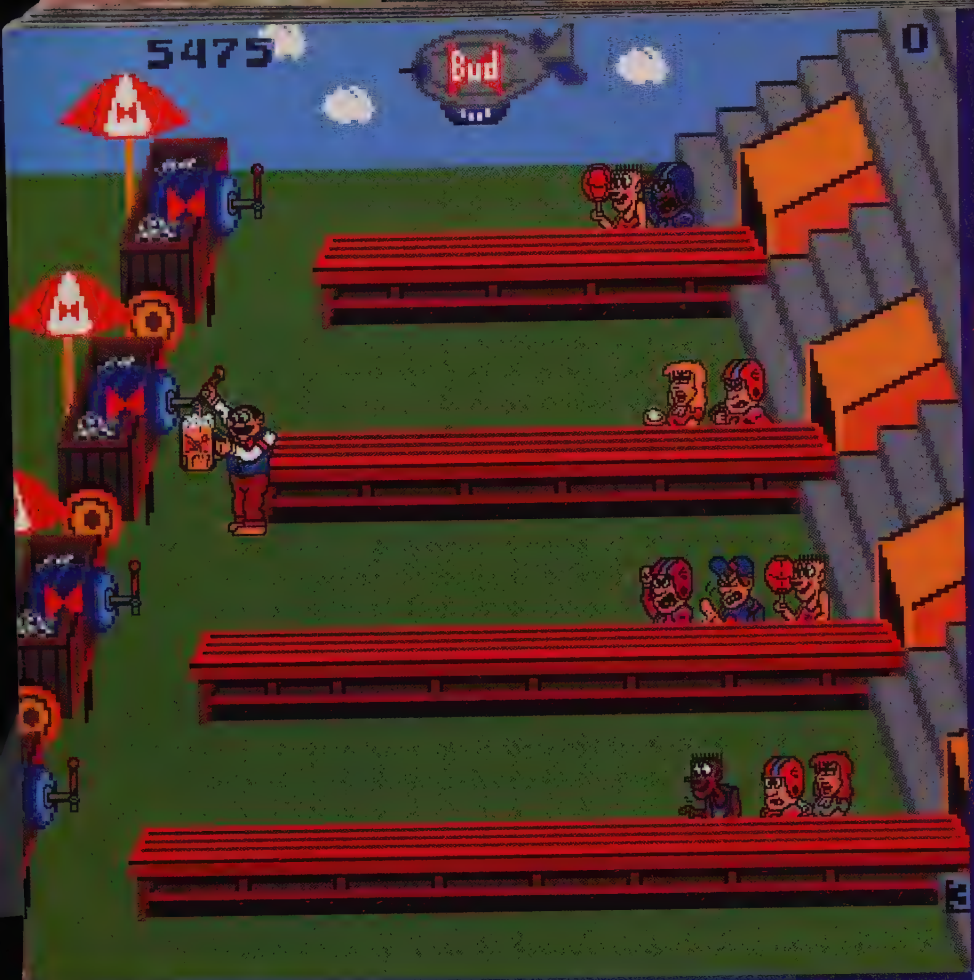
Long before Mike Tyson gave boxing a bad name with his misogynistic tendencies and inclinations toward ear mastication, Nintendo released *Punch Out!*, a comical, lighthearted boxing game with silly cartoon-esque boxers and dynamic prize-fighting action.

Players control an acid-green wire-frame fighter from an over-the-shoulder perspective. An interface of three buttons lets players toss a punch with either their left or right hand, or throw a powerful uppercut. A 4-way joystick moves the fighter from side to side to dodge the opponent's punches, while the up and down directions position the fighter's hands for defense or designate a high or low attack.

The game was one of the first to make use of two 19" monitors stacked one on top of the other, each wired separately for sound. The top monitor displays portraits of the boxers alongside their current stats, including fighter energy and knockdown potential. The bottom monitor displays the fighters in the ring.

Players have to make their way through six fighters – Glass Joe, Piston Hurricane, Bald Bull, Kid Quick, Pizza Pasta, and Mr. Sandman – in the World Video Boxing Association to win the championship, and then they must defend the title from the same six boxers. The second time around, however, the fighters are considerably tougher.

Nintendo's arcade boxing game was such a success that the company ported *Punch Out!* to the Nintendo Entertainment System in 1987. The NES version of the game contained several additional opponents along with a basic storyline. Also, to capitalize on Mike Tyson's recent WBC Heavyweight Title victory, Nintendo signed a deal with the volatile fighter, and called the game *Mike Tyson's Punch-Out!* where the final championship fighter is none other than Iron Mike himself. Unfortunately, the agreement with Tyson didn't last much longer than Tyson's reign as champ, and in 1991, after Tyson's defeat at the hands of Buster Douglas, Nintendo re-released the game as simply *Punch-Out!* In the new version, the final boxer looks just like Tyson, but sports the name "Mr. Dream." ■



In Atari's ***Tapper***– also known as ***Root Beer Tapper***, and later ***Mountain Dew Tapper*** (available for the Atari 2600) – you control a bartender who must swiftly serve up frosty mugs of tasty branded beverages to rows of thirsty patrons. Just be sure to collect the empties before they smash onto the floor!

Samurai Nipponichi

Taito

In the history of videogames there have been a few games that are downright silly, some even stupid – but it wasn't until *Samurai Nipponichi* that games crossed the line into the truly surreal.

In Taito's bizarre sword-fighting simulator, also known as *Samurai Magic*, the player controls a Samurai warrior engaged in heated battle. Players guide the Samurai through the waves of attacking enemies – rival Samurai, tigers, and, of course, killer knife throwing birds – as they attack.

THE LEGEND WILL NEVER DIE: Mitsurugi Vs. Sophitia in *Soul Calibur* for Dreamcast.

But the evolution of the katana-wielding samurai videogame – which also includes SNK's ground-breaking series, *Samurai Showdown* – would reach ne plus ultra with the introduction of Namco's popular arcade game *Soul Calibur*.

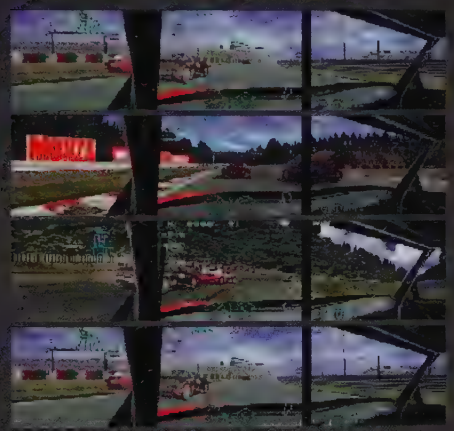
The game was further perfected in Namco's breathtaking port of *Soul Calibur* for the launch of the Sega Dreamcast – a game that was without doubt the most graphically breathtaking home videogame ever created. Playing as Heishiro Mitsurugi – the ultimate Samurai warrior – you fight with your deadly sword to defeat opponents in an attempt to capture Soul Edge. ■

Snake Pit – the first arcade videogame introduced by Sente, Nolan Bushnell's follow-up arcade venture after Atari – was an adventure game inspired by the hit film *Indiana Jones*. In it, you play whip-smart explorer Outback Jack who must escape from the deadly snakes as you search for lost treasure.

TX-1

Atari

Created by Namco (makers of the hit Grand Prix racing game *Pole Position*) and licensed to Atari for US release, *TX-1* was an exciting entry into the wide world of racing simulators. With three separate video monitors that added up to a 270° perspective, drivers were fully immersed in the racing environment for unparalleled realism and action.



FERRARI 355 CHALLENGE: Sega's exhilarating race sim designed by Yu Suzuki.

The game's revolutionary multi-screen technology would again emerge in 1999 with Yu Suzuki's stunning masterpiece, *Ferrari 355 Challenge*. Introduced by Sega, this thrilling road race over six unique tracks – Montegi, Monza, Suzuki Short, Sugo, and Long Beach – finally put financially challenged Ferrari fans behind the wheel of the legendary Italian Stallion in one of the most realistic car racing environments ever engineered for an arcade game.

Although *TX-1* was a hit in arcades, there certainly weren't very many of them – the double-wide game's hefty price tag limited production and forced operators to charge an unprecedented 75¢ per game, limiting the audience to die-hard speed freaks. ■

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NINTENDO

VS. Baseball

Nintendo

BY TODD ZUNIGA

Amidst the epic 1984 videogame market crash, arcade videogame manufacturers needed a new angle to draw gamers back into arcades. Inspired by the inherently competitive nature of game fans (as well as arcade operator's desperate need to preserve its precious cash flow), Nintendo introduced the VS. System – a revolutionary cartridge-based arcade conversion system (and a predecessor to MVS and JAMMA) that allowed operators to effortlessly update their existing arcade cabinets with brand new games.

The VS. System was installed into Nintendo's standard upright cabinets with two sets of player controls for intense head-to-head action. However, the more sophisticated VS. DualSystem was housed in a double-wide low-boy cabinet and featured dual monitors angled away from one another – each with its own set of controls so up to four simultaneous players could face-off. A number of videogames were produced for the systems in 1984 including *VS. Duck Hunt*, *VS. Tennis*, *VS. Wild Gunman*, and Nintendo's take on the all-American classic for the DualSystem, *VS. Baseball*.

Nintendo's *VS. Baseball* set the standard for all baseball games that would follow and introduced many innovative gaming firsts to arcade hardball. To start, it was the first baseball game to feature shadows; when a batter skied a ball into the outfield, it didn't look like the line drives of yesteryear – it actually rose and sunk, its shadow widening and diminishing. Other baseball firsts included: the ability to choose your team's uniforms, which were patterned after the popular baseball teams of the day (even the St. Louis Cardinals' sickly baby-blue and red uni's of the mid-eighties were an option); fielders automatically chasing the ball onscreen; and switching the view when a ball was hit. Also, baserunning was no longer a simple stop and go, no-concern-for-momentum process; for the first time runners would stutter step before reversing direction. No longer would a run-down turn into a nightmare for fielders. More often than not, as in real baseball, an overaggressive runner caught in the throes of a rundown was begging to be tagged out.

But perhaps *VS. Baseball*'s most pressing feature was its innovative use of time when playing against a human opponent. Seconds were awarded per credit and the amount of time left on the clock increased and decreased based on performance. If you blasted a two-run double, your time would shoot up while your opponent's time decreased. If you gave up an early inning dinger, the opposite would happen. After one player's time expired, the CPU would take over to finish the time remaining. There was nothing was more discouraging than having no baserunners on, a 1-2 count, a mean friend as an opponent, and four winding seconds staring you in the face. ■

YOU L
VS WILD GUNMAN

OST!!

COMBAT!
Studio II
Home TV Programmer
MORTAL KOMBAT
NOMAD

Collections

A mind-bending collection of Nintendo Game & Watch handheld videogames on display at Classic Gaming Expo.

Videogame enthusiasts are a rare breed.

But rarer among them are the hardcore classic videogame collectors – those who've made it their mission in life to preserve the history of the game industry and all of its technology, determined to search out every last cartridge and system that hasn't been lost to the landfill. To them, classic videogames are more than just a hobby. They are an obsession.

Although interactive entertainment has evolved dramatically in the past thirty years – from the simple phosphorescent blips generated by the Odyssey, to the dynamic 128-bit digital worlds seen on next generation game systems like the Dreamcast, PS2, Xbox, and GameCube – for these collectors, nothing could possibly beat a game of *Minestorm* on the Vectrex...

IMAGE: PREVIOUS AND LEFT: VAN BURNHAM

Chris Cavanaugh
Editor-in-chief, *Classic Gamer Magazine*
San Diego, California

"My first system was the Atari VCS, which was bought for me on my 11th birthday. Words failed me that such a cool thing could even exist.

Since then, I suppose I always collected. That is, if begging my mom and dad can be considered 'collecting.' After a brief hiatus from gaming (when I discovered girls and beer) I returned to find that games could be picked up incredibly cheap at flea markets and garage sales. That's when the true collecting bug bit me – here was a chance to get ahold of all the games that eluded me as a kid.

My most prized item is my NTSC prototype of *Asterix* for the VCS. I found it at a thrift store in San Jose. Actually, I think my jaw is still sitting on their filthy floor."

Clint Dyer
Ebay seller
San Bruno, California

"The first videogame system I ever owned was the Fairchild Channel F. My family had all the games for it and would regularly hold competitions to see who could get the high score in *Bowling* or the fastest times in *Drag Racing*. That system opened my eyes to the world of videogames.

After the Fairchild, I got an Atari 2600. When I lost interest in videogames (I guess I'm somewhat responsible the crash, sorry!) in the early '80s, I had about 200 Atari 2600 games. I put the system and games (all in their original boxes, I might add) into storage and forgot about them until my uncle asked if he could borrow my old Atari. I packed everything up and sent it to him and he kept it for about four years. Then, one fateful day, a friend at Sega, where I was working at the time, and I were talking about the 'glory days' and I decided to get my games back from my uncle. Over the next five or six years, I collected nearly 6,000 games and just about every system ever made.

Right now, I'm really into 'collecting' for the Sony PlayStation, Nintendo 64, and Sega Dreamcast – but I still love the classics. My greatest loves are handheld videogames, Fairchild Channel F, Sega Master System, Atari 2600, and Vectrex, which gets the most play by far. I love that system and the games – it's so easy to setup and play, then put away! I wish other companies would take note and make a similar system. Next to the Veccie, the Atari 2600 gets a lot of play, especially through emulated collections on the PlayStation and PC. But one time, I had 13 systems hooked up to my TV – I could play just about anything at anytime with just a change of a single cable.

The biggest impact classic game collecting has had on me are the friends that I've made and the long distance relationships that I treasure to this day. My two best friends in this world were made through games – I can't imagine my life without the incredible people I've met!"

Syd Bolton
Software developer
Brantford, Ontario, Canada

"My first home computer was a VIC-20 – on which I both played and programmed games. But my first videogame was a Coleco Telstar. During the heyday of classic game systems I never actually owned one, but was extremely jealous of a school friend who had one of the first Atari 2600 systems in Canada. He had all the cool games like *Pitfall*, *Asteroids*, and *Space Invaders*. It was actually my jealousy of him that inspired me to collect later on.

So when I was 16 years old I started a computer collection. At age 16, I had 16 computers. At 18, I had 18, and so on. I vowed to always have at least as many computers as my age. In 1989, someone offered me an old Atari 2600 system for $20. At first, I thought, 'What will I do with it?' Then I decided that the Atari could count as a computer, so I bought it. After looking at it in an old box I finally hooked it up to play *Asteroids*. I realized then how much I loved that system – all those memories from my childhood came flooding back. And so, my quest began.

I still enjoy playing the 2600, and when I do it's usually *Pitfall* or *Asteroids*. *Pitfall* is still extremely entertaining to me, especially now that I am more familiar with the internal workings of the 2600 – you begin to appreciate how impressive those graphics really are when you consider the hardware they're running on. I also love to play *Star Castle* on the Vectrex, and will play for hours if I'm left to my own devices.

As for my collection, because of the story behind it and its perceived rarity, *Chase the Chuckwagon* – a promotional game for the Atari 2600 released by Ralston Purina – is likely the most important item in my collection. But I am also very proud of my Vectrex collection. Although the system isn't the rarest thing on the Earth, it's fun to show it off since most people have never seen one.

IMAGE: TOP, LEFT TO RIGHT: ROMSCANNER AD, COURTESY ATARI GAMING HEADQUARTERS; KEE GAMES 2600 PROTOTYPE; COLLECTION OF JIM BICKMAN; ATARI

IMAGE: TOP, LEFT TO RIGHT: VECTREX AD; ATARI BUMPER STICKER; COLLECTION OF LEONARD HERMAN; COLLECTION OF WILL FONG; USPS COMMEMORATIVE STAMP FROM ITS "CELEBRATE THE CENTURY: THE 1980S" COLLECTION; *ATARI AGE* COURTESY THE ATARI HISTORICAL SOCIETY

To accommodate it all, I have converted most of my basement for my videogame addiction. One entire room has had custom countertops and shelving units installed to handle my systems. The goal was to have all of the systems actually hooked up and playable so that you don't need to swap video cables – it hasn't entirely worked out that way yet, but I'm still working on it. So far, I've managed to get one television hooked up to nine systems so that I can play any one of them by pressing only two buttons, which is pretty cool.

One of my long term goals now is to open a musuem with my collection in order to share it with others. I love telling the stories behind things, reciting the trivia that most people can't believe I'd cram into my brain like, 'Did you know *Centipede* was designed by a woman?'

Collecting classic videogames has given me the ability to revive something in people that is almost unexplainable. I've found that when I'm showing someone my collection, they get this look on their face, all the childhood memories rushing back. Everyone has a different game they remember, but there is nothing like seeing someone's eyes light up as they say, 'Oh wow! Do you have *Frogger*?'"

Will Fong
Proprietor, Collectibles Plus
San Francisco, California

"We were very poor when I was a kid, so window shopping was my only real connection to videogames. I remember going to Woolworth's and Emporium Capwells to play all the latest games and systems.

My introduction to classic videogame collecting was pretty much like getting hit on the head! Most of my classic gaming stuff was given to me in the late '80s and early '90s by friends. To make a long long story short, I was missing an Atari 5200 in my collection, so the hunt was on.

One day I saw an ad in our local newspaper that read 'Atari 5200 & 100 games for $20.' Yes, you heard right. I finally meet the guy and he shows me the goods – a beat-up looking Atari 5200 in a Macy's shopping bag. So I checked the contents out. Basically, it looked like a bunch of crap to me – a pile of boards and cartridges with no labels except for two *Super Breakout* cartridges. I had the nerve to bargain with the guy and asked him if he'd give it to me for $15. Then I looked at the pile again and thought about how many people out there really love this old crap, so I gave him the $20 and it was sold.

When I got home, I played it a bit but soon lost interest, so the whole pile got shelved for a few months. One day I was searching on the Internet to get some more information when I realized exactly what I had: an Atari 5200 prototype Video System X unit with over 100 cartridge prototypes. All the Atari 2600 protos were on EPROM boards and most of the Atari 5200 protos were actual lab loaner carts with the labels intact. In addition, there were two Atari 2600 *Saboteurs* (two versions), an ultra-rare Atari 2600 *Miss Piggy's Wedding* cart, Atari 5200 *Frisky Tom*, *Meebzork*, *Road Runner*, and some other rare cartridges. The first person I showed the collection to was Clint Dyer.

Today, my most prized system is my boxed Entex Adventurevision with all four games. Most are mint store stock. I paid a hefty price, but I didn't care. Life's too short to wait. The next best thing would be my complete boxed Coleco Telstar Arcade collection. Sweet! I've had some super crazy money offers for these items, but I would never sell – it would take me another lifetime to find it all again."

Nate Miller
Collector
Minneapolis, Minnesota.

"The first system I ever owned was an Atari 2600.

I'd always lusted for videogames as a child – I can still remember drooling over the Vectrex in the *Sears Wish Book*. I ended up with the 2600 instead. Once I finally moved out of the house and acquired some disposable income, I thought I'd get back at my parents for not fulfilling all of my videogame dreams.

In regard to my collection, I'm not what you'd call an elitist – I enjoy wonky hardware of all types. I typically acquire a system, and then never get around to actually searching out appropriate the software for it. But the 2600 will always be my favorite due to the nostalgia associated with it. Well, that and the Vectrex my parents gave me on my 24th birthday. (Only 15 years late.)

Nowadays, I'll wear my coat with the Atari patch on it, and all sorts of people will say, 'Hey! I used to have an Atari!' and then I'll hear the story about how they probably still have it somewhere, and boy, wouldn't it be great to dig it out again. It's nice to be able to relate to such a variety of people that share this connection. People sure do love old videogames." ■

Galaga
Galaga
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TOMYTRONIC
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ATARI
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TRON
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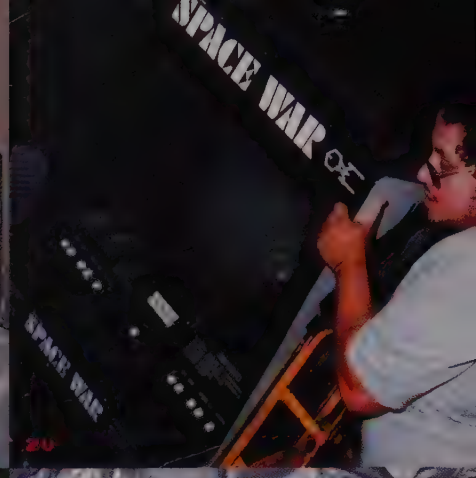
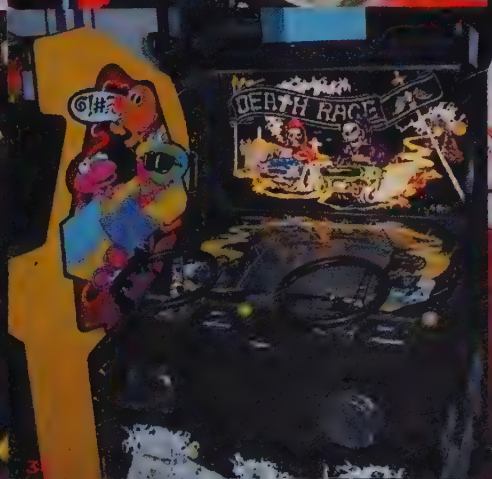
ARCADE GAME
LEVI'S



I ♥ VIDEO GAMES!



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Exhibits

Bolt

The Bureau of Low Technology (Bolt) – a division of San Francisco-based art collective, Blasthaus – has been experimenting with modern applications of classic videogame and computer technology since it was founded in 1997. As an organization devoted to the preservation and appreciation of all things low-tech, the bureau functions as a reminder of the early techno-era. Bolt embraces this old-school bitmapped arcade culture in order to create nostalgic reminders of the 8-bit days of youth. They believe that since the earliest evidence of computing into our everyday life was the advent of home videogames, the bureau has determined that this aspect of our technological history is worthy of preservation.

To achieve this goal, Bolt has developed a modern venue to preserve these familiar low-tech games – the Bolt gaming lounge.

The gaming lounge features home videogames dating from the late '70s to the '80s – including Pong, Atari VCS, Intellivision, and ColecoVision home consoles, handheld electronic games, and computer systems like the TRS-80, Apple II, and Amiga – and presents their own version of a home videogame arcade with multiple televisions and large-format projected games that are enjoyed in the presence of modern electronic music.

In the year 2000, Blasthaus opened a new gallery space called Joypad, a retro-futuristic hangout near the SFMOMA in San Francisco – a must-see for all classic game fans. **www.blasthaus.com** ▲

California Extreme

In 1997, a group of game enthusiasts decided to host the biggest pinball and video arcade event the Golden State had ever seen: California Extreme.

This classic arcade games show – now held in San Jose – has become an annual celebration of all the classic coin-operated pinball machines, arcade videogames, and electro-mechanical novelty games that have ever graced a game arcade. For two action-packed days, hundreds of classic coin-op arcade fans come from around the country to help celebrate the glory days of interactive entertainment.

California Extreme was born as an opportunity to share the rare coin-op games currently in the hands of private collectors with the public that adores them. Organized by a dedicated group of gamers including TJ Beyer, Ken Chaney, Dean Golden, Mike Louie, Dale Luck, Brad Martinson, and Alan Whittle, the show features tournaments, industry speakers, collectors, vendors, and the opportunity to play games you haven't seen in years – all set to free play – for endless hours of classic arcade fun.

Some of the classic video arcade games that have been on display at the show are *Asteroids*, *Maneater*, *Space Wars*, *Qix*, *Death Race*, *Missile Command*, *Sinistar*, *I, Robot*, *Warrior*, *Space Invaders*, *Q*bert*, *Quantum*, *Wacko*, *Battlezone*, *Red Baron*, *Galaga*, *Defender*, *Bandido*, *Bi-Plane*, *Centipede*, *Pac-Man*, and – the ultimate classic – *Computer Space*. **www.caextreme.com** ▼

Classic Gaming Expo

From the ashes of World of Atari rose the phoenix that has become the Classic Gaming Expo. This annual event – held in fabulous Las Vegas, Nevada – has emerged as the premiere event for classic videogame collectors who descend upon its tables to browse, buy, trade, and play all their favorite games from the golden age and beyond.

Since the show's modest debut in the summer of 1998, Classic Gaming Expo has grown to attract hundreds of classic game fans from around the world, as well as dozens of industry pioneers – including such legends as Ralph Baer, David Crane, Jay Smith, Tim Skelly, Jerry Lawson, Rick Dyer, Steve Cartwright, Jamie Fenton, Joe DeCuir, Warren Davis, and Rob Fulop – who have taken part in the engaging round-table conference series that accompanies the show. Gaming celebrities like Billy Mitchell and Walter Day have also been on hand for high score competitions that take place throughout the event for cash and prizes.

Organized by Keita Iida, John Hardie, Sean Kelly, and now Joe Santulli, Classic Gaming Expo is now held at Jackie Gaughan's Plaza Hotel & Casino. The Expo itself consists of the main show floor – where collectors, developers, and retailers display a virtual wonderland of classic game systems and ephemera – as well as video arcade, conference rooms, and a classic videogame museum. Other events include game auctions and swap meets, but the most fun is no doubt the after show scene where you have a chance to meet and greet all of your classic videogame heroes. **www.cgexpo.com** ▲

IMAGE: PREVIOUS: KEITH FEINSTEIN/VIDEOTOPIA; LEFT: COURTESY BLASTHAUS;

The Hacker's Garage

In 1996, The Computer Museum re-enacted the dawn of the PC revolution in Las Vegas, in an inspired exhibit called "The Hacker's Garage" – a fullsize reconstruction of a seventies-era computer hobbyist's garage, cluttered with various classic computing artifacts including an Apple I board, an Altair 8800, an oscilloscope, and a ham radio. It also featured Atari's *Pong* and Nutting Associates' *Computer Space*, the first arcade videogame.

As a part of the "Museum at COMDEX," this journey through the history of technology took visitors back in time to a place where the PC industry's intrepid pioneers – hackers like Apple Computer's Steve Wozniak and Steve Jobs – would tinker in their homebrew Silicon Valley garage labs, building the ancestors of the modern personal computer and creating the future.

Wozniak, co-founder of Apple Computer, said of the era, "We were a group with a purpose: the revolution of home computers. I couldn't afford a computer so I started to think about building one for myself."

The exhibit was organized by The Computer Museum in association with Softbank/COMDEX, Intel, and Motorola, Michael Simmons, and David Nelson, with commentary by Intel president Andy Grove. Scenes from The Hacker's Garage are now a part of TCM's *People and Computers: Milestones of a Revolution*, which traces the rich history of the computer from the early days of Big Blue to the dawn of Windows. **www.tcm.org** ▲

Philly Classic

Since Silicon Valley and the adjoining West Coast has always been synonymous with videogames and videogame collecting, Jeff F., David Newman, Marc Pallante, and Chuck Whitby decided it was finally time someone gave props to the North East classic gaming crew.

Born in Philadelphia in 1999, Philly Classic – now known as "The East Coast Classic Gaming Show" – has earned its place as a jewel in the triple crown of classic gaming events. Along with its left coast colleagues Classic Gaming Expo and California Extreme, Philly Classic hosts a swarm of game collectors and enthusiasts who flood the show floor to buy, trade, and drool over all the videogame artifacts on display.

Held at the Airport Sheraton, the show features an impressive display of classic arcade, handheld, and home videogame systems, brought in by proud collectors and vendors from across the country who are there to show-off all their most prized possessions – such as a rare Entex Adventure Vision cartridge-based handheld videogame system.

Highlights from this year's show included a tabletop *Pac-Man* tournament, game auction, classic arcade competition, and, most important, a continuous screening of Greydon Clark's cult arcade flick *Joysticks* – which in itself was more than enough reward for the journey. And if that's not enough motivation for you, don't forget about the cheesesteaks! **www.phillyclassic.com** ▲

Videospiele Museum

In 1997, the Association of Social Work Service for Juveniles founded the Computer und Videospiele Museum in Berlin – the first European museum devoted exclusively to video and computer games.

The museum's mission is to increase awareness and acceptance of the important role of video and computer games in modern culture, and destroy any existing prejudices. They believe that with the help of games, society can overcome its fear and anxiety of new technologies.

The exhibits have featured classic 8-bit systems of the '70s and 80s – including the Magnavox Odyssey, RCA Studio II, Atari VCS, ColecoVision and Vectrex, as well as more unusual European systems like the Philips G7000 – right alongside original arcade games from the golden age of videogames. **www.computerspielemuseum.de**

Videotopia

With over 75 arcade videogames and every home console system throughout the history of interactive entertainment, Videotopia is the only exploration of videogames of its kind in the world. Since opening to the public in 1996, this traveling exhibit has become a key resource for the appreciation and understanding of the unique combination of art and technology known as videogames. Videotopia details the evolution of home and arcade games through kiosks and displays that take visitors through the history of videogames in a way that is nostalgic, educational, and fun. **www.videotopia.com** ▲

IMAGE: LEFT: COURTESY THE COMPUTER MUSEUM HISTORY CENTER; CENTER: COURTESY PHILLY CLASSIC; RIGHT: COURTESY KEITH FEINSTEIN/VIDEOTOPIA

Today

IMAGE COURTESY MICROSOFT

Raven and her sliver sidekick in a Microsoft tech demo that showcases the processing power of the Xbox home videogame console, originally presented at Game Developers Conference 2000.

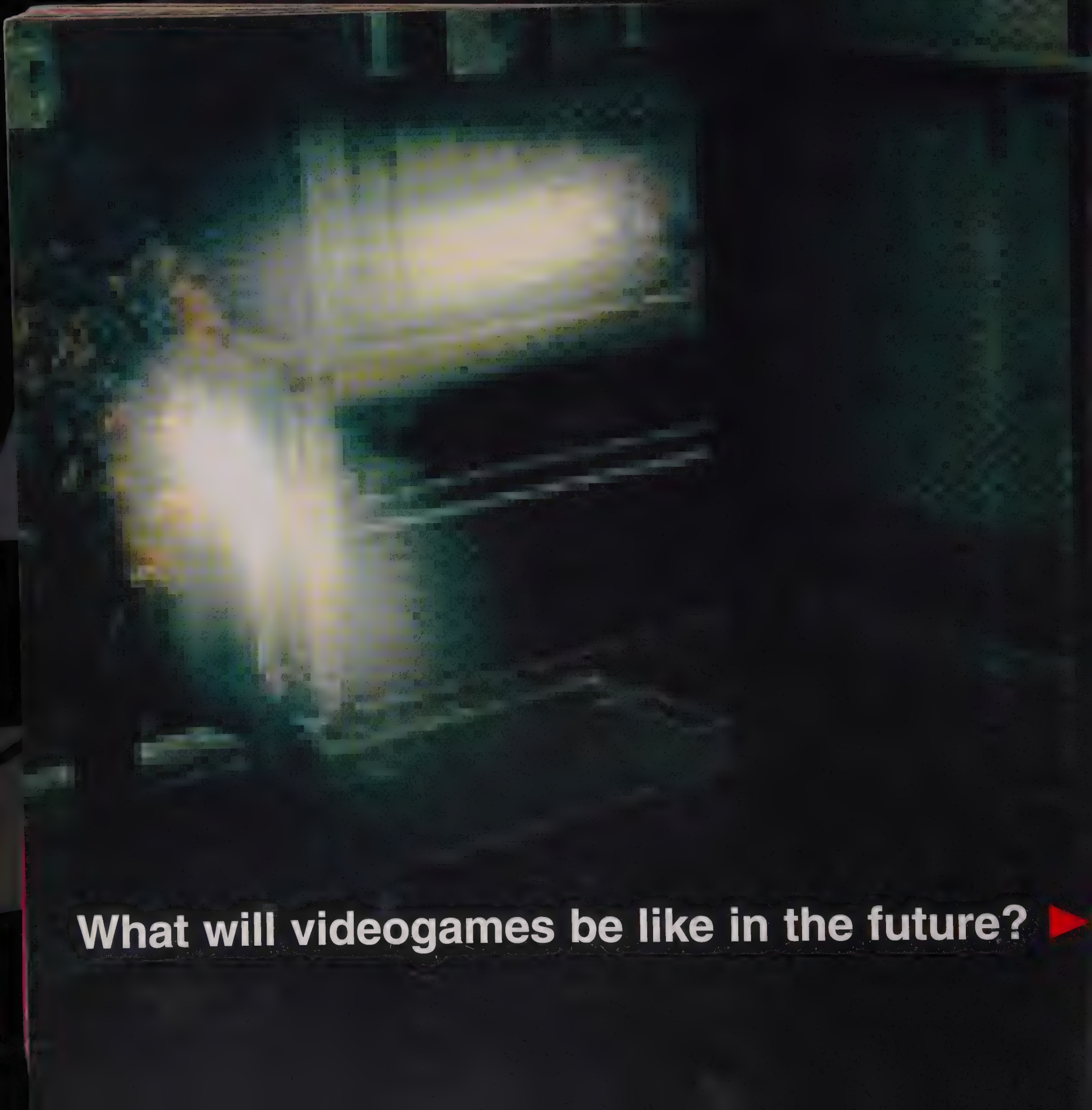

What will videogames be like in the future?

IMAGE: COURTESY KONAMI

A still from the DVD trailer of Hideo Kojima's *Metal Gear Solid 2: Sons of Liberty*, one of the most anticipated videogames for the PS2.

A scene from *Luigi's Mansion*, in a demo shown at Spaceworld 2000 that highlights the incredible graphics potential of the upcoming Nintendo GameCube.

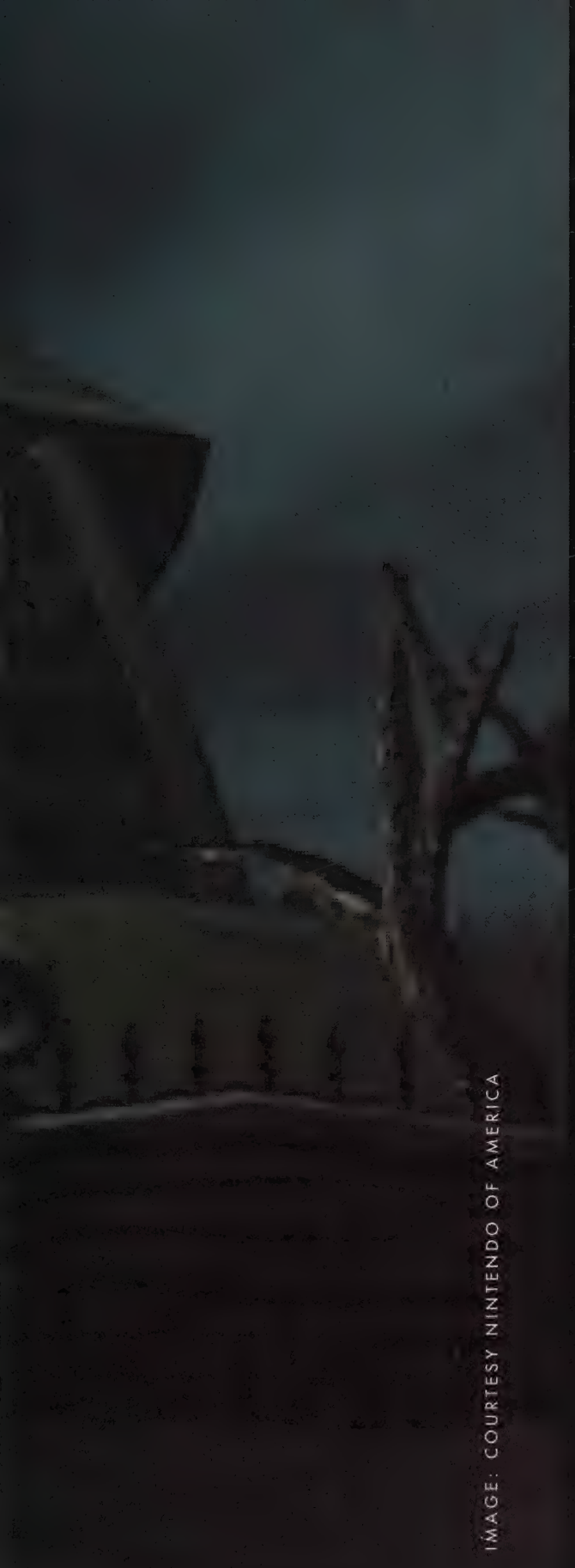


IMAGE: COURTESY NINTENDO OF AMERICA

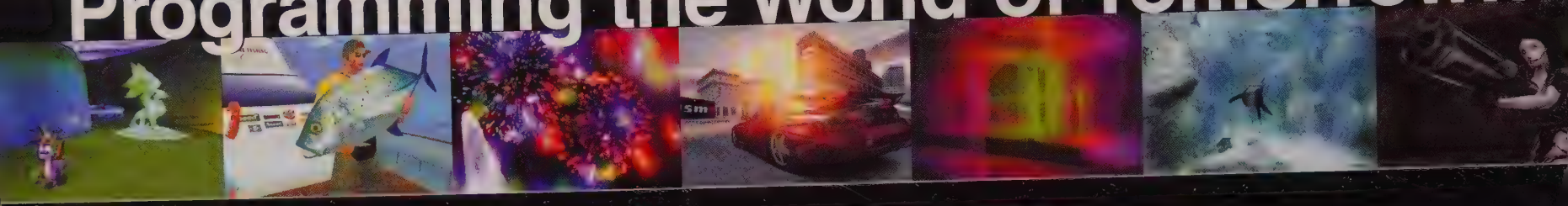
Tom Russo, editor-in-chief of *Next Generation* magazine: I'd like to think, as any gamer with a massive imagination will tell you, that we'll ultimately get to that "holodeck" experience – games will become the fiction of virtual reality. But how and when we get there is anyone's guess... ► **John Romero**, founder of Ion Storm and id Software: Really cool. ► **Minoru Arakawa**, founder of Nintendo of America: It's hard to say how much more in-depth games will become in the future. As videogame technology continues to improve, more of the game designer's imagination can be translated into the game, making the experience even more engrossing for game players. ► **Ed Logg**, programmer of *Asteroids* and *Gauntlet*: Bigger... prettier... more complex. I am afraid that each new generation of videogames just ups the bar. So it becomes necessary to spend more time, money, and people to get the job done. This means game development is expensive. And once it becomes too expensive we will experience the Hollywood syndrome – game development run by big companies with big marketing budgets – and it will be difficult for individuals or small teams to make a contribution. ► **Chris Stamper**, co-founder of Rareware and Ultimate Play the Game: I know that videogames will be technologically dazzling – it's our job to harness this technology and direct it towards the fun content of the games. ► **Warren Spector**, programmer of *Deus Ex*: I don't think anyone can say for sure what videogames will be like next week, let alone the future. It's tempting to say something quotable like "the holodeck will be a reality" or "the future is online games." But, while those are all nice soundbites – and I think all of them are possible, if not likely – each tells only a bit of the story. The fact is, there is no one Gaming Future, any more than there's a single literary or cinematic future. The future of gaming is limited only by the creativity of the men and women making games – which is to say that there are no limits. ► **Jerry Jessop**, manager of hardware engineering, Sony Computer Entertainment America: Of course better graphics, sound, maybe a more immersive interface – but the big change will be the online aspect in my opinion. As broadband becomes more available we will increasingly be playing games and socializing via the Internet on a vast scale. The next generation game consoles are going to bring the Net into the living room on a scale that the PC can't. As a result, the social aspects of gaming will be changing more than the games themselves for the first time. ► **John Davison**, editor-in-chief of *Electronic Gaming Monthly* and *Official U.S. PlayStation Magazine*: I would love to see videogames acknowledged as the art form they are, and hope that things will change so that opportunities will arise for more experimentation and wacky displays of creativity. Right now everything is very corporate and commercial which means that the vast majority of projects are a bit staid, and only the talented few are cranking out games that redefine the medium. It will be great to finally reach a point where the systems are so powerful that the technology itself becomes transparent. Then, a small independent group could focus on creating the future of interactive entertainment. Whether this will be something beamed into the backs of our eyeballs, experienced in a trance-like state, seen as a hologram, or projected on HDTV doesn't really matter – I just want to see the creative boundaries pushed to their limits. ► **Shigeru Miyamoto**, creator of *Donkey Kong*, *The Legend of Zelda*, and *Super Mario Bros.*: Honestly, I cannot tell. Something which I can explain in words is not going to be a very fun thing! But we are hopeful that the public will see a glimpse of the future in gaming with the Nintendo GameCube. Once, videogames were a new product which captured the public's imagination – now, it is just one of many forms of entertainment around us. Our mission is to make videogames which continue to capture the imagination of people throughout the world, by making them so attractive and advanced that they lead the trend. ► **Ralph H. Baer**, the Father of TV Games: Videogames of the future will be more and more lifelike – becoming interactive movies in many ways. Also, just as we started the industry with two-player games, online one-on-one games will become very popular when Net-based gaming becomes convenient, reliable, fast, and cheap. ► **Yoshiki Okamoto**, general manager of Capcom and creator of *Street Fighter II*: If I knew, I'd work on it before I'd tell anyone about it! But I can at least talk about my dream. I would like to see people play and communicate *through* the game, not *within* the game. An online videogame is a good example of this, but it shouldn't be the only solution. There will be more... ► **Craig Kanarick**, co-founder of Razorfish: No, the question is: In the future, what *won't* be like a videogame. ► **Chris Kantrowitz**, co-founder and chairman of The Groove Alliance: Click. Nothing is real. ■

station

IMAGE COURTESY ELECTRONIC ENTERTAINMENT EXPO

A view of the dynamic show floor at Electronic Entertainment Expo 2000, the primary annual event for the multi-billion dollar videogame industry.

Programming the World of Tomorrow...



Do you like videogames?

I awoke with my face pressed against the industrial grey carpeting of the United terminal. It smelled so new, so strong. My sunglasses were all askew and cutting into the bridge of my nose as Ryan sat there, staring, the way he often did.

"Can I borrow your Game Boy?" he asks.

Certainly this can wait. We were all waiting. Forever. I wish I had some gum. "Can I have some gum?" I inquire, handing him my atomic purple playground. I watch as he aligns the shapes just right, clearing four rows of brightly colored blinking blocks.

The dream I had was a combination of events really, I'm trying to recall at the moment...

<!-- CUT TO INTERIOR - MONTE CARLO - MORNING -->

I awoke with my face pressed against the slick synthetic surface of the quilted floral bedspread, which I neglected to turn down prior to passing out the night before. The boy is in my bathtub again, laughing hard, with his electric eyes, and his sexy stare, and his tousled hair as I close my eyes and drift back to sleep for just a few more solitary moments filled with magical gems, and bunnies, and thunderbolts, and golden amplifiers spinning slowly before the third inevitable call.

The telephone is ringing in my sleep again. Am I dreaming? "Hello?" Am I awake? Am I holding the phone? No, not yet. "Hello?" I say.

"Van!" he screams. Time to wake up. Time to get dressed. Time to go to the Valley of Fire. I stand up and walk out onto the balcony. The sun is shining bright through the morning haze, forcing me to squint my eyes to see. Unreal. Back inside, I glance around the room at the Cheetos and the PowerBook and the dolphin tank and the huge plastic cups overflowing with brightly colored monkeys. Yes.

This is definitely Las Vegas.

Downstairs, I walk across the gilded marble lobby to the glass doors that lead into the blinding heat of the parking lot. Everyone is here. Eating glazed donuts. Ryan is standing next to a massive yellow Hummer. Smiling. It is definitely the best thing in the lot. Yes, Ryan. Definitely that one. I want to ride in that.

We are driving fast through the desolate desert landscape as I lean out the open window. It is just so beautiful the way the air is swirling and the heat is radiating off every molecule in the most fantastic way. The deer tumble into the sky like black rubber rag dolls as we drive by. I look along the horizon up ahead and spot the thick red smoke pouring into the atmosphere from the top of a nearby mountain. I can already hear the sirens. "Quick, turn right!" I say. They know exactly where we are...

<!-- CUT TO INTERIOR - DM GOTHIC - NIGHT -->

"You fucking die!" I scream loud as I thoughtfully choose a weapon from my mind-bending arsenal of mortal devastation. Ripper. Rocket Launcher. BioRifle. Ooooh. Redeemer. Die, Carl.

I swiftly jump down from my tip top secret hideout, intent on a killing spree of epic proportions. With eighteen frags and counting, I slowly strafe out of the shadows of the texture-mapped arena to target my unsuspecting foe, mindlessly contemplating a pair of AntiGrav Boots down below. Fool. Soon I will be the winner.

Locked on target, I launch my full-metal assault of mobile thermonuclear war. Boom. The dull deadly flash is followed by a sudden jolt of feedback as I jump away to escape the fallout. Nineteen.

Everyone can see what's going on. But I know they don't understand. Not really...

<!-- CUT TO EXTERIOR - BEST BUY - DAWN -->

"I'll trade you my PS2 for your car!" Homeboy quips from his rag-tag campsite oasis, pressed up hard against the plate glass of the locked and chained main entrance to the Best Buy in Pinole. I step out of my silver Audi TT and smile. "If you throw in *GT3*, you've got yourself a deal..." I reply as I cross the glistening wet asphalt, laughing to myself. Everyone knows that *Gran Turismo* won't ship until Spring. "So what's the allocation?" I ask.

"Twelve," he says.

I raise a knowing eyebrow to see if I can force a confession.

"Trust me. Twelve," he repeats, unapologetically.

Judging from the sell-out crowd of *exactly* twelve hardcore game enthusiasts gathered around the doors, I know that the dude speaks the truth. As I scan the impressive display of plaid flannel shirts, sleeping bags, MiniDiscs, and Colt 45s glimmering in the eerie pre-dawn moonlight, I know there is no PlayStation 2 for me here. I pass a guy wearing a plastic PS2 rain poncho. "Hey, didn't I see you over at Metreon?" I ask. Perhaps tomorrow...

<!-- CUT TO INTERIOR - MANDALAY BAY - NIGHT -->

We are down on the floor now. Todd is here by my side, contemplating the field.

"Twenty-five on the horn," I say, tossing my last $25 smart chip down the brilliant expanse of pixellated computer-generated green felt. It lands perfectly at its destination. Very, very good.

"Twenty-five horn," the dealer says, as he firmly taps the chip, locking it in place. He then pushes six analog dice – carefully rolling them to and fro, aligning them just right – over to Todd, who is now waiting at the stainless steel hook, running his hands anxiously through his hair. I just love Las Vegas. This is the future.

IMAGE, TOP, LEFT TO RIGHT: *SPYRO THE DRAGON*; *SEGA MARINE FISHING*; FANTAVISION; *GRAN TURISMO 3*;

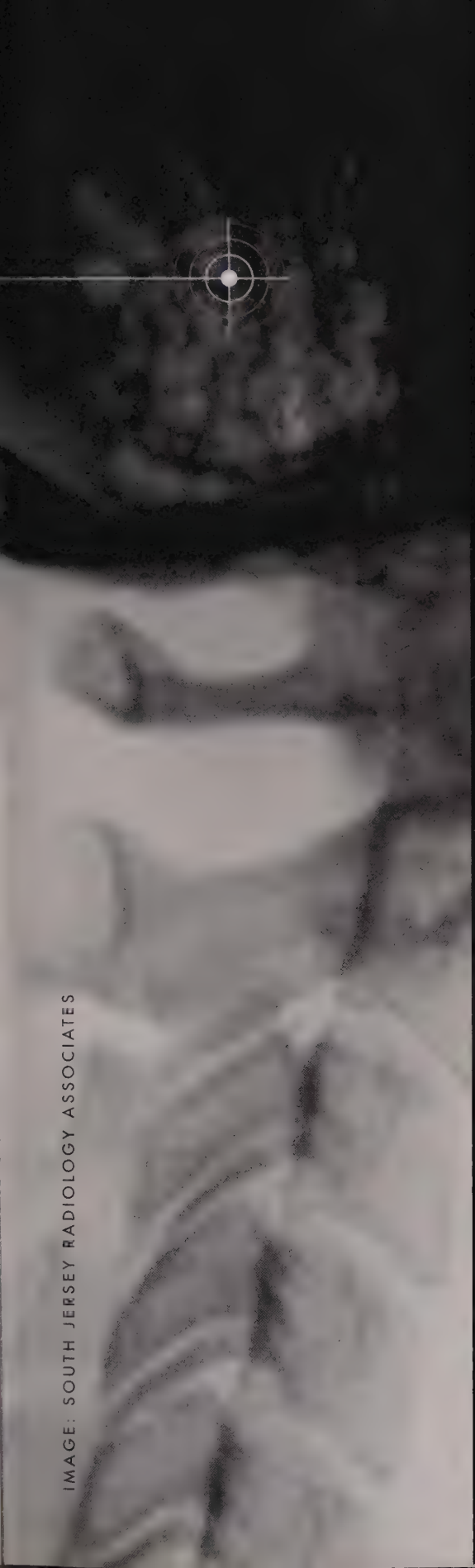


IMAGE: SOUTH JERSEY RADIOLOGY ASSOCIATES

We are all here again. Vegas, baby. Vegas. Todd looks serious as he selects the best two, pauses, shakes them, and suddenly tosses them down the playfield with a startling burst of kinetic energy. He is definitely a hot shooter. "Hard ten!" He screams as the ruby red cubes bounce around magically and eventually settle to the surface. Craps three. My chip lights up first blue, then green, then red, throwing off its brilliant points of light in a brilliant display. I am definitely the winner. A huge stack of brightly colored chips is loaded into my tray. I look over at Todd and smile. "So. Anyone up for some high-stakes *Slingo*?"

We are all up in the lounge now, watching a Carlos Santana wanna-be perform a stunning cover of the hit "Smooth" – except the guy from Matchbox 20 is a trio of holographic Elvis impersonators. "Let's go to Crazy Horse," I say, sipping a White Russian.

"I think we're supposed to meet the guys from Daily Radar over at Rum Jungle," says Suzie, industry PR flack and designated cruise director.

"Rum Jungle is depressing and there's no nudity," I say, hoping to sway the popular vote. "Besides, I have their coordinates – I'm confident they'd prefer lap dances to leopard spandex."

We are all piling into a white stretch limousine now, Todd and everyone. But as I step inside, I realize that this limo is unlike any I have ever seen before – a huge 50" Philips plasma screen sits where a wetbar ought to be. "Do you want to play the new *Metroid*?" Todd asks, handing me a limited edition Ice Blue wireless controller. So very cool. Onscreen, Samus appears in full armor from the shutter-like door, running down a dark, deep-space causeway as a swarm of metallic alien creatures relentlessly pursue her. Of course I want to play. I glance up through the moon roof as a galaxy of multi-colored stars explode into the night sky…

<!-- CUT TO EXTERIOR - UNKNOWN - NIGHT -->

I am there now. Running low across the tarmac. Alone. I am wearing a black leather jumpsuit with fantastic wearable data system. GPS. WAP. Agency Intranet. Satellite tracking. Mobile communicator. All perfectly coordinated. I am Agent X. Alarms sound in waves as I flee the towering metal and glass enemy headquarters, top secret documents firmly in hand. Two black helicopters track me from above as I make my stealth getaway through the flawlessly scripted route of escape...

function AI_enemyapproach()

<!-- CUT TO EXTERIOR - MAKUHARI CITY - DAY -->

The girl is in my head again, staring into space, with her electric armor, and her icy stare, and her long blonde hair. I'm late now. It was the Neo-Geo. I just love Akihabara. As I emerge from the high-speed Shinkansen the hazy summer heat of Tokyo pounds into me. Yes. I am definitely late.

"I fell in love with videogames because I believed in the future… But what do we do now that the future has arrived?"

I walk fast along the burning city streets, up to the overpass lined with tiny glimmering holoptic seashells, and down the vacant corridor that leads to the Pokémon center. Inside, giant Pokéballs are suspended from the ceiling, turning ever so slightly with each burst of air that invades the massive space. Beyond the ocean of people, a JumboTron looms large on the horizon, flashing to life. They are here now. Everybody. Waiting to see the future...

"Flight 2311, we will now begin boarding Zone 1."

It all comes rushing back.

Welcome to the evolution of the state-of-the-art multi-tasking, multi-dimensional, post-postmodern mind. A place where everything is possible. Click. In the best of all possible worlds.

I fell in love with videogames because I believed in the future – because I believed that one day we would be able to do everything, all at once, forever. But what do we do now that the future has arrived? I stare out the window, watching the perfect white cumulus clouds slowly scroll by. We've just leveled off at 35,000 feet – our optimal cruising altitude. Yes. It is only a matter of time. ■■■

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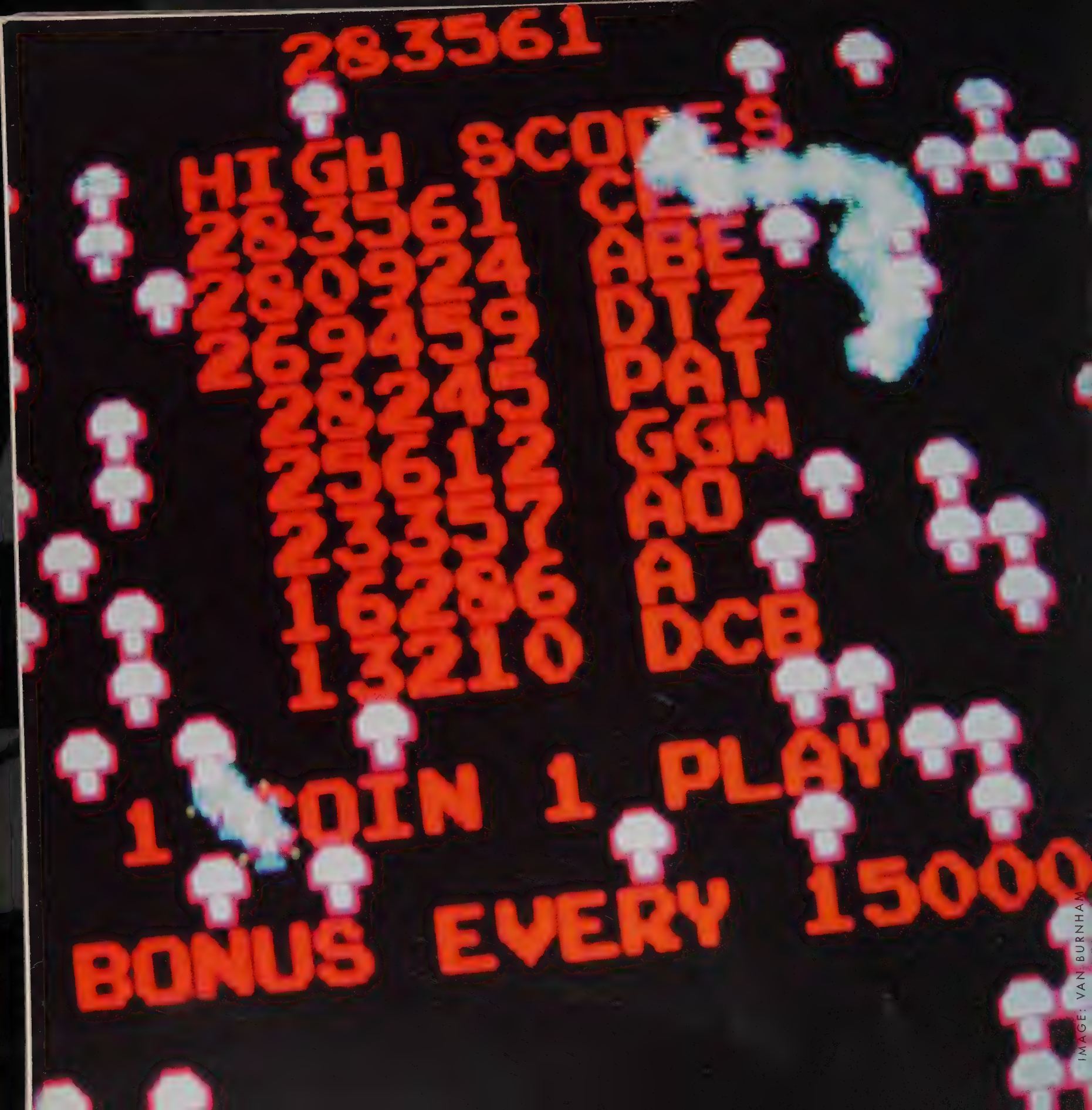

283561
HIGH SCORES
283561 CAB
280924 ABE
269459 DTZ
268245 PAT
256127 GGW
235757 AO
216286 A
213210 DCB
1 COIN 1 PLAY
BONUS EVERY 15000
IMAGE: VAN BURNHAM

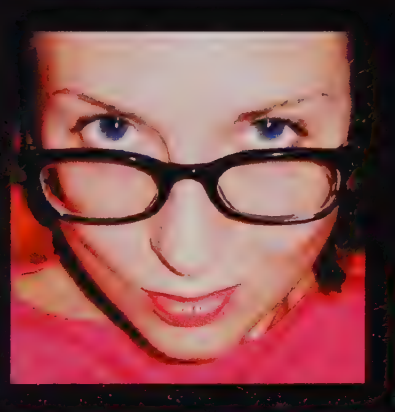
Timeline

(PAGES 61-63) SPECIAL THANKS TO APPLE COMPUTER, ATARI, RALPH BAER, THE BRONZE AGE ARCADE GAME ARCHIVE, NOLAN BUSHNELL, GREG CHANCE, DAMON CLAUSSEN, THE COMPUTER MUSEUM HISTORY CENTER, JASON EDWARDS, KEITH FEINSTEIN, ADAM FISHER, SHAUN GEGAN, LEONARD HERMAN, IBM, INTEL, STEVEN KENT, THE KLOV, RYAN LOCKHART, MICROSOFT, CHRIS MOORE, NAMCO, NINTENDO OF AMERICA, SEGA, TAITO, DONALD A. THOMAS, JR., CURT VENDEL, THE WALT DISNEY COMPANY, DAVID WINTER, AND WMS INDUSTRIES.

Collections Collage

(PAGES 406-407) IMAGE: 1. *GALAGA* TWINS AT PLAYLAND ARCADE, SANTA MONICA, CA; 2. *DONKEY KONG JUNIOR* MARQUEE; 3. *MARBLE MADNESS*, JOEY ANUFF, AND CARL STEADMAN; 4. *TANK 2* AND *BI-PLANE* AT CALIFORNIA EXTREME, COURTESY AL KOSSOW; 5. JOHN HARDIE AND PAC-MAN AT THE ELECTRONIC ENTERTAINMENT EXPO; 6. ELECTRONIC GAMES AT PHILLY CLASSIC; 7. PJ SODASKI TESTS THE PROTOTYPE OF *ESCAPE FROM SUPERCADE!* AT JACKIE GAUGHAN'S PLAZA HOTEL BEFORE CLASSIC GAMING EXPO; 8. CLINT DYER'S CLASSIC VIDEOGAME COLLECTIBLES AT CLASSIC GAMING EXPO; 9. *DONKEY KONG* ATTRACT SCREEN; 10. TAITO ARCADE GAMES AT CALIFORNIA EXTREME, COURTESY AL KOSSOW; 11. NATE MILLER; 12. VAN BURNHAM PLAYING *GALAGA* AT THE TOMORROWLAND ARCADE, DISNEYLAND; 13. ARCADE GAMES AT VIDEO GAME CONNECTIONS, HOWELL, NJ; 14. ROLOFF DE JEU AND MARCO KERSTENS AT CLASSIC GAMING EXPO, COURTESY DIGITAL PRESS; 15. SWAP MEET AT CLASSIC GAMING EXPO; 16. *COMPUTER SPACE*; 17. BEN HECKENDORN'S CUSTOM 'VCS-P' PORTABLE ATARI 2600 SYSTEM (WWW.CLASSICGAMING.COM/VCSP); 18. *MARBLE MADNESS* IN THE PATHFINDER; 19. *JOYSTICKS* SCREENING AT PHILLY CLASSIC; 20. BILL ESQUIVEL WITH *SPACE WAR*; 21. COLLECTION OF NATE MILLER; 22. TOPPS TRADING CARD; 23. *CENTIPEDE* AND *PAC-MAN* AT PLAYLAND ARCADE, SANTA MONICA, CA; 24. ATARI JACKET, FROM THE COLLECTION OF VAN BURNHAM; 25. ACTIVISION GAMES AT CLASSIC GAMING EXPO; 26. COLLECTION OF JEAN BAUDIN; 27. JULES URBACH PLAYING *SMURF: RESCUE FROM GARGAMEL'S CASTLE* FOR THE COLECOVISION; 28. COLLECTION OF VAN BURNHAM; 29. VAN BURNHAM PLAYING *GALAGA* AT PLAYLAND ARCADE, SANTA MONICA, CA; 30. DEATH RACE AT CALIFORNIA EXTREME, COURTESY MATT ROSSITER; 31. VINTAGE ATARI T-SHIRTS AT CLASSIC GAMING EXPO; 32. WILLIAMS ARCADE GAMES AT CALIFORNIA EXTREME, COURTESY AL KOSSOW

Author



Van Burnham is a videogame junkie. *Space Ace* and *Pac-Man*, Odyssey and the Atari – these were the games and systems that defined her youth and inspired a fascination with technology that led to a career in interactive entertainment.

Van is a founding member of Team Bravo, a developer of future-generation video and computer games.

As a member of the International Game Developers Association, the Academy of Interactive Arts and Sciences, the Video Arcade Preservation Society, and the International Academy of Digital Arts and Sciences, she is dedicated to the preservation and advancement of interactive entertainment.

In addition, the author is a contributing writer for *Wired* magazine and has contributed to *Gear*, *Official U.S. PlayStation Magazine*, and *Electric Playground online*.

Van lives in Los Angeles with an extensive collection of classic arcade and home videogame systems. She can kick your ass at *Galaga*.

Contributors

IMAGE: WARREN DAVIS BY JEFF LEE; JUSTIN HALL BY GREGORY ALKAITIS-CARAFELLI; LEONARD HERMAN BY MIKE ETLER; KEITA IIDA BY NAMCO

Ralph Baer is the Father of TV Games. As the inventor of the first videogame console – released by Magnavox in 1972 as the Odyssey – he holds nearly fifty patents, including the original TV Game patent. Ralph has also created the classic electronic games Simon, Kid Vid, Maniac, and Smarty Bear.

William Cassidy is the enigmatic lead editor of ClassicGaming.com (www.classicgaming.com). William also founded the Odyssey² Homepage! and co-authored the SerpentHead game series (www.serpenthead.com). He cannot be harmed by edged weapons.

Chris Charla is the elusive production manager of Digital Eclipse. Chris is also the former editor-in-chief of *Official Sega Dreamcast Magazine* and *Next Generation*, as well as a frequent contributor to *Wired* and Daily Radar (www.dailyradar.com).

Warren Davis was the lead designer of the popular arcade game *Q*bert*, released by Gottlieb in 1982, as well as the futuristic laserdisc game *Us Vs. Them*. At Williams, Warren also worked on *Joust 2*, *NARC*, and *Terminator 2*. He has since worked with Walt Disney Imagineering.

Julian Dibbell, author of *My Tiny Life: Crime and Passion in a Virtual World* (Henry Holt), writes a column for Feed (www.feedmag.com), and has contributed to *Rolling Stone*, *Time*, and *The Village Voice*. Julian has been writing about technology and culture since you were in cargo pants.

Joe Fielder (right) is the executive editor of Ziff Davis' videogames.com. Joe owns a slightly beat up *Wizard of Wor* arcade machine, which makes him often think back fondly to when he first looked up at the game in awe in the Elk Grove Bowl in 1981.

Lauren Fielder is an editor-at-large for Ziff Davis' videogames.com. Lauren is also a segment host for ZDTV's *Gamespot TV*, and is a contributor to *Electronic Gaming Monthly*. She is most proud of rollerskating out of a rink to play *Dig Dug* at the bowling alley across the street.

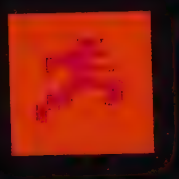
J.M. Graetz is a founding member of the Pinewoods Morris Men. He rides and writes about bicycles and trains. He is one of the Original Five Buffalo Boys, with whom he has hiked up mountains in New England, New York, and Colorado. He writes stuff for a living.

Justin Hall has been an electronic gamer since his mom got him an Apple][+ in 1981. After eighteen months as "Director of Innovation" at Gamers.com, Justin is writing and speaking, and publishing his life on his home page www.links.net.

Leonard Herman (right) has been playing videogames since 1972, but has yet to excel at them. Despite this handicap, he is the author of *Phoenix: The Fall & Rise of Videogames* and *ABC to the VCS* (www.rolentapress.com), as well as a contributor to *Electronic Gaming Monthly*.

Chris Hudak (gametheory@mindspring.com) is a religious pool player, marginal Japanese language student and writer for *Wired*, *Playboy*, Electric Playground and many less-likely venues (he is also the ill-fated protagonist of the Harlan Ellison short story *Keyboard*).

Keita Iida can often be spotted burrowing through the underworld of Japan in pursuit of Fygars and Pookas – his favorite delicacies. In between expeditions, Keita passes the time running Atari Gaming Headquarters (www.atarihq.com), working at VM Labs, and hanging out with his wife Kazuko.



Steven Johnson is the author of *Interface Culture: How New Technology Transforms the Way We Create and Communicate*, as well as a contributor to *I.D.* and *Wired*. Steven is also editor-in-chief of Feed (www.feedmag.com) and co-founder of Automatic Media.

Ryan Lockhart is a game designer for Seven Studios. In a previous life, he was an editor for *Electronic Gaming Monthly*, *Incite*, *Gamers' Republic*, and *Game Fan*, and author of numerous videogame strategy guides including *Ecco The Dolphin*. He currently lives in Santa Monica.

Steven L. Kent, author of *The First Quarter: A 25-Year History of Video Games*, plays too many videogames – and still isn't any good at them. Steven is also a columnist for MSNBC and *The L.A. Times*, as well as a frequent contributor to *Wired* and *Next Generation*.

Nick Montfort is the author of the interactive fictions *Winchester's Nightmare* (the first publication to include, in the "hardcover" edition, a functioning laptop), *The Ed Report*, and the forthcoming book, *Twisty Little Passages*. Nick is also a contributor to *Wired* and *Technology Review*.

Bob Parks, senior associate editor of *Wired* magazine, has chronicled the shopping habits at Fry's Electronics and the struggle of a man trying to pull off a flawed Internet scam. During one particularly depressing job at an Internet company, Parks developed a crippling *Stargate* addiction.

Mark Saltzman (gameguyis@home.com) is a freelance journalist and author of five books on the videogame industry including *Game Design: Secrets of the Sages* (McMillan). Marc stays warm in the Great White North by the loving glow of his computer spewing *EverQuest* gaming goodness.

Yoshimitsu Shinobi is a deadly ninja warrior. Raised in Kyoto, Japan by a band of rogue Imperial assassins, Yoshimitsu mastered the Shuriken before he mastered *Space Invaders*. Between stealth missions, Yoshimitsu writes for *Wired* and *Next Generation*.

Carl Steadman is a columnist for *The Industry Standard* and Feed (www.feedmag.com), a contributor to *Wired* and *The London Times*, and author of *NetMogul: The Step-By-Step Guide To Your Start-up Millions*. Carl is also responsible for Suck (www.suck.com).

Nick Sweeney still remembers the cheat code for *Manic Miner*, fifteen years on. (It's 6031769, if you were wondering.) Nick is a contributing editor for *The Industry Standard* and is presently pursuing his Ph.D. at Oxford University. He's English, and writes things.

Tom Vanderbilt is a contributing editor to *I.D.*, *Interiors*, and *The Baffler*. He is also author of *The Sneaker Book: An Antomy of an Industry and an Icon* (The New Press), and the forthcoming *Survival City: The Architecture of the Cold War* (Princeton Architectural Press).

Michael Wolf is the sultry Nintendo editor of Daily Radar (www.dailyradar.com), as well as a contributor to *Next Generation* and *PC Gamer*. He lives in San Francisco with his newlywed wife and an impressive collection of Pikachi plush dolls.

Todd Zuniga is funnier than you, though not the funniest man alive, nor funniest woman. He is merely, shall we say "a clambake of humor." Currently he's an associate editor of *Official U.S. PlayStation Magazine*, and also contributes to *EGM*, *Expert Gamer*, and OpiumMagazine.com.

IMAGE: MARC SALTZMAN BY VAN BURNHAM; YOSHIMITSU SHINOBI BY SEGA; CARL STEADMAN

Hardware

Supercade was designed and produced on Apple Power Macintosh G4/450, PowerBook G3/500, 8500/150 PowerPC, Macintosh SE, and Power Computing Power Tower Pro 225 computers running Mac OS 7.5-8.6. Data was stored on VST, LaCie, and Iomega Jaz and Zip drives. Images scanned on Agfa Duoscan T1200 and T2000 XL scanners with FotoLook 3.05. Digital images shot with a Fuji MX-700, Sony DSC-P1, and Game Boy Camera.

Software

Communications: AOL 5.0, Eudora Pro 4.0.2, Fetch 3.0.3, ICQ 1.7.2, Internet Explorer 4.5, Netscape Navigator 4.5.
Design: QuarkXPress 4.04.
Emulation: Adventure 1.0, Atari 800 1.04d1, Bleem! 1.4, Catakig 1.15, Cinemu 1.1, ColEm 1.0.1, Connectix Virtual Game Station 1.1, D Gen 1.1.7, *Dragon's Lair* DVD-ROM, HanaHo ArcadePC, *Intellivision Lives!*, MacMAME 0.37b13 and MAME 0.37b4, MacMESS 0.37b6, MacUAE 0.8.6, MacV9T9 0.2a1, MasterGear 1.3, O2EM, Power64 2.8.1, Power20 1.4, Power Spectrum 1.0, Rainbow 1.4, Sim6502 0.1d, *Space Ace* DVD-ROM, Stella 1.1.1 VCS, TRS-80 1.6, V7800, Vectorama 1.0.2, VIC-20 0.6a, Virtual Gameboy 1.7.
Images: Adobe Illustrator 8.0, Adobe Photoshop 5.5.
Mapping and Tracking: Microsoft Excel 98.
Motion Capture: OS 8.6, QuickTime 4.1, Adobe Premiere 5.0.
Wordprocessing: Microsoft Word 98.

Typography

Supercade cover title set in L.C.D., designed by Alan Birch (ITC, 1981), and digitally enhanced in Photoshop. Titles, captions, and body type set in Helvetica, designed by Max Miedinger (Haas, 1957). Image credits set in Futura, designed by Paul Renner (Bauer, 1927). Timeline display type set in Data 70, designed by Bob Newman (ITC, 1970). Dingbats by FontShop. The Joystick and Supercade fonts were custom designed by Van Burnham exclusively for *Supercade*.

Printing

Quebecor, USA.

This book was made possible by:

Diet Coke; *Puzzle Bobble*; double lattés; *Mario Party Naked*; Sausage McMuffins; *Soul Calibur*; KFC; Coconut Jelly Bellys; jetlag; Broadcast, *Work and Non Work*; Ebay; Happy Donuts; *Conker's Bad Fur Day*; Various Artists, *Rock On 1981*; Tang; Gil; *Super Smash Bros.*; Raspberry Royale; *Ferris Bueller's Day Off*; pseudoephedrine; *Chu-Chu Rocket*; Mr. Flash; *Shanghai*; T1; Pulp, *This Is Hardcore*; Crazy Girls; Foreigner, *Foreigner 4*; M-44; Various Artists, *Bootyz In Motion*; *Unreal Tournament*; Kozmo.com (RIP); *Fantavision*; Van Halen, *Van Halen*; Score; *Sega Marine Fishing*; Wham, *Fantastic*; C.C. Lemon; pandas; *Fast Times At Ridgemont High*; Space Lab Yellow; *Space Ace*; ACE; *Blix*; dexadrine; *Hydro Thunder*; Power Bars; *Miami Vice*; Beck, *Midnight Vultures*; Veuve Clicquot; *On The Floor At The Boutique*, mixed by Fatboy Slim; Nokia 8890; Home, Sydney; E3; *No One Lives Forever*; Mel's Drive-In; *SSX*; $C_8H_{22}O_{11}$; *Tron*; Aldo Nova, *Aldo Nova*; The Standard; *Buckaroo Banzai*; panic; Ultron 14; Doonesbury Sorbet; *Donkey Kong*; The Beastie Boys, *Beastie Boys Anthology: The Sounds of Science*; Las Vegas.

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Supercade : a visual history of the videogame age, 1971-1984

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Supercade

a visual history of the videogame age **1971–1984**

van burnham

www.supercade.com

It was a time when technology was king, status was determined by your high score, and videogames were blitzing the world. . . . From *Pong* to *Pac-Man*, *Asteroids* to *Zaxxon*—more than fifty million people around the world came of age within the electronic flux of videogames, their subconscious forever etched with images projected from arcade and home videogame systems.

From the first interactive blips of electronic light at Brookhaven National Labs and the creation of *Spacewar!* at the Massachusetts Institute of Technology; to the invention of the TV Game Project and the myriad systems of Magnavox, Atari, Coleco, and Mattel that followed; through the rise of the Golden Age of videogames and forward into the imagination of millions, *Supercade* is the first book to illustrate and document the history, legacy, and visual language of the videogame phenomenon.

Exuberantly written and illustrated in full color, *Supercade* pays tribute to the technology, games, and visionaries of one of the most influential periods in the history of computer science—one that profoundly shaped the modern technological landscape and helped change the way people view entertainment.

Supercade includes contributions from such commentators and participants as Ralph Baer, Julian Dibbell, Keith Feinstein, Joe Fielder, Lauren Fielder, Justin Hall, Leonard Herman, Steven Johnson, Steven Kent, Nick Montfort, Bob Parks, Carl Steadman, and Tom Vanderbilt.

Van Burnham is a videogame junkie. *Space Ace* and *Pac-Man*, Odyssey and the Atari—these were the games and systems that defined her youth and inspired a fascination with technology that led to a career in interactive entertainment. She is a contributing writer for *Wired* magazine and has contributed to *Gear*, *Official U.S. PlayStation Magazine*, and *Electric Playground Online*. In addition, she is a founding member of Team Bravo, a developer of future-generation video and computer games.

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Van lives in Los Angeles with an extensive collection of classic arcade and home videogame systems. She can kick your ass at *Galaga*.

"It's impossible to praise this book too highly. Burnham collates all the scattered data relating to the genesis of videogaming—both home and arcade—into a fascinating story, then assembles a bounty of enticing images—the people, the screenshots, the packaging, the arcade machines themselves—to accompany her lively text."—Paul Di Filippo, *Asimov's*

"With her book *Supercade*, Burnham's done a splendid job of recreating the cathode-lit dens and arcades of our youth; she reminds us why we'll never regret frittering away our allowance a quarter at a time."—Bill Smith, *LA Weekly*

"In this dour era, when it can seem as though computing and communications have been subsumed into some vastly instrumental, global, and, above all, functional whole, this book celebrates all those software systems, programmers, and machines that arose from nothing more than the desire to create the perfect game."—Fin Fahey, *New Scientist*

"Between the glossy screen shots and retro gear . . . *Supercade* makes a crucial point: Not only did the 'golden age' of video games kick-start an entertainment industry that now rivals Hollywood, it got millions hooked on the interactive screen opening the domicile to digital circuitry and helping transform the computer from a number cruncher into an image machine of major cultural import."—Erik Davis, *Bookforum*

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