OLD!

PC | SONY | SEGA | NINTENDO | SINCLAIR | SNK | ATARI | COMMODORE | COIN-OP | MOBILE

retro GAMER

164 PAGES OF ICONIC GAMES

ANNUAL

Digital Edition

FUTURE

VOLUME 5

WELCOME TO

retro GAMER ANNUAL

Nostalgia is a powerful tool. It can make us remember a specific point in time, or get us feeling all misty-eyed about a particular film or TV show we cared about. As fans of classic games we always find ourselves looking back to the past, but reminiscing isn't all we like doing on **Retro Gamer** and we go out of our way to share fascinating stories about the fantastic games and hardware you grew up with in your youth. With that in mind we've trawled through the last 13 issues of your favourite magazine in order to deliver the finest content in one easy-to-read tome. So put your feet up, grab a cup of tea and a couple of biscuits and enjoy some behind-the-scenes chit-chat as we revisit some of the greatest games and systems of all time.

Future PLC Richmond House, 33 Richmond Hill,
Bournemouth, Dorset, BH2 6EZ

Editorial
Editor **Darran Jones**
Designer **Emma Birch**
Editorial Director **Jon White**
Senior Art Editor **Andy Downes**

All copyrights and trademarks are recognised and respected

Advertising
Media packs are available on request
Commercial Director **Clare Dove**
clare.dove@futurenet.com

International
International Licensing Director **Matt Ellis**
matt.ellis@futurenet.com

Circulation
Head of Newstrade **Tim Mathers**

Production
Head of Production **Mark Constance**
Production Project Manager **Clare Scott**
Advertising Production Manager **Joanne Crosby**
Digital Editions Controller **Jason Hudson**
Production Managers **Keely Miller, Nola Cokely,**
Vivienne Calvert, Fran Twentyman

Management
Chief Content Officer **Aaron Asadi**
Commercial Finance Director **Dan Jotcham**
Head of Art & Design **Greg Whitaker**

Printed by William Gibbons, 26 Planetary Road,
Willenhall, West Midlands, WV13 3XT

Distributed by Marketforce, 5 Churchill Place, Canary Wharf, London, E14 5HU
www.marketforce.co.uk Tel: 0203 787 9001

Retro Gamer Annual Volume Five
© 2018 Future Publishing Limited

We are committed to only using magazine paper which is derived from responsibly managed, certified forestry and chlorine-free manufacture. The paper in this magazine was sourced and produced from sustainable managed forests, conforming to strict environmental and socioeconomic standards. The manufacturing paper mill holds full FSC (Forest Stewardship Council) certification and accreditation

All contents © 2018 Future Publishing Limited or published under licence. All rights reserved. No part of this magazine may be used, stored, transmitted or reproduced in any way without the prior written permission of the publisher. Future Publishing Limited (company number 2008885) is registered in England and Wales. Registered office: Quay House, The Ambury, Bath BA1 1UA. All information contained in this publication is for information only and is, as far as we are aware, correct at the time of going to press. Future cannot accept any responsibility for errors or inaccuracies in such information. You are advised to contact manufacturers and retailers directly with regard to the price of products/services referred to in this publication. Apps and websites mentioned in this publication are not under our control. We are not responsible for their contents or any other changes or updates to them. This magazine is fully independent and not affiliated in any way with the companies mentioned herein.

Future plc is a public company quoted on the London Stock Exchange (symbol: FUTR)
www.futureplc.com

Chief executive **Zillah Byng-Thorne**
Non-executive chairman **Richard Huntingford**
Chief financial officer **Penny Ladkin-Brand**

Tel +44 (0)1225 442 244

Part of the

retro* GAMER

bookazine series

retro GAMER ANNUAL

THE ULTIMATE GUIDE TO CLASSIC VIDEOGAMING

CONTENTS

8 **THE IMPACT OF SPACE INVADERS**
Tomohiro Nishikado and gaming historians celebrate 40 years ofTaito's influential arcade hit

16 **THE MAKING OF PAC-MAN**
Tod Frye on recreating the classic Namco arcade game for the humble Atari 2600

22 **THE COLLECTOR'S GUIDE TO ULTIMATE PLAY THE GAME**
Everything you need to know about collecting for the prestigious developer

26 **THE HISTORY OF TETRIS**
Alexey Pajitnov and Henk Rogers look at the evolution of the hit puzzle game

36 **THE HISTORY OF AMSTRAD**
Roland Perry and Lord Sugar on the highs and lows of their popular home computers

44 **ULTIMATE GUIDE: LASER SQUAD**
Julian Gollop looks back at his astonishing 8-bit strategy masterpiece

50 **THE MAKING OF SAVAGE**
Nick Bruty goes behind the scenes of Probe's epic multi-load arcade blaster

54 **STREET FIGHTER: BLOW BY BLOW**
Capcom's finest discuss the impact of the company's groundbreaking one-on-one fighter

68 **THE SOUND OF THE AMIGA**
Key figures from the Amiga music scene on why the 16-bit computer sounded so good

74 **INSIDE THE MEGA DRIVE**
Rieko Kodama and other developers reveal what made Sega's console sing

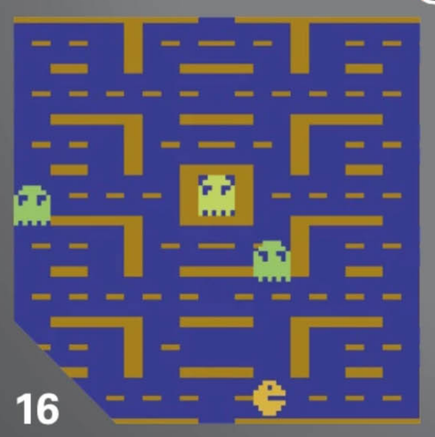
84 **ULTIMATE GUIDE: ANOTHER WORLD**
Your essential guide to Eric Chahi's cinematic adventure game

90 **THE MAKING OF CONTRA III & CONTRA: HARD CORPS**
Nobuya Nakazato on how his run-and-guns pushed 16-bit consoles to their limits

98 **THE MAKING OF SONIC THE HEDGEHOG 2**
Discover how Sega created its astonishing sequel to its smash-hit platformer

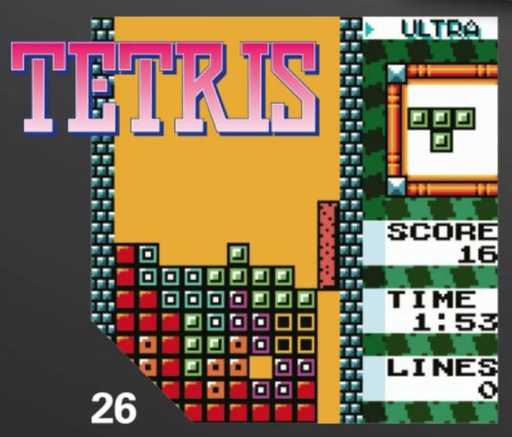
108 **ULTIMATE GUIDE: THE CHAOS ENGINE**
Everything you need to know about The Bitmap Brothers' supercharged run-and-gun

8



16

22



26

116 THE MAKING OF DAYTONA USA

Toshihiro Nagoshi and the rest of his team on reinventing the arcade racer

126 GOLDENEYE 007: THE DECLASSIFIED REPORT

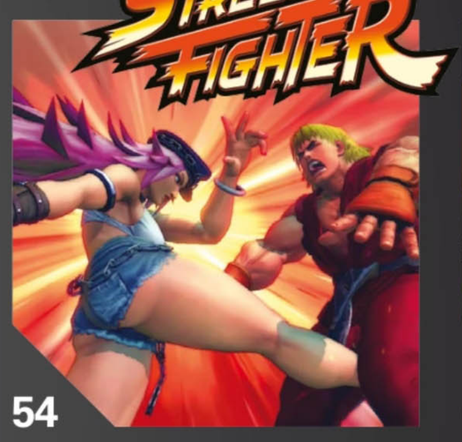
We've rounded up all of Rare's agents for the ultimate debrief on the N64 mega smash

140 THE MAKING OF SUPER MARIO SUNSHINE

Yoshiaki Koizumi looks back at Nintendo's adventurous open world platformer

150 INSIDE THE XBOX

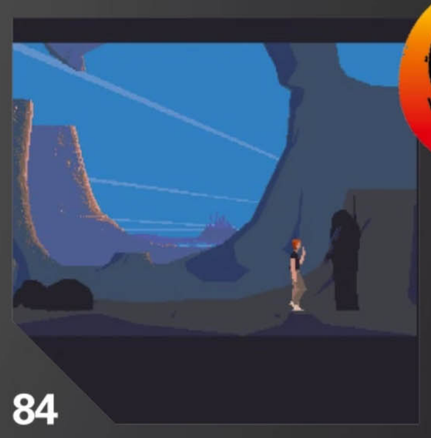
Seamus Blackley and Ed Fries explain how they beat the odds to deliver Microsoft's killer console



54

68

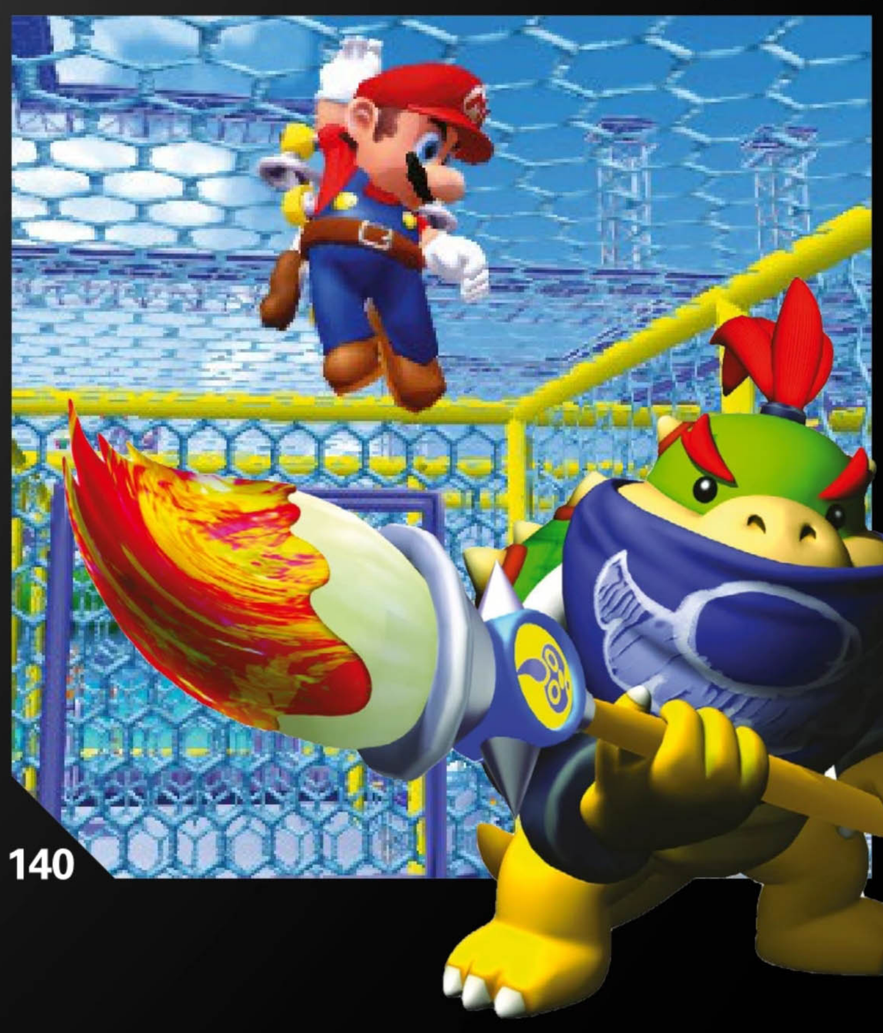
74

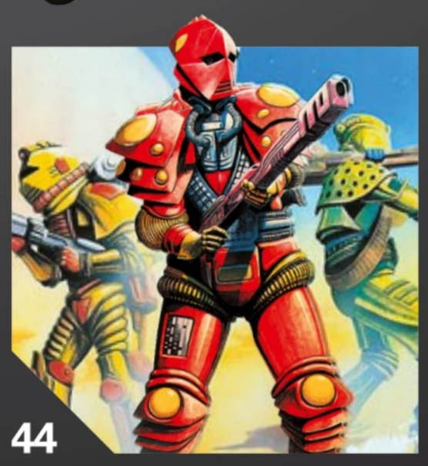

84

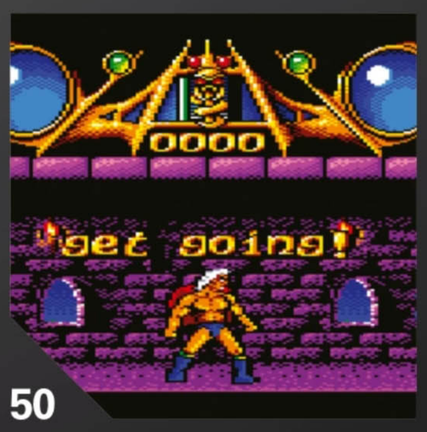
90

98

108


140


44



50

116

THE IMPACT OF SPACE INVADERS

THEY DIDN'T COME FROM OUTER SPACE BUT A COLLECTION OF ALIENS MADE JUST AS BIG AN IMPACT HERE ON EARTH. AS DAVID CROOKES DISCOVERS. CREATOR TOMOHIRO NISHIKADO JOINS A HOST OF DEVELOPERS AND CULTURAL ARTISTS IN DISCUSSING THE WIDE-RANGING EFFECTS OF SPACE INVADERS

Throughout the best part of the Seventies, game developer Tomohiro Nishikado looked towards America with aspiration in his eyes. In turn, the US peered back at Japan with a dollop of suspicion.

But that was symptomatic of the state of these nations during that period — a decade in which post-war America, in line with much of the western world, suffered economic stagnation while the far east enjoyed rapid growth.

Nishikado was a talented young developer, an engineering graduate who had been employed by the Japanese vending machine manufacturer Taito since 1969. He'd had reasonable success with a variety of games, starting with the *Pong* clone *Elephong* in 1972, followed by *Davis Cup* and *Soccer* in 1973, again inspired by the classic game from Atari.

TIMELINE

Charting 40 years of repelling invaders

Space Invaders released in the arcades

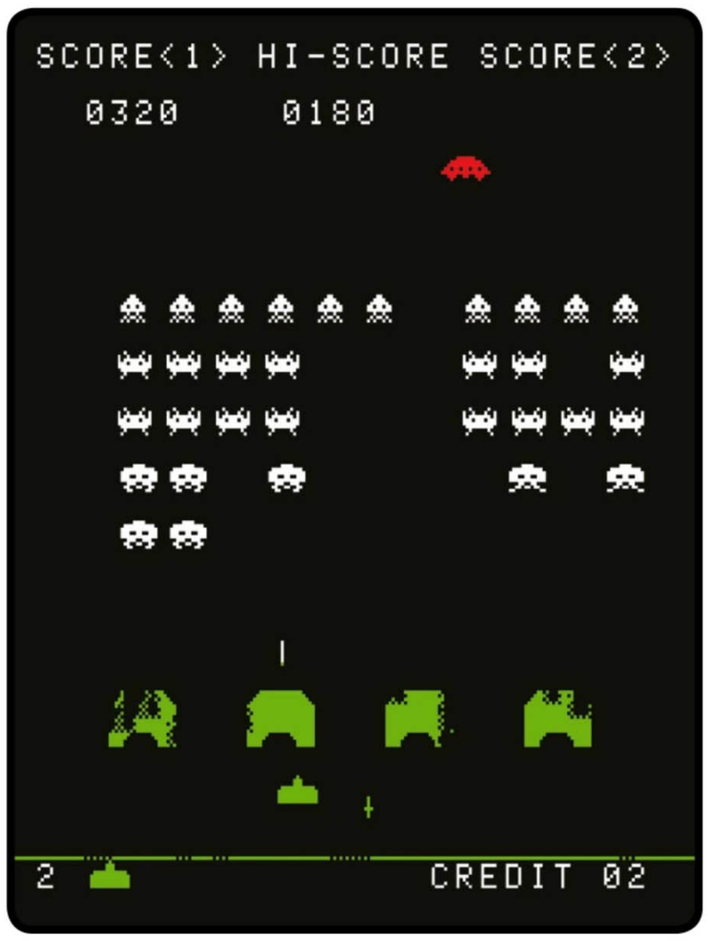
1978

Yellow Magic Orchestra samples *Space Invaders* sounds in the single *Computer Game*

Gamers could pop their name on the high score table in *Space Invaders Deluxe*

1979

A cocktail table follow-up, *Space Invaders II*, appears



» The game mirrored your own anxiety: the more successful and palm-sweaty you were, the faster it became.

The titles he worked on would show great promise and innovation. *Speed Race* in 1974 had scrolling graphics, a racing wheel controller and a choice of beginner or advanced play; *Western Gun*, or *Gun Fight* in the US, was the first to bring human-against-human violence to videogames the following year.

Yet at that time America was dominating the videogame industry. Atari in particular had seized the market and it was leading in arcades – and homes, too, thanks to the launch of the 2600 console. Nishikado became hooked on Atari's *Breakout* and the more he played, the more determined he became to better it.

"My goal at that time was to catch up with the United States," he tells us. But in that aim, he was not alone. For throughout the Seventies (and going into the Eighties), Japan had been snapping at the heels of key American businesses, most notably the automobile industry. American manufacturing had been in decline and power was swinging.

As such, there was rising discrimination and an increase in what has been dubbed 'Japanophobia' – a revival of anti-Japanese sentiment that predated the Second World War. "There was this interesting tension as the rise and strength of the Japanese economy really made an impression on the US national identity as the great country of innovators and inventors," says the academic game designer professor Lindsay Grace.

» Tomohiro Nishikado is the creator of *Space Invaders*.

With that in mind, Nishikado's next game, *Space Invaders*, would face multiple battles. Alien invasions aside, it had to fight against a fear of Japanese influence on American culture. And, there were worries the game was proving too distracting for children.

On the issue of Japanophia, however, Lindsay contends *Space Invaders* "gave more fodder or proof for not being afraid". Indeed, it opened up gaming and its huge potential right across the world. "It's hard to know what would have happened to gaming without *Space Invaders*," says Mark Cutmore, head of commercial enterprises at the Science Museum Group.

Space Invaders landed with impeccable timing. "Videogames were in the ascendent, a new form of entertainment with untold promise," explains Iain Simons, director of culture at the British Games Institute. As such, it was a time of great experimentation, of pushing the available tech and creating new genres.

To that end, Nishikado began work on *Space Invaders* in 1977 and he created a microcomputer from scratch to do so. It was the first Japanese game to use microprocessors and it became the most advanced arcade game available. Built around Intel's 8080 8-bit processor rather than using discrete logic chips, it made for a better performance.

Perhaps more importantly, *Space Invaders* also anchored itself to the predominant themes of mainstream culture at the time. "This era was the dawn of the space age – both in reality with the Apollo moon landings, the launch of the space shuttle, communications and spy satellites, interplanetary probes, and with science fiction such as *Star Wars*, *Star Trek*, *Dune* and *Aliens*," says Eugene Jarvis, who went on to produce his own sci-fi shooter, *Defender*, in 1981. ▶

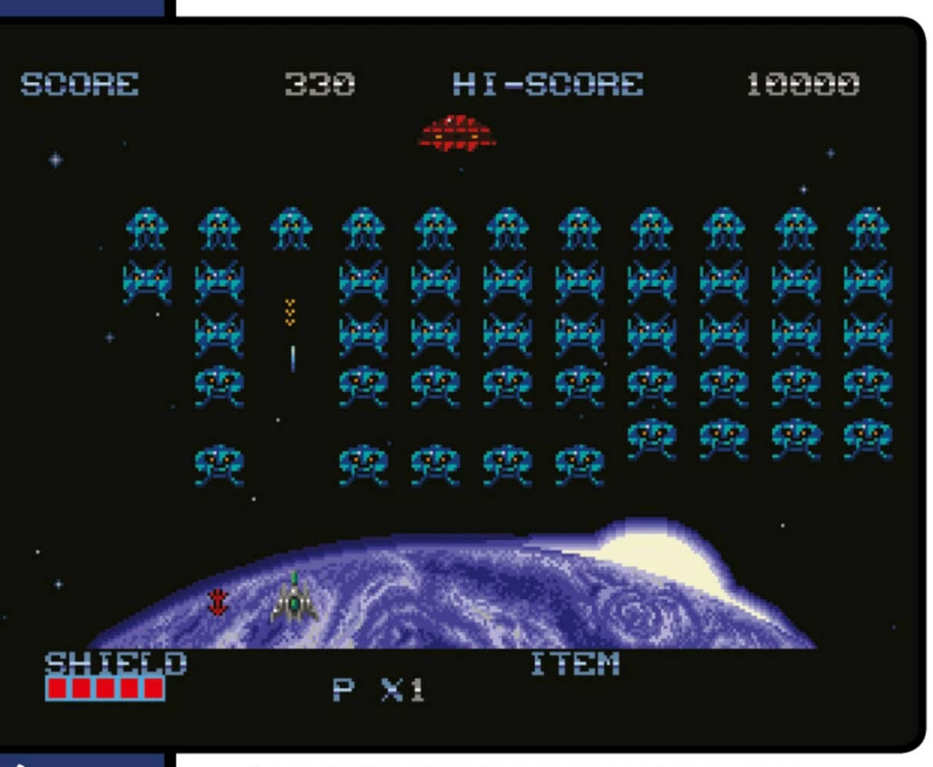
» You'd be seeing red if you played *Space Invaders* on the Virtual Boy but that was entirely down to the screen.

1979

- *Super Invader* becomes an early clone
- Funny Stuff releases the song *Disco Space Invaders*

1980

- The Pretenders release the hit song *Space Invader*
- *Space Invaders* lands on the Atari 2600
- 10,000 players compete in the National *Space Invaders* Superbowl run by Atari
- Bally Midway releases a pinball version



» A rather faithful rendition of the original game, *Space Invader 90* nevertheless had enhanced sound and graphics.

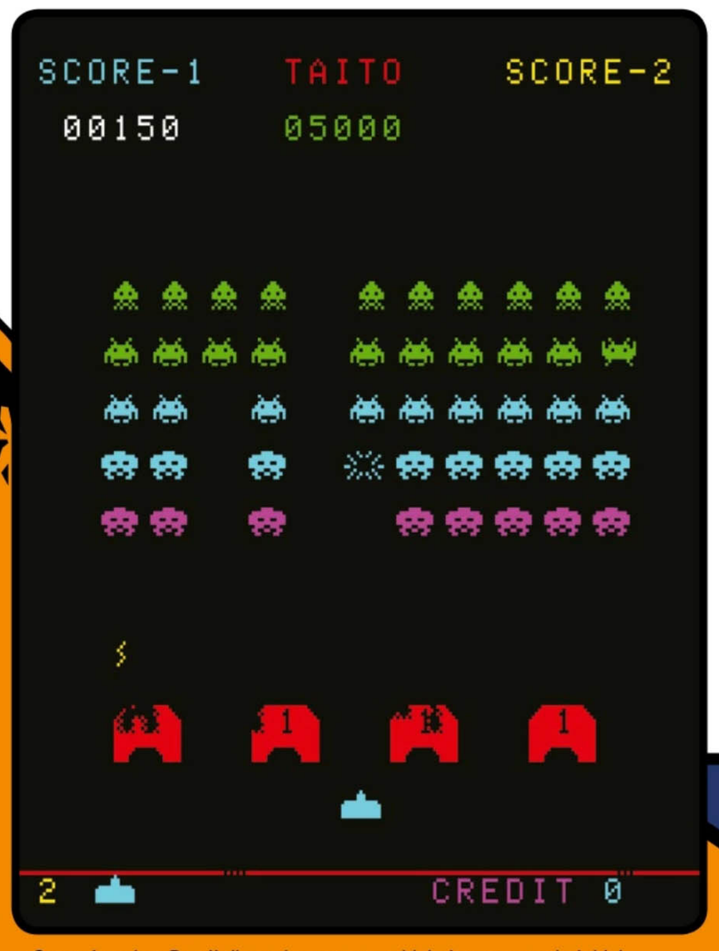
» *Space Invaders* is such a simple, casual game that it works perfectly well on smaller screens.

"IT HERALDED A NEW ERA OF ENTERTAINMENT IN JAPAN"

Tomohiro Nishikado

▶ It wasn't always going to be that way. Initially, Nishikado considered aeroplanes as the enemy, but he switched to humans for technical reasons. Taito wasn't happy and felt it would be too immoral to have gamers blasting away at people so Nishikado chose to set the game in space instead. It was, he tells us, "a convenient theme for videogames unlike sports that are bound by specific rules". He chose well, as history demonstrates.

"*Star Wars* had just captured the imagination of the entire world, not just as a movie, but as a universe," Iain continues. "We didn't just buy a ticket to watch the film, we bought the action figures and the lunchbox to take our sandwiches to school in. *Space Invaders* arrived at the peak of that first wave of a new, popular science fiction explosion. It was a new, aspirational technology that shackled itself to the moment."



» *Space Invaders Part II* allowed gamers to add their names to their high scores, making for a more competitive, social experience.

Even so, *Space Invaders* still had to be attractive in itself and that was always at the forefront of Nishikado's mind. It meant that when *Space Invaders* was released in the arcades in Japan in 1978, its impact was immediate, with some pachinko parlours and bowling alleys soon rebranding themselves as *Space Invaders* arcades, filled to the brim with coin-op machines.

"I was surprised by media reports saying that pachinko parlours – a leading industry in Japanese entertainment at that time – were being invaded by the game," Nishikado says. He was also astonished to read that the game was causing a shortage of 100 yen coins.

"It is true that newspapers reported *Space Invaders* caused the shortage of 100 yen coins and, consequently, Nippon Ginko's increased production of 100 yen coins, but I didn't feel that much at the beginning of the boom," Nishikado explains. "One day, I happened to see the tyre of a truck weighed down by a load of collected 100 yen coins in the car park at Taito's headquarters. This surprised me and I realised that *Space Invaders* had become a phenomenon."

Although many a gaming expert have since dispelled the yen shortage as fake news, *Space Invaders*' popularity was very much true. But even though it was eating up cash, there were fears in Japan that the game was leading to delinquency and children playing truant.

"It was an unanticipated fad for the amusement industry and so rules or regulations were not able to catch up with that instant phenomenon," Nishikado says. "But if I, as a games creator was to look back in a positive way, I'd say it heralded a new era of entertainment in Japan."

There is no denying that. When Nishikado visited the Amusement and Music Operators Association show in 1978 when the game was introduced, he was astounded. "I saw a lot of people waiting in the queue in front of the *Space Invaders* cabinet and, at that moment, I felt that our games might be overtaking the videogame giant." The US had competition.

» Mark Cutmore works at the Science Museum Group.

It was 1981 and a number of parents in the affluent village of Irvington in the state of New York were waging a war of sorts against their children. They were incensed at the plethora of coin-op machines which had been invading their space for a few years and they'd manage to convince the authorities to do something about them.

The proposal was dramatic and involved banning anyone under the age of 17 from playing. It also sought to impose a $100 licensing fee for machines and restrict the number that any single establishment could have to two. "I hear they're addictive," said mayor Reginald F Marra, as the village prepared to vote on the issue.

Marra was against the age limit, but he sympathised with the concerns. Just as in Japan, the games were eating up pocket money and while that was good news for the owners, they were being blamed for kids going without lunch or arriving late at school.

The coin-op had been brought to America by Midway and it had quickly appeared in cafes and pizza parlours in cities across the US. But although arcade machines had been making in-roads into American culture for the best part of ten years, they had not attracted quite the same level of attention as the Japanese newcomer.

"I found a *Pong* machine in a landromat in Kent, Ohio, in 1975 and I decided that I preferred spending my quarters on drying clothes," scorns games developer Matt Householder, who went on to develop M*oon Patrol*, for the ColecoVision. "*Space Invaders* was the first videogame (coin-op or otherwise) that I found was truly fun to play." He wasn't alone.

"Suddenly videogames had some character," Iain says. "Sure, they were two dimensional and rudimentarily animated but the aliens in *Space Invaders* had enough character to make themselves feel like characters. *Pong* was an astonishing achievement, but it didn't provide videogames with a figurehead. *Space Invaders*' marauding, oceanic aliens delivered such a powerful character design that they're still used to symbolise videogames to this day."

As it proved, 1978 was a turning point both for the videogame industry and the growing backlash against it. The

1982 – Acclaimed author Martin Amis writes *Invasion Of The Space Invaders*

1983 – *Space Invaders* grosses $2 billion

1985 – *Pepsi Invaders* is commissioned by Coca-Cola

1987 – *Return Of The Invaders* is released

1987 – Taito releases the game on the NES in Japan

1987 – KP Snacks sells Space Raiders crisps

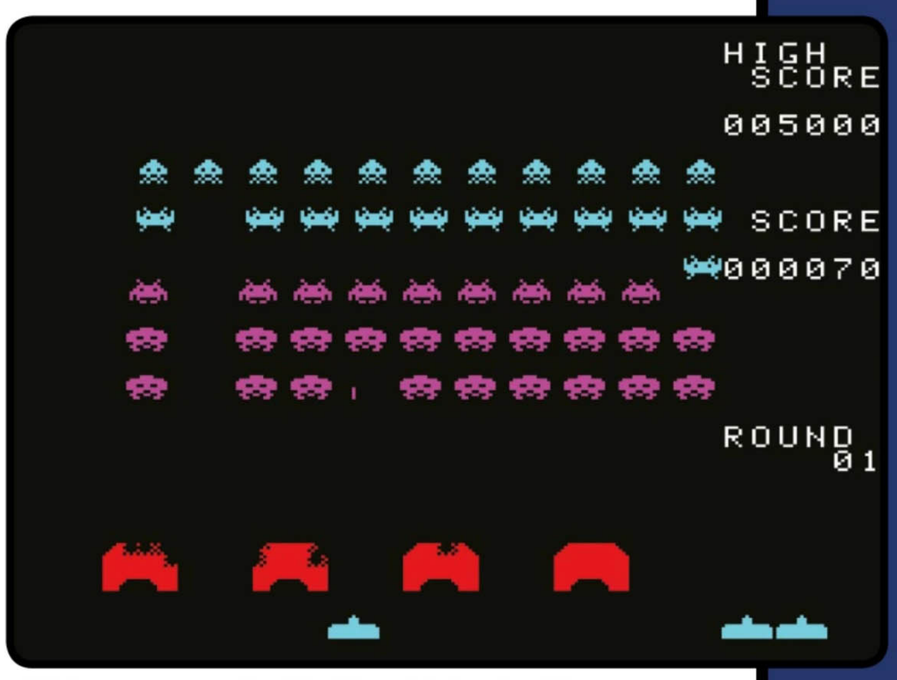
same happened in the UK, the rest of Europe and other markets around the world. One of the main problems was that *Space Invaders* was so attractive and addictive, although some people found other, more bizarre reasons to outlaw this particular invasion.

» Iain Simons works at the British Games Institute.

In *Japanamerica: How Japanese Pop Culture Had Invaded the US*, author Roland Kelts writes of *Pac-Man* creator Toru Iwatani's "bafflement when discussing the banning of Space Invaders in several southern states in the Eighties – allegedly because aliens are not in the Bible, and because of the game's violence towards them". Unlucky for them, *Space Invaders*' success only led to more shooters. In the Eighties, Japanese arcades were dominated by them.

"As the most popular game of the era, *Space Invaders* became the target of fear but the cause was that people didn't understand the emerging trend for gaming or recognise the positive aspects of it," argues Mark. "The same fears had been levelled at television in its early days and at new genres of music like punk and hip-hop."

As it happens, the proposed ban on children in Irvington was thrown out and the planned restrictions on cabinet numbers were loosened to three machines per establishment. Yet arcade games – *Space Invaders* in particular – continued to attract as much negative attention as it did positive. In 1981, George Foulkes, Labour MP for South Ayrshire in Scotland tried to push the Control of Space Invaders and Other Electronic Games bill through the UK parliament. ▶



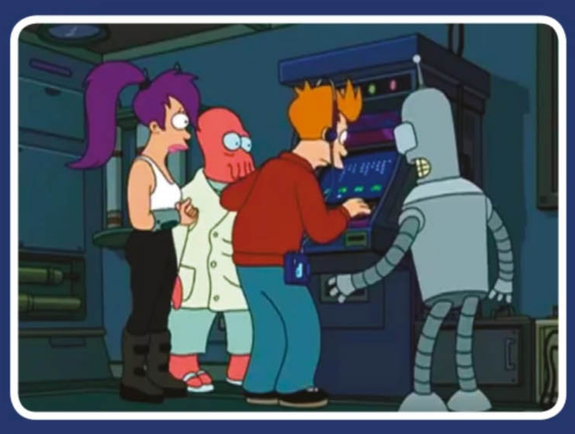
» With better weapons and lovely backdrops, Taito's porting of *Space Invaders* to the PC Engine in 1990 was a success.

WORLD DOMINATION

How Space Invaders made its way into the zeitgeist

MUSIC

■ Musicians were inspired by *Space Invaders* after its launch and, even putting aside the sampled audio in the messy medley that was Yellow Magic Orchestra's hit, *Computer Game*, fans could enjoy *Disco Space Invaders* by Funny Stuff in 1979, *Space Invader* by The Pretenders in 1980 and *Space Invaders* by Player One.



TELEVISION

■ *Space Invaders* has had an impact on the small screen in a variety of ways. Not only was a BBC series by celebrity builder Tommy Walsh called *Space Invaders*, there have been numerous references to the game in *Futurama*, *Scrubs*, *Chuck*, *Danger Mouse* and *Black Mirror* among many others.

FILM

■ Whether it's *Spaced Invaders* or appearances in sci-fi films such as *Terminator 2: Judgement Day* and *Cherry 2000*, Hollywood hasn't been immune to the classic title. *Space Invaders* has a role in *Pixels* and there's talk of a movie directly based on the series.

LITERATURE

■ It may seem odd that Martin Amis' wrote the guide, *Invasion Of The Space Invaders*, in 1982 but he's not the only author to reference the game. Terry Pratchett's *Only You Can Save Mankind* saw invader-style aliens surrendering and seeking help. Characters in *Discworld* play *Barbarian Invaders*.

ART

■ The urban artist Invader has decorated cities across the world with *Space Invaders* ceramic tile mosaics, some of which were stolen in Paris in 2017. The game has also featured in many exhibitions and gallery spaces, with one single alien invader sprite becoming a design icon.

© KylaBorg

ARCHITECTURE

■ Many home interior design companies are called 'Space Invaders'. But does the game's influence spread to blueprints? Yes, if NL Architects' proposed *Space Invaders* alternative tower block is anything to go by. It was earmarked for South Korea.

1990

- *Majestic Twelve: The Space Invaders Part IV* launches
- Versions of the game hit the Game Boy and Mega Drive
- A prize-winning riff on the game offers a £20 jackpot

1991

- *Super Space Invaders* offers non-arcade action for home computers
- *Space Invaders* appears in the film *Terminator 2: Judgement Day*

1993

- The remake *Space Invaders DX* for arcades is released

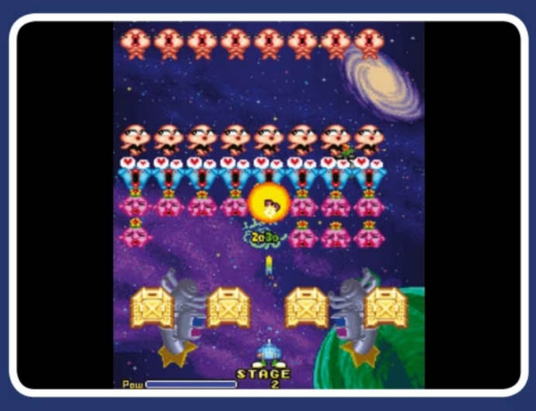
OUT OF THIS WORLD

Key games that define the series

SPACE INVADERS

1978, ARCADE

■ The original was entirely black and white and was released in Japan by Taito as a sit-down cocktail table. An upright cabinet was introduced in the west by Midway, reflecting the graphics on to a painted backdrop. Gamers soon became acquainted with the need to blast away five rows of 11 aliens.



SPACE INVADERS '95: ATTACK OF THE LUNAR LOONIES

1995, ARCADE

■ This is a wacky, upbeat, cartoony rendition of *Space Invaders* which allowed you to play as various characters. It has many Earth-based settings and gives you five bosses to battle making it familiar and unique at the same time.

SPACE INVADERS

1980, ATARI 2600

■ Atari bagged the home licence from Taito and created the 2600's must-have title. It only had 36 aliens and three rather than four defence barriers but there were a staggering 112 game variations along with an assortment of shots, difficulty levels and a two-player modes. It sold very well indeed.

SPACE INVADERS

1999, PLAYSTATION

■ This was one of a glut of *Space Invaders* variants at the turn of the millennium but it puts a fresh spin on the design. Modelled in 3D and with a blistering soundtrack, players have to hit four aliens of the same colour in a row to receive different power-ups. There are nods to 1978 in the intro, too.

RETURN OF THE INVADERS

1985, ARCADE

■ The true-colour sequel launched seven years after the original and it unleashed the invaders like never before. The blocks of old were supplemented by patterned waves of aliens that proved increasingly difficult to see off. Deflector invaders had to be shot right in the centre otherwise your fire would bounce back.

SPACE INVADERS EXTREME

2008, NINTENDO DS/PSP

■ Produced to coincide with *Space Invaders*' 30th anniversary, *Space Invaders Extreme* stands as one of the finest remakes in the series' history. Four-hit combos would earn power-ups and it was possible to control when the UFO appeared. A sequel arrived in 2009.

MAJESTIC TWELVE: THE SPACE INVADERS PART IV

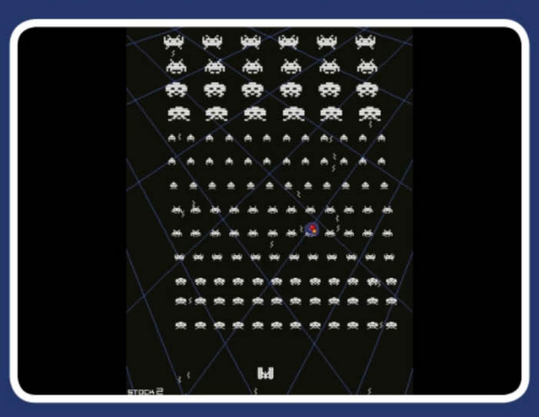
1990, ARCADE

■ Also known as *Super Space Invaders '91*, this version was ported to 8-bit and 16-bit computers and consoles. As well as introducing boss invaders, the CG30 cannons could take more than one hit and it was possible to play with a friend.

SPACE INVADERS INFINITY GENE

2009, iOS/ANDROID

■ As another reimagining, Infinity Gene brought *Space Invaders* up to date with charming simplicity, making the most of the touchscreens of mobile devices. It also added the ability to unlock better weapons and rewarded the chain destruction of enemies.



SPACE INVADERS DX

1993, ARCADE

■ A number of games make up this classic: there are colour, monochrome and cellophane versions of the original. The most fun of all is the parody game. This replaced the iconic *Space Invaders* sprites with characters from nine of Taito's games including *Bubble Bobble* and *Arkanoid*.

SPACE INVADERS FRENZY

2017, ARCADE

■ You can't miss Raw Thrills' *Space Invaders Frenzy*. It plays on a nine-foot screen, uses lightgun cannons as controllers and allows you to identify and blast at individual aliens regardless of where they may be.

1995 — Players can enjoy a Virtual Boy *Space Invaders* experience

1999 — *Space Invaders* looks very different on the PlayStation

2003 — *Space Invaders Anniversary* celebrates 25 years of the series

2005 — *Space Invaders Revolution* is launched on the Nintendo DS

2006 — The PSP is blessed with the interesting *Space Invaders Evolution*

2006 — The game is chosen to represent Japan by the country's Agency for Cultural Affairs

"IT WAS ONE OF THE FIRST TIMES I HAD SEEN 'ADVANCED GRAPHICS'"

Graeme Devine

▶ "A Sheffield mother is quoted as saying that a Jekyll and Hyde change came over her 14-year-old son when he became hooked on *Space Invaders*," he told MPs. "In London, a 13-year-old vanished from his home for ten days, visiting arcades to play the machines. Also in London, a 17-year-old boy was so desperate for money to feed the machines that he turned to blackmail and theft, demanding £900 from a clergyman with whom he had previously had sexual relations."

For those who were playing *Space Invaders* however, there was nothing better on Earth. It proved inspiring and it created a social scene for young people to hook into. "The game was being enjoyed by all ages due to its simple gameplay," explains Nishikado. "Having said that, the game is not that easy to win. The enemy aliens shoot at the player, which makes the players feel frustrated and nervous. On the other hand, the game gives exhilaration when the player defeats all the enemy aliens and clears a level. A blend of these feelings urged the players to insert another coin for next challenge. I suppose this is the reason for the success of *Space Invaders*."

» If the characters here look familiar it's because they've come from various Taito games. How many can you name?

» Sony's PlayStation received a number of upgraded arcade classics and *Space Invaders* was no exception.

Scores of players and wannabe developers agreed and there was no getting around the fact that *Space Invaders* was hugely innovative. "It was one of the first times I had seen 'advanced graphics', and the novelty of controlling something on a screen was still really new," says Scottish game designer and programmer Graeme Devine, who went on to create *The 7th Guest* and *The 11th Hour*. "*Space Invaders* was also a watchable game: you'd understand the rules after watching a friend play a few games and you'd want to have a go."

Some of videogaming's key figures over the years were influenced by the game, not only in Japan but in the US, UK, the rest of Europe and beyond. John Romero cites it as a key influence, as does Eugene.

"It was the first fully-formed videogame with real enemies, incredible audio, ever-increasing difficulty and tension with infinite play time as long as you can stay alive," he tells us. "It also created the first videogame addicts and launched the worldwide videogame revolution. By allowing expert players to set record scores limited only by skill, endurance and bladder capacity, *Space Invaders* also became the first esport."

Dona Bailey, who was working as an assembly language programmer for microprocessors in Cadillac engines at a GM-Delco plant in Santa Barbara, California, clearly recalls her first encounter with videogames and the impact it had not just on her but other media. "It was April 1980 and my best friend was very interested in new music," she says. "He played the first Pretenders' album constantly and it had an instrumental song called *Space Invader* on it. I didn't typically like instrumentals but I heard that one so much, I started really liking it."

» Graeme Devine created *The 7th Guest* and *The 11th Hour*.

One night she asked a friend what the song was about and what the title meant. "He got wildly excited and explained it was about this great arcade game called *Space Invaders*," she says. "He said there was a game in a bar close to where we worked, and I should go there with him at lunch some day to check it out. We went, he put in quarters, I got killed before I could figure out what I was supposed to do but I recognised how much the game display looked like the climate control display I programmed on the car back at work, and that's how I fell in love with videogames."

Dona ended up moving to Sunnyvale in May 1980 without a job or much of anything else but she was soon hired at Atari where she devised and worked on *Centipede*. *Space Invaders* had taught her ▶

2006 — *Space Invaders* is included in the Game On exhibition at the Barbican Centre, London

2008 — *Space Invaders Get Even* appears on WiiWare

2008 — Taito releases an album called *Space Invaders 2008*

2009 — An art game *Invaders!* is included at the GH ART exhibition at the Games Convention, Leipzig

2009 — *Space Invaders* launches on iOS

2010 — *Space Invaders Infinity Gene* launches on PS3 and Xbox 360

» Known as *Space Raiders* in Japan, this was rebranded here as *Space Invaders: Invasion Day.* It's not particularly memorable, either.

» Made available as WiiWare, *Space Invaders Get Even* allowed players to control the aliens.

▶ much about gameplay and she thrived. The same was true of other developers.

"Skill, risk and strategy," affirms David Perry of the lessons taught. "The feeling that each time you play, you feel you're getting better; the rewards for taking risks. *Space Invaders* really was ahead of its time."

David draws attention to the fact that players could not hide the whole game. They had to keep popping out into danger or risk being exposed when the barriers were destroyed or killed if the aliens got too close. "The fact that you could attack in any order and use bases for cover allowed for strategy and the two most clever parts were that things sped up, forcing you to rethink your strategy of how to handle the last invaders," he says. "And that was before you saw the glorious strategy disrupter – the spaceship."

» The intro to *Space Invaders* on the PlayStation made multiple knowing references to the original game.

» David Perry cofounded Shiny Entertainment.

The coin-ops themselves were another disrupter. The emergence of the arcades proved crucial in getting people interested in videogames and it could be argued that gaming and *Space Invaders* may not have become so big had they not been introduced in such a way.

"The immense success of the *Space Invaders* arcade cabinet saw competitive gaming enter new and often unexpected locations for its time, such as shops and restaurants," argues Marie Foulston, curator of the V&A's Videogames: Design/Play/Disrupt Exhibition. Jason Fitzpatrick, curator and chief executive officer of the Centre For Computing History in Cambridge, agrees, "They didn't have a strong barrier to entry – players could put 10p in a machine and play without having to invest in expensive home computers or consoles. The arcades had a feel about them and an atmosphere that people enjoyed. Games were instantly social."

Even so, *Space Invaders* did land in peoples' homes. In 1980, Atari had grabbed an exclusive licence for the game, making it the first arcade game to be ported on to a console. It appeared on the VCS, later known as the 2600, and became a hit, helping to quadruple sales of the machine three years after it was launched.

"Probably the biggest masterstroke was cementing *Space Invaders* into peoples' homes by porting it to the 2600," Iain said. "By bringing a half-decent version of an arcade experience onto the first truly popular home videogame console, it embedded itself into living rooms as well as arcades."

For Atari cofounder Nolan Bushnell, it was another feather in his cap. Already successful in the arcades himself thanks to *Pong*, he had pulled off a coup, even though he was initially sceptical of it. "*Space Invaders* gave me further humility on how to judge a good game," Bushnell tells us. "When I first played it I didn't think much of it but clearly I was massively wrong. It made me realise

"IT HAD THE CORRECT BALANCE BETWEEN RISK AND REWARD"

Nolan Bushnell

that you have to be careful of quick judgments about a game – you need to play it enough to make an accurate judgment. It became one of my favourite games."

Suddenly a Japanese-made game was propelling an American-created console to great heights and *Space Invaders* began to enjoy a second wind. "It was probably the first videogame that had both dynamic and narrative development," Nolan continues. "It had the correct balance between risk and reward."

Just as with the arcade coin-op, the home console version proved encouraging. "It inspired a new generation of people to get into games development and coding," Mark says. "The music and sound effects in *Space Invaders* were influential on the future of games development, showing what a background score which reacts to development within the game can do for the experience. People recognise that these developments had a huge impact and *Space Invaders* is held in high regard as a creative turning point."

It had a big effect on people such as Jenna Seiden who was eight years old when *Space Invaders* launched on the Atari 2600. She eventually became the former vice-president of content development and strategic partnerships at Microsoft Studios, and she is the current head of content acquisition at the gaming distribution platform Ultra. "*Space Invaders* hit all the right notes and it became iconic the moment it landed on the shelf," she says, "It combined the successful shoot and destroy mechanics of previous titles with more intense graphics, and it was an inspiration for gamers like me."

Jenna says the game became an icon because it moved the industry into one of the first examples of storytelling in videogaming. "I did love the double bullets if you held the reset button while you turned the 2600 on, and I liked getting my phalanx-narrowing on, but it was truly the fact that *Space Invaders* spawned the next phase of iconic titles like *Galaga* and *Asteroids* that also resonated with the marketplace."

Space Invaders also impacted on the Japanese development scene. "*Space Invaders*' success stimulated many companies in Japan to embark on game developments." says Nishikado. "The rapid growth of the game industry threw up some masterpieces and developed the consumer game

2014 — A new species of arachnid is named Taito spaceinvaders

2015 — *Space Invaders* appears in the Adam Sandler movie *Pixels*

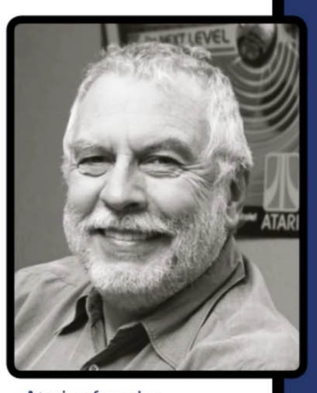
2017 — The *Space Invaders Frenzy* coin-op dwarfs gamers in the arcades

field from which the Famicom, or NES, was born. When the Famicom became a global hit, it was clear Japanese videogames were taking the world by storm." As for *Space Invaders*, its legacy was set in stone.

The game grossed $2 billion in less than four years and, as Mark argues, "it demonstrated that the emerging entertainment industry was big enough to rival film and music". Big companies were keen to associate themselves with the game. But unlike those who worked in rival industries, Nishikado did not achieve personal fame for a few years, with Taito's policy being to hide the creators.

"I don't think that I felt frustrated at the time, but I had some small sad and envious feelings when I encountered the individual names of videogame creators of other manufacturers later on in magazines," Nishikado says. "I feel happy that nowadays disclosing their individual names is quite natural and common sense."

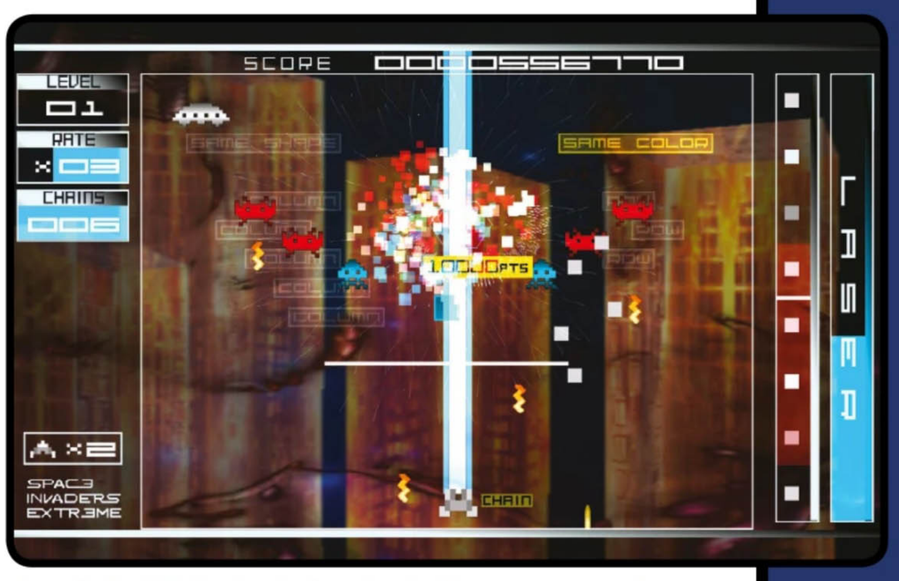
» Mario Foulston curates the Design/Play/Disrupt exhibition.



» Atari cofounder Nolan Bushnell.

French street artist Invader has peppered cities across the world with depictions of the *Space Invaders* aliens that he creates out of square ceramic tiles. People also often use pseudonyms to take part in *Space Invaders* competitions (although Frank Tetro was more than happy to be named when, aged 14, he hit the headlines for achieving an incredible 110,125 points in the National Space Invaders Superbowl of 1980).

Crucially, the name *Space Invaders* has become ubiquitous and it remains on the tip of people's tongues. "The visual design of space invaders is a universal iconic shorthand for 'videogames'," says Iain. "Even if only by that measure, it's hugely relevant." ✱



» Launched for Xbox Live Arcade, *Space Invaders Extreme* saw revamped graphics as well as new visualisers created by Jeff Minter.

MARKING 40 YEARS

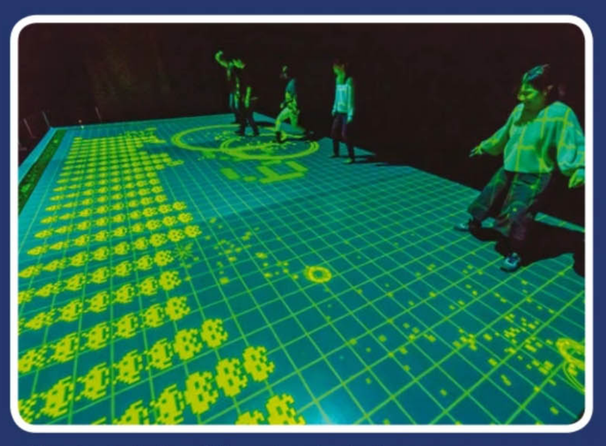
How Taito and Square Enix are celebrating four decades of Space Invaders

To celebrate the 40th anniversary of *Space Invaders*, Taito's sister company Square Enix planned and developed four attractions. It has brought the game to life like never before, starting with the amazing Play! *Space Invaders* Exhibit in January which took place at in the Roppongi district of Tokyo, Japan.

The highlight has been *Space Invaders Gigamax*, a huge, wide installation that projected the game on to the windows of the building and allowed up to ten players to enjoy the classic title against the backdrop of Tokyo. It proved to be a sight to behold with the invaders making their way towards the city's streets as gamers sought to blast them away.

Another exhibit created by Square Enix is *Arkinvaders* which projects the game on to the floor and introduces elements of *Arkanoid*. Here, players seek to destroy the aliens by kicking digital circles at them while trying to prevent the weapons falling off the playing field. It's energetic and fun and an artistic spin on age-old gameplay that feels fresh.

» *Space Invaders* being projected against a backdrop of the night sky is an no-brainer, really.



» The simple design of *Space Invaders* invites many innovative ideas on how to play the game.

More sweat-inducing is *Noborinvaders* which is projected against a climbing wall. As the players reach climb, invaders appear on the various boulders meaning players have to position themselves close and reach out to touch them, thereby removing the aliens from the playing area and racking up the points.

Finally, there is *Bahamut Disco*, a mind-bending, almost migraine-inducing experience which projects the game on to a 360-degree screen. Four players each pick a colour of alien and use Vive VR controllers to swat them away as they appear, all played to a disco beat. Since it doesn't need a virtual reality device, Square Enix says it offers a new way of playing with VR.

» The art and iconography of the arcade classic lends itself perfectly to a unique art exhibit.

THE STORY OF...

PAC-MAN

PROGRAMMER TOD FRYE MADE VIDEOGAME HISTORY WHEN HE DESIGNED THE ATARI 2600 VERSION OF PAC-MAN. BUT NEARLY 40 YEARS LATER, THAT INTENSE EXPERIENCE, THE GAME'S RECEPTION AND GHOSTS OF THE PAST ARE STILL CHASING HIM. TIM LAPETINO RUNS DOWN THE STORY.

In early 1981, Atari assigned a brilliant, formerly homeless, high school dropout to one of its most important games ever – the home version of its mega-hit *Pac-Man*.

Pac-Man's pop culture invasion began a year earlier, when an army of little yellow dot-munchers stormed the arcades, pool halls and convenience stores of America. The wildly-popular arcade game smashed demographic barriers around the world with its approachable, non-violent game design. Players of all ages and walks of life were drawn to one of the first character-based videogames. *Pac-Man* was a genuine phenomenon, selling an estimated 400,000 cabinets worldwide. The game also spawned a merchandising bonanza, with the character's image emblazoned on bedsheets, drinking glasses, T-shirts, stickers, cereal, a Saturday-morning cartoon, and even a pop single.

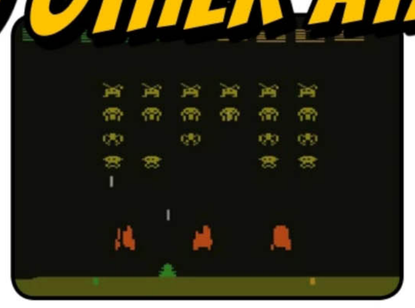
Atari was betting gamers would play *Pac-Man* at home, too, when it acquired the home videogame rights from *Pac-Man*'s parent company Namco. The arcade game's popularity guaranteed that it would come to living rooms on the popular Atari 2600, the home console.

The job fell to programmer Tod Frye, who was regarded as a brilliant, but undisciplined, software engineer at Atari. In high school, he cut classes – hiding in a closet to smoke pot and program on a Wang 3300 computer to produce a text-based adventure game with the player cast in the role of drug dealer. "I wasn't drawn to athletics," he remembers. "I wasn't drawn to acting. I was drawn to programming. It just found me." Tod could look at code and see "a problem to be fixed", and writing code offered him "a godlike power to make things right, to bring order to chaos – to create something that wasn't going to be there if you didn't make it".

» The Atari 2600 was no stranger to big arcade ports, thanks to releases like *Space Invaders*.

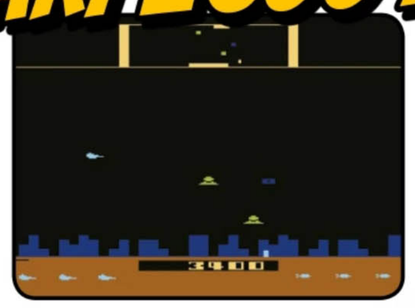
MAN
ON ATARI 2600

10 OTHER ATARI 2600 ARCADE PORTS



SPACE INVADERS

■ This translation of the monumentally popular arcade game was instrumental in resuscitating the struggling Atari 2600 in 1980, turning this timely port into the industry's very first killer app. *Space Invaders* at home was a strong port of the original that made Atari's first home console a huge success.

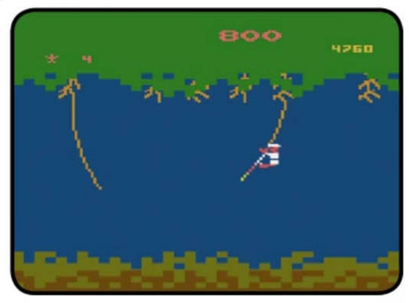


DEFENDER

■ While this port has been maligned in some circles for its simplified game design, programmer Bob Polaro did a yeoman's work in reinterpreting the complex arcade controls for the Atari 2600's single-button joystick. While it's not as difficult as its arcade predecessor, it captures the original's essence well.

MISSILE COMMAND

■ Atari's apocalyptic arcade game was translated beautifully for the Atari 2600, despite cutting some of its bells and whistles. It removes the final, haunting mushroom cloud and ominous 'The End' titles of the game's finale, but otherwise captures the zeitgeist from the original Cold War-era classic.



JUNGLE HUNT

■ This vine-swinging adventure game stacks up well, even to another jungle-themed classic such as *Pitfall!*. *Jungle Hunt* on the Atari 2600 tightly reproduces the four unique game screens of the arcade original in a way Atari's home console can handle, even with the inclusion of some subtle parallax scrolling.

CRYSTAL CASTLES

■ The eye-popping isometric maze graphics and animation of the arcade game are missing, but the game plays well even in its slimmed-down version. The mazes are unique and the game plays fast and fun, especially if you can replicate the arcade feel with the console's separate Trak-Ball controller.

CREATING PAC-MAN

The differences between arcade and 2600 Pac-Man

MAZE AND DOTS

The 2600's graphics limited the number of dots on screen, and increased their minimum size. Atari compensated by calling them "video wafers" in the game manual. The vertical maze orientation had to change to fill the more horizontal 4:3 ratio of vintage televisions.

CHARACTER ANIMATIONS

To conserve memory, Tod simplified animations, removing details like Pac-Man's vertical rotation, and the more complicated ghost animation, which had to be condensed into two-frame animations for the 2600.

FLICKER

Tod utilised a flicker technique that strobed the ghost character graphics so that all four appeared on-screen at once – something that had never been done on the 2600 before. He also justified this approach, noting that the ghosts were ephemeral spirits. Though the method was successful, players complained about the constant flicker. Atari grilled Tod about it after the game's release. Tod explained that the 4K memory prevented him from using a solution other than flicker. Not coincidentally, *Pac-Man* was the last of Atari's 4K games.

MAZE COLORS

The Atari 2600 version of *Pac-Man* includes maze colours that do not match those of the original arcade game, which was a sore point for fans. The colours were Tod Frye's own decision. "What I think is really interesting about that is that no one knew that a necessary part of the *Pac-Man* signature was the colours," he says. "And it's easy for people to say, 'Oh, it was obvious!' But you know what? It clearly was not obvious."

ARCADE SOUND

The delicate 'waka waka' eating sounds of the arcade *Pac-Man* were replaced with the blunt bonking sounds generated by the 2600's primitive sound chip. The urgent, jarring siren background sound was absent altogether.

TWO-PLAYER GAMEPLAY

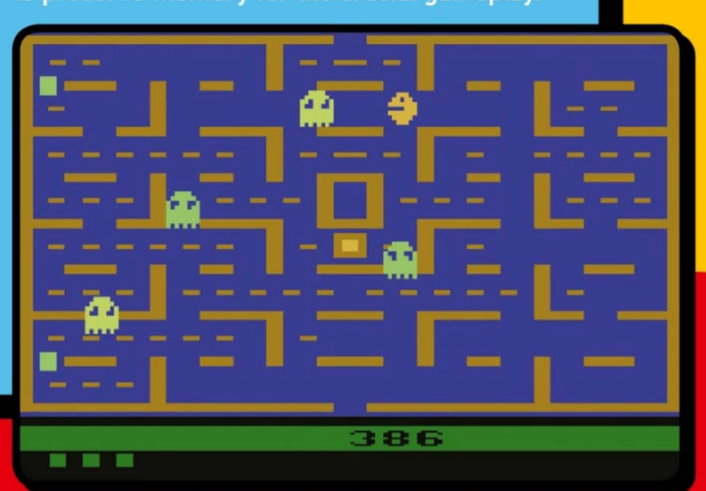
Later adaptations of *Pac-Man* and *Ms Pac-Man* dropped the option of two-player gameplay, a feature that Tod Frye refused to eliminate. The decision would have saved him precious bytes to utilise elsewhere, but he deemed it essential in capturing the spirit of the original.

FRUIT VS VITAMINS

Arcade *Pac-Man*'s levels are often designated by the different fruit – cherry, strawberry, orange and the rest. The bonus fruit are worth varying point totals, but had to be eliminated from the Atari 2600 version because of memory constraints. In their place, Tod used a rectangle within a rectangle shape, which Atari's manual writers dubbed a 'vitamin'.

CUTSCENES

A unique storytelling aspect of *Pac-Man* was excised when the game translated from arcade to the 2600 home console. The whimsical animated interludes, a fun and brief respite from the fast-paced game itself, were removed to preserve memory for the crucial gameplay.

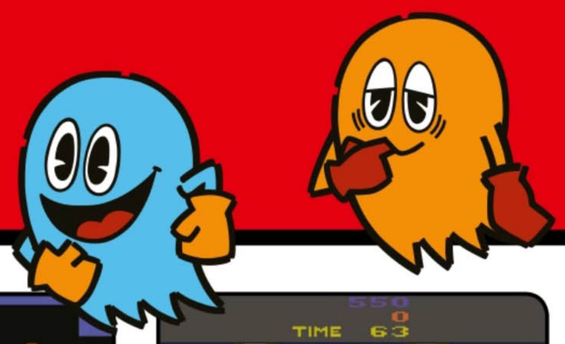


Tod dropped out of high school in his junior year, and his father kicked him out of the house. Rebellious and homeless on the streets of Berkeley, he panhandled until finding work on a construction crew, eventually becoming a master carpenter. Later, a high-school friend helped him get an interview at Atari, and Tod returned to the only calling that had captivated him. He began work as a game programmer in 1979, at one of Silicon Valley's hottest companies.

His initial projects included a handheld *Breakout* game and the Atari 400/800 version of *Asteroids*. Like many others, he enjoyed the freewheeling culture of Atari, where employees mixed the business of game programming with chemical pleasure. On fellow programmer Howard Warshaw's first day, Tod introduced himself by lighting up a joint in his office and inviting Howard to smoke with him – only "the good stuff".

Tod also showcased his oddball side. He earned the nickname of 'Arfman' for barking like a dog as he roamed the halls. The tall programmer would literally scale Atari's walls, too, placing a foot on each wall of the narrow hallways of the company's Sunnyvale headquarters, then cantilevering his way down the corridors several feet off the ground.

» The 2600's maze was created using blockier, lower-resolution 'playfield graphics' mirrored across the vertical axis.



TRACK & FIELD

■ Atari preserved the fast-paced experience of this Konami classic on the 2600. The game challenging both with the standard joystick, and using the pack-in arcade style controller. Much like its excellent Olympic cousin, *Decathlon*, *Track & Field* is as physically demanding as a classic console game gets.

DOUBLE DRAGON

■ Credit to programmer Dan Kitchen for even attempting this popular arcade game near the end of the 2600's lifespan. It has two-player action and multiple levels, but the game is crushingly difficult because its crucial special moves have been distilled into awkward combos on the 2600's single-button joystick.

RAMPAGE

■ Some arcade translations are too ambitious for their own good, and this particular Atari 2600 port sheds too much of the original's charm. In trying to preserve *Rampage*'s signature two-player mayhem, the 2600 conversion falters with poor collision detection issues and a weak graphical style.

CENTIPEDE

■ Atari managed to capture the frenetic pace of the arcade in this Atari 2600 counterpart, and it plays even better with Atari's Trak-Ball controller. The graphics are a significant step backward from the arcade original, but the pure and compelling gameplay almost makes up for that loss.

STAR WARS: THE ARCADE GAME

■ It's almost shocking how well this iconic space shooter looks and feels on the Atari 2600. The colour vector graphics and immersive cockpit cabinet are missing, of course, but the 2600 does a fine job of replicating the dogfights and trench run from the arcade original.

"THE EFFORT WAS TO CATCH THE ESSENTIAL FEELING, THE ETHOS, THE SPIRIT – THE SOUL OF PAC-MAN"

TOD FRYE

» Tod's *Pac-Man* added an eye for the onscreen character before any other game had done so. Call it a wink.

His wall-walking habit ended abruptly when he smacked a ceiling-mounted sprinkler with his forehead, requiring 23 stitches.

With talent and quirkiness to burn, Tod appeared to be a perfect match for Atari. But during a crucial review, Tod's boss suggested that he wasn't fitting in well – and should consider looking for another job. "He said, 'Look, you're probably a real good programmer, but you're not putting out,'" Tod recalls. The conversation stunned the young game designer and left a lasting impression. He smoked one more joint, and threw up. Tod then went completely sober for almost a year while working on *Pac-Man*. The game was a chance to prove his worth at Atari. "I buckled down," he remembers.

Translating the hit game to the 2600's primitive hardware was a serious challenge, and the programmers knew it. Colleague Bob Polaro passed on *Pac-Man* because he thought it impossible, selecting another arcade conversion instead – the popular *Defender*. Tod accepted the *Pac-Man* assignment, spending 80-hour weeks over the next six months trying to create a worthy version of the game on lesser hardware. "I was sufficiently unprofessional that I gave my very best," he says. The difficulty of the task sharpened his work habits and dedication.

The Atari 2600 was initially created to play *Pong* variations and *Tank* games, staples of the Seventies arcade era. The machine wasn't designed to play sophisticated arcade-style games that Atari was now trying to create. So, it was quite a technological achievement to tackle *Pac-Man*. "There's a lot of tradeoffs involved," Tod explains. "It's a very, very constrained system."

Hindsight makes the translation seem like straightforward, but that is surely revisionist history. The coin-op *Pac-Man* machine used a custom-made arcade system board with hardware running three times as fast as the 6502 microprocessor which powered Atari's 2600. The arcade game contained 16K of ROM, 2K of video RAM and 2K of general RAM, whereas the *Pac-Man* 2600 cartridge was limited to 4K of ROM in total – one quarter of the arcade machine. The 2600 also had less ability to display background graphics, which meant that any maze Tod created would have to be simpler and blockier, utilising chunky playfield graphics. In designing this version, he'd need to execute some clever programming tricks just to make it happen.

Faced with extensive (and necessary) compromises, Tod took a pragmatic view of translating *Pac-Man*. "I was thinking of it as an abridged adaptation," he said, "and the effort ▶

PAC-MAN

FIVE HOMEBREW VERSIONS

The best from the new wave of Pac-Man conversions

PAC-MAN 4K

■ Programmer Dennis Debro sought to create a version of *Pac-Man* for the Atari 2600 that was more faithful to the arcade game while still remaining within the same 4K memory limit as Tod Frye's original game. The results are nothing short of impressive.

8K PAC-MAN

■ Daniel _____ (DINTAR816) took 2600 *Pac-Man* one step further and designed a *Pac-Man* game that utilises 8K of ROM and includes all the bells and whistles of the original arcade game, like animated cutscenes, improved sound and incredibly faithful ghost AI.

PAC-MAN COLLECTION FOR COLECOVISION

■ A version of *Pac-Man* was planned for the ColecoVision, but was never completed. Eduardo Mello of Opcode Games took it upon himself to remedy that with the homebrew *Pac-Man Collection* containing versions of *Pac-Man*, *Ms Pac-Man* and another hidden game.

JR PAC-MAN FOR ATARI 7800

■ The side-scrolling mazes of this overlooked *Pac-Man* sequel are challenging on any platform, and Bob DeCrescenzo brings a faithful rendition of the game to the Atari 7800 with a variety of player-friendly difficulty settings.

CRAZY OTTO FOR 7800 HOMEBREW PAC-MAN

■ *Crazy Otto* was an unlicensed enhancement kit for *Pac-Man* arcade machines developed by General Computer Corporation. GCC worked with *Pac-Man* licensee Midway to turn the game into the beloved sequel, *Ms Pac-Man*. Programmer Bob DeCrescenzo hacked Atari's 7800 *Ms Pac-Man* game to better match GCC's original game.

▶ was to catch the essential feeling, the ethos, the spirit – the soul of *Pac-Man*. *Pac-Man* was known to be a repeated pattern game. So, I worked out a very precise, repeatable logic for how the ghosts worked. It was not the one [arcade *Pac-Man* creator Toru] Iwatani used, but that wasn't computationally possible for me. What that actually means is, like coin-op *Pac-Man*, my *Pac-Man* produces completely reproducible patterns. If you do the same thing every game, it will do the same thing every game. And that's actually the level at which I understood the ethos or spirit of *Pac-Man*. It's a fundamental. I really honestly intended my *Pac-Man* to be as faithful a representation as I deemed possible and necessary."

The game arrived to much fanfare, and its initial performance did not disappoint. Sales were stratospheric, and *Pac-Man* would go on to be the bestselling Atari 2600 game of all time, moving a reported 7.7 million cartridges and earning nearly $200 million in gross profits for Atari. But a growing discontent began to fester beneath the glowing balance sheet. On 11 May 1982, *Electronic Games Magazine* published its first-ever bad review for an Atari videogame, saying, "Considering the anticipation and considerable time the Atari designers had to work on it, it's astonishing to see a home version of a classic arcade contest so devoid of what gave the original its charm." *Softline* computer magazine wrote that the 2600 version looked "less like Midway's original than any of the pack of imitators".

Tod's concessions to the 2600's hardware were obvious to devoted fans. The maze colours were different, the characters less detailed, and the game seemed to underscore the console's advanced age. For his part, Tod was unaware of the criticism, already working on his ambitious *Swordquest* series. "I didn't really know about all of the bad press for a long time," he says. "I was doing the next thing." The 2600 version of *Pac-Man* would

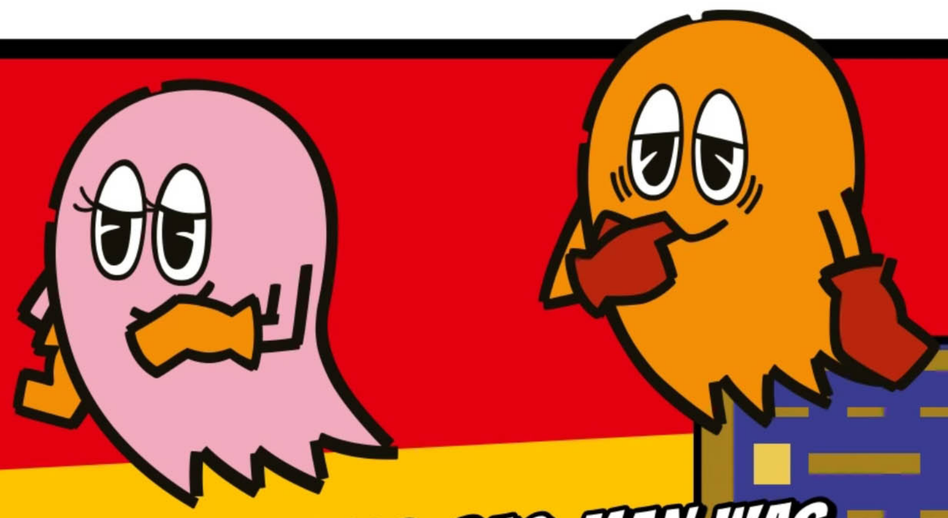
» Tod Frye used a pseudo-random number generator for the game logic, which made the ghosts act in consistent, repeatable ways.

eventually unfairly acquire the reputation as a half-hearted effort, a corporate cash-in. Early video game journalists certainly didn't rush to Tod's aid, either. Harsh reviews were just "part of the meat grinder *Pac-Man* went through", he later decided.

You know what I say? Fuck the press," Tod retorts, now with 37 years of reflection. "*Pac-Man* was very, very credible. The things the press doesn't like were just the fact that it was the first. We would have fixed the obvious, easy-to-fix things that people harp on, if anyone anywhere in the human species had known at that point. No one knew. History was being made. We were just finding out what the rules were. That's what it is to be a pioneer."

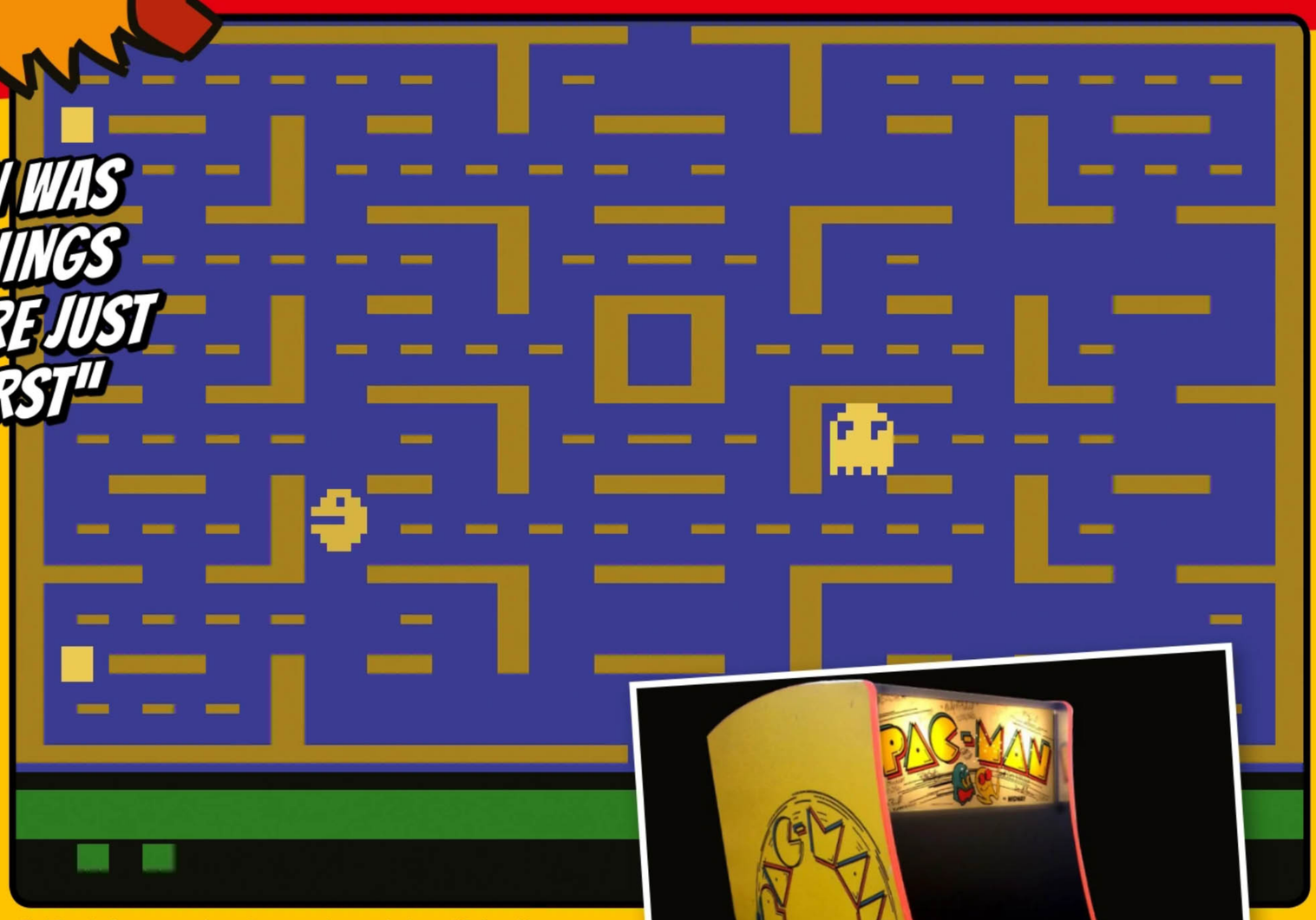
Some within Atari felt the game wasn't ready for prime time. Atari's marketing manager of coin-ops, Frank Ballouz, said in a 1998 interview, "I took a look at this bullshit game and told Ray [Kassar, CEO of Atari] that no one's going to want to play it. But he didn't listen to me." But that seemed to be a minority opinion, as many Atari programmers were impressed with Tod's translation and what he was able to squeeze out of the aging 2600.

"The idea of what it meant to be a faithful representation of *Pac-Man* was not established," Tod says. "It did not exist at the time I wrote *Pac-Man*. No one else in that whole process really knew it. [Later], we, as a culture,



"FUCK THE PRESS. PAC-MAN WAS VERY, VERY CREDIBLE. THE THINGS THE PRESS DOESN'T LIKE WERE JUST THE FACT THAT IT WAS THE FIRST"

TOD FRYE



» Tod Frye believes empathy makes a good game designer, "Being able to project what it will feel like to play that game if you're someone else."

invented the idea of a meaning and created a definition of what an adaptation was. There is a direct connection between 2600 *Pac-Man* and arcade *Pac-Man*, and I was influenced by arcade *Pac-Man* when I made mine." Details like colour fidelity and maze design might seem like obvious decisions in retrospect, but Tod is adamant that those pioneering days left zero road maps for game development. "Not only did I get to be a case study," he says, "but I got to help make the rules, to help find out in that back and forth, which is only done through whole product development cycles."

It's also probable that the marketing hype behind the game heightened anticipation to unreasonable levels – which led to a rubber band reception when the game didn't perfectly align with expectations.

During Tod's development of *Pac-Man*, Atari initiated a program of profit sharing ("incentive compensation bonus") to prevent senior game programmers from leaving and becoming competitors – as in the case of third-party developer Activision. This reward system wasn't instituted until after *Pac-Man* was completed, but it was life-changing for Tod. The agreement would award him $0.10 for every *Pac-Man* game sold. After its wild success, Tod was suddenly very rich, eventually earning more than $1.3 million in incentives.

The financial windfall was both liberating and overstimulating. "It was overwhelming. It's like winning the lottery," he said. "I was a little defiant, and I was a little out of touch. You don't deal with that as a 26-year-old. It was a lot of marijuana and cocaine. It completely changed my life." Tod struggled with this wealth. "In those three years I went from a salary of $19,000 a year to a $320,000 royalty check. It did bend my brain, and it did honestly put my life in danger. But I survived. There are things I would do differently if I could have."

» Atari's 2600 version of *Ms Pac-Man* benefitted from critical hindsight and a larger 8K memory limit to faithfully adapt the arcade game.

He taped a photocopy of his first royalty check – $320,000 – to a public bulletin board at Atari HQ. "I have no idea why I did that," he says. "I really don't. It was a long time ago. It sounds like something I shouldn't have done. Fuck if I know. I was only 26."

Tod bought 15 vintage guitars, new suits, two Alfa Romeos, a ranch in New Mexico and more. With the pressure release valve of such success, more of Tod's blunt intelligence came out, and to some colleagues, it seemed like arrogance. Did that resentment go both ways? "Some people viewed me as a genius and some saw me as a clown," Tod explained in a 1997 documentary. The license plate of his new Alfa Romeo Spider read 'PACMAN'.

By 1985, most of the money was gone. Bad advice and poor choices drained him financially. "I was on a downward spiral," he said. "It was too much money, too fast. It was more power than responsibility, and it broke me."

Some reviewers claim that 2600 *Pac-Man*'s critical failure started a landslide that began Atari's downfall. While *Pac-Man* might have forced game buyers to look more cautiously at new releases, its negative impact has been overblown. "They say, '*Pac-Man* and *E.T.* ruined a whole business!'" Todd laughs, "If I had that kind of power, I would productise it and retire! It's foolishness. A lot of times people want a story – not even a particularly believable story. But they want a story."

Yet he does realise that now, 37 years later, with an impressive software engineering career working on everything from videogames to solar power and AI – he'll always be known for *Pac-Man*.

"*Pac-Man* was such a big part of my biography that I'm going to be living with it for the rest of my life," he says. "I feel different ways about that. The amount of critical scorn it's gotten and the swarms of tribal fanboys pissing all over it are not an ego booster. It actually is a self-esteem challenge. Some people want to say '*Pac-Man* sucked!' and I gave them that opportunity." After *Pac-Man* and the *Swordquest* series, Tod continued making games, both for the Atari 2600 and other later-generation consoles. But creating *Pac-Man* for the Atari 2600 is an experience that will never leave him. It was more than just another project. Its cultural significance, popularity and reception made a lasting mark. "In some way," he said, "who I am touched all those tens of millions of people."

In the final analysis, 2600 *Pac-Man* deserves a place in videogame history. Tod managed to capture the game's essence in hardware that was nearly 100 times lesser than its arcade predecessor. "I have regrets," he concludes. "But fundamentally, I'm proud. They tell me it's a waste of time to defend *Pac-Man*. I've got time to waste." ✱

COLLECTING ULTIMATE PLAY THE GAME

MARTYN CARROLL REVEALS EVERYTHING YOU NEED TO KNOW ABOUT COLLECTING ULTIMATE PLAY THE GAME TITLES AND HIGHLIGHTS THE MOST SOUGHT-AFTER RELEASES THAT'LL MAKE YOU WEEP

In August of this year a sealed copy of Ultimate's *Nightshade* for the ZX Spectrum was auctioned off on eBay for an eye-watering £311. At the same time similarly pristine copies of *Knight Lore* and *Alien 8*, also for the Spectrum, sold for £305 and £215 respectively. These were the highlights of more than 30 lots from the same seller – someone who was offloading a treasure trove of 'as-new' Ultimate Play The Game titles that were still in their original shrink-wrapping. *Entombed* for the Commodore 64 went for £104 and a copy of *Imhotep* for the same format fetched £90. *Atic Atac* and *Sabre Wulf* for the BBC Micro sold for £84 apiece, while the Amstrad CPC version of *Sabre Wulf* reached £70.

» The classic *Sabre Wulf*, the first of Ultimate's games to retail for £9.95 rather than the usual £5.50.

The story behind these lots is an interesting one. The seller was Huw Ward, who had worked in-house at Ultimate from its earliest days, initially as a game tester. He revealed on Twitter that he uncovered the games while clearing our his parents' loft and listed them on eBay (with his auctions starting at £9.95, a nod to the RRP of Ultimate's titles during the mid-Eighties). Huw was "shocked" at how high some of the bidding went, but anyone who has an interest in retro collecting knows that the Ultimate games have always been popular. The Ultimate label was hugely respected back in the day, so it's hardly surprising that when gamers revisit the 8-bit scene many are drawn to the Ultimate titles.

Ultimate published more than 20 games between 1983 and 1987 (with the last two years under the ownership of US Gold). 16 of these were initially developed for the Spectrum and most were then ported to other machines, including the BBC Micro, Amstrad CPC and Commodore 64. The C64 also received six exclusive games that were not ported to any other format, bringing the total number of individual Ultimate titles to 22 – a very attainable target across two formats. Obviously if you wanted to collect releases (including rereleases) across all formats then your task will be much trickier.

Spectrum fans may be content collecting the 16 titles for their machine, but the wider range does feature some tempting releases. The first six Spectrum titles were released in single cassette cases, yet when *Jetpac* and *Atic Atac* were later released for the BBC Micro they were presented in the big box style packaging that didn't become

ULTIMATE HOARD

When he's not writing about retro games, Richard Burton is stockpiling 8-bit games in his attic...

» An early advert showing off Ultimate's early games. Note the cheaper £5.50 price point.
» [Left] *Lunar Jetman* isn't quite as good as *Jetpac*, but it's no less collectible.

the norm on the Spectrum until the release of *Sabre Wulf*. On the subject of *Sabre Wulf*, the cover art used on the various ports was different (and preferable) to the Speccy original thanks to the addition of the golden 'Wulf' amulet. There are other artwork variations to consider too, such as the different colour schemes used on the various versions of *Knight Lore* (the Spectrum version is orange, the BBC version is green and so on). Even more enticing are the *Alien 8* covers where the Spectrum, BBC Micro and Amstrad CPC releases all feature an exclusive variant of the main artwork. Fans of Tim Stamper's illustrations will surely want to collect all three.

So what can you expect to pay for Ultimate titles? As you might expect the Spectrum releases go for the most money. Huw Ward's auctions illustrate this nicely, with Speccy *Nightshade* hitting £311 yet the same game in the same mint condition only fetching £67 on BBC Micro and £48 on Amstrad CPC. However, many of the Spectrum releases can be picked up quite cheaply. The early single cassette titles typically go for £5-£7, while the later big box releases (*Sabre Wulf, Underwurlde, Knight Lore* etc) are valued at £10-£15. It's the later titles from 1986 onwards ▶

How complete is your collection of Ultimate games?

I'm not sure if it will ever be complete as I collect official and unofficial releases from all around the world. This includes interesting bootleg copies and variants, and I'm finding new ones all the time. I have a few complete sets of UK releases across all formats and I'm also working towards a complete set of sealed UK releases. Outside of the UK there are a few European releases from companies such as ABC Soft, Investronica, Erbe, Dro Soft, Microbyte, Svenska Soft Service, Aackosoft and Monser that I'm still looking to find. Japan and Brazil also have their fair share of elusive Ultimate oddities from Plan Soft, Topia and Licantropo.

» Richard's hoard of sealed Ultimate games is extremely impressive. It's also worth a fair bit of cash, too.

How did you manage to acquire so many sealed copies?

I've 200 or so sealed Ultimate games that I've sourced from a variety of places over the years – former Ultimate employees, online auction sites but mostly from old warehouse finds. One particularly fruitful find was from a warehouse in Finland following a chance conversation with a Spectrum games collector. He knew of a former shop warehouse that had a large quantity of brand-new unopened stock and after a spot of trading, we came to an arrangement for the Ultimate games. Several years back there was also a couple of large finds in the UK which yielded a good supply of brand-new software including Ultimate titles.

What's the most you've spent on your collection?

The most I've spent on a single Ultimate-related title is £225 for a Dingo arcade board. This 1983 coin-op was one of the earliest Stamper games designed as Ashby Computers and Graphics. I picked it up about ten years ago. The game itself has got a distinctly Spectrum vibe to it, with backgrounds reminiscent of *Sabre Wulf*.

For you personally what's the appeal of collecting Ultimate titles?

Ultimate's secrecy and air of mystery surrounding its software releases was something that made the company very easy to like. The large black box releases stood out from other games and made them instantly collectable. Other companies emulated this approach yet for me the main pull was the cover artwork and inlay copy. Tim Stamper's art elevated the games and the minimalist instructions were more intriguing than factual. Apart from David Rowe and Steinar Lund's inlay artwork for Quicksilva, I can't think of any other illustrations that add to a game's appeal as much as Tim Stamper's do.

Do you think all the Ultimate mysteries have now been laid to rest, or do you believe there are still some secrets to be revealed?

Until the Stampers decide to give us a definitive answer as to whether development on *Mire Mare* was started, aborted or completely finished, the conjecture and debate will remain, and this in turn will continue to perpetuate the Ultimate mystique that fans love. I would bet that there are still a few secrets tucked away in the Stamper vaults that no one other than them knows about.

» Some of the weird and wonderful overseas releases which Richard has acquired over the years.

TOP TEN RARITIES

If you're serious about collecting Ultimate titles then these should be on your radar

JETPAC

ZX SPECTRUM

■ Yes, *Jetpac* for the Spectrum, but not the common release most of you will be familiar with. This is for the first issue that simply states "Sinclair ZX Spectrum" on the inlay. This was soon changed to "For the 16 or 48K RAM Sinclair ZX Spectrum". Fans are drawn to the 'original' version and so the price is quite a bit higher. You can expect to pay £20-£25 for it.

NIGHTSHADE

VARIOUS

■ The first title to use Ultimate's Filmation II system is not one of its best-remembered releases, but it remains popular in collecting circles. On the Spectrum, it hovers around the £20 mark, going higher or lower depending on condition (time is not kind to cardboard, after all). On other formats it fetches slightly less, but is still desirable.

PENTAGRAM

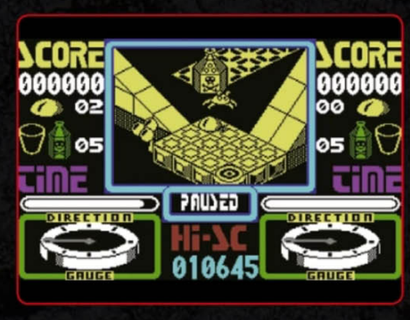
ZX SPECTRUM, MSX

■ With *Mire Mare* a no-show, this was the final Sabreman game and it's easily the most sought-after. It was released in a standard double cassette case rather than a big box, but this doesn't deter collectors who are willing to pay £30-£40 for the Spectrum version. The MSX version is less common but less coveted, fetching £25-£30.

MARTIANOIDS

VARIOUS

■ This game proved more than any other that Ultimate's star had fallen. It sold poorly so now it's a hot collectible of course! On the Spectrum it typically goes for around £50 and doesn't drop off too much on other formats, with the MSX and CPC releases both valued at £30-£40. One to admire on a shelf rather than load up and play.



BUBBLER

VARIOUS

■ This was Ultimate's final game (despite it ending with a "To be continued" message) and it commands the highest value of all the regular releases. It goes for as much as £80 on the Spectrum and £40-£50 on MSX and CPC. There's also an scarce CPC disk release which hardly comes up for sale and is probably worth mega money.

IMHOTEP

COMMODORE 64

■ This C64-exclusive received scathing reviews when it was released (*Zzap!64* awarded it a miserable 20%), but it has fared better as an Ultimate collectible. That said, its value has fallen over the past ten years, dropping from £35-£45 to £20-£25. Its value is unlikely to drop much further so now would be a fine time to grab yourself a copy.

UNDERWURLDE / SABRE WULF

COMMODORE 64

■ This double pack disk release for the C64 was only available in the US, and only then to those who bought the tape versions and sent off the enclosed card to receive the pack via mail order. It's uncommon so value is difficult to gauge, although we can safely say you wouldn't get much change from £50.

ALIEN 8

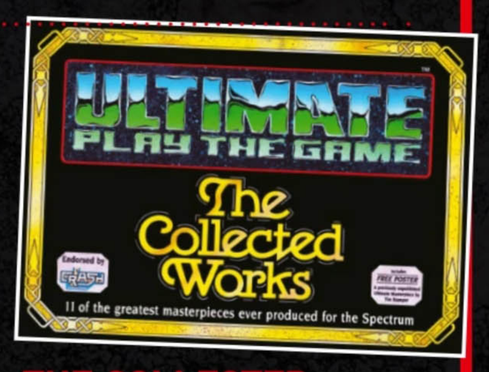
MSX

■ The four Japanese MSX releases will always be collectable. The two Dexter Soft releases, *Knight Lore* and *Nightshade*, are hard to find complete, but it's the two Jaleco releases, *Alien 8* and *Gunfright*, that are particularly sought-after. For *Alien 8* you might be looking to pay as much as £150 to acquire a complete, boxed example.

COSMIC BATTLEZONES

BBC MICRO

■ If you're an Acorn collector then this compilation of *Jetpac*, *Lunar Jetman* and *Alien 8* is a must have, especially as *Lunar Jetman* never received a standalone release on the Beeb. A copy will set you back £25-£30 at present, which may sound bad but its price has halved over the past decade. Now is the time to grab it.



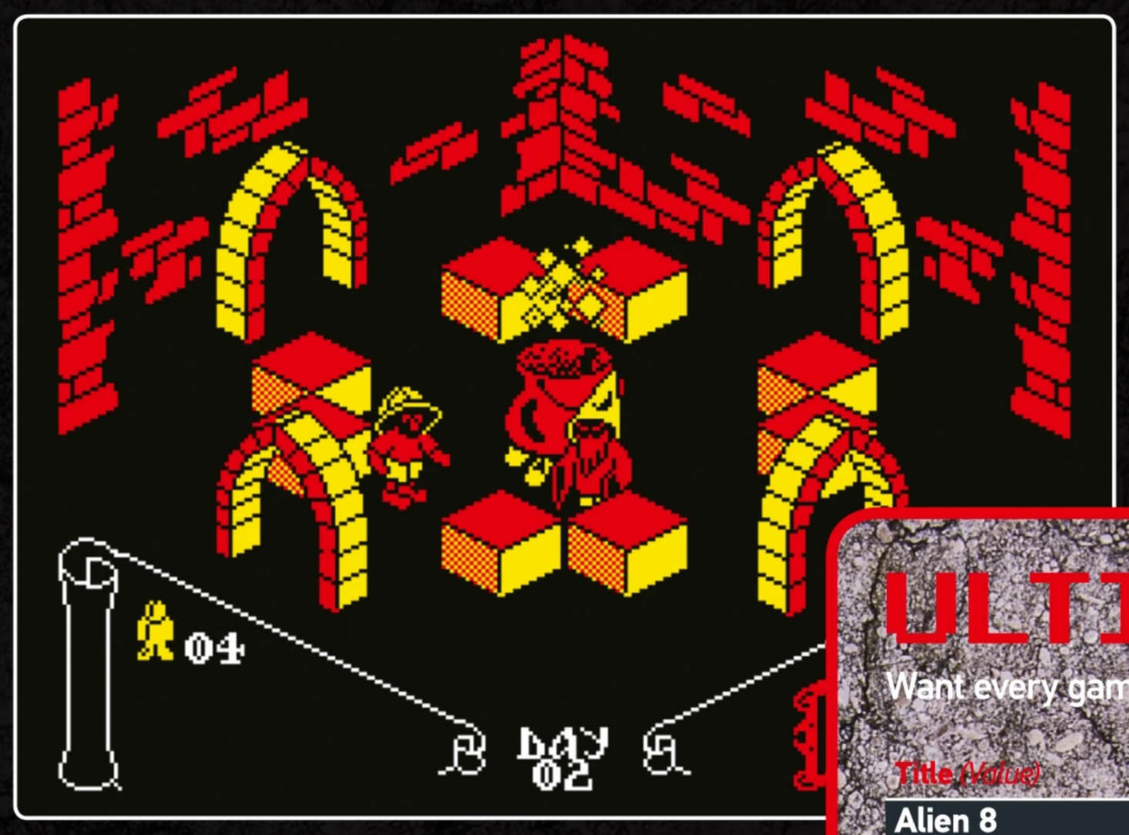
THE COLLECTED WORKS

ZX SPECTRUM

■ This features 11 of the firm's hits, from *Jetpac* through to *Gunfright* (though missing *Underwurlde*). If complete with history doc, hints sheet and 'Land Of Ultimatum' poster it's worth around £50-£60. That's for the tape version however. For the +3 disk version you'll be looking to pay a hefty premium.

▶ that command the highest prices – *Pentagram*, *Martianoids* and particularly *Bubbler*, which was Ultimate's final release and will go for as much as £60-£80. You can expect to pay around the same for the cartridge rereleases of *Jetpac*, *Pssst*, *Tranz Am* and *Cookie* that were published by Sinclair Research (see the Collector's Guide in last month's **Retro Gamer**).

Prices on other formats are less predictable, but the list at the end of the article will give you a general idea of current values. In recent years the value of the Commodore 64, BBC Micro and MSX releases has dropped so now is a good time to fill any gaps in your collection. If you like to collect curios then the Ultimate range has its fair share of interesting items – particularly if you look overseas. For the US market Firebird published a Commodore 64 twin pack that contained both *Underwurlde* and *Sabre Wulf* on disk. There are also four MSX cartridge releases (*Knight Lore*, *Alien 8*, *Nightshade* and *Gunfright*) that were released in



» Amstrad versions of Ultimate's games benefitted from extra colour.

» *Dragonskulle* was the fourth and final Arthur Pendragon game released for the C64.

"THE LARGE BLACK BOX RELEASES STOOD OUT FROM OTHER GAMES"

Richard Burton

Japan and feature unique, if unusual, cover art. These don't come up for sale very often to valuing them is tricky (you're looking at £100+), but if you're after something unusual then you should seek them out. Another Japanese exclusive is the odd (in a good way) version of *Knight Lore* that was released for the Famicom Disk System by Jaleco.

If you're into homebrew then there are a number of fan-made releases that you should consider. Updates of *Knight Lore* and *Alien 8* were produced for the MSX2 in 2009 and these fetch good money on eBay. There's also Dingo, a game that the company developed for the arcades in 1983 and was later remade for the Spectrum in 2011. The remake's graphics artist Mark R Jones hand produced around 100 copies that were mainly sold at retro shows. Along the same lines is *Land Of Mire Mare*, a homage to the famously unreleased Ultimate title that actually began life as a speculative outline and mocked-up screenshot in the *Mire Mare* article in **Retro Gamer** 105. In 2014, 100 physical copies were produced as a Kickstarter perk to support one of Retro Fusion's *ZX Spectrum In Pixels* books. The game and packaging are both in keeping with the Ultimate style and it's quickly becoming a collectable item in its own right, with copies swapping hands for £50+. *

Special thanks to Richard Burton and Mark R Jones for their help.

ULTIMATE CHECKLIST

Want every game? Our list will help you out

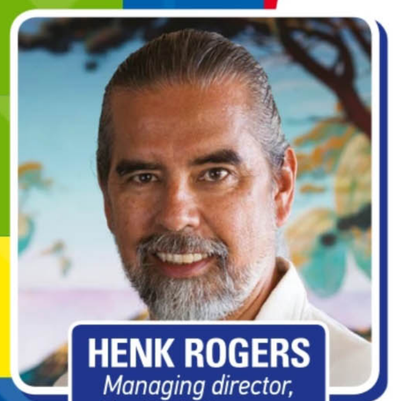
Title (Value)	ZX Spectrum	C64	VIC-20	Amstrad CPC	BBC Micro	MSX
Alien 8	■			■	■	■
Alien 8 (Ricochet)	■			■	■	
Atic Atac	■				■	
Blackwyche		■				
Blackwyche (Ricochet)		■				
Bubbler	■			■		■
Bubbler (disk)				■		
Collected Works, The	■					
Collected Works, The (disk)	■					
Cookie	■					
Cookie (Sinclair cartridge)	■					
Cookie (Sinclair tape)	■					
Cosmic Battlezones					■	
Cyberun				■		■
Dragonskulle		■				
Dragonskulle (Ricochet)		■				
Entombed		■				
Gunfright	■			■		■
Imhotep		■				
Jetpac	■		■		■	
Jetpac (Ricochet)	■				■	
Jetpac (Sinclair cartridge)	■					
Jetpac (Sinclair tape)	■					
Knight Lore	■			■	■	■
Knight Lore (Ricochet)	■			■	■	
Lunar Jetman	■					
Martianoids	■			■		■
Nightshade	■	■		■	■	■
Nightshade (Ricochet)	■			■	■	
Outlaws		■				
Outlaws (Ricochet)		■				
Pentagram	■					■
Pssst	■					
Pssst (Sinclair cartridge)	■					
Pssst (Sinclair tape)	■					
Sabre Wulf	■	■		■	■	
Sabre Wulf (Ricochet)				■		
Staff Of Karnath, The		■				
Tranz Am	■					
Tranz Am (Sinclair cartridge)	■					
Underwurlde	■	■				

THE HISTORY OF TETRIS

TETRIS

FOR CLOSE TO 35 YEARS, TETRIS HAS INFILTRATED THE MINDS AND HEARTS OF GAMERS. CREATOR ALEXEY PAJITNOV, AND TETRIS BOSSES HENK ROGERS AND MAYA ROGERS REVEAL TO DAVID CROOKES HOW THIS SIMPLE PUZZLER BECAME A WORLDWIDE JUGGERNAUT

ALEXEY PAJITNOV
Creator of Tetris



HENK ROGERS
Managing director, The Tetris Company

MAYA ROGERS
President and CEO, Blue Planet Software

There are some videogames out there that are incredibly difficult to tear yourself away from. We're also aware that games can distract you from life's more tedious tasks. What to make of *Tetris*, then? A puzzler that gets so inside your brain, it can lead to the medically recognised 'Tetris Effect' – where you play so much of the game you actually start hallucinating tetrominoes in your day-to-day life. Yet it's a runaway bestseller that's essentially about tidying up the playfield over and over again. Cleaning, we imagine, has never been so successful.

It was a strong pairing of developers which saw this iconic puzzler reach dizzying, multimillion-selling heights, and it ended up in the slippy mitts of so many people and companies that the entire western licensing deal could easily become the basis of a gripping holiday page-turner. Never mind that it's already been the subject of a BBC documentary, *Tetris: From Russia With Love*, *Tetris*' origin story is richer than a Russian oligarch.

To go into the ins and outs of what happened between 1984 and 1989 would likely take over the entirety of this issue. Suffice to say 29-year-old Russian computer engineer Alexey Pajitnov toiled on his humble Elektronica 60 computer at the Soviet Academy Of Sciences in Moscow and created a prototype of an intriguing puzzle game that would eventually be fought over by companies such as Nintendo, Mirrorsoft, Spectrum Holobyte, Andromeda and Bullet-Proof Software.

The breakthrough was a PC version in 1985, created by Alexey with the help of colleague Dmitry Pavlovsky and a young programmer called Vadim Gerasimov. The whole shebang had been inspired by the board game, *Pentominoes*, which involved putting 12 types of five-square pentomino pieces on to an 8x8 grid, rotating and reflecting them to fit without overlapping. Alexey realised that 12 pieces was too much – "People would not be able to remember so many," he says – so he ditched pentominoes for tetrominoes (geometric shapes composed of four squares connected ▶

» *Tetris*' popularity skyrocketed with the Game Boy version. It would go on to become the handheld's bestselling title.

GOING MAINSTREAM

The puzzle masterpiece is so popular it's broken into other forms of media...

MUSIC

■ The single, *Tetris*, shot to number two in the UK charts in 1992. Based on the 19th century Russian folk song *Korobeiniki*, it was created by Dr Spin – the pseudonym used by Andrew Lloyd Webber – and record producer Nigel Wright. Another song called *Tetris* by Madilyn Bailey was released this year and uses the blocks as a love metaphor.

THE SIMPSONS

■ In episode nine, season 14 of *The Simpsons* in 2003, Homer is trying to pack the car only for Bart to question whether he'd be able to get all of the junk in the trunk. "Don't worry," he reassures as an infamous tune plays in the background. "This is what all those hours of playing *Tetris* were for."

TRESTLING

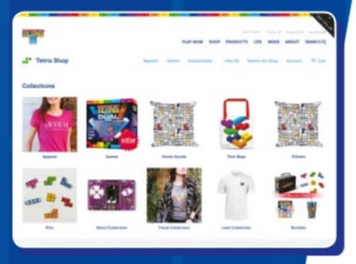
■ Featured in the hit comedy *The Big Bang Theory*, Trestling was introduced as combining "the physical strength of arm wrestling with the mental agility of *Tetris*". Played by characters Sheldon and Raj way back in the first season (episode *The Peanut Reaction*), the idea was to play *Tetris* while arm wrestling with the first to win in either emerging victorious.

PUBLIC ART

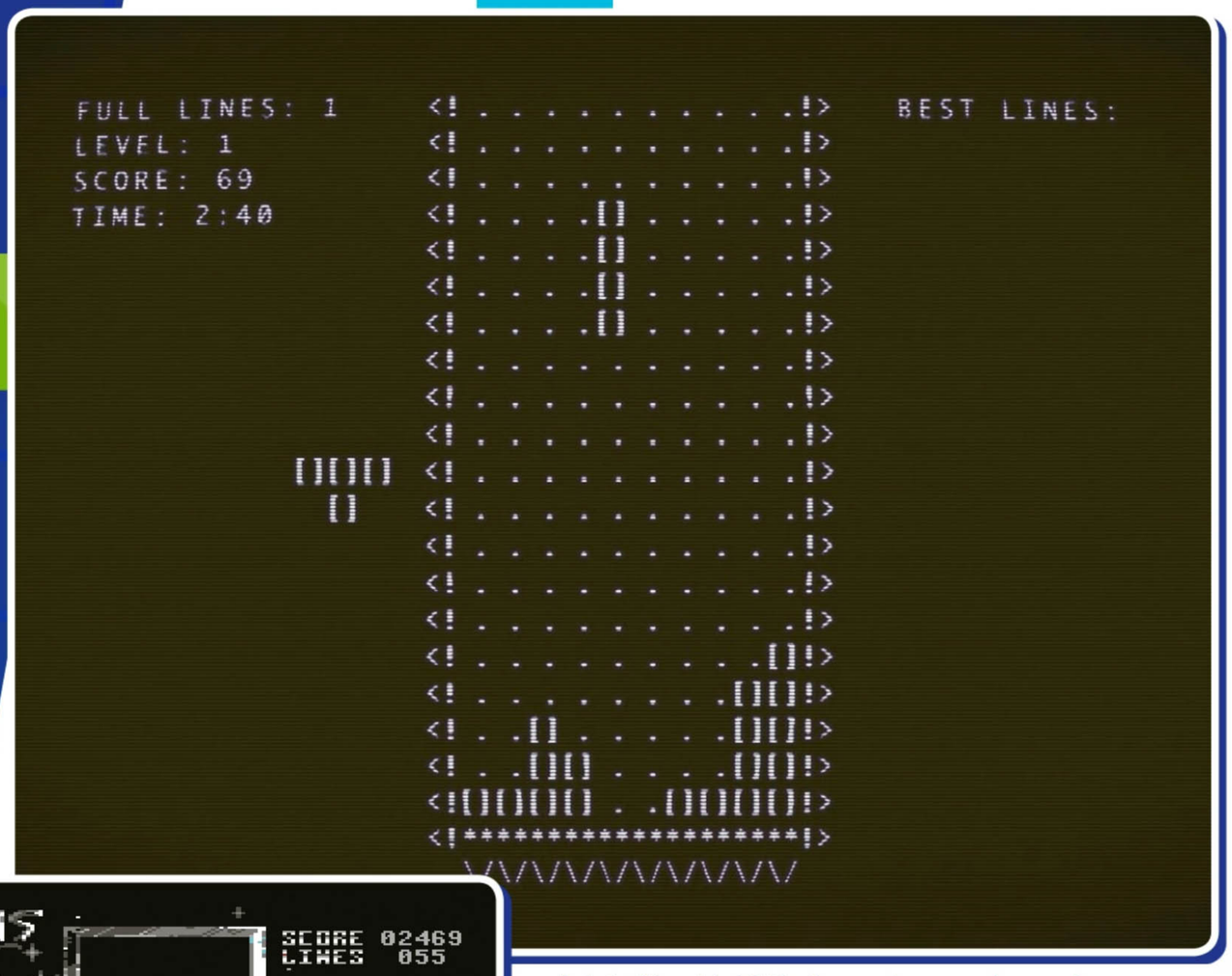
■ By projecting a game of *Tetris* on the side of Philadelphia's Cira Centre in 2014, Dr Frank Lee's art installation not only created a stunning 29-storey canvas on which to play, but earned a world record for the largest architectural videogame display. Meanwhile LummoBlocks in Madrid's Plaza de las Letra used a giant screen and allowed pedestrians to play by simply walking.

Image © Drexel University

MERCHANDISE



■ From T-shirts and tote bags to pillows and lights, the huge variety of *Tetris* merchandise can be seen on the streets, in the home and at work. "Merchandise is a big part of the business," says Maya Rogers. "One of the things we found is that any merchandise where people could see the game and imagine playing it always works very well."



» A photo of the original *Tetris* – the game has come a long way from the simplistic visuals of an Elektronica 60 computer.

» *Tetris* on Commodore 64 was part of the first wave of conversions by Mirrorsoft.

▶ orthogonally), cutting the number of shapes down to seven.

From there, the game found its way out of the USSR. It was ported to the Apple II and Commodore 64 by Hungarian coders then, in 1987, it was converted to many machines for the North American and European markets. The following year, Bullet-Proof Software's boss Henk Rogers spotted the game at the Consumer Electronics Show in Las Vegas and became determined to secure the rights. He released versions for the NES and PC in Japan and, following trips to Moscow, moments of panic and companies creating versions they weren't actually allowed to, he ended up walking away with, among others, the licence to produce ports for handhelds. By putting this into the palms of Nintendo, *Tetris* was created for the Game Boy in 1989. Bundled with the console, it became the best-selling puzzle game of all time, with 30.26 million copies sold.

Tetris suited handheld gaming extremely well. "The Game Boy had a small monochrome screen but *Tetris* was perfect for it because the blocks were easy to see and manipulate," Henk says. As a true pick-up-and-play title, it could occupy short bursts of time while being easy to learn. Players simply needed to move the pieces left and right, rotate them and slot them into place within other blocks at the bottom of the playing field. Getting four lines achieved a tetris, removing them from play. But just getting one line resulted in it being cleared it. It's then a matter of keeping it up so the blocks don't reach the top.

"To me, the Game Boy was made for *Tetris* and *Tetris* was made for Game Boy," Henk continues.

But that's not to say it doesn't work on other formats. *Tetris* has the world record for being the most ported videogame, covering more than 70 platforms. It's available in 185 countries and in 50 languages. It's even been known to help the sick – and we're not kidding: a university study in 2017 claimed it can prevent post-traumatic stress disorder by lessening intrusive thoughts, while playing for three minutes a day is said to decrease craving for addictive substances by a fifth.

Much of that is down to Henk. He struck up an instant rapport with Alexey during his negotiations and the pair became close. "He was the only one who knew anything about games," Henk says. "Everyone else were bureaucrats or KGB." Henk also influenced the direction of the game. "Alexey's original was all about survival so I put in the additional play concept of having points for clearing lines and bonuses for getting rid of three at a time, which changed the way people played," he continues. "I also broke *Tetris* up into levels."

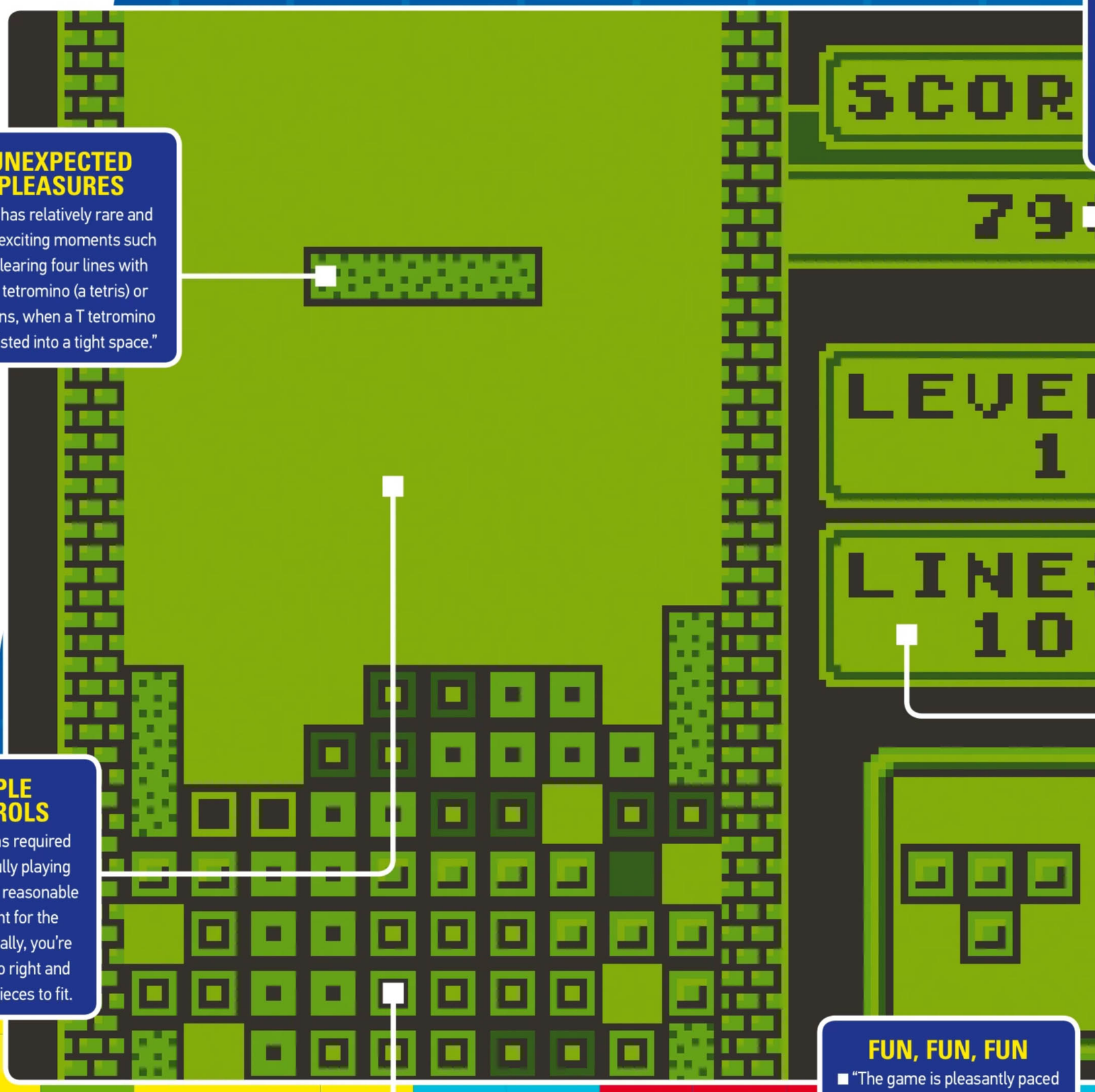
From then, *Tetris* snowballed, evolving, changing and mashing up with other games and concepts. Today, The Tetris Company officially recognises in excess of 220 versions of the game and the first of these came straight away, when in 1989 Alexey, with the help of Andrei Sgenov, designed *Welltris*.

Instead of falling down the screen, *Welltris* had blocks falling into a pit. Players would then move the pieces from wall-to-wall before considering how they'd slot into place at the bottom to complete vertical or horizontal lines. Originally released for DOS and the Mac and ported to 8-bit and 16-bit home computers, it was inspired by another puzzler, *Blockout*, developed in Poland by California Dreams.

"I didn't like *Blockout*," Alexey explains. "It used 3D wireframed blocks that only showed the edges and I thought a lot about how it would be possible to do it myself. I decided to essentially make *Welltris* a 2D game with a real strong sense of 3D by having flat pieces fall down the surface of the walls. The effect of jumping the piece from wall-to-wall, especially on the bottom, uses really complicated 3D effects but it still has the addictiveness of *Tetris* because you work with 2D pieces." ▶

THE DNA OF TETRIS

Alexey Pajitnov tells us why he thinks Tetris is beautifully addictive and works so well



UNEXPECTED PLEASURES

■ "It has relatively rare and very exciting moments such as clearing four lines with one tetromino (a tetris) or T-spins, when a T tetromino is twisted into a tight space."

SIMPLE CONTROLS

■ "The actions required for successfully playing *Tetris* are both reasonable and pleasant for the player." Basically, you're moving left to right and rotating the pieces to fit.

FAST PUZZLING ACTION

■ "*Tetris* combines puzzle-solving and real-time actions," Alexey says, pointing to the way gamers have to think on their feet as they slot blocks into full lines to clear them.

FUN, FUN, FUN

■ "The game is pleasantly paced and it is also fun to play, to watch and to compete."

PICK-UP-AND-PLAY

■ "*Tetris* has a good learning curve – there is a long period when the player feels his or her skills and abilities are pleasantly improving."

RICHLY REWARDING

■ "The game has a natural, great reward/punishment system. All achievements are rewarded with a score and a simplification of the game environment while mistakes put more environmental pressure on the player."

CONVERSION CAPERS

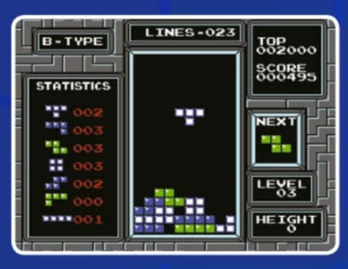
Official versions of Tetris that will steal away your time

NINTENDO

GAME BOY

■ Nintendo's Game Boy version is the most iconic of them all, delivering a pure green screen game of *Tetris* that showed the next available piece, kept score and levelled up when you got ten lines.

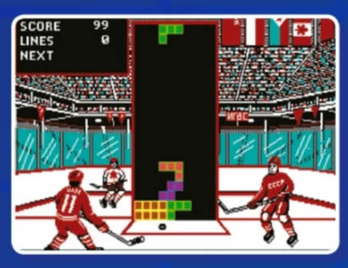
NES



■ Three versions existed on the NES and this was Nintendo's. Although it only allowed for single players, it had bigger and more vivid blocks than Tengen's version and it was faithful to Alexy's original game.

SPECTRUM HOLOBYTE

DOS

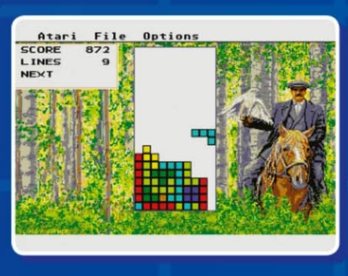


■ This version was the one that originally got PC gamers hooked to their keyboards. Not only was this rendition fast and smooth, it let you push up to change the background on the fly.

APPLE II

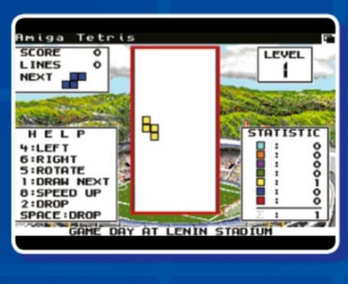
■ After choosing your level and height, you could get down to business. The pieces fell slowly, almost jerkily, to the sound of Russian folk music but the changing backgrounds added variety.

ATARI ST



■ Spectrum Holobyte produced its own fantastic version of *Tetris* for the Atari ST. It had some stunning backdrops depicting Russian cultural iconography as well as some classic Eastern European tunes.

AMIGA



■ The keyboard's control layout could have been better, but this game avoided the horrid garishness of the Mirrorsoft version and so it felt much more like pure version of the much-loved puzzler as a result.

MIRRORSOFT

COMMODORE 64

■ Set against a black and white backdrop, the coloured basic-looking blocks of this version of *Tetris* really stood out. It was certainly a graphically unique, almost haunting version of the game.

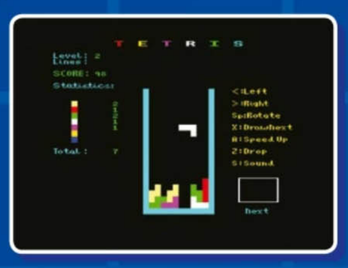
ZX SPECTRUM

■ Depending on which version you went for – 48K or 128K – you'd have different title music and either sound effects or a tune playing as you got to grips with this surprisingly smooth-running rendition.

AMSTRAD CPC

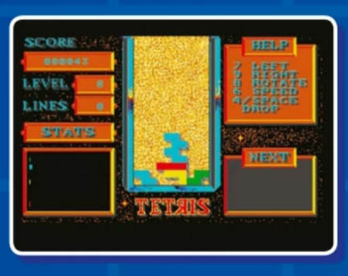
■ Played to the backdrop of a god-awful tune, *Tetris* on the CPC also had eye-searing graphics, a mind-boggling striped background and frustrating controls. Not one of the finest ports if we're honest.

BBC MICRO



■ A glorious, basic-looking *Tetris* port that features ten levels of skill and literally throws you straight into the action. Its major disappointment are the simple beeps – no mood-setting music here.

ATARI ST



■ Quite why Mirrorsoft decided to include a fuzzy yellow background in this version of the game is anyone's guess (it can be turned off). You'd have to perform exceedingly well to get on the high score table, too.

AMIGA

■ Near-identical to Mirrosoft's Atari ST version, the music could become annoying after a while but its perspective effect on the blocks was nice and it was ranked one of the 100 best games by *Amiga Power*.

TENGEN

NES

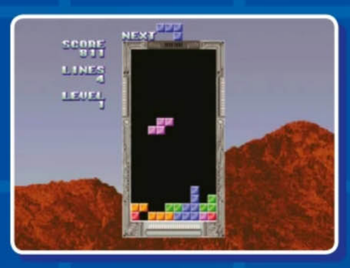
■ This Tengen version is often considered to be the best thanks to its presentation (coloured blocks become the same colour as they land) and options including cooperative, versus and against-AI modes.

ARCADE

■ The Tengen NES version's style had been influenced by this rendition of *Tetris*: Atari Games' arcade port of the game. Of course, the arcade version looked and sounded more impressive.

SEGA

ARCADE



■ Sega's arcade *Tetris* was a hit across Japan where players loved the challenging marathon mode. Pieces can rotate anticlockwise and there was time to rotate a piece on the ground before locking it in.

MEGA DRIVE

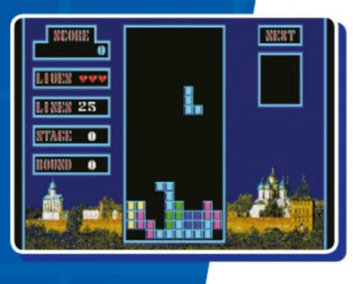
■ Nintendo became synonymous with *Tetris* because Sega's efforts were trashed. But it's worth seeking out: there are two rotate buttons and doubles mode where players share the same pieces well.

BULLET-PROOF SOFTWARE

NES

■ As a less-well-known version of *Tetris* on the NES, Bullet-Proof's effort was nevertheless the first. Clear 25 lines to advance and try not to use up your three lives too quickly.

MSX2



■ With beautiful presentation and the existence of three lives as with the NES version, *Tetris* on the MSX was detailed yet slow. Pressing up to rotate the pieces was confusing, though.

"DR MARIO WAS A BLATANT ATTEMPT TO COME UP WITH A TETRIS REPLACEMENT"

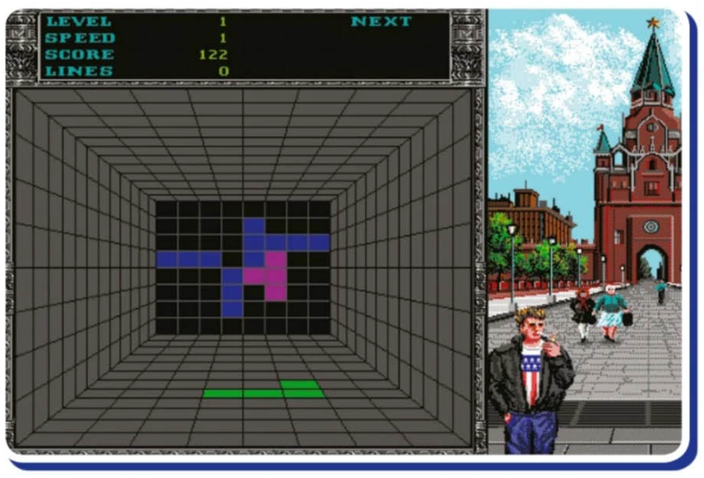
Henk Rogers

Welltris was followed by *Hatris*, a more peculiar take on *Tetris* because, as the name suggests, it involved headwear. Players stacked five identically-styled hats and it remains one of Alexey's favourites. "We originally considered doing something with utensils and other kitchen objects but thought hats would be more fun. It was very funny and we couldn't stop playing it. We hoped it would be really popular."

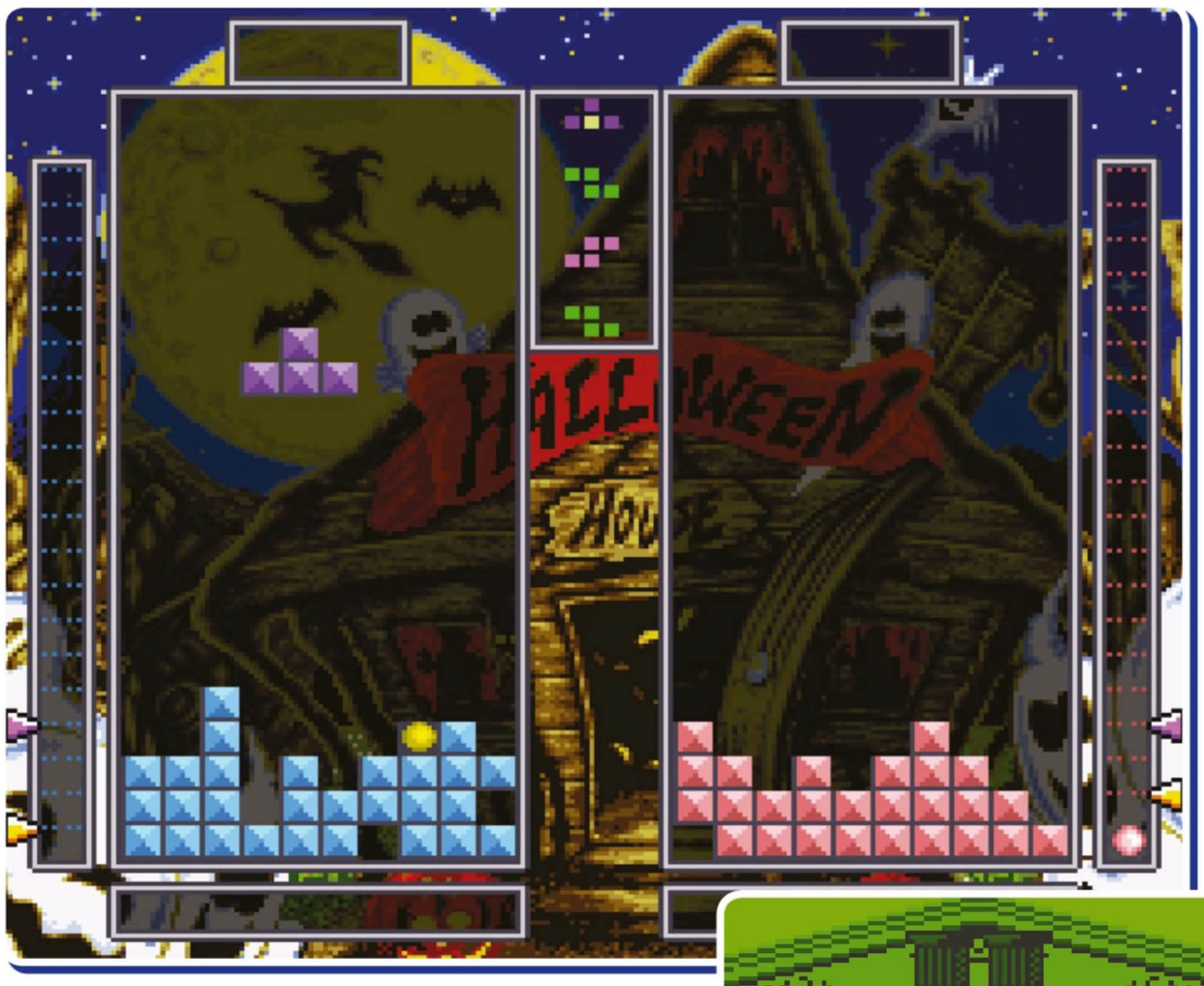
Henk did, too, and he released it for the NES, Game Boy and TurboGrafx-16, while an arcade version was created by Video System. "But the sales didn't match our expectations," Alexey laments. "I still can't explain what was wrong with it and why it was not as addictive as we wanted it to be. We thought it had some smart moves so it was a big disappointment."

Such bafflement was less apparent for *Faces Tris III*. Although this game won Best Action/Arcade Program in the Software Publishing Association's Excellence in Software Award, Alexey, who worked on it with Vladimir Pokhilko, admits: "Personally, I didn't like it very much. We forced it on Spectrum Holobyte and it was interesting because the pieces would form a human face. But somehow the effect of your mistakes was an ugly image on screen." As it turned out, *Faces Tris III* was the last *Tetris*-style game that Alexey directly created. But still the franchise continued.

Strong efforts were made to keep *Tetris* fresh. *Super Tetris* in 1991 had bolts of lighting, competitive and two-player co-op and, crucially, bombs that would remove as few as two or as many as 16 blocks. *Tetris 2 + Bombliss*, by Bullet-Proof Software, meanwhile, allowed for traditional games of *Tetris* but included a set of games that connected bombs to the pieces and allowed for greater explosions if there were many lines. Nintendo's *Tetris 2* changed the pace and inserted extra, irregular tetromino shapes, some of which did not adjoin. It also popped in some bombs for good measure, adding two-player simultaneous play and encouraging



» With *Tetris* doing very well, Alexey Pajitnov was hoping for equal success with *Welltris*.



» *Tetris Battle Gaiden* was a Japan-only release by Bullet-Proof Software where players shared one queue of pieces.

» Alexey Pajitnov experimented with *Tetris* and ended up with *Hatris* that had two hats fall from the sky in order to be matched.

gamers to match blocks of the same colour. As the box suggested, it was a "tougher *Tetris* challenge".

"I liked these but I really enjoyed *Tetris Battle Gaiden* – that was probably one of the best games," says Alexey of those early iterations. *Tetris Battle Gaiden* was published on the SNES by Bullet-Proof in 1993. "It was really innovative with some good ideas – they put extra levels on top of the regular *Tetris* game and when you strategically collected specials, you could use it as a defence or an attack weapon," Alexey continues. "But unfortunately it was a rushed production and they didn't polish it enough. That kind of game needs three or four years just to balance it accurately and make it fun. The balancing of a game is part of the testing process and it's usually done on a very tight schedule."

Even so, *Tetris Battle Gaiden* forced players to rethink their strategies. Gamers strived to defeat their opponent by making use of the four special powers handed to each playable character and it ensured success could only come with a sharp eye, good timing and dollops of strategy. It appeared to go down better than *Dr Mario* (despite it being one of the better games inspired by *Tetris*). "I was pissed off about that game," admits Henk. "*Dr Mario* was a blatant attempt to come up with a *Tetris* replacement and I thought they did it in a cheesy way."

Originally a NES and Game Boy title, *Dr Mario* was enhanced and paired with *Tetris* on the SNES for the release of *Tetris & Dr Mario* in 1994. It didn't affect the franchise, however. Henk cemented his relationship with Nintendo ("Which was good before *Tetris*," he says, having published *Black Onyx*, the first RPG made in Japan on the NES in 1988). This led to Bullet-Proof Software releasing *Super Tetris 3* for the SNES at the end of 1994.

A year later, Henk set up a new company, Blue Planet Software, based in Hawaii, and it became the exclusive agent for the *Tetris* brand. In 1996, The Tetris Company was formed and a set of guidelines were created to pin down quality standards and consistency in the games that were created from that point on. By outlining a minimum specification for *Tetris* titles, third-party developers could be sure their game would be granted a licence. They'd specify what buttons should do what, for example, so players could easily move from platform to platform with comfort. They'd also discuss super rotation of the pieces to dictate how the blocks spawn and ought to behave.

Henk and Alexey vowed to keep raising the bar. Perhaps more importantly, Alexey began to be rewarded. Up until that point he had not received a single ruble for his efforts on *Tetris* due to the complications of Soviet-era contracts. Instead he had granted his rights to the government for ten years so 40 million sales counted for nothing in his pocket. With the rights reverting to him, he could finally collect royalties. "That was good," he says modestly.

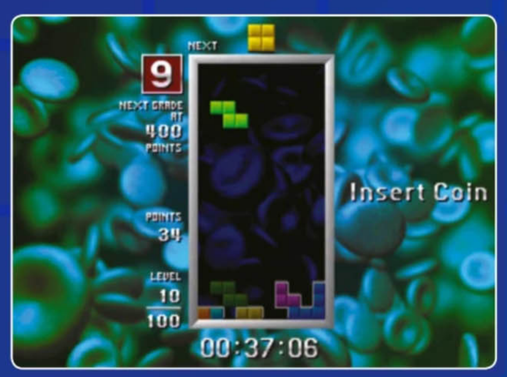
Indeed it was because *Tetris* was on a roll. There had been a couple of Virtual Boy releases – Bullet-Proof's *V-Tetris* in Japan and Nintendo's US-only *3D Tetris*, the former adding a cylindrical puzzle mode to the traditional game and the latter rendering the blocks as 3D wireframe models. Meanwhile, *Tetris Blast* was released in 1996 for the Game Boy as a version of *Bombliss* that needed bomb pieces to clear lines, throwing in some dominoes and triminoes for good measure. This version had a cool tournament mode that placed blocks ▶

BLOCK BUSTERS

The tetromino sequels that are worth your time

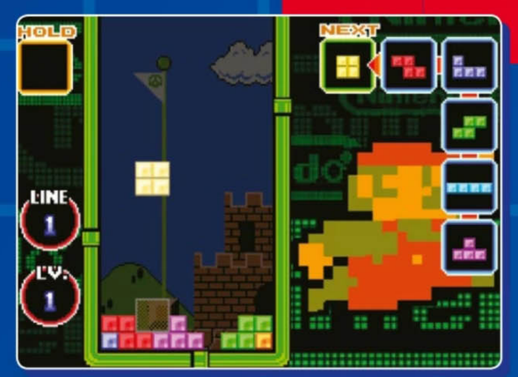
TETRIS: THE GRAND MASTER ▸

■ This arcade game was a chance for advanced players to prove how good their skills were. Rather than level up by clearing lines, players would see the level counter increase for each piece dropped and for every line cleared. The speed would rise and eventually pieces would instantly drop (at a speed known as 20G).



TETRIS DS ▸

■ As well as offering the standard game (albeit with 8-bit homages to other Nintendo titles on the top screen and endless rotating at the bottom), *Tetris* on the DS handheld console arguably picked up where the Game Boy *Tetris* left off. Its touch mode made good use of the stylus as you shifted blocks at the bottom to allow the creation of rows.



◂ PUYO PUYO TETRIS

■ The tile-matching game *Puyo Puyo* has long been popular in Japan, with blobs falling down the screen and players looking to match them by colour in groups of four to create huge combos. It's very strategic and tactical and, in a mash-up with *Tetris* (particularly in the Fusion mode), has formed a superb follow-up that heavily emphasises competitive play.

◂ TETRIS ATTACK

■ Released for Nintendo's Game Boy and SNES, this spinoff title includes the *Tetris* name and it sure has blocks in it. But they don't fall, nor are they made up of four squares, and so the overall package is, in truth, simply a match-three puzzle game that uses *Tetris* brand name to draw in fans. Still, it's great fun, with a single-player and multiplayer modes.

TETRIS GIANT ▸

■ From the tiny screen of the Game Boy to the colossal arcade machine that is *Tetris Giant* the puzzle franchise has come a long way. But although the fast onscreen action is highly attractive in this version (the grid on offer here is a chunky 6x7 rather than the usual 10x20), it's the humongous controllers, one red and one green, that truly catch the eye.

MAGICAL TETRIS CHALLENGE ▸

■ Produced by Capcom, this version features Disney characters but, more importantly, some nice innovations. The Temporary Landing System lets you see where a piece is heading, while the 'magical' mode lets you send hard-to-fit pieces of more than four blocks to opponents when you clear two or more lines. It also has great music.

◂ SUPER TETRIS 3

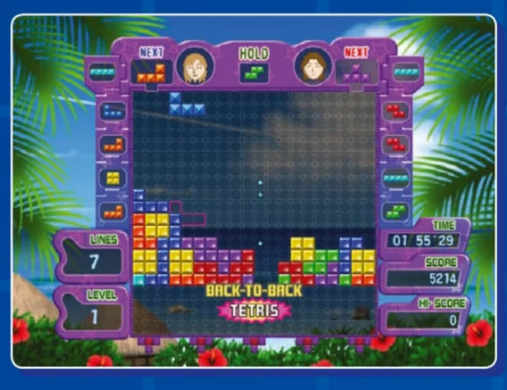
■ Created by Blue Planet Software for the SNES, *Super Tetris 3* was played to the traditional background tune of *Korobeiniki* and it not only allowed up to four players in a Familiss mode, it inserted a *Bombliss*-style game with Sparkliss and, crucially, amazed gamers with Magicaliss: create a line of a single colour and every other block with that shade would vanish.

◂ TETRIS BLITZ

■ Henk Rogers tells us that he wanted to get the gaming time of *Tetris* down to two minutes in this iOS and Android title as it meant it could be playable between train stops. *Blitz* also got you spending thanks to its freemium model but it made use of a great one-touch control system.

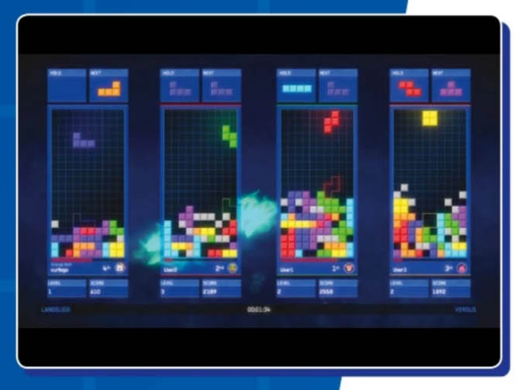
TETRIS PARTY DELUXE ▸

■ Offering lots of variations on *Tetris*, this Wii and DS title included a number of fun modes such as Field Climber which had players trying to get a tiny character to the top of the screen and Bombliss which hadn't been seen since 1993. The Sprint mode had you frantically trying to clear 40 lines in the fastest time possible. There was co-op versus co-op, too.



TETRIS ULTIMATE ▸

■ Released in 2014, this game marked the 30th anniversary of *Tetris* and it was developed for the Nintendo 3DS before being made available on the PlayStation 4, Xbox One, PlayStation Vita and Windows. It got top marks for its smooth online multiplayer, with up to seven players able to do battle. There were also time and marathon modes to tackle.



"IT WAS HUGELY INTELLECTUAL AND I STILL ENJOY IT FROM TIME TO TIME"

Alexey Pajitnov

▶ on the field of play prior to the start of the game as well as a lovely battle mode which entailed destroying a creature – most satisfyingly by dropping blocks on its head. Meanwhile, a new puzzle mode was added for *Tetris Plus* where you needed to get a climbing professor to the bottom of the screen by clearing blocks from under him, trying hard not to crush his head on the spikes above.

None of those were anywhere near as odd and innovative as *Tetrisphere*. "That was a very strange project which I did with Ken Lobb, my friend at the time," says Alexey. "We'd worked at Microsoft together and he was really fascinated by the idea of *Tetris* of the sphere. But it was too complicated, even though it was interesting to work on."

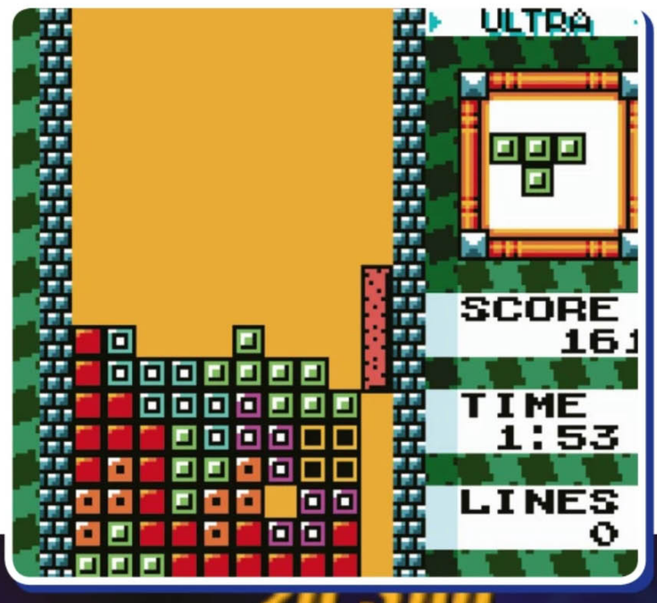
Developed by H20 Entertainment and published for the N64 by Nintendo of America, *Tetrisphere* was revolutionary and polished to near-perfection but it required a lot of learning. Perhaps for the first time, a game of *Tetris* was pushing the graphical boundaries of a machine. Wholly original, it revolved around a rotating ball that you pulled blocks off in layers to reveal enough of the core. "It was hugely intellectual and I still enjoy it from time to time," Alexey says.

Other N64 titles followed. *Tetris 64* was released in Japan and it was notable not just for allowing up to four players but for being the only game that ever made use of SETA's Biosensor, a device that connected to the controller's extension port and came with an ear clip. As daft as it would make you look, it measured the player's heartrate and altered the speed of the game depending on whether you were close to cardiac arrest or chilling. The concept was certainly more out there than, say *Tetris 4D* on the Dreamcast or *Kids Tetris* by Hasbro. *Tetris DX*, a version of the game for the Game Boy Color from 1998, was a little gem, however.

"For *Tetris DX*, Nintendo came to us with the Game Boy Color and asked if we could keep the same game," says Henk. "But we designed the ultra mode which built on the marathon mode by having a three minute time-limit. We called it ultra because there was a character in Japan called Ultraman who, when the world was going to hell, would have three minutes to defeat the monsters. It kind of became a new standard."

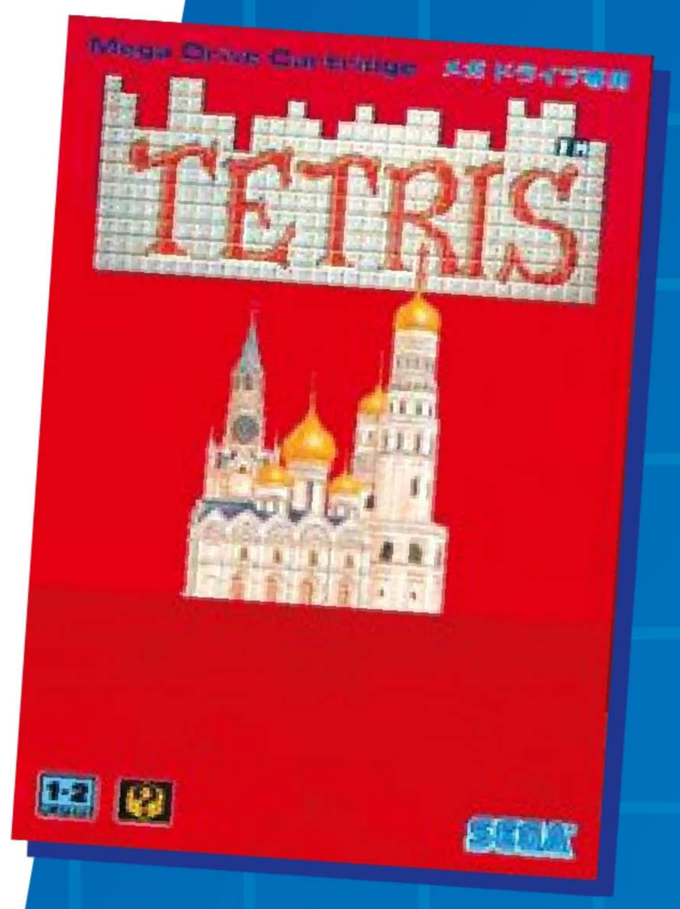
By now, of course, gaming had (one could argue, perhaps controversially) come on in leaps and bounds, so tiles falling and fixing into place could easily be seen as old hat(tris). *Tetrisphere* was proof that the concept could be modernised and tweaked, while still being faithful to the original, but there were other approaches to *Tetris* as it continued to prove a mainstay of gaming.

Just before the turn of the 21st century, for instance, the arcade was blessed with *Tetris: The Grand Master*, a chance for players to prove how accomplished they were by upping the ante. There was also *The New Tetris* for the Nintendo 64 that included real-time renders of famous buildings and a new gaming mechanic where you could make a four-by-four block that, when cleared, would generate many point-scoring lines. Players could also hold a piece that could be swapped with one that was falling and see the next three blocks for ▶



» *Tetris* came to the GBC in the guise of *Tetris DX* which included a three-minute Ultra mode.

» *Tetrisphere* was a gorgeous-looking game putting a very different spin on the *Tetris* franchise.



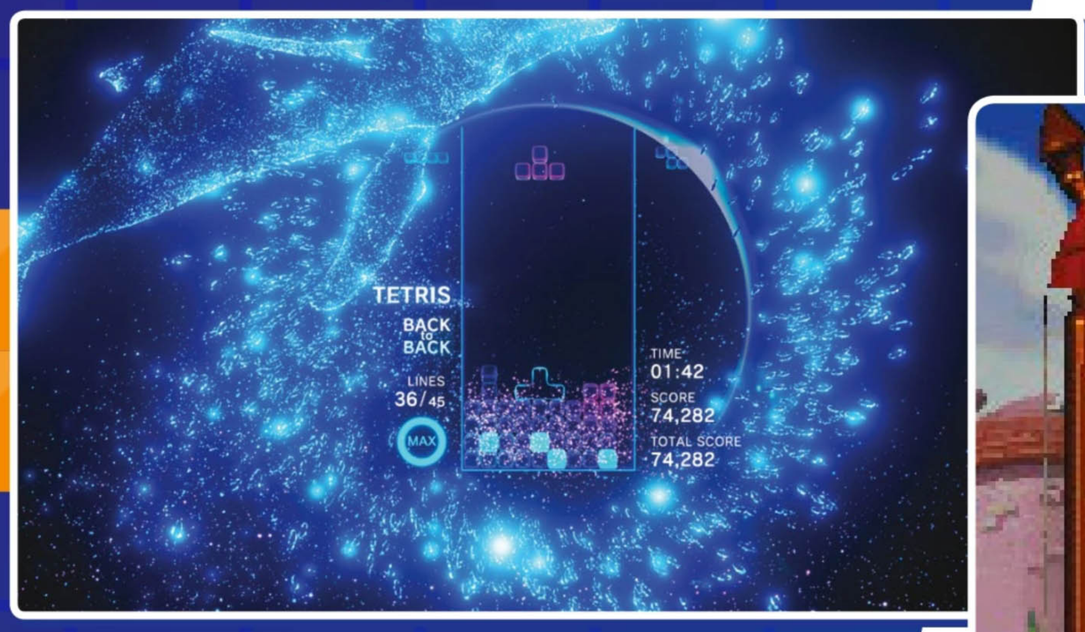
HOW MUCH!?

A version of Tetris has collectors' wallets cowering in fear

In July 2011, an eBay seller created a listing for the Japanese Mega Drive version of *Tetris*. The Buy It Now price? A cool $1 million, but then this game – signed by Alexey Pajitnov, no less – is the most rare of all of the *Tetris* ports. With an estimated ten copies thought to exist in the entire world today, it's little wonder it is so highly sought after.

The reason there are so few units around is down to the licensing fiasco surrounding *Tetris* in its early years. Bullet-Proof Software had the rights to console versions of the game in Japan and so Sega's game – produced at the same time as the System-16 arcade version – was blocked from being sold.

The idea is that Sega then destroyed its production run but some copies leaked out. Whether or not that makes it worth such a high sum is open to debate, though. The seller – shinsnk – is thought to have originally bought the game for $16,000 four years previously and, in truth, that sounds about the right price.



THE TETRIS EFFECT

The iconic puzzler heads into the world of virtual reality

According to a Harvard University study in 2000, 60 per cent of people who play *Tetris* for more than seven hours over three days end up seeing blocks falling after they stop playing. They also look at buildings and seek to move the blocks in their mind to complete lines, and even take to dreaming about those damned tetrominoes.

So what have the brains behind *Tetris* done? Well, licensed a trippy game called *Tetris Effect*, which is named after the phenomenon. What's more, the reigns have been handed to Enhance president and CEO Tetsuya Miziguchi, who created *Lumines* and *Rez Infinite*. It will be released for the PS4 with PS VR support and it promises to infiltrate your mind like never before.

"The idea behind *Tetris Effect* the game is to amplify and enhance that same magical feeling where you just can't get it out of your head, and not just the falling shapes, but all the visuals, the sounds, the music – everything," Miziguchi wrote on the PlayStation Blog.

He says this will be done by using background elements, audio, special effects and, last but not least, pulsating, dancing, shimmering, exploding, musical pieces. There will also be more than 30 stages complete with music, characters and animation to provoke emotional responses and convey moods.

» *Magical Tetris Challenge* combined *Tetris* with, well… magic, alongside a cast of Disney characters.

"SMARTPHONES INHERENTLY CHANGED HOW TETRIS IS PLAYED"

Maya Rogers

» *Tetris: The Absolute The Grand Master 2 Plus* – it's name is nonsensical and its difficulty takes no prisoners.

▶ better planning. Then there was *The Next Tetris* that had you clearing pre-placed blocks, introducing multicoloured pieces which really had you scratching your head. And, of course, *Magical Tetris Challenge,* developed by Capcom and starring Mickey Mouse, Minnie Mouse, Donald Duck and Goofy, it let you play seven variants of the game, with the upside-down mode being particularly good fun since every line you cleared was added to your opponent's pile. *Tetris Worlds* introduced the infinite spin where tiles could be rotated after touchdown.

In 2002, Henk launched Blue Lava Wireless to develop mobile phone versions of *Tetris* which he sold to Jamdat three years later, granting it an exclusive 15-year licence to publish *Tetris* on mobile phones. That power switched to Electronic Arts in 2006, the year *Tetris* for the iPod was launched, bringing it to yet another platform and a new market. Of greater note was the release of *Tetris DS* which followed a few *Grand Master* sequels and *Tetris Elements* (a game that let you import MP3 tunes and incorporated the natural world into *Tetris*). "With *Tetris DS*, we were able to put the game on another Nintendo handheld and they did a great job of implementing it," says Henk.

The DS version made use of the handheld's two screens and it was a delight for 8-bit gamers thanks to its themes based on *Donkey Kong, Metroid, Super Mario Bros* and the *Legend Of Zelda* among others. Tower mode had you using the touch features to free balloons by clearing a mass of pieces from the screen. The game also ended up in the Guinness World Records, this time as the first wireless *Tetris* game. It allowed ten players to compete locally or four via Wi-Fi.

T*etris* was on a high and, in recognition for his incredible contribution to gaming, Alexey was handed the First Penguin award (now the Pioneer Award) at the Game Developers Conference in 2006. *Tetris* also moved effortlessly from one generation to the next: come 2007 and *Tetris Splash* (complete with a watery theme and six-person online play) was launched on Xbox 360's Xbox Live Arcade, becoming the first game published under The Tetris Company's new subsidiary, Tetris Online.

By now, Henk' daughter, Maya, had joined Blue Planet Software and she headed up game development, global licensing, marketing, brand management and IP enforcement. She helped pushed *Tetris* into different directions. *Tetris Party* was released as WiiWare, for example, making the game playable via a Balance Board. EA pumped out *Tetris* for the iPhone and iPod Touch, while an online multiplayer *Tetris* went to the top in South Korea.

» *Tetris Party* brought the puzzling madness to the Wii, and added a mode which let you control the action with the Balance Board add-on.

In 2010, *Tetris* debuted on the iPad and surpassed 100 million paid mobile downloads making it the best-selling mobile game for its time. "If you compare the original *Tetris* to what it is today, it's very different," Maya says. "Smartphones inherently changed how *Tetris* is played. There are now controls and it's all swipe touch. We work hard on prototyping and development to ensure *Tetris* is available on each new platform."

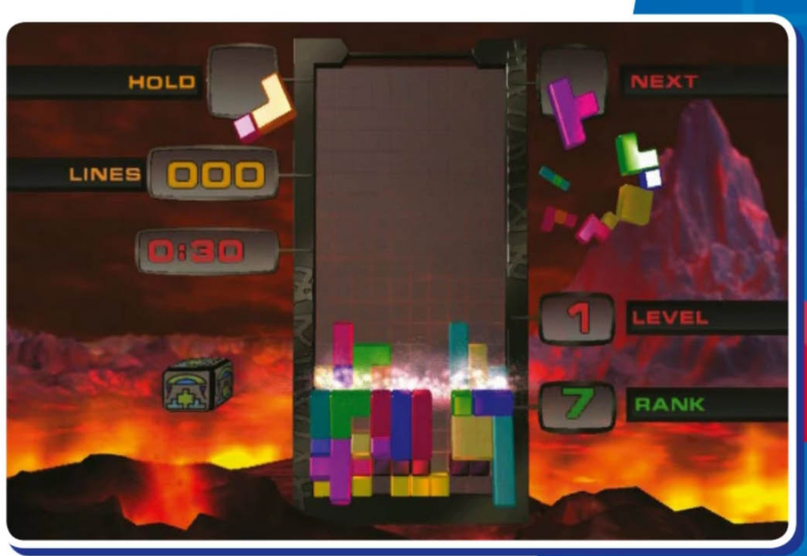
The *Tetris* guidelines are still in place and steps are taken to ensure they're adhered to. "We're technically a licensing company and so we licence our IP to different developers, looking at whether they are the right partnership for that market," Maya continues. "We work with their development team and train their QA department to teach them what has to be done and what can be done. We spend a lot of time talking about what *Tetris* is today and what's been done in the past, brainstorming ideas for new platforms."

Some of those have included experiments in augmented reality such as in *Tetris Axis* for the 3DS. Games have been produced for Facebook such as *Tetris Battle* and *Tetris Stars*, allowing for online play. Electronic Arts worked on the ultimate casual *Tetris*, *Tetris Blitz*, by ensuring games would last for just two minutes at a time. But while the hunger for platforms has even seen *Tetris* appear on the Amazon's Fire TV and Ouya the biggest breakthrough has been *Puyo Puyo Tetris* in 2014. "That's been developed by Sega and it's on every console under the sun," says Maya.

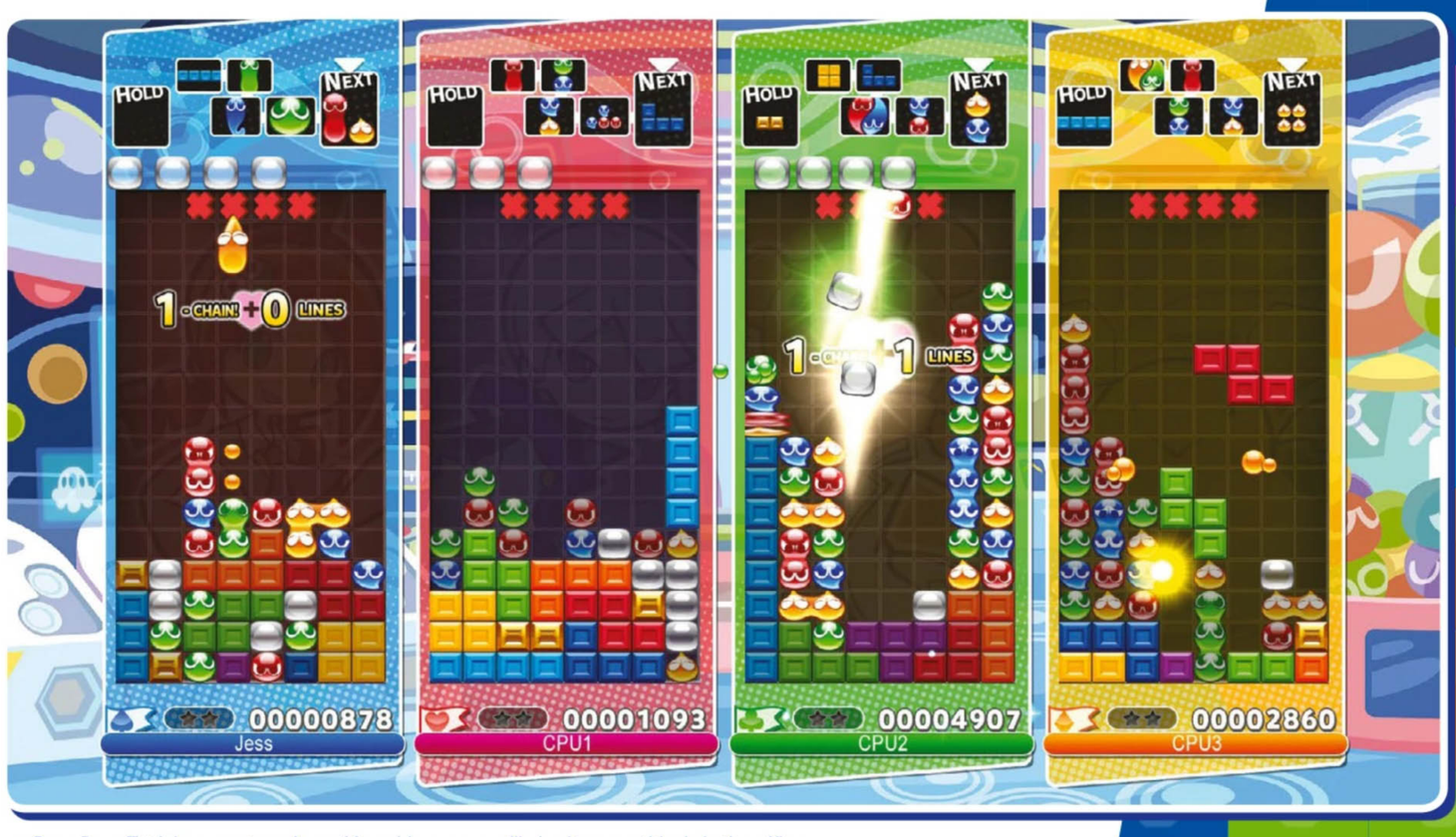
Puyo Puyo Tetris was originally rolled out in Japan for the 3DS, Wii U, PS Vita and PS3 before getting an outing on the Xbox One, PS4 and Switch. It made its way to North America and Europe last year and it's sensational, combining the styles of Japanese favourite *Puyo Puyo*, a tile-matching game, with *Tetris* in the Fusion mode. It's fast-paced and competitive with blocks and puyos alternating on the game board and dollops of strategy involved. Can it be bettered by the forthcoming *Tetris Effect* which takes the into modern VR? We'll have to wait until later this year for an answer.

In the meantime, there's still a concern about clones. "*Tetris* is one of the most copied games in the world and we spend time cleaning up the landscape," Maya says. Asked whether those clones have ever led to fresh ideas, she adds: "It does happen and they end up becoming a licensee but I would say most of the time we've already thought of it."

Still, at least it shows there's interest. To date, there have been around 500 million mobile downloads ("As far as the bank goes, that's my favourite," laughs Henk). People are also getting better at the game: American Kevin Birrell became the first player outside of Japan to achieve grandmaster status in *Tetris: The Grandmaster 3* in 2015. But it must keep fresh. "Our vision now is how do we keep *Tetris* going for the next 30 years?", Maya says. We're sure they'll find a way. *



» *Tetris Worlds* offered a host of new modes alongside four-player multiplayer.



» *Puyo Puyo Tetris* is a great mashup of franchises – we still play it competitively in the office.

THE HISTORY OF AMSTRAD

» Amstrad's second generation of PCs hit the headlines for the wrong reasons in 1989.

AMSTRAD

For more than ten years, Amstrad produced dozens of computers from the CPC to the PCW and IBM PC compatibles. Founder Lord Sugar talks to David Crookes about that period, along with Roland Perry and Richard Chandler

Between 1987 and 1989, *Amstrad Action* ran an amusing comic strip called Sugarman. You could say it was the precursor to the fictional mutant villain of the same name which made an appearance a few years later in Marvel Comics' *Generation Next*, but you'd be lying. No, this one was based on Alan Michael Sugar and his determination to dominate the world with his computers. It touched upon themes as varied as his buyout of Sinclair and his failure to break into America.

The strip wasn't by no means essential reading, but it was proof that Alan Sugar – or Lord Sugar as he is now known, after being created a life peer in 2009 – was rather well known. After all, it was near-impossible to separate Amstrad from the man given that it bore his name (Alan Michael Sugar Trading). It was he who called the shots, made the decisions and drove the bargains which ensured the company was a success.

Born on 24 March 1947, Lord Sugar had become business-minded from a young age. He sold ginger beer to his classmates at school, woke early to work on a market stall and bagged various jobs as a teenager. He became familiar with hundreds of retailers across London as a salesman for companies such as Robuk Electrical, R Henson and Binatone. It put him in good stead for founding Amstrad in 1968.

» The CPC 664 was only on sale for six months. Amstrad decided to replace it with the 128K CPC 6128.

Image © Retro Computer Museum

Initially, he rebadged products for sale but he soon began thinking of items he could make from scratch and sell for less than others. His breakthrough was producing dust covers for hi-fis, using a technique called injection moulding – enabling him to sell each unit for a few quid. Before long, Amstrad was also making amplifiers and tuners.

AMSTRAD

» The CPC range was well-supported at the time, with popular games magazines like *Amstrad Action* and *Amstrad User*.

But it was Lord Sugar's foray into producing all-in-one music centres that brought him success. He combined an amplifier with a tuner and tape deck into a single unit and made them look like they were separate. Powered by one plug and retailing for £199, it came with the bonus of needing little time to set up. Audiophiles hated it, but Lord Sugar wasn't bothered.

"There had been a falsehood in the early days of hi-fi and audio that the big Japanese brands had something very, very special about them," he tells us. "But actually there was nothing special about them. We just manufactured products and sold them at a price in relation to what they cost to build and not what people thought they were worth to sell."

Although Amstrad also made car, portable and clock radios, by 1982 Lord Sugar began looking for a new market to enter. He noted the successes of Sinclair, Commodore and Acorn in the home computer industry and spotted a problem he felt he could resolve. "If you owned one of their computers, you had to commandeer the television set in the home," he says. "You had to plug it in and use an RF modulator to tune it to a certain station on the television. Then you had a separate cassette box or something like that to load programs on. It was very, very messy."

Lord Sugar believed he could do for computers what he did for hi-fis. "My solution was very simple," he tells us. "You do it all-in-one. You go and buy a package which has its own screen and its own datacorder and you plug it in and away you go. No wires. That was the philosophy behind Amstrad. We wanted to make it easier." But Lord Sugar also realised that if he wanted to get a computer in the shops, it needed to be designed from scratch. There was no time to waste.

"The wisdom was that it would take about a year to develop a computer," says Roland Perry, a Cambridge graduate who was working for the component supplier and hardware design consultancy company, Ambit International. "So Amstrad handed the task to a couple of guys they had worked with in the past. Only these guys didn't really understand the enormity of the task and when they realised they were never going to deliver it, they did a runner."

» Amstrad released an A4-sized portable Z80-based computer called the NC100 Notepad in 1992.

Alarmed, Bob Watkins, Amstrad's technical and manufacturing director, turned to Ambit and asked if the team could help rescue the computer. "They needed to find someone mad enough to think they could pick up the entrails and do something useful with it in three months," Roland laughs. "And that's what we did."

Lord Sugar inherently believed creating a computer was a straightforward process. "We were a consumer electronics company and there was kind of an air of mystique that people were trying to make about computers," he remembers. "My view was that they were just another piece of consumer electronics and there was no mystique about them. I felt if we applied our mass production philosophy to it, we would come up with a winning item."

To create that first computer, Amstrad studied the Commodore 64, BBC Micro and Spectrum, noting the good and bad bits of each one. They chose a Motorola 6502 microprocessor which had been used in the Apple IIe, Commodore PET, BBC Micro, Commodore 64 and others. But when Roland visited Locomotive Software, that quickly changed.

"We were running Locomotive from the back room of my little terraced house in Dorking and Roland brought a prototype computer with him," says

10 GAMES THAT DEFINED THE AMSTRAD RANGE

ROLAND IN TIME

■ There were eight Roland games in total for the Amstrad CPC, released between 1983 and 1985. "We had *Roland On The Ropes*, *Roland In The Caves*, Roland does this, Roland does that, I can't remember them all," says Lord Sugar. "The character would jump all over the place. We named him after Roland Perry."

GET DEXTER

■ Originally released for the CPC, this funny isometric graphic adventure was developed in France where the CPC was popular thanks to the efforts of Amstrad France boss Marion Vannier. Boasting superb graphics, animation and music it was packed with tiny flourishes, testing player skills to the limit.

GRYZOR

■ Or *Renegade*, if you wish, for either of these Ocean classics looked superb on the CPC thanks to the artistic skills of Mark K Jones. Packed with screens and with lots of weapons at your disposal it played like a dream. CPC owners blessed with 128k could also enjoy an enhanced version of it.

FANTASY WORLD DIZZY

■ This offering is proof that some games were ported from the Amstrad to the Spectrum, with the Oliver twins making the CPC their lead platform. It just so happens that *Fantastic World Dizzy* was also created when Amstrad owned the Spectrum and back when Dizzy was an unofficial 8-bit mascot of sorts in the United Kingdom.

BURNIN' RUBBER

■ This launch game shipped with every GX4000, 464 Plus and 6128 Plus and it instantly hinted at the power of the new machine. Made by Ocean and essentially an unofficial version of *WEC Le Mans*, it boasted superb sprite scaling and jaw-dropping graphics. It was included in the demo units sent out to shops.

"THEY NEEDED TO FIND SOMEONE MAD ENOUGH TO THINK THEY COULD PICK UP THE ENTRAILS"

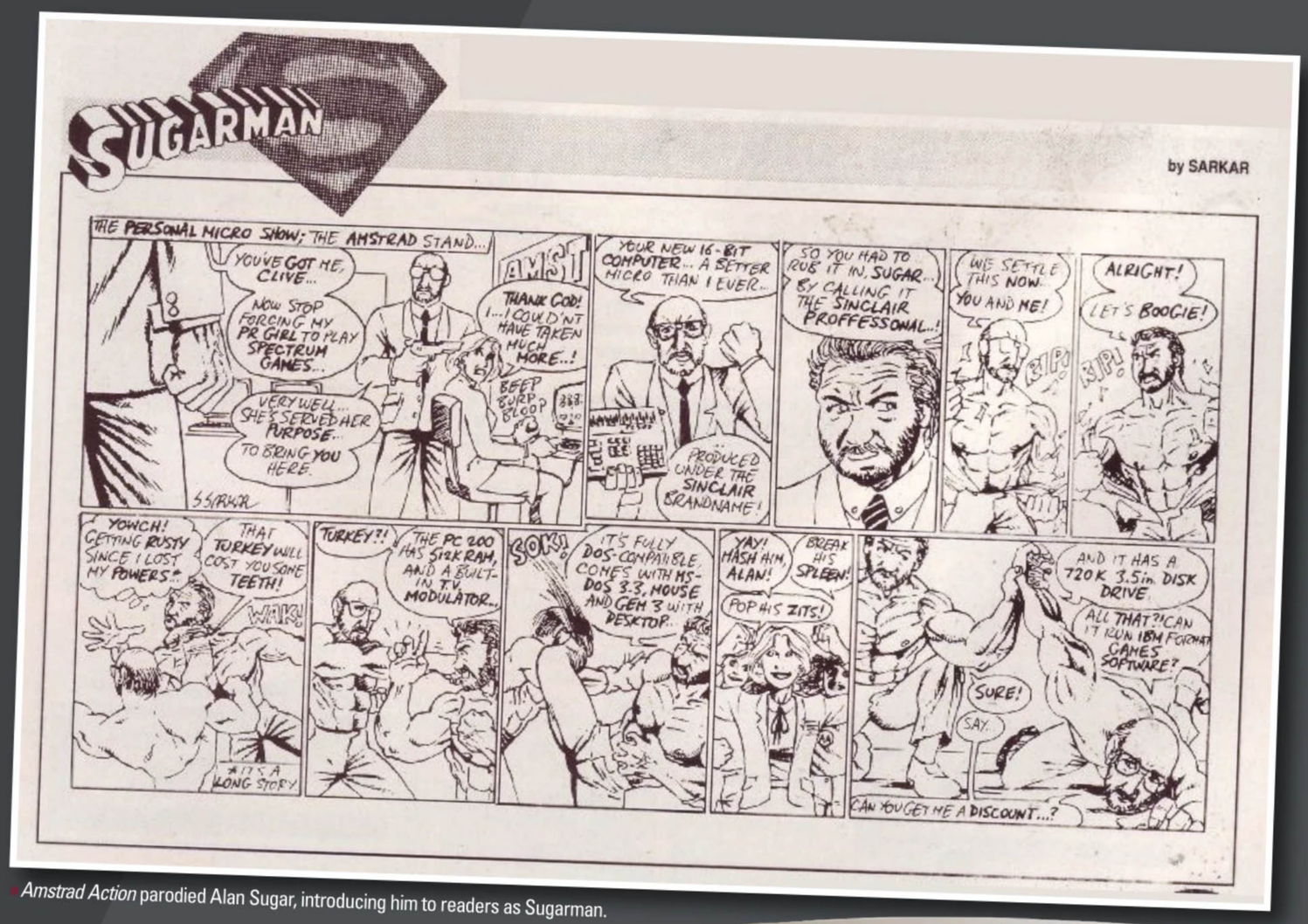
Roland Perry

Locomotive Software cofounder Richard Clayton. "He wanted to know how long it might take us to port a copy of our BASIC interpreter and, since it turned out there wasn't really any existing code, write a simple operating system for it."

Richard told Roland it would take half a year. "The problem was that the system used a 6502 and our BASIC was for a Z80," Richard tells us. "If it was for a Z80 then we thought it would take four. So we called our friend and hardware designer Mark-Eric Jones [aka Mej] to come and have a look. He quickly pointed out that the circuit board wasn't going to work because some of the chips didn't have power and ground connected, and he suggested starting again on the hardware as well." It was at this point that Roland was convinced a move to a Z80 would be a wise choice.

Perry agreed to the switch and Locomotive worked towards a deadline of January 1984. "It was hard work and long days," says Richard. "But we hit our targets." They sought to make BASIC more logical, adding commands such as 'DRAW', 'INK' and 'FILL'. Mej suggested Amstrad slash the number of components within the machine and make use of gate arrays which allowed for a large number of discrete components to be squeezed on to a single chip, cutting costs. "It also made it harder for folk in the Far East to clone the machine should it become successful," says Richard.

Eventually a sellable computer emerged and, in April 1984, Amstrad unveiled its baby as the Amstrad



Amstrad Action parodied Alan Sugar, introducing him to readers as Sugarman.

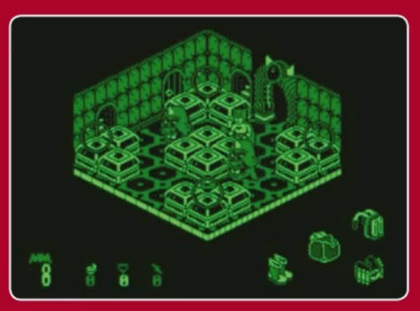
CPC 464. "We'd created an all-rounder 8-bit machine that had the capability of doing whatever the other machines did," Lord Sugar tells us. The difference was that the 464 had a built-in tape deck, came with a monitor and was powered with a single plug. It also had 64K of memory (which Lord Sugar figured would matter to buyers comparing specs), 27 colours, three screen modes and support for up to two joysticks.

The computer retailed for £229 for the green screen version and £329 for colour. Users could get to grips with BASIC immediately or insert a tape and run a program. "But the problem initially was to get software writers to produce programs for it because they were writing millions of games for Sinclair," says Lord Sugar. "Getting those converted over to the Amstrad CPC 464 was, I guess, the biggest challenge we had at the time." To encourage development, Amstrad sent out prototypes to software houses but it also created its own division called Amsoft,which also worked

In West Germany, Schneider was given permission to sell and market Amstrad products and it badged them with its own logo.

PREHISTORIK 2

■ Amstrad only wanted the extra Plus features to be accessible to games released on cartridge but clever developers soon found a way around that. *Prehistorik 2* was among the disc and tape games taking advantage of the extended colour palette and graphical touches, although it suffered from slowdown.



BATMAN

■ The first *Batman* game ever developed made its way on the Amstrad PCW proving that the computer could indeed be interesting to gamers. There was no colour, other than green, in this 3D isometric action adventure, of course, and it sounded bloody awful but, holy Amstrad, it was very enjoyable to play.

SONIC THE HEDGEHOG

■ Yes, that Mega Drive favourite was available on the Amstrad Mega PC and it was completely indistinguishable from the original. But that's only because it was the original game, plugged into the Mega Drive port on the front of this 386 PC-console hybrid and played using the bundled controller.

BLOCKADE

■ This *Tetris* clone made its way on to the Amstrad Notepad, squeezing onto the computer's long, thin screen. Other games for the system included *Super Blockage* and *Trikade*. But other than that, the Notepad was really a machine for boring stuff like word processing and spreadsheets.

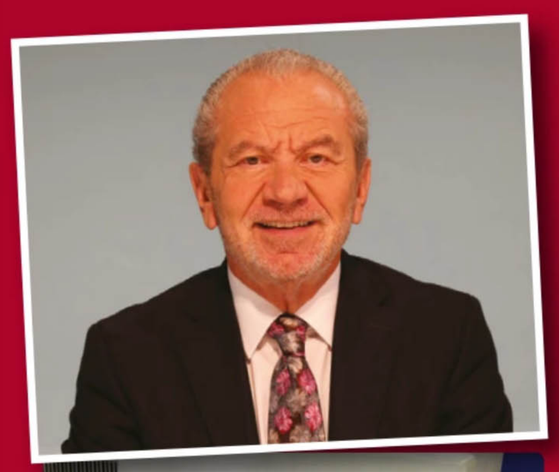
PRINCE OF PERSIA

■ Having established itself as a CPC classic, pushing the tech to near-16-bit levels, Jordan Mechner's platforming classic was bundled with the Amstrad PC5286. Aimed at gamers specifically, the computer came with a 14-inch VGA monitor displaying 256 colours from a palette of 250,000, as well as a joystick.

AMSTRAD

THE BUSINESS SIDE OF AMSTRAD

How the British business proved itself to be a major contender



» Producing an IBM-compatible PC in 1986 for less than £1,000 was perceived as being revolutionary.

"We took the PC market by storm," boasts Lord Sugar, of a venture that began in 1986 with the release of the 512K IBM-compatible PC1512. "Within 18 months, we had 25 per cent of the whole European market." It also had a PC that sold for just £499, seriously undercutting its rivals.

Motivated partly by a desire to ship its computers across the world and because it was being nagged to create an IBM-compatible computer, Amstrad began the process of creating its own PCs by getting engineers to crack an existing PC open.

"We found that the actual components inside those machines didn't warrant the £2,000 price that IBM wanted to sell them for. It was more like £399," Lord Sugar tells us. "So we didn't make our PCs cheaper than anyone else, we just sold them for a more reasonable price."

It worked wonders. By pricing according to the hardware's cost, Amstrad sold millions of units. "Sales exploded," Lord Sugar affirms. Even though it originally opted not to buy a licence for MS-DOS and decided to use Digital Research's DOS-Plus instead, that debut had more than enough power to run popular games such as *Monkey Island* and *Elite*. There was a joystick port on the keyboard, too.

Many more PCs followed, including the portable PPC range ("A computer for people who wanted to transport their machine from home to client and plug it in when they got there," says Roland Perry). But of most note for us were the PC5286 and Mega PC. The former was a 16MHz 286-based PC that had a 40MB hard drive and 1MB of on-board memory. Aimed specifically at gamers, it was priced at £1,050 and came with *Prince Of Persia*, *F-15 II* and *Links*.

The Mega PC, meanwhile, was made under a licence from Sega in 1993. Originally costing £999.99, and later reduced to £599, it included Mega Drive hardware and it had both a 32-bit Intel 80386SX CPU and a Motorola 68000. Despite a 40MB hard drive, a megabyte of memory, expandable to 16MB, and a controller was bundled – it didn't sell very well.

» Now a rare collector's item, the Mega PC could play UK, Japanese, US and unlicensed Mega Drive games.

But at least it didn't cause a headache of 1989 proportions. That year Amstrad hit the headlines when it had to swap every hard disc fitted in the PC2386 model bought by customers due to reported problems of the Seagate ST227R seizing up. Such negative press saw Amstrad's leading position in the PC market slip dramatically.

» Amstrad put the ZX Spectrum +3 to bed in 1990, prompting this rather dramatic headline.

on instruction manuals, a magazine and a users' club. By Christmas 1984, Amstrad had sold 200,000 CPC 464s and it was well and truly in business.

It was time to think about the next move. "We'd decided to get people interested in cassettes first because we were trying to hit a price point for our first computer, and putting in a disc drive at that time would have doubled it," explains Roland. "But we did have an external disc drive for the 464 and we had loaded games off it when we demonstrated the computer at launch. When we began to sell it, we became inundated with people asking us to put a floppy drive in the 464 instead. We looked at this enormous demand and thought, 'Okay, we will.'"

This resulted in the CPC 664 – codenamed IDIOT, or Includes Disk Instead Of Tape – which was released in April 1985. "The market was changing and more data was needed with faster loading so we built the floppy disc drive into a new CPC," affirms Lord Sugar. "We had to move with the times." It was an ugly-looking beast that retailed at £339 for the green screen and £449 for the colour screen versions. Still, it attracted 70,000 customers and it came complete with the operating system CP/M 2.2.

"But we were also selling in foreign marketplaces and the distributors there were saying they couldn't sell a 64K computer any more because it was too low a number," says Roland. "So a completely separate research and development production team worked on the CPC 6128 which was basically a 664 with 128K of memory. We launched this in the USA first."

US distribution was handled by Jose Luis Dominguez at Indescomp who had pestered Amstrad to allow him to sell the CPC 464 in Spain. Jose had proved hugely successful, much to the surprise of Lord Sugar who was sceptical of the Spanish market – perhaps justifiably given there were some later shenanigans involving an import tax on computers with 64K or less RAM that Amstrad was forced to get around it by soldering in an extra, yet unusable, 8K.

Lord Sugar also had reservations about selling the CPC 6128 in the USA, believing America's market to be more sophisticated and hostile to European computer manufacturers. He was right. Although the extra 64K was bank-switched and let the machine run CP/M+, which was a good selling point, Indescomp priced the machine at $799 for the colour version (complete with Amsword and a copy of *Roland In Time*) and $699 for green (with a copy of Wordstar and three blank discs). It duly flopped.

Amstrad launched the 6128 in Europe instead, replacing the 664 after just six months. "We maybe shouldn't have launched it in the UK for another six or

» Lord Sugar wanted full control over the Spectrum when Amstrad bought the rights: he didn't want Sir Clive Sinclair to be involved.

nine months," says Roland. "After all, no one in the UK knew there was a 6128 in America." Nevertheless, for gamers, the 6128 with its three-inch disc drive and 128K of RAM proved to be a decent machine.

Even better, some games made good use of the extra memory including *Nigel Mansell's World Championship*, *Hero Quest* and *Switchblade*. Not that Lord Sugar fully appreciated such things. "I did play games, the chess games and the shoot-'em-up games occasionally just to try them out a little bit. But I wasn't the expert on them, no," he tells us.

Lord Sugar was more interested in the serious business of ensuring Amstrad launched a new product each year. In July 1984, he sketched an idea for another computer, one with an A4-shaped monitor that had a built-in disc drive and a printer sat on top. By the time it launched in 1985 as Amstrad's first PCW – a dedicated word processor designed to replace the typewriter – it had a standard sized monochrome monitor and a separate nine-pin printer. "It was basically for the budding author, the small business owner or the vicar wanting to write his weekly sermon," says Roland.

Locomotive Software was involved in the process once more ("We were asked to create the word processor and came up with LocoScript," says Richard). But Lord Sugar wasn't entirely happy. "Turned out he actually wanted an electronic typewriter so he was very disappointed that you had to finish editing a document before you printed it," Richard adds. Still, the PCW was a phenomenal seller and it pushed Amstrad away from the CPC. There would be six PCW iterations in total released through to 1995. "The one thing I never understood was why no other company produced a similar machine in competition with us," says Roland. "We had the market to ourselves."

That couldn't be said for Amstrad's PC range, however. Debuting with the PC1512 in 1986 for a staggeringly cheap £499, Amstrad successfully opened up the PC market to the masses and it spawned about 30 follow-ups including desktops, handhelds and laptops. There were also two main stabs at a proper gaming PC from Amstrad – the PC5286 and Mega PC in that time – but the majority were generally aimed at serious users and they allowed Amstrad to gain as much as a quarter of the European computer market. ▶

"THE ONE THING I NEVER UNDERSTOOD WAS WHY NO OTHER COMPANY PRODUCED A SIMILAR MACHINE IN COMPETITION WITH US"

Roland Perry

» The PCW8256 was an evolution of the CPC range and was aimed at business users first and foremost.

AMSTRAD PCW

A brief history of one of Britain's most popular PC ranges

» Unlike the earlier grey CPC models, the later PCW range of systems by Amstrad had a more business-like look to them.

When Amstrad launched the PCW range in 1985, it wouldn't in its wildest dreams have believed it would become Britain's most popular computer for a total of 31 years. But up until the Raspberry Pi sold its 8 millionth unit in 2016, that's exactly what it achieved as it sought to make the typewriter all but a memory.

The debut PCW8256, had 256K of memory, a keyboard with dedicated cut, copy, paste and print keys and a printer. "It evolved from the CPC," Lord Sugar tells us. "It had the same philosophy – a simple solution going forward." The idea was to sell a machine that primarily let users word process, making use of 90 by 32 resolution that allowed a full A4 page to be displayed without the need to scroll.

"Before the PCW, people needed a program that they ran on a computer together with a separate printer and separate monitor and I just said, 'No, what we'll do is make it all-in-one: a monitor and electronics in one box, a keyboard in front of it and a floppy disc in the cabinet,'" Lord Sugar continues. "The original drawings had the printer sitting on top but we felt that it wasn't the correct way to go."

Amstrad continued to refine its range. The 8256 was followed by the PCW8512, which had 512K RAM and two three-inch floppy disc drives; the PCW9512 replaced the green screen with a black and white one; and the PCW9256 introduced a 3.5-inch drive. A £299 PCW16 in 1995 utilised a new GUI operating system – like the Mega PC, it didn't sell.

There was some light relief, though. Gamers could enjoy adventures made by the likes of Infocom, Level 9 and Magnetic Scrolls. There were also big name titles ranging from *Batman* and *Head Over Heels* to *Match Day II* and *Last Ninja 2*. "The PCW was the first computer that had a waiting list in Dixons," says Roland Perry. "The salespeople couldn't switch customers to another product when we ran out of stock because there wasn't anything else equivalent to switch them to."

AMSTRAD

THE SINCLAIR COMPUTERS

How Amstrad carried on the Sir Clive's legacy

Lord Sugar knew how he wanted the Spectrum to look well before he picked up the phone to talk to Sir Clive Sinclair about buying Sinclair's brand and products. The entrepreneur got one of his designers to sketch it before tasking workers in Brentwood, Essex, to take delivery of a Speccy, open it up and list the components so that he could estimate how much it would cost to manufacture.

Armed with this knowledge, he was convinced he could cut costs and make a healthy profit on Sinclair's machines. So after a bit of back and forth a deal was struck and the Spectrum was soon his.

It was at that point that Amstrad realised it had another asset on its hands: former Sinclair Research engineer Richard Altwasser, who had only recently started working for Lord Sugar's firm. Richard Altwasser understood the inner workings of the Spectrum and he got on with modifying the basic chip design, improving the sound and producing a new PCB layout.

Before long, the tape-based Spectrum +2 was born, adopting a better keyboard and a similar design to the CPC 464. Selling for £140 in 1986, it sold 250,000 in the first year and it was followed by the three-inch disc based Spectrum +3. Initially retailing for £249, this included AMSDOS on a 64K ROM, although the computer wasn't entirely compatible with 48K hardware and software.

Both systems ended up being made in the Far East rather than the UK to save money. But Lord Sugar says Amstrad also solved a major problem. "The returns rate of the Spectrum was horrific. The stuff was coming back in greater numbers than they sold," he says. "I don't know why, but obviously there were technical issues."

Thankfully for Speccy fans there was never any consideration given to removing the Sinclair name, "I think much of the value was the brand," says Roland Perry, "We just production-engineered them to be affordable and reliable."

Not that Amstrad wasn't thirsty for more. On 7 April 1986, it announced it had bought the rights to sell and manufacture all existing and future Sinclair computers in a deal worth £5 million. It wasn't entirely a surprise: Sinclair Research had sold more than a million Spectrums and it had a 40 per cent share of the home computer market, yet it only limped through the previous year. Had it not been for Dixons spending £10 million taking 160,000 Spectrum Plus computers and televisions,it would have gone bust.

"Sinclair was about to go bankrupt so we just stepped in there and bought the intellectual property rights," Lord Sugar tells us. "We then took the Spectrum Plus and redesigned it, putting a cassette recorder on the end. We sold hundreds of thousands of them." Indeed, the Spectrum +2 and +3 machines were big sellers for Amstrad. The company also managed to make a killing by flogging unsold stocks of Spectrum and Sinclair QL models before axing them off completely.

Despite such activity, Amstrad didn't completely lose sight of the CPC. In 1988, it started working on revamping the 464 and 6128 to take a greater slice of the ever-growing gaming market. It also sought to take on Nintendo with the release of the GX4000 games console. Each model had a cartridge slot offering players an enhanced feature set and although the same 4MHz Z80A processor used in the CPC drove the software, there were 16 hardware sprites made up 16x16 pixels and 16 colours that could be magnified to double or quadruple normal size.

The machines also had smooth hardware scrolling and programmable scan line interrupts which gave the illusion of more colours and more sprites. A Direct Memory Access controller played music without burdening the processor, too, while the carts held 128K of accessible code.

Yet despite a palette of 4,096 colours, they were still 8-bit machines at a time when 16-bit was dominating. If that didn't put people off, then the fact too many cartridge games were straight CPC ports certainly did. "The GX4000 wasn't very good and it came at a time when we tried to resurrect stuff based on the 464 and, to be frank, it wasn't really a success, no," Lord Sugar admits. And yet Roland has no regrets. "I wouldn't say the GX4000 or Plus machines were a mistake. Loads of people were nagging us left, right and centre asking us to do something with our existing platforms so that we'd have something vaguely competitive with Nintendo and we gave it a go," he says.

"The feeling was that people wanted to load stuff off a cartridge and that, by not having this capability, we were behind the times." Given the GX4000 sold just 15,000 consoles and suffered the indignity of being discounted from £99 to £79 mere months after launch (eventually going as low as £30), it inevitably spelled the end of the CPC range. Amstrad then concentrated on the PCs and PCWs, while sticking its

Image © Retro Computer Museum

» It may look primitive today next to MacBook and Surface computers, but the PPC512 was an impressive portable computer for its time.

» The E-m@iler is useless today as a video conference device, its service was shut down in 2011. You can still use it as a regular phone, though.

fingers in other pies (Lord Sugar even busying himself with the purchase of Tottenham Hotspur Football Club in June 1991).

The Nineties saw Amstrad become heavily involved in the production of satellite set-top boxes for Sky's television service. It had been offered the contract in 1989 by Rupert Murdoch ahead of Sky's proposed launch in February 1989, mainly because Lord Sugar said he could knock the devices out at short notice for a £199 price point. Amstrad met the deadline and its relationship with Sky flourished. It produced huge numbers of boxes and dishes and, continued doing so when Sky Digital launched in 1998. The digital boxes were able to receive an interactive television service, called Open, from August 1999. This even had a range of simplistic games, including *Beehive Bedlam*, *Fathom*, *Big Top Drop*, *Sheep Dip*, a version of *Tomb Raider* and *Corporal Cluck*. It was rebranded Sky Active two years later.

By this time, Amstrad PLC had actually been wound up, its shares split into Viglen and Betacom. But Betacom was renamed Amstrad PLC and, in 2000, it released a telephone and email device called the E-m@iler, followed by the E-m@iler Plus and E3 Videophone. The latter two let users download and play Spectrum games via an emulator. The E3 even came with a games controller. But Lord Sugar's obsession with these devices caused a major fallout.

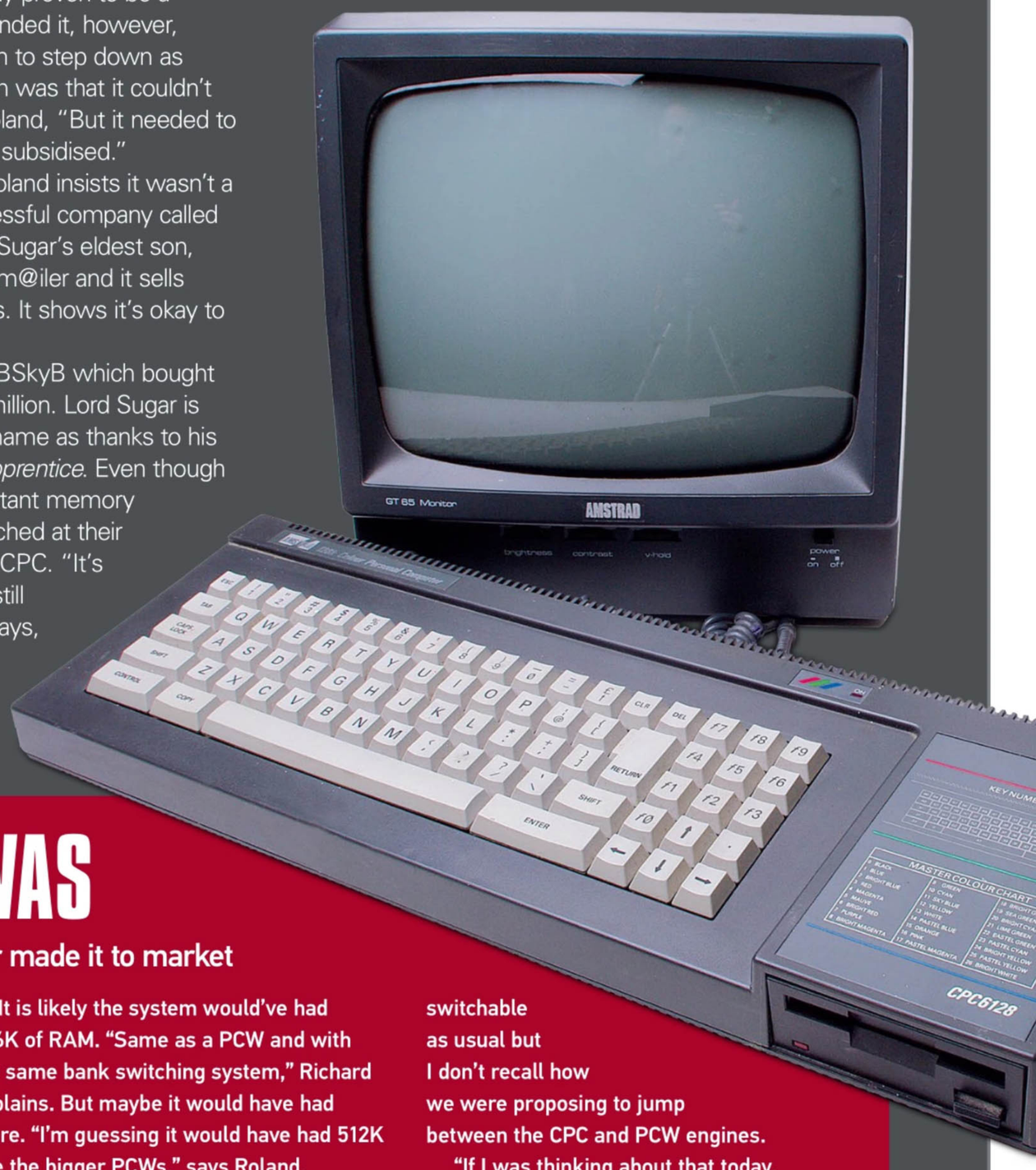
Bob Watkins, who had worked at Amstrad for 25 years, is understood to have resigned in 2001 over the machine, noting it had already proven to be a fantastic failure. Lord Sugar defended it, however, and it even outlasted his decision to step down as Chairman in 2008. "The problem was that it couldn't find a business model," says Roland, "But it needed to because the device was heavily subsidised."

Like the GX4000 and Plus, Roland insists it wasn't a waste of time, though. "A successful company called Amscreen which is run by Alan Sugar's eldest son, Simon, is a descendant of the Em@iler and it sells advertising space on digital signs. It shows it's okay to have a failed product."

Today, Amstrad is owned by BSkyB which bought the company in 2007 for £125 million. Lord Sugar is also something of a household name as thanks to his leading role in the BBC's *The Apprentice*. Even though his computers are now but a distant memory for him, Lord Sugar appears touched at their enduring appeal, particularly the CPC. "It's quite surprising that people are still using the machines today," he says, "it's a long time ago and things have moved on but it was a great era for us."

"IT'S SURPRISING THAT PEOPLE ARE STILL USING THE MACHINES TODAY"

Lord Sugar



THE CPC THAT NEVER WAS

Richard Clayton and Roland Perry reveal details on the computer that never made it to market

Work on the original line up of CPCs appeared to grind to a halt following the release of the 6128. But while history shows that Amstrad moved on to the PCW and PC market until briefly coming back to the CPC with the short-lived Plus range, there had actually been plans for one more Colour Personal Computer.

Mark-Eric Jones of Data Recall and Locomotive Software had been commissioned to produce a second machine as work got underway on the PCW 8256. Dubbed Arnold Number Two (or ANT for short), the computer was going to be compatible with both the CPC and PCW.

Having spoken to Roland Perry and Locomotive Software's Richard Clayton, we have gained a tantalising look at what might have been for the CPC as it battled against its 8-bit rivals during the late Eighties.

The 8-bit machine would have been a colour version of the PCW with a CPC emulation mode. "It would have run CPC software in emulation mode and then allowed for more fancy things," says Richard. "There was a lot of commonality with the PCW and that's why some of the bit addressing in the PCW screen memory is the odd way that it is."

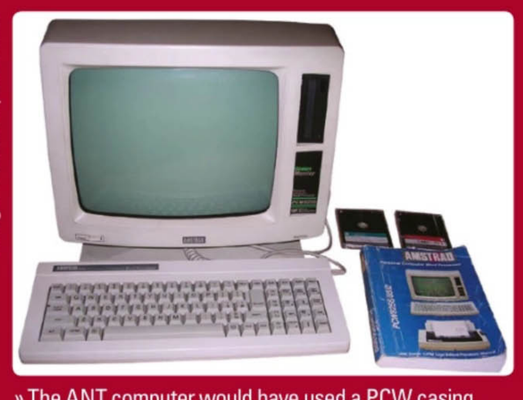


Image © oldcomputer.info

» The ANT computer would have used a PCW casing, with a more bespoke keyboard.

The ill-fated computer would have been a colour version of the PCW with a CPC emulation mode. "It would have run CPC software in emulation mode and then allowed for more fancy things," reveals Richard. "There was a lot of commonality with the PCW and that's why some of the bit addressing in the PCW screen memory is the odd way that it is."

It is likely the system would've had 256K of RAM. "Same as a PCW and with the same bank switching system," Richard explains. But maybe it would have had more. "I'm guessing it would have had 512K like the bigger PCWs," says Roland.

Gamers would have been well served, too. There was elegant screen-handling hardware and more RAM would be used for the screen. However, Richard adds, "If you had colour you did not get the same screen resolution as the PCW."

Locomotive would have provided an updated LocoScript and CP/M and had the same firmware/BASIC as the CPC for that mode. The computer would also have loaded up a CPC 464 screen. "The boot loader told the hardware to emulate and it was just like the PCW in that all of the disk handling was software," says Richard who actually owns a prototype of the machine.

"The whole point was being to run all of the available software for both the CPC and PCW in one box," Roland continues. "The different screen modes would have been switchable as usual but I don't recall how we were proposing to jump between the CPC and PCW engines.

"If I was thinking about that today, maybe this would be done by examining track zero of the floppy and then either booting the Locoscript or CP/M environment from the floppy, or switching in an image of the CPC firmware ROM."

As for how it was going to look, Roland says it would have used the same case as the PCW. "One stumbling block included what the keyboard would look like. Some games needed the CPC keys in familiar places rather than scattered around a fundamentally PCW keyboard," he says.

So why was it shelved? "That was partly our fault in that we were somewhat behind with LocoScript and so had not done very much coding for the ANT," says Richard. "Amstrad then decided it did not make sense any more, with 16-bit machines becoming more important."

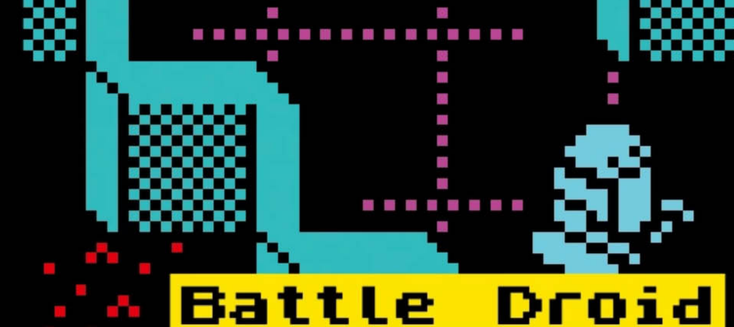
THE ULTIMATE GUIDE TO LASER

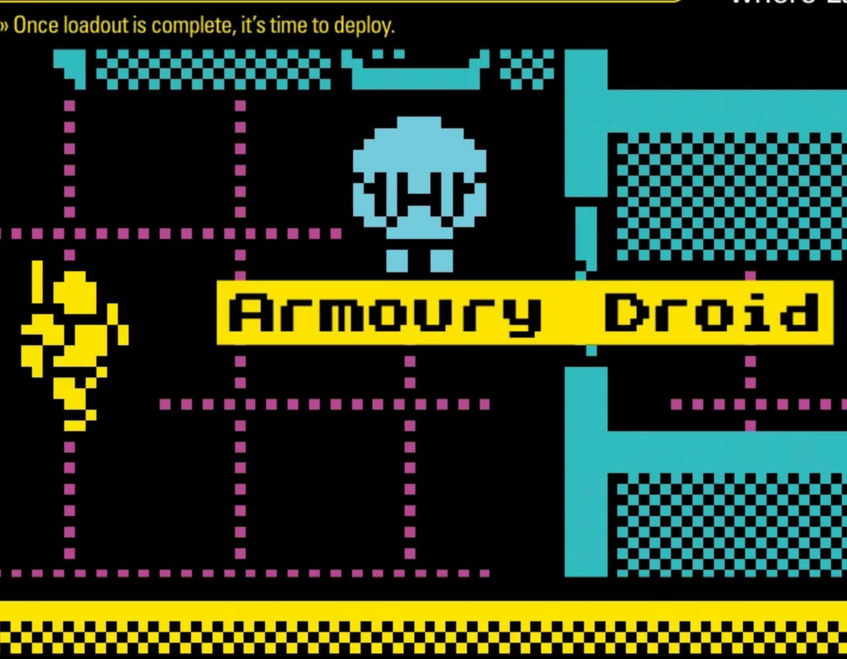
During the Eighties, Julian Gollop refined strategy games. Regarded by fans as the genre's pinnacle, Retro Gamer brings you the ultimate guide to the imperious Laser Squad

As a genre, 8-bit strategy games had quite the fervent following back in the early Eighties. Often ugly, impenetrable and lacking much of a sense of control over proceedings, the games were often revered by a small cluster of fans, but rarely broke into the mainstream. Julian Gollop, initially under the banner of Red Shift, took the template and merged it with a slightly less cerebral, more combat-laden tone to create the famous *Rebelstar* games. If you want to read more about those excellent titles, check out our History Of *Rebelstar* back in issue 142. This month we're focusing on the game that Julian had, in essence, been building up to throughout the entire decade.

» Once loadout is complete, it's time to deploy.

Despite the overall brilliance of the turn-based *Rebelstar* games, even their author would admit they had weaknesses, both in terms of their design and his own abilities. The core mechanics of *Laser Squad* were there, but the games were too easy, especially for experienced gamers, and each one was limited in terms of weaponry options and missions – the excitement of fast-paced combat could only go so far. For *Laser Squad*, one of Julian's key early decisions was to introduce a weapons loadout – at the start of each mission the player had a limited number of credits with which to kit out their team, and a varied arsenal to select from. Gone were medi-probes, coffee tokens and photons; in came auto-pistols, heavy lasers, grenades and sniper rifles. Experience and trial and error teaches the team commander how much armour can be allocated to their squad, and which weapons were the best value for money. Do you go for those extra couple of clips for your laser rifles, or issue those devastating grenades to them instead? Decisions such as these play a vital part in swinging each battle. Once the loadout is completed, the scenario begins, and here is where *Laser Squad* really shines, for this is ▶





STICK TO YOUR GUNS

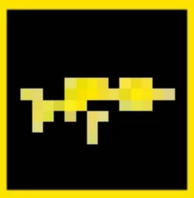
The weapons of Laser Squad and what they do

AP50 GRENADE

■ A lightweight explosive that does a significant amount of damage within a considerable range. Useful in a tight corner, but needs priming.

DAGGER

■ One of only two melee weapons, and let's be honest, if you've got close enough to use it, you're doing something wrong...



L50 LAS-GUN

■ Marginally better than similar rifles in terms of auto-shot AP cost, but underpowered in comparison. Best avoided unless you like being shot.

LIGHT SABRE

■ This melee weapon inflicts massive damage upon any enemy if you get close enough to use it, but the chances are that you won't.

MARSEC AUTO-GUN

■ A weapon of choice. Packs a punch, and has relatively low AP costs. It also has decent accuracy.

MK-2

■ A very slightly-improved version of the MK-1 rifle, however it is not really worth the extra money that you'll end up shelling out for it.

PUMP SHOTGUN

■ A strangely contemporary weapon among the futuristic lasers, the shotgun has no autofire and is only really worth using at close range.

AP75 GRENADE

■ As with the AP50, but double the weight, and almost double the damage. Indispensable against armoured opposition.

HEAVY LASER

■ Similar to *Rebelstar*'s Photon, this is a low-AP cost gun that's wildly inaccurate with medium firepower. As the name suggests, also very heavy.

L80 LAS-GUN

■ Basically, a laser-guided sniper rifle. Incredibly accurate with an aimed shot, but not auto-fire makes it useless close up.

M50 AUTO-PISTOL

■ As inaccurate as the heavy laser, but considerably lighter and does more damage. A good backup weapon.

MARSEC PISTOL

■ Low ammunition capacity and slow rate of fire make this pistol a good back up weapon only.

M5 AUTO CANNON

■ Heavy and expensive, this fires a powerful explosive shot that deals out explosions similar to a grenade.

SNIPER RIFLE

■ As you might expect, hugely accurate and only any good at range. No autoshot, but that's not really what it's for anyway.

AP100 GRENADE

■ Despite its name, not as powerful as the AP75, but just as heavy. Only available in missions six and seven.

KASTEC AUTO-GUN

■ A cheaper version of the Marsec Auto-gun that boasts lower AP cost, but also lower damage.

LAS-CUTTER

■ An essential device in scenario six, it can cut through solid steel doors with ease, and people too, although that's a tad messier.

M4000 AUTO-GUN

■ Virtually identical to its rival, the Marsec Auto-gun, the M4000 loses out in AP Cost and damage.

MK-1

■ It's extremely accurate but also costly in AP terms. Packs a punch when it hits, but you won't get many chances to use it.

ROCKET LAUNCHER

■ Along with the AP75 grenade, this deals the most damage in the game. AP heavy, but worth it.

SP30 PISTOL

■ Better than the other pistols thanks to its excellent damage percentage, but still only really worth it as a secondary weapon.

JULIAN GOLLOP

We talk to the man behind this fantastic 8-bit strategy game

Had some of the ideas that we saw *Laser Squad* been considered in your earlier games?
Yes, for sure. Line of sight in particular was something I wanted to do, because it was something board games could not do easily. In fact, I designed a board game that involved hidden soldiers and line of sight rules – but it required a player to act as moderator and it was rather slow and cumbersome. As for equipping the soldiers, this was very much a feature I wanted from my earliest experiments with videogames. I was heavily influenced by RPGs here.

The campaigns hang loosely together. Did you consider a more structured story-based approach?
It was actually supposed to be a campaign following a particular story and, in fact, the PC release had three short stories in a booklet which covered the first three scenarios. If I had figured a way to carry over soldiers with improvements, I probably would have done it – but this feature would have to wait until *X-COM*.

The original release came with three scenarios and two more offered via mail order. Sounds like early DLC.
Yes, we thought it was a brilliant idea, and indeed did quite a trade in our expansion kits. Each kit came on a short tape, with a scenario on each side and we made two of them for *Laser Squad*.

Were there any plans for a sequel?
Indeed there were, in fact. We made a demo, which was a simple two-player demo with limited graphics. It did have a few innovations: isometric graphics, 3D shooting and fully animated characters. However, we wanted to find a new publisher, so we approached MicroProse, but they wanted a much bigger game, something that could compete with *Civilization*. So *Laser Squad* became *UFO: Enemy Unknown*.

***Laser Squad* is regarded today as one of the finest 8-bit strategy games. What do you think makes it so popular with its fans?**
I think it was quite a refined turn-based system, with customisable squads and different ways of playing the game. The hidden movement of enemies also adds some real tension, and for the time it was totally unique. And the strategy and arcade elements helped make it so successful.

Venomous Splurge

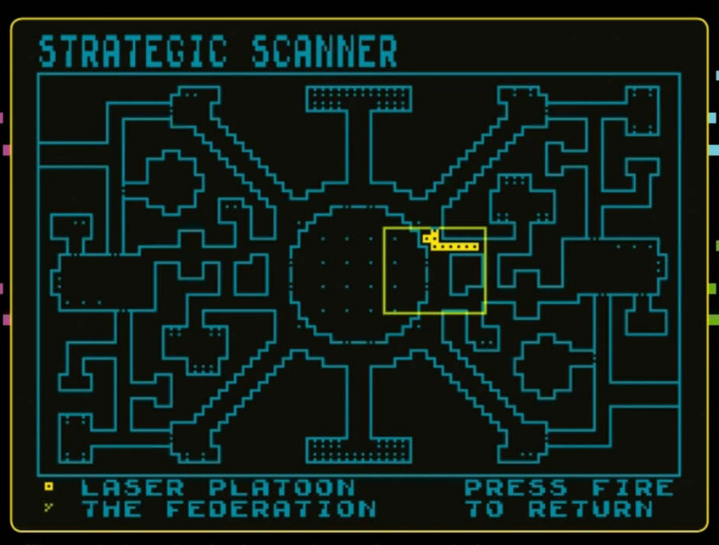
Storm Commando

"I think it was quite a refined turn-based system"
Julian Gollop

▶ no lone mission as in *Rebelstar*. The original 8-bit game contains three different missions, and each one requires an alternate set of tactics. From eliminating an arms dealer to liberating rebels, each scenario connects loosely to the theme of the rebelstars, heroic freedom fighters contesting a valiant battle against an evil government and its factions, such as the Metallix Corporation.

Each scenario has a pattern of deployment squares (marked simply as 'D'), and in conjunction with an overviewing scanner, the player places their squad carefully across the map. Once this is done, the mission proceeds in turns, with the human player always taking first dig when playing against the computer. Equipment is stored in each character's own inventory and they begin empty-handed; first order of business, then, is to arm everyone, unless you plan to fight this battle by just using harsh language. Equipping a weapon, like everything in *Laser Squad*, uses action points, or AP. Unlike the *Rebelstar* games, each character is now a semi-animated sprite, turning on the spot within the pseudo-3D screens. This is vital, considering the most important improvement the game boasts over its predecessors: tactical line-of-sight combat.

» Preparing to assault the moonbase on Amiga.



» The tactical map is a fundamental part of every mission.

In *Rebelstar* and Rebelstar 2, the player can see any unit in their turn, even if it's on the other side of the map. While this may make for a quicker and more exciting game, as there's no need to slowly creep across the screen in case of enemy attack, it's a method that distinctly lacks realism. In *Laser Squad*, enemies are unseen until they appear in the character's field of vision, creating a dramatic sense of tension previously absent. Opportunity fire, a clever, if underused, concept from *Rebelstar*, suddenly becomes one of the most tactically fundamental parts of the game. As a result, its implementation is smoothed out – now players have to merely leave the prerequisite amount of action points remaining to a squaddie before ending the turn. Should any unlucky enemy soldier wander into view, their progress is paused while the other player gleefully rains laser fire upon them. Further strategic complexities are there for the player to discover, such as ▶

» When entering fire mode, a new, simpler version of the game map appears.

CONVERSION CAPERS

How the later versions of the game compare

AMIGA

■ The belated release of the 16-bit versions saw a number of improvements graphically, and sonically. The gameplay is essentially the same, although a cumbersome transfer effect between menus slows things down, and there were only five missions released with no expansion materialising. Impressive intro screens help set the scene and give each mission a weightier feel.

AMSTRAD CPC

■ Also coded by Julian Gollop, the Amstrad iteration of Laser Squad loses much of the colour from the original ZX Spectrum version, although it does boast some nice electronically apt sound effects. Like the C64 conversion, lucky Amstrad owners got an extra four missions, with Laser Platoon and The Stardrive available as a later second expansion pack.

ATARI ST

■ Naturally very similar to the Amiga port, the Atari ST version was also coded by Teque Software AKA Krisalis Software, a team including Frederic O'Rourke (programming) and Jason Wilson (graphics). Both versions offer excellent tunes from Matt Furniss and were published in the United States by MicroIllusions.

COMMODORE 64

■ Coded by Julian's brother, Nick, with help from the man himself, the Commodore 64 port of *Laser Squad* is virtually identical to the ZX Spectrum game in visual terms. Aurally it improves greatly on it, although the game's explosions seem wimpy in comparison to the crunching effect on the Sinclair machine.

PC

■ *Laser Squad* on the PC is the version that differs mostly from the original in terms of gameplay, and for one, big, reason: it uses mouse control. This means, instead of the player having to 'learn' the amount of action points each movement uses, the game very helpfully tells you right before you click your action to confirm.

MSX

■ As with many MSX games, this is a straight port of the ZX Spectrum version, and consequently still a very good game. Strangely, however, the MSX version was only released in Italy, although cracks exist online with the game's text converted back into English. This version was unknown to Julian, so is likely an unofficial port.

Sterner Regnix

"We approached MicroProse, but they wanted a much bigger game"

Julian Gollop

▶ windows that enemies can be spied through, destructible environments, explosive scenery and the individual requirements of each mission. In addition, the player must manage the human element of their squad. Too much incessant hiking around the map and your soldiers will lose stamina and action points; lose too many of your team and its remaining members slowly become nervous, before a full-scale panic attack ensues, together with the attendant drastic reduction of action points.

As with Julian's other games, *Laser Squad* originated on the ZX Spectrum, with Julian himself converting the game to the Amstrad

» The C64 port was coded by Julian's brother, Nick

several months later, and his brother Nick to the Commodore 64. Having formed Target Games with Nick, the initial idea was to sell the game themselves, directly to distributors, and the game had a limited release with a sole robotic trooper on its cover. After coming to the conclusion they needed better marketing, Julian and Nick were approached by an agent who set up Blade Software with Krisalis Software for further publication of *Laser Squad*. These latter releases of the 8-bit versions include the two extra missions initially offered via mail order (*Paradise Valley* and *The Cyber Hordes*), with Blade also publishing the Amiga, Atari ST and PC versions. Despite Target retaining the expansion kit mail order rights for the further two missions (*The Stardrive* and *Laser Platoon*), the shift meant Julian could focus more on what he loves: game development.

In retrospect, the outstanding aspect of *Laser Squad* is how, unlike many of its peers, you don't *have* to be a fan of the strategy genre to appreciate the game, and the love for it, especially on the Spectrum, is no better shown than in the range of fan-made level editors, maps and remakes. *Laser Squad's* ease of play – you can realistically jump straight into the game – and considerable

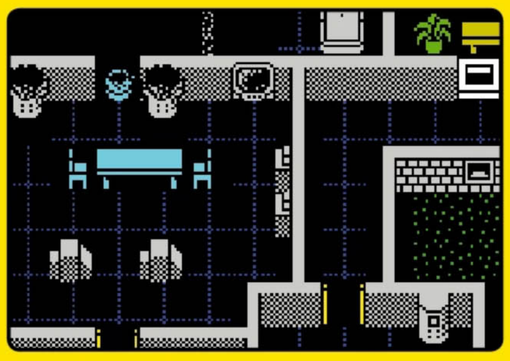
SQUAD GOALS

Retro Gamer's tactical guide to beating Laser Squad's missions

- Armour is a luxury. It's costly and weighs down your squad, reducing their action points. Use sparingly, if at all.
- **The best all-round weapon is the Marsec Auto-Gun.**
- Grenades are very useful for clearing dangerous areas – but, obviously, don't forget to prime them!
- **Learning the number of action points required for each movement is key – moves cannot be undone.**
- Opportunity fire is your friend. Move slowly and cautiously, and always have troopers covering flanks with it.
- **Ensure each trooper has the correct ammo clips. Scavenging from the field is dangerous and consumes valuable AP.**
- For more open missions, such as The Assassins, or ones with long corridors or tunnels, it's always worth equipping one trooper with a sniper rifle.
- **Open doors are a dead giveaway to your movements. Born in a barn? Shut those doors behind you!**
- Beware the vidscreens. These pepper most levels and have a nasty habit of exploding when shot. Check your fire!

SQUAD TACTICS

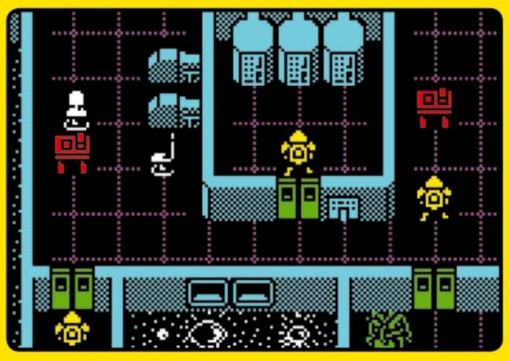
Laser Squad's seven scenarios and how to beat them



THE ASSASSINS

■ You know what Marsec is: it's the arms supplier who most likely made the gun you're holding. However its boss, Sterner Regnix, is using mind control drugs and other unpleasant means to get the best from his employees. Take him out!

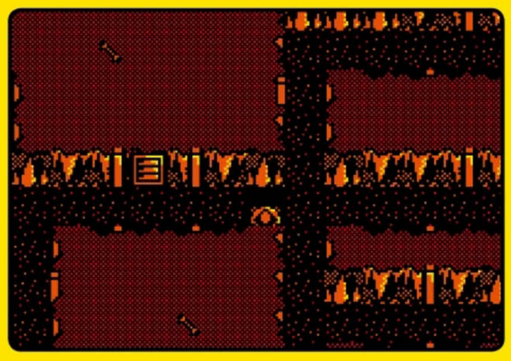
HOW TO BEAT IT: There's a sensible way – and a fun way. The former involves infiltrating Regnix's base and focusing on the living quarters where he'll no doubt be skulking. The latter is tooling up with a rocket launcher or two and systematically decimating his house. Less precise, but oh-so-satisfying.



MOONBASE ASSAULT

■ In the first of several nods to Julian's previous games, this scenario concerns the Omni Corporation's base on Arid-6 which houses a vast database on Sector Nine, a sector containing the infamous Rebelstar.

HOW TO BEAT IT: The base's guardians generally reside within the central area, with a few scouts outside. Ignore the top of the base and take two teams in via the southern doors. Leave one soldier guarding the rear (on opportunity fire) and advance slowly, taking out databanks as you go.



RESCUE FROM THE MINES

■ As the name suggests, this is a mission where the aim is to rescue three captives, taken prisoner when their routine recon mission goes awry. Lead another mission to free the men and escort them to safety.

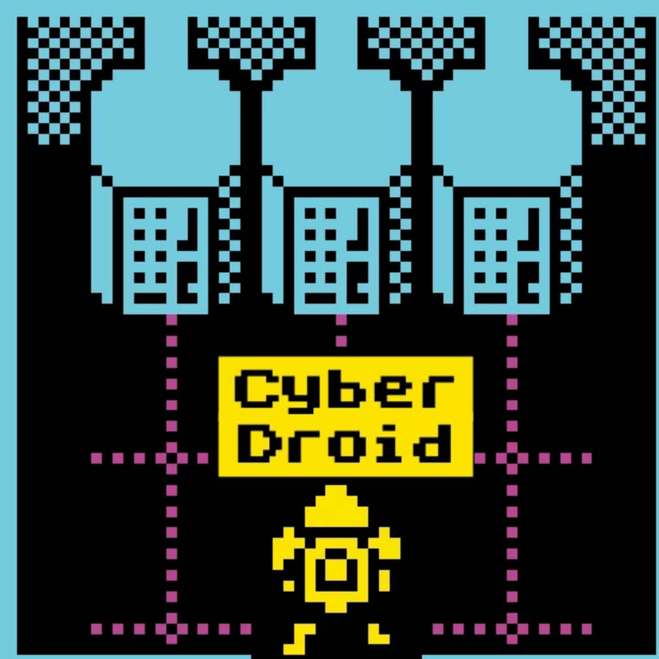
HOW TO BEAT IT: Place two rebels to the left and three to the right. Make sure you have explosives in each team, and study the map to check the whereabouts of the prisoners. One enemy holds a key to a vidscreen that allows you to see the enemy positions. Its acquisition is invaluable.

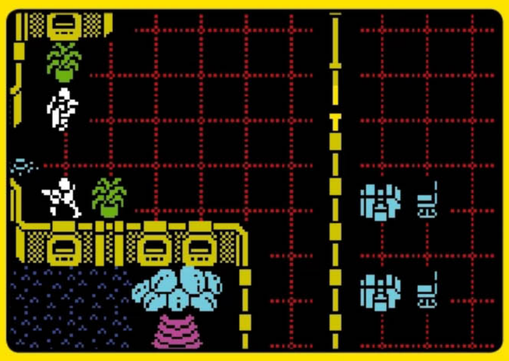
» Each squad member has a set of statistics that determines their ability to fire and move

depth, demonstrates that even the most ardent of arcade shoot-'em-up freak will soon find themselves embroiled in the classic sci-fi struggle of plucky rebels versus evil empire.

Its AI presents a stiff challenge, especially on the higher levels, but it's with the two-player option – something Julian always preferred thanks to his board game roots – where the game really shines through best. And honestly, what better way is there to spend an afternoon with a friend than battling it out with Marsec auto-guns and AP50 grenades? ✱

Our thanks to Julian for his time.





THE CYBER HORDES

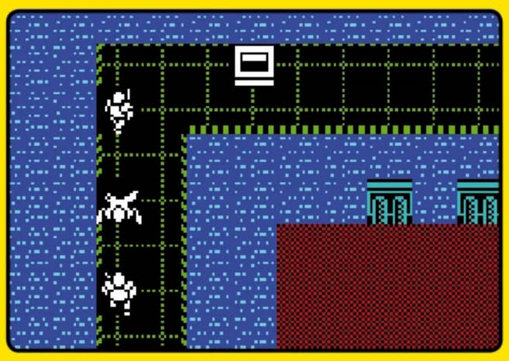
■ The rebels are on the back foot. Forced to defend their base, the key here are seven stabiliser cores that throttle the seismic instability of the planet. An Imperial droid squad has been sent in to destroy them.

HOW TO BEAT IT: Possibly the trickiest of the missions, as the Cyber Hordes include the heavily-armoured Battle Droid that can only really be destroyed from front-on using heavy explosives. Give up the cores to the left, form an opportunity fire perimeter in the middle of the base, and pray.

PARADISE VALLEY

■ With an Imperial fleet lurking overhead, the rebels decide to put their secret starfighter's plans onto a security device and charge a small team with escorting it across the deadly Paradise Valley to a waiting transport.

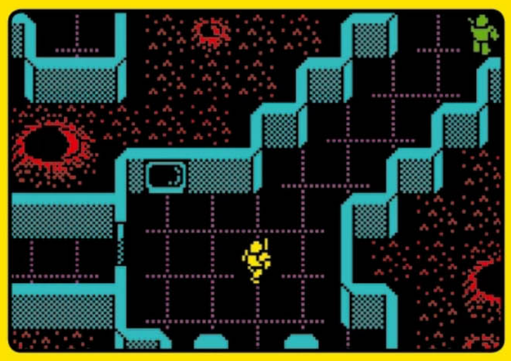
HOW TO BEAT IT: Focus all your squad to either secure the top or bottom of the valley. The first half is very rarely populated with venomous splurges, so it's easy to hack across swiftly before making sure the person carrying the device is well protected in the second half of the valley.



THE STARDRIVE

■ A group of dastardly mercenaries has stolen the stardrive from the rebel's fancy new spaceship and taken it back to their home base on Prozine 5. The legendary rebel squad, The 7th Brigade, has been sent in to recover the device, and stick it to the mercs.

HOW TO BEAT IT: Enemy droids spawn from open corridors in the north and south. Assign a squad to each point and leave a man there to cover them otherwise you'll find your rear exposed. Don't forget to equip a Las-cutter as you'll need it to break in to the mercenary base in order to reacquire the drive.



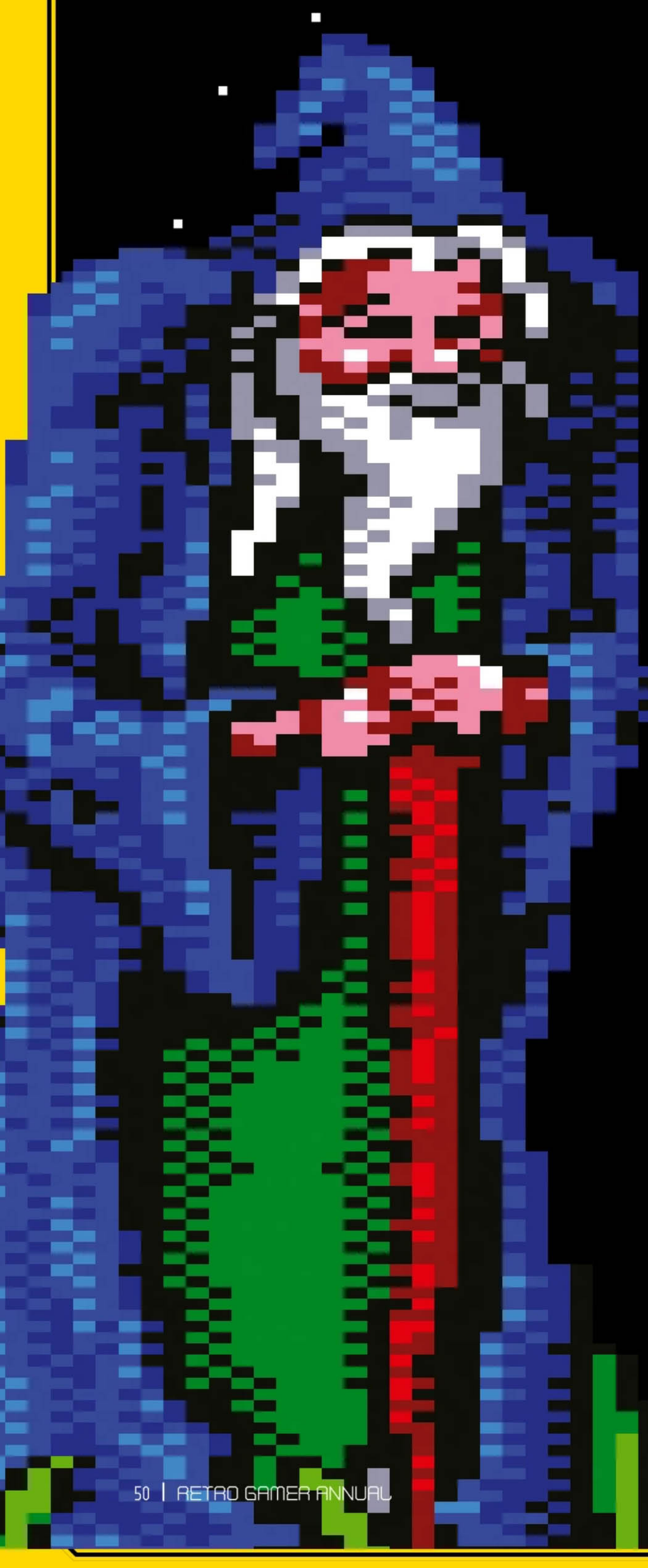
LASER PLATOON

■ An elimination level, with no specific plot or requirement other than to utterly destroy the enemy, clean and simple. Enemy reinforcements will appear every five turns, and to win all enemy units must be destroyed before they arrive.

HOW TO BEAT IT: This is a little different in that the scenario can continue indefinitely as reinforcements simply continue as long as troops remain alive on the field. Monitoring the reinforcements is key here, so an assault is timed to avoid pesky enemies arriving just as you have them on the back foot.

THE MAKING OF SAVAGE

Trantor was a hit on the Spectrum and a revelation on the Amstrad. Nick Bruty tells Rory Milne how he and David Perry followed up the popular run-and-gun with the high-octane Savage



IN THE KNOW

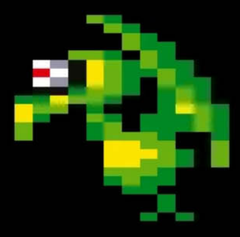
» **PUBLISHER:** FIREBIRD SOFTWARE

» **DEVELOPER:** NICK BRUTY AND DAVID PERRY

» **RELEASED:** 1988

» **PLATFORM:** ZX SPECTRUM, AMSTRAD CPC, VARIOUS

» **GENRE:** ACTION



SAVAGE 101

■ Although linked by a common narrative, *Savage*'s three stages are effectively different games. Its first level is a frenetic hack-and-slash with unforgiving platforming, its second is an into-the-screen shooter that riffs on *Space Harrier* and its final stage is a deadly maze that you have to guide a laser-spitting eagle around.

The Amstrad CPC was often poorly served when it came to multiplatform titles, with lazy ports of Spectrum originals being viewed by many publishers at the time as a quick and cost-effective means of supporting the system. *Trantor: The Last Stormtrooper* was an exception, however, in that it received a conversion that played to the Amstrad CPC's strengths and pushed the machine to its limits. While working on this adaptation, *Trantor*'s designer – Nick Bruty – and its coder – David Perry – decided that they should form a partnership, as the designer recollects. "We both liked to work fast, and we liked to do big, bold stuff," Nick begins, "so as we were finishing up *Trantor* we were like, 'Yeah, we should clearly be working together.' Dave worked out of his mother's house. He had a bedroom, and he converted this big closet into his development area. I was living in Brighton at the time, but I used to be up once or twice a week and we would work together there. Every day was a fun day because the speed that we would work at made every day different."

Naturally, the focus of the developers' efforts was a follow-up to the well-received *Trantor*, which Nick remembers being driven by a desire to produce something bigger and better. "I always wanted to see more spectacle," Nick muses, "and *Trantor* was my first step at that. I was like: 'I can blow all the memory on this big, stupid sprite!' So when we were talking about a sequel we decided that we wanted to have more stuff in there. But we weren't going to be able to fit it in because we were going to have another big, epic sprite again, so we were like: 'Well why can't we just have more loads?' It was really just about 'more' – we just wanted to do more."

The opening stage of Nick and David's multiload sequel – *Savage* – took its run-and-gun predecessor as a starting point, but the emerging hack-and-slash soon deviated from *Trantor* by having its enemies guard the game's power-ups. "It wasn't to distinguish *Savage* from *Trantor*," Nick clarifies, "it just felt more like a reward system to keep you engaged. I wouldn't say that it was a heavy design choice. A lot of the choices were just made around what felt good to us at the time. It sort of worked out okay, but some of the game we made a little bit too hard."

Respite from *Savage*'s challenging gameplay came in the form of bosses which could be slipped past rather than fighting them for the weapons in their possession, although as Nick admits this particular mechanic was unintentional. "It was a flaw! We should have spent more time on the bosses and given them some more diverse attacks to deal with that. We made games very quickly, so they often wouldn't get the testing that they should have. We definitely got more time with *Savage*, but because we were making three loads not that much more time."

There was, however, time for the developers to add some unique features to their game's first level, such as vibrant motivational phrases that would flash up on-screen. "It was just adding an extra element of energy," Nick says of *Savage*'s inspirational commentary. "We would have loved to have had a voiceover, but there was just no memory for it, and so we just went for

» *Savage*'s attempt to escape a castle dungeon starts with a few words of encouragement.

"A lot of the choices were just made around what felt good to us at the time. It sort of worked out okay but some of the game we made a bit too hard"

Nick Bruty

visuals. It was getting as much motion on the screen as we could get without interfering with the gameplay. And also we did like the fun tone of throwing messages up there as it was speaking to the player a little bit. It was just a high-energy thing, and a bit tongue-in-cheek."

Although equally ostentatious, Nick and David's plans for *Savage*'s second load meant that it would be dramatically different from the game's first stage, with their inspiration being provided by an early classic. "The first section was a running guy because one of my first professional games was *V* – and my first sprite for that was a little running man," Nick reasons, "then *Trantor* had my *big* running man. So after *Savage*'s first level I was like: 'I need to do something different!' Both of us really loved *3D Deathchase* – it just had that little bit of magic to it; the timing, the excitement. We were amazed that no one had really followed that up, and wanted to do our version of that. So we had a crack at it and came up with *Savage*'s middle section, which we called 'The Escape'."

As well as *Deathchase*, *Savage*'s into-the-screen shoot-'em-up second section bore some resemblance to the vivid playfields of Sega's coin-op hit *Space Harrier*, which Nick is quick to acknowledge. "I really liked *Space Harrier* at the time. It was the first time that arcade titles had started to get powerful. I can't think of anything before *Space Harrier* that was *that* graphically intense. So I think we were probably trying to get somewhere a little in between *3D Deathchase* and *Space Harrier* knowing that we had the extra colour and trying to ramp it up."

Key to making *Savage*'s second load stand out from its inspirations were Nick's designs for the stage's nightmarish scaled-sprite monoliths, which the artist viewed as a worthwhile extravagance. "I don't think I started with the intention of making monolithic faces; I just went there out of it being too wasteful to not do something with it. I realised: 'Wow! This is an overly large chunk of the memory for these scalable sprites!' The thing I enjoyed was that I could make them animated; I could have them open their mouths and have their tongues come out. It was also fun knowing we were blowing all of the memory on that one sprite!"

Of course, *Savage*'s third level was a fresh load, and so Nick and David had an empty memory to design into. The pair opted to devise a labyrinth ▶

CONVERSION CAPERS

How Savage compares across various systems

ZX SPECTRUM

■ Thanks to clever colour segregation, the Spectrum version of *Savage* is far more vibrant than many other games for the system. Its collision detection, smooth scrolling and the responsiveness of its controls are equally impressive, all of which you would expect given that *Savage* was designed with the Spectrum in mind.

AMSTRAD CPC

■ As the other platform that *Savage* was created for, the Amstrad understandably boasts a top-notch version of the game. Nick Bruty's visuals are a showcase for what the system is capable of, and in gameplay terms the CPC's *Savage* greatly benefits from the speed and mayhem made possible by David Perry's coding.

COMMODORE 64

■ Although the Commodore 64 version of *Savage* plays almost exactly like the original games, it doesn't quite look the part. 8-bit maestro Steve Crow's stage one and three visuals are well-defined but suffer from a dull colour scheme, and his second level graphics lack detail. However, the C64 *Savage* does sound great.

ATARI ST

■ The 16-bit *Savage* versions are all but identical to look at, with Nick Bruty's adaptations of his original 8-bit visuals representing a real step-up in terms of resolution and colour depth. The Atari ST version of *Savage* feels as intense as the originals, plus it has more bosses in stage one and more varied monoliths in stage two.

AMIGA

■ Like the Atari ST version, the Amiga *Savage* looks fantastic; the only difference being that it has more vivid colours in places. The gameplay in the two conversions is exactly the same. Where the Amiga adaptation stands out is with its superior sound effects and grating music, which thankfully can be turned off, saving your sanity.

PC

■ Even when played in EGA mode, *Savage* on the PC falls far short of its Atari ST and Amiga counterparts in the looks department, and its 'beepy' tunes are not much more than on par with the Spectrum *Savage*'s intro music. As far as the actual game design goes, the PC *Savage* is just as challenging as the rock-hard 8-bit originals.

BRUTY & PERRY

More from the respected double act

TRANTOR: THE LAST STORMTROOPER

■ Before teaming up, Nick Bruty designed *Trantor* for the Spectrum and David Perry adapted it for the Amstrad, although the pair bounced ideas back and forth, and Nick crafted the visuals for both versions. An attractive, frantic run-and-gun, *Trantor* is noteworthy for its flamethrower weapon and its stiff challenge.

DAN DARE 3

■ Nick and David's follow-up to *Savage* was the third 8-bit *Dan Dare* title, although the licence was added after the game had been developed – it was originally called *Crazy Jet Racer*! Their maze-based shooter features an arsenal of over-the-top weapons and teleporters that require you to navigate twisting astral wormholes.

TEENAGE MUTANT HERO TURTLES

■ When asked to produce Amstrad and Spectrum versions of an NES *TMHT* game, Nick and David opted to adapt rather than convert the console title. Their slick adaptation has more confined levels and adds a somersault move that can be used to spin the heroic turtles sideways off platforms.

SMASH TV

■ Given the number of protagonists and the size of the bosses in the *Smash TV* coin-op, the Speccy and CPC versions were always going to be a compromise. Nick Bruty and David Perry's conversions nail the arcade title's frantic, fast-paced blasting and complement it with visuals that play to the 8-bit systems' strengths.

PAPERBOY 2

■ Another pair of Amstrad and Spectrum conversions, but based on a console title rather than a coin-op machine. *Paperboy 2* riffs on its arcade predecessor, with Nick and David's Spectrum port being notable for its colourful levels, and their Amstrad version standing out thanks to its cute sprites and blistering speed.

» Certain bosses in *Savage*'s dungeon can be rushed past, but you'll be missing out on power-ups.

» Not long into *Savage*'s first stage a lightning-firing boss confronts the axe-wielding hero.

for *Savage*'s giant eagle to navigate, although the hero himself would be absent from this final stage. "You know what? I should have put *Savage* on the back of the eagle; that would have been better," Nick realises. "At the time, it was because I wanted to animate a different character. And we wanted to get another dimension in the game; we didn't want to do another horizontal perspective. It was the last stage and we thought we would go full-screen movement, and that the eagle should shoot in multiple directions."

A further deviation from *Savage*'s first level followed as the game's developers implemented a screen-wide energy bar that could be fully replenished by magic caldrons placed periodically throughout the game's maze-like level three. "Energy bars were new to us," Nick points out. "It may just have been part of a natural evolution; stage three was an evolution of the ending of stage one. I think in general we were just opening ourselves up to different ideas. It may not have been a conscious choice; it was more just exploring and wanting to advance. Like, what can we do next? We would actually think about that probably more than we would think about pure game design. We developed so quickly that we didn't really spend a lot of time around design papers or planning things out."

This rapid form of development resulted in *Savage*'s stage three labyrinth being populated with deadly obstacles, obstructive one-hit foes and enemies that required multiple strikes to vanquish, which Nick ultimately feels was reasonable given the difficulty of the game's earlier levels. "We were generally looking to fill the screen, and you got more space to do things than you did in the first stage; you could take a time-out," he says. "So it was busy, but I think in the right way. Looking at how the eagle flew around, it had gravity but it did feel very up-down-left-right. If I had a do-over, I would probably put a little more work into the flight mechanic and then give the eagle a little more space to use that, but I think the amount of action was appropriate with the rest of the game."

Following the completion of *Savage*'s third level, the game's designers were left with not one but two finished products, which as Nick explains was as a byproduct of their atypical design process. "It was an interesting thing to do the Spectrum and Amstrad *Savage* [versions] side by side. We did the graphics on the Spectrum first, but Dave always had the engine code running identically. So as fast as I could draw the graphics, there was the Amstrad version right there, which was nice, because if we had waited until the end to do it the Amstrad version would probably have got less time on it. But because Dave had done such a good job of *Trantor* on the Amstrad we wanted to keep that good will that we had built up."

In terms of reviews, this dual system approach to development seemed to pay off with both the Spectrum and Amstrad versions of *Savage* receiving top ratings on their release. The games sold less well, unfortunately, which Nick puts down to misjudged marketing. "The reviews definitely seemed very positive, but sales-wise I don't think it did that well. I hated the marketing campaign – the print ads. They had this weedy little school kid becoming *Savage*, and I think they really just should have focused on the game itself. So there was this big thing: '*Savage*' – a colourful, full-on, *Conan*-on-steroids game, and then we got this weedy, black-and-white advert. Everything about it sucked the life out of me."

But poorly conceived advertising aside, Nick Bruty looks back fondly on his time developing *Savage*, and is rightly proud of his and David Perry's colourful over-the-top epic action game. "I was happy with the whole experience and how it came out. Generally it was a really fun time, I think we were probably just disappointed that we didn't get big sales from it, but I'm still very happy with *Savage*," he concludes. "I like the way it looks; the framerate's pretty good and it's colourful. It was a good progression." ✱

"Both of us really loved 3D Deathchase. We were amazed that no one had really followed that up, and wanted to do our version of that"

Nick Bruty

DEVELOPER HIGHLIGHTS

TRANTOR: THE LAST STORMTROOPER
(PICTURED)
SYSTEM: ZX SPECTRUM, AMSTRAD CPC, VARIOUS
YEAR: 1987

ALADDIN
SYSTEM: MEGA DRIVE
YEAR: 1993

EARTHWORM JIM
SYSTEM: MEGA DRIVE, VARIOUS
YEAR: 1994

STREET FIGHTER

BLOW BY BLOW

SINCE 1987, CAPCOM HAS DELIVERED BONE-CRUNCHING BLOWS AND SPECTACULAR SPECIAL MOVES TO THE DELIGHT OF GAMERS WORLDWIDE. NICK THORPE SPEAKS TO THE SERIES' DEVELOPERS TO BREAK DOWN EXACTLY WHAT GOES INTO MAKING THE GAMES GREAT...

For over 30 years, *Street Fighter* has been at the pinnacle of the fighting game genre. Like a crafty veteran prize fighter, Capcom has managed to not only keep up with its competition, but outfox it along the way. Rivalries with the likes of *Mortal Kombat* and *The King Of Fighters* couldn't halt the rise of *Street Fighter*, and nor could the rise of the three-dimensional fighting game. Even the changing fortunes of the fighting game genre as a whole haven't been able to floor this series.

The first game was a critical success that did good business in the arcades, but it's seen as little more than a historical curio today. That's because *Street Fighter II* redefined the genre in 1991, setting the standard for 2D fighting games for decades to come and kicking off a craze that revitalised the arcade market. Via *Street Fighter*, Capcom stood atop the 2D fighting pile for the remainder of the Nineties with the popular *Street Fighter Alpha* series and hardcore-friendly *Street Fighter III* series. Then in 2008, *Street Fighter IV* revived the series and ushered in a fighting game renaissance, drawing mainstream attention back to the genre. *Street Fighter V* attracted record-breaking numbers of competitors to the prestigious Evolution Championship Series fighting game tournament in 2016.

Over the years, *Street Fighter* has busted out of the arcades and into the modern esports scene, and has transcended videogames to become a part of broader pop culture. There aren't many games that would be instantly recognisable when referenced in a Jackie Chan film or an episode of *Family Guy*, but *Street Fighter* shout-outs made it into those and more besides. The series has inspired comics, animated movies, card games and even a major Hollywood film starring Jean Claude Van Damme, Ming-Na Wen and Raul Julia.

Of course, what goes into the creation of a good *Street Fighter* game hasn't changed much over the years. All of the games share a common framework of important aspects, counting everything from the fighting itself to flavour additions such as stage design and music, and the competitive scene which has a symbiotic relationship with the games. We've spoken to Capcom's developers to break down exactly what makes a great *Street Fighter* game, and what goes into those distinctive areas to create a cohesive whole.

BUILDING THE BRUISERS

CHARACTER DESIGN FIGHT!

YOSHINORI ONO AND TAKAYUKI NAKAYAMA DISCUSS THE FINER POINTS OF CHARACTER DESIGN

Every *Street Fighter* player has a preferred strategy – and in the game, those strategies are represented by their characters. As a result, character design is of utmost importance to the series. Whether you want to get in close and deal lots of damage, play keep-away and punish mistakes, or even play a deliberately weak character as a handicap, Capcom provides a character with the attributes and move set to let you play *your* game. So with decades of hindsight, it's strange to think that the original *Street Fighter* game's characters represented obstacles to overcome. To do that, you had a generic martial artist with a single skillset: Ryu. This need to combat fighters of all types ultimately ended up informing the character's abilities. "In terms of gameplay, he's a great all-rounder and easy to use," says Yoshinori Ono, a series veteran and the executive producer of *Street Fighter V*.

In *Street Fighter II*, the number of playable characters was increased to eight. This meant that for the first time, the developers had to design a multitude of characters to play both with and against, and could explore the aforementioned offensive and defensive extremes. We've often wondered what the starting point is, so we call *Street Fighter V* chief director Takayuki Nakayama into the ring; do the designers come up with character designs to fit certain fighting styles, or design cool-looking people and then decide how they'll fight? "Both of those approaches have been used but we actually mostly come up with them at the same time," he explains. "We think about what kinds of moves would be fun at the same time as we're thinking about what kind of design would best show off their moves."

» The original *Street Fighter* may not raise eyebrows today, but it lay the groundwork for the rest of the series.

» The ever-animated Yoshinori Ono is a series veteran, and directed *Street Fighter V*.

Character design has always been a difficult process, with many ideas trialled and dropped along the way – rejected *Street Fighter II* designs include a bullfighter and an American amateur wrestler. According to Nakayama, it remains difficult to nail down. "We go through at least 100 versions when we are designing a brand-new character, going through many iterations of their appearance, storyline and moves," he explains. Such a process must surely take a long time? "It obviously depends on the specific character but I'd say, broadly, it takes five people three months to design one character," he confirms. "And then it's a further six months to finalise their moves and animations."

Something that has always been a part of *Street Fighter* is its international flavour – the

FAVOURITE CHARACTERS

DARRAN

I genuinely love any character with a 360-degree move, as it allows me to employ 'The Darran Jones factor". **Hugo** is my favourite due to his size and reach. In case you were curious, The Darran Jones Factor requires frantic rotation of the joystick while laughing or crying, ideally both.

NICK

My favourite character is **Ryu** – I know, it's a shock coming from Nick 'Default Character' Thorpe. But let's face it, this is the only sane choice. I'll never have to learn another character, and I can easily judge new mechanics by how well they play with his eternal moveset.

DREW

I picked **Karin** up recently in *Street Fighter V*, and she's quickly become my favourite. I prefer nimble characters that strike, and Karin's rekkas are deadly in the right hands. Then, looking at her design as a whole, she's a showboater who laughs manically at her foes; it's *me*.

FIGHTERS' EVOLUTION

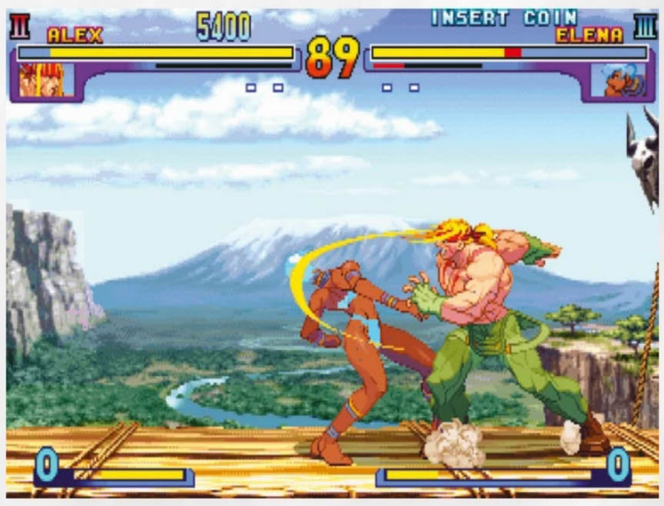
» Zangief may be a grappler by design, but other characters can throw, too.

original game featured fighters from the USA, Japan, China and the UK. "The fact that the original *Street Fighter II* had *The World Warrior* as its subtitle tells you that fighters from around the globe coming together to compete is not just a natural part of *Street Fighter* but an essential part," says Ono. "I think that it also lets players feel more connected to the game when they see a character from their part of the world in it, and maybe it's a hook for them to get into the game in the first place."

However, new characters are only one part of the story. While *Street Fighter*'s cast and the bulk of the characters in *Street Fighter II* and *Street Fighter III* had to be designed from scratch, the *Street Fighter Alpha* series provided a mixture of new and returning characters that has become the model for new instalments to the series going forward. How does the team go about bringing these older characters back after long absences? "The first step is researching how the character was played in the games they previously appeared in. We play those games and watch videos, and even reread the old design documents to work out what the original intent behind the character was," says Nakayama. "Combined with our estimation of what players want from the character and how they like to play as them, we recreate them and then work on eliminating the aspects that aren't in line with our vision."

For Ono, it's hard to pick a favourite. "Hmm… I get asked this a lot. The characters are like my children – I don't like to engage in favouritism," he hesitates. "I love R Mika a lot, and used my position at Capcom to bring her back in *Street Fighter V*," he explains with a chuckle. "But then again, I joined the company in the *Street Fighter II* era and worked on the sound team, I do have a special place in my heart for Cammy, since she was part of my work back then." But what of the Blanka toy that Ono is often seen with? "Well, he's been my travel buddy around the world for over ten years now, so he's beyond the level of like or dislike."

But despite all of the new characters over the years, none has displaced Ryu as the face of the series. "I think it's his personality that makes him resonate so much," says Ono. "He doesn't stand out, he values effort, he's a man of few words, he's kind of mysterious, and there's no one who you could say he's similar to. I think that's what has kept him popular over the long history of the series." It doesn't take much to convey that either, as occasional post-match win quotes will suffice. "He also has the 'Perfect Attendance Award' for the series and that is something that I think shows his dedication," Ono laughs.



» (Above) Charlie and Guile are both military men and fight similarly.

» (left) Just by looking at Alex, you can tell he's a heavy-hitter.

» (below-left) Poison has come a long way from her debut as a regular enemy in *Final Fight*.

ARENAS OF AGGRESSION

MAKING THE STAGES

EVERY GREAT FIGHT SCENE NEEDS GREAT FIGHT SCENERY

The very name of the *Street Fighter* series suggests a location for the brawls it hosts – not within the confines of gyms and stadia, but out in the open. It has always delivered on that promise, too, from subways to sidewalks to more exotic locations, like volcanoes.

At first blush, it might seem that stage design is a relatively unimportant aspect of the *Street Fighter* series. It's certainly true that the series has been conservative in its approach to stage design – as others have experimented with new mechanics, *Street Fighter* has stuck with a flat floor and a wall at each end. But it's the sense of character and polish provided by these stages that makes them so crucial, as you remember the little things about each stage. When you throw someone through the crates in Guile's *Street Fighter II* stage, there's a real sense of impact. When Seth's stage starts to fall apart in *Street Fighter IV*, you know that you're reaching the climax of the game. Without the expertise of the stage designers, playing *Street Fighter* would be a rather flat experience – so let's find out how they're made from *Street Fighter V*'s art director, Toshiyuki Kamei.

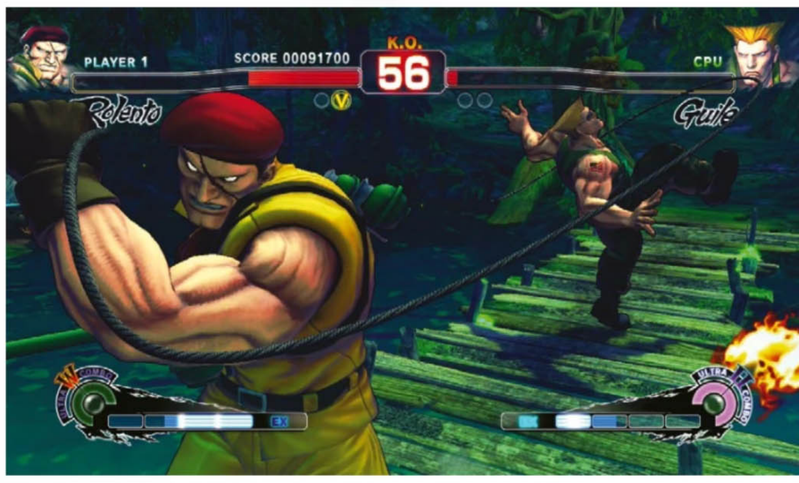
What do you do to ensure each level represents the character fighting on it?
I try to bring in elements like the character's nationality and colour scheme. When choosing the setting of the stage, I look at scenes and buildings typical of the country they come from, and then build more detail in with designs and props that bring out the character's personality. Colour is a really important factor, so I'll choose a colour that goes well with the character and then work on the lighting. I try to make sure each new stage fits in with the image players have for the games, while also bringing something fresh and new.

Is any real-world location scouting done when designing levels?
We haven't done anything like that recently. I would jump at the chance to go, though!

How long does a typical level take to create?
From the initial idea to creating prop assets, background characters and so on, it's about three months, then lighting and optimisation takes another month until it's complete. Some stages take longer than others – the China stages tend to have lots and lots of small details, for example.

There's lots of Easter eggs in the background of the levels, is that a labour of love from the team?
The team are all huge fans, so they love to put all kinds of little details in for fans to enjoy spotting.

Vega has his own stage-specific attack in some games, the wall climb. Have you ever considered adding more stage-specific attacks to *Street Fighter*?
We have considered that and it can be fun in single-player, but we also don't want to put in moves that only the CPU can pull off as it means players will want to do it in versus mode as well.



» The jungle stage in *SFIV* is teeming with flora and fauna, and the fighters trade blows on a precarious wooden bridge, upping the ante.

Over the years, other fighting games have adopted ring-out systems, uneven arenas, and other stage design features. Why has *Street Fighter* not done so?
I think verticality, ring-outs, weapons and other rules are fun and would be cool to try out, but they would have to be in a bonus mode. *Street Fighter* has become an esport in its own right, and introducing these kinds of 'uncertainties' to the rules would probably not go down well.

What version of *Street Fighter* has the best levels and why?
I think each title has done well at making the stages part of its coherent vision and playstyle. I always get a sense of excitement from the background characters watching the fight, and a feeling of the atmosphere of each country.

GET BONUS!

THE LEVELS OF STREET FIGHTER AREN'T JUST FOR FIGHTING IN...

TILE BREAKING
STREET FIGHTER

■ If it's not enough that you've had to face several gruelling rounds of opponents, you're now expected to perform in front of an idiot crowd who are just waiting for you to karate chop your way through nine rock-hard tiles. Timing is everything, so be sure to get it right; otherwise Ryu will hurt both his hand and his pride. It's repeated later in the game, but with thicker concrete blocks.

WOOD BREAKING
STREET FIGHTER

■ Ryu's trials and tribulations continue with a room containing three burly men and three planks of wood. There's no hazing going on here, though, just a dazzling display of strength and skill as you've got to break the pieces of wood the three men are holding with your fists or feet. It pops up again later in the game, but now there's a fourth plank holder to deal with.

WRECK THE CAR
STREET FIGHTER II

■ *Final Fight* taught us that smashing the crap out of someone else's car makes for an entertaining bonus game. Capcom brought it back for *Street Fighter II*, but left the weapons back in Metro City so your character will simply have to rely on their limbs instead. The stage has popped up in later games to allow later generations to enjoy some car carnage.

SETTING A SCENE

WHAT GOES INTO A CLASSIC STREET FIGHTER BACKGROUND? WE BREAK IT DOWN USING DHALSIM'S STAGE FROM ALPHA 3

LOCAL SCENERY
This is India, Dhalsim's homeland, and the backdrop needs to convey that. Good design means that you're not easily going to mistake the architecture in this scene for that of Rome or Chicago.

WILDLIFE
Animals are often used to add local flavour, such as the elephants here – they're a common feature of Dhalsim's stages. The dogs aren't quite so common, but they're cute so they get a pass.

THROWBACKS
The *Street Fighter* crew loves to reference the series' wider mythology. When Dhalsim fights here, his wife Sarah (introduced in his *Super Street Fighter II* ending) appears as a spectator to cheer him on.

SPECTATORS
The kind of crowd present at a fight can tell you a lot about a fighter. Flashy fame hunters like Ken can draw big crowds. Dhalsim, who doesn't care for the attention, has a single yogi.

BARREL BUSTER
STREET FIGHTER II

■ This bonus stage requires you to smash 20 barrels. It sounds easy, and would be if they just sat there like barrels normally do. These one have a purpose, though, and that's to bugger up your chance to score big points by bouncing erratically from a conveyer belt and hopefully knocking you down in the process. Despite how annoying it is, it's still popped up in later games.

OIL DRUMS
STREET FIGHTER II

■ Sometimes people just ask for trouble and the person who stacked these carefully placed oil drums clearly wanted them to be knocked down, right? Careful though, as these particular drums occasionally set alight, burning anyone who hits them in the process. Capcom revisited the idea with less flames and additional bricks for its home conversions to the SNES and Mega Drive.

BASKETBALL
STREET FIGHTER III

■ This smart stage is designed to show off the game's new parry system and it's thematically cool to look at as well. Shaun will lob an increasing number of basketballs towards you at different speeds and heights and you must simply attempt to parry/deflect as many of them as possible. Careful, though, as he's a bit of a swine and likes to catch you out with low blows.

THE SWEET SCIENCE

FIGHTING MECHANICS

EXPLAINING THE MECHANICS THAT SWAY THE OUTCOME OF EVERY BOUT

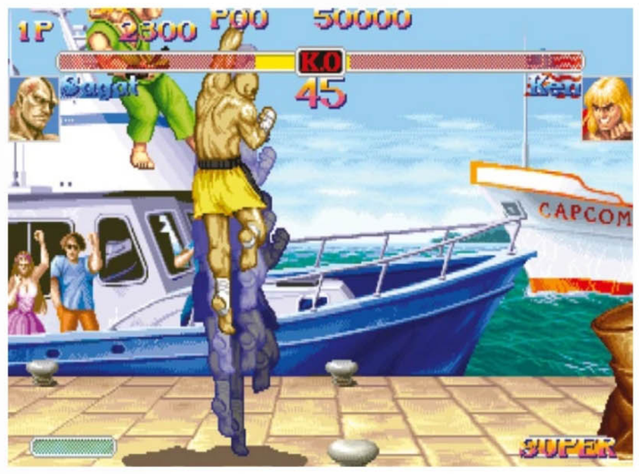
If you've ever wondered why some people passionately prefer *Street Fighter Alpha 3* to its predecessor, or why players of *Street Fighter III: 3rd Strike* didn't necessarily get on well with *Street Fighter IV* to start with, it's usually because of the fighting mechanics. As a basic example, consider throw attacks. Introduced in *Street Fighter II*, they allowed a player to inflict a damaging attack on blocking player – thus reducing the viability of defending your way to a time out victory. But from *Street Fighter III* onwards it's possible to 'tech' throws, reducing damage or even cancelling the throw entirely with an appropriately timed input – thus limiting the usefulness of such moves.

» Parrying became a defining trait of the *Street Fighter III* series of games.

By tweaking the abilities and options available to players in this way, Capcom can dramatically change the way games feel. "It changes a lot just because it makes the meta different," explains Justin Wong, a professional fighting game player. "If there was parry, you have to think twice in using long-range normals, if there is focus attack you have to think about how to break the opponent's focus attack since it can absorb one hit. Each different game mechanic changes the meta and also changes the tier list as well."

Of course, *Street Fighter II*'s defining mechanic famously originated as an unintended side effect of another system. The ability to cancel the animation of a normal attack into a special move, creating a combo, was accidentally added when the developers were making special moves easier to pull off but was considered interesting enough to include in the final game. Landing combos has become key to maximising your offensive opportunities over the years, and those simple origins are far behind us. "*Street Fighter*'s combo system evolved a lot," says Justin. "Back in the day there was no combo count but now there is, so people can see what is a combo and what is not a combo. It also changed a lot with juggles, using the game mechanics to extend combos to make them longer."

Street Fighter Alpha introduced a mixture of mechanics that enhanced both offensive and defensive options. The one that symbolises this balance most effectively is the air guard – although it's an extra blocking option, it's one that makes aggressive moves like jumping towards the opponent much safer. Likewise, the



» Sagat punishes Ken for a mistimed aerial attack with a devastating uppercut.

Alpha Counter allowed players to turn defence into attack, burning one segment of your super meter to hit an opponent in response to a blocked attack. Escape rolls also ensured that your opponent couldn't always predict where you'd be standing when you got up from being knocked down. *Street Fighter Alpha 2* added the devastating Custom Combo, a DIY super move that could inflict huge damage, and *Street Fighter Alpha 3* allowed you to use Guard Crush to punish players that blocked too much.

Street Fighter III: The New Generation added a variety of new movement options that significantly increased the scope for aggressive play. For the first time, a double tap of the joystick forwards or backwards allowed the player to dash in the appropriate direction, closing distance quickly. By flicking the stick downwards prior to jumping, you can perform a super jump, covering additional distance. Hitting

MECHANIC'S MANUAL

WHICH GAME INTRODUCED YOUR FAVOURITE MECHANIC?

STREET FIGHTER

- **Special moves** (PICTURED)
- **Light, medium and heavy attacks**

STREET FIGHTER II SERIES

- **Throws**
- **Combos**
- **Stun** (PICTURED)
- **Super moves** *(from Super Street Fighter II Turbo)*

STREET FIGHTER ALPHA SERIES

- **Taunt**
- Air guard
- Alpha Counter (PICTURED)
- Custom combo *(from Street Fighter Alpha 2)*
- Escape roll
- Air recovery *(from Street Fighter Alpha 3)*
- Guard crush *(from Street Fighter Alpha 3)*

» Use a mix of high, mid and low attacks to keep your opponent constantly guessing.

down when knocked down would also cause a quick stand, throwing off your opponent's attack timing and allowing you to get straight back into the fray. And then there's the parry – a curiously aggressive defensive move. By pushing the stick towards the opponent in time with their strike, you can nullify damage and recover before them to launch your own attack. *2nd Impact* introduced EX moves, powerful variants of certain regular special moves that cost super meter to use.

If all that aggression rubbed you up the wrong way, the *Street Fighter IV* series was probably more to your taste. The Focus Attack was a powerful new ability that allowed players to absorb an attack and deliver a devastating strike in response – one which would induce the new 'crumple' state, in which the enemy is falling but still vulnerable to attack. The Ultra Combo was also introduced – a secondary super gauge which charged only upon receiving damage, allowing for some extraordinary comebacks. The pendulum has swung back, with *Street Fighter V* adding V Triggers and V Skills, character-specific abilities that skew towards aggressive play, as well as Crush Counters that allow players to carry on combos after countering a weaker attack with a strong attack. However, defensive characters aren't as disadvantaged in competition as players initially believed, and that's the beauty of *Street Fighter*'s mechanical depth – it can take years to fully work out what's going on and how best to work within a given game's rules.

FIGHTING TALK

BRAWLER TERMINOLOGY EXPLAINED

ARMOUR
Usually if you manage to successfully land a hit on an opponent when they're mid-attack, their attack animation stops. Moves with 'armour' won't break that animation when hit.

BAITING
The act of trying to get your opponent to attack you so you can punish them.

CANCEL
Breaking out of your character's current animation with another move or ability – good for extending combos.

CROSS-UP
A tricksy move that makes it difficult for your opponent to decide whether to guard their left or right side.

FOOTSIES
Typically a part in a match where players are poking one another with long-range ground moves, usually kicks.

FRAME DATA
The numbers behind an attack animation. Each move has frames for its startup, hit and recovery animations.

HIT CONFIRM
To launch string of attacks to break through an opponent's block, then moving straight into a combo.

» [Arcade] A game of footsies is taking place here, with both Ken and Alex trying to hit each other's foot. The fools.

INFINITE
A combo that can go on indefinitely, much to the dismay of your opponent if you land one.

JUGGLE
The act of launching your opponent into the air, then hitting them to keep them airborne.

MIX-UP
A combo or string of low, medium and high attacks that are unpredictable.

PUNISH
To take advantage of an opening in an enemy attack's recovery animation.

WHIFF
To completely miss your attack. Sometimes used intentionally to bait your opponent.

ZONING
Controlling the battlefield at mid-to-long range using projectiles and out-prioritising your foe's own attacks.

Bold indicates evergreen mechanics – ones kept through subsequent games

STREET FIGHTER III SERIES

- **Dash**
- **Quick stand**
- Super jump
- Parry **(PICTURED)**
- **EX moves** *(from Street Fighter III: 2nd Impact)*

STREET FIGHTER IV SERIES

- **Crumple**
- Focus attack **(PICTURED)**
- Ultra combo
- Delayed standing *(from Ultra Street Fighter IV)*

STREET FIGHTER V

- V Trigger **(PICTURED)**
- V Skill
- Crush Counter

SOMETHING SPECIAL

SPECIAL MOVES

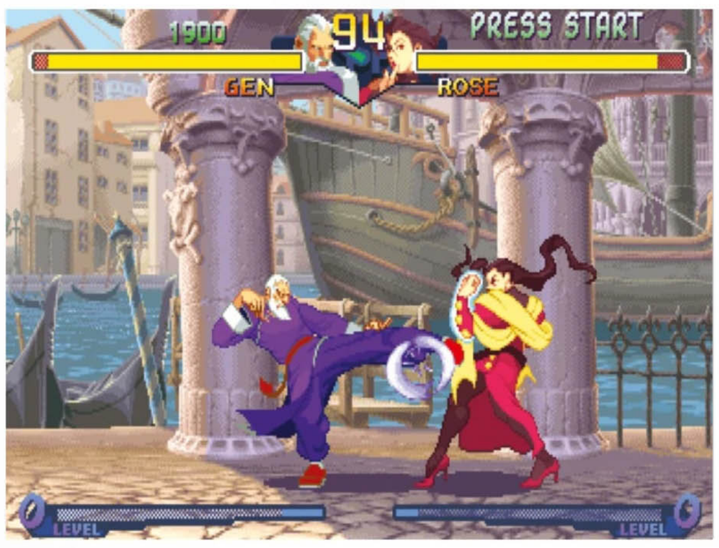
WHY STREET FIGHTER CAN'T DO WITHOUT THE SPINNING BIRD KICK, PSYCHO CRUSHER AND TIGER UPPERCUT

There are many things that go into making your favourite *Street Fighter* character play in their own unique fashion, but arguably the most important is special moves. Don't take that from us, though – take it from multiple time Evolution championship winner Justin Wong. "Special moves are always important throughout the years because they are what makes the character who he/she is," says Justin. "Ryu would not be Ryu without the Hadoken and seeing the evolution of it being better/worse has always been a treat."

As compared to normal attacks, special moves are a little more difficult to perform in that they require a combination of joystick movements and button presses. The trade-off is that these attacks typically have properties that aren't found in other moves. Some might hit multiple times or send you to the other side of the screen in the blink of an eye. Others launch projectiles, others still nullify and repel those projectiles. In any case, they have a huge impact on the way you play.

» Chun-Li's projectile attack is slightly different (and not as good) to Ryu and Ken's.

» More adventurous combat styles were refined for the later sequels.



When creating special moves for characters, three key considerations are taken into account: "Individuality, coolness, and accessibility," according to *Street Fighter V*'s chief director Takayuki Nakayama. But one thing that Capcom tries to steer away from is introducing more powerful moves in exchange for more difficult inputs. "We try not to have any moves that are really hard to pull off. The strength and difficulty of a move should not be in its input command but in the strategy of deciding when to use it – the timing and the frames, and how to work out the risks and rewards," Nakayama explains. Does the team ever come up with moves that end up suiting another character better? "Not often, but it has happened," confirms Nakayama. "We also sometimes reuse ideas that were cut from games that didn't come out."

Between games, a set of special moves is what keeps a character familiar. If you know how

LARGER THAN LIFE

REAL-LIFE FIGHTING STYLES FEATURED IN STREET FIGHTER

KICKBOXING

USED BY: **ALEX (WITH WRESTLING), DEE JAY, ED (WITH BOXING)**

■ Developed from a multitude of different martial arts including Karate, Muay Thai and boxing. Contrary to its name, the fighting style incorporates strikes from both legs and arms.

WRESTLING

USED BY: **HAGGAR, ZANGIEF, E HONDA, HAKAN, EL FUERTE, ALEX, POISON, R. MIKA, BIRDIE, DARUN MISTER, ABEL**

■ This style typically consists of wearing down the opponent with numerous throws, joint locks, takedowns and grappling.

BOXING

USED BY: **BALROG, CRACKER JACK, DUDLEY, ED (WITH KICKBOXING)**

■ An ancient sport, combatants use their fists to land blows and must keep their strikes above waist height. There are numerous styles and stances on offer across the series.

SHOTOKAN

USED BY: **RYU, KEN, AKUMA, GOUKEN**

■ Developed by Gichin Funakoshi, the Shotokan style is generally considered one of the most influential styles of karate. Interestingly, the real-life version is nothing like that used by the characters in the game.

» Poison goes in for the nut shot on Ken with her Ultra Combo– let's face it, he probably had it coming.

to pull off a character's moves in an older game, the chances are high that you'd be able to jump straight back into playing with them in *Street Fighter IV* or *Street Fighter V*. Of course, there are exceptions – Chun-Li, for example, has had her Kikoken fireball changed from a charge motion (holding back, then forward) to a half-circular motion and back again. "I feel that the reception has been positive," says Nakayama when asked about such changes. "We only make changes in order to bring the inputs in line with the character's fighting style, or when two moves have similar inputs which can cause players to do the wrong move at critical moments."

One function that special moves perform particularly well is differentiating characters that are otherwise quite similar, such as the trio of Ryu, Ken and Akuma. "Each character has to have their own concept defined. Ryu has weight in each attack, and is very defensive. Ken is better at combo attacks and has a certain flashiness, so when he starts attacking he keeps going. And Akuma has the best parts of both but takes more technical mastery to use well," Nakayama explains. "Based on these concepts, we separate out the abilities of their moves. Ken is a character where you want to rush your opponent, so he has lots of hits, and his fists brush up against the ground so friction causes them to go on fire – that kind of thinking is how we distinguish each character."

The natural culmination of the special move has been the rise of the Super and Ultra attacks. When introduced in *Super Street Fighter II* Turbo, Super moves were just more powerful variants of special moves. But in recent years, the gameplay function has remained the same while the graphical presentation has turned them into miniature cinematic attack sequences, with dynamic camera angles and detailed facial expressions making them into much more of a spectacle. "This trend started in *Street Fighter III* and was firmly established in *Street Fighter IV*," says Nakayama. "I think they simply came from wanting to show powered-up versions of special moves in really creative and cinematic ways." Land a couple of Supers and you'll agree that they combine flash and function into something incredibly satisfying.

» Laura's special moves are a mix between grapples and strikes, which fits in with her jiu-jitsu fighting style.

MUAY THAI

USED BY: **SAGAT, DAN HIBIKI, ADON, SAWADA**

■ Originating in Thailand, this style utilises a number of powerful strikes and clinching techniques and sees the fighter using a variety of devastating kick, elbow, knee and punch attacks.

NINJUTSU

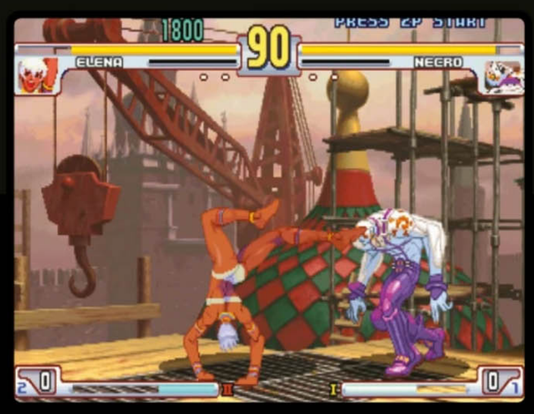
USED BY: **VEGA, GUY, MAKI, IBUKI, ZEKU**

■ Okay, this is cheating slightly, as *Street Fighter* features a fictional version of ninjutsu called bushinryu. Proper ninjutsu was allegedly practised by shinobi and typically deals with fast strikes and numerous weapons.

KUNG FU

USED BY: **FEI LONG**

■ Rather than actual kung fu, *Street Fighter* instead features its own stylised version called Hitenryu, which is loosely based on Bruce Lee's Jeet Kune Do. Needless to say, it's practised in the game by Bruce Lee lookalike, Fei Long.



CAPOEIRA

USED BY: **ELENA**

■ This fusion of music, dance and acrobatics in one of the most spectacular forms of martial arts, and has its origins in Brazil and Africa. It focuses on speed and power and spins and it primarily uses kicks.

GET THE BLOOD PUMPING

MUSIC AND SOUND DESIGN

FROM BRUISING BEATS TO SPIRITED SOUND EFFECTS, STREET FIGHTER'S AUDIO DELIVERS CHARACTER AND FIGHT FEEDBACK

From the second you hear the opening chord of Ken's theme in *Street Fighter II*, your hand grips the joystick tighter and your heart pulses, because you are in for a *fight*. As you twist the stick and hit punch, a scratchy cry of "Yoga fire!" alerts you to a successfully performed special move, and a "fwoosh" signals that your opponent has been engulfed in flames as planned. That's the goal of audio design in *Street Fighter* – to pump you up, to keep you informed, and to convey the cracking of bones as fist meets flesh.

Many of the classic *Street Fighter* tunes originated from *Street Fighter II*. It's hard to believe that the game shared similar sound hardware with its predecessor – the largely forgettable tunes of the first game emanated from a YM2151 FM synthesis chip and two MSM5205 ADPCM chips, while the sequel gained an MSM6295 ADPCM chip to replace the twin chips of the older board. The composing team of Yoko Shimomura, Isao Abe and Syun Nishigaki did maintain

» Many iconic characters were introduced in *Street Fighter II*, and many recognisable themes with them.

a tradition from the first game, in that the music was appropriately themed to the location it represented. However, their skill and programming advances ensured that the hardware sang in a way quite unlike what had gone before. The audio design also retained the best aspect of the first game, vocal sound effects for moves that conveyed character personality and showed intensity. When *Super Street Fighter II* arrived, taking advantage of the new CPS2 arcade board, the music was upgraded to take advantage of the new DL-1425 QSound chip. This meant reinvented arrangements of familiar themes, alongside new ones for the additional characters – and this would become the model for creating *Street Fighter* game music moving forward. *Street Fighter Alpha* took the same approach, retaining *Street Fighter II*'s classic themes and adding new ones for its new and returning characters, and *Street Fighter Alpha 2* did likewise.

Towards the end of the Nineties, *Street Fighter* games became more experimental in their approach to music. The *Street Fighter III* series let the old themes go, and lead composer Hideki Okugawa instead used the CPS3's sound chip to deliver sample-based tracks in a healthy mixture of musical styles, from house and rap to jazz. Back on the CPS2, *Street Fighter Alpha 3* also ditched all of the established character themes entirely, and went with an almost industrial sound – an energetic electronic soundtrack filled with grinding guitar samples. Ultimately, this new approach lost out to the previously established approach, as *Street Fighter IV* adopted the old character themes en masse and its sequel *Street Fighter V* has taken the same approach.

We get the lowdown on sound from the audio director and music producer of *Street Fighter V*, Yukinori Kanda.

» The *Alpha* series threw out character themes for a more uniform soundtrack.

BEATS WHILE YOU BEAT

DARRAN

Ken's theme is a brash, aggressive tune with a heavy beat that sums up Ken's cocksure personality perfectly. There's a ridiculously loud cover on YouTube by LittleVMills so make sure you give it a listen.

NICK

Okay, so it's the Ryu theme from *Street Fighter II. I know.* But, it's a well known fact that *Daytona USA* vocalist Takenobu Mitsuyoshi improves everything he touches with his golden vocal chords, and back in 2003 he performed a vocal cover of the classic tune for a *Street Fighter* tribute album. Seek it out!

DREW

I once wandered into gardens on a dusky summer evening. I heard Guile's theme and went to investigate, and saw a man playfighting with his dog he was shouting "*Hadoken*" and the dog was doing Guile's somersault attack in reply. So, yeah, Guile's theme is my favourite.

MEME THEME SUPREME

While some scientific discoveries are the result of years of research, others are stumbled upon completely by chance – and when humanity uncovered the universally appropriate musical backing for any piece of video footage, it was the latter. In 2010, someone combined video from the *Super Mario Bros* movie and audio from *Super Street Fighter II*, then uploaded it to YouTube under the username guilethemefitsall. This pioneer soon revealed that their username was no mere boast, as a series of clips showed that Guile's theme goes with everything. The music was inserted into scenes including Mufasa's death in *The Lion King*, Susan Boyle singing and the countdown from, erm, *Countdown*, and fit each of them as if it had had been commissioned bespoke.

The phenomenon was so powerful that the guilethemefitsall account racked up 3.75 million views across 17 videos, and copycats quickly emerged. Soon, Guile's theme was plastered atop videos of drunk people trying to stand up, Uncle Phil's pool hustle in *Fresh Prince Of Bel-Air* and Gordon Ramsay blocking a slap to the face. Some of these achieved as many as 3.5 million views of their own, but the most popular was one set to footage from the Japanese film *Kamen Rider Decade: All Riders Vs Dai-Shocker*, which achieved a massive 6.5 million views. So the next time you need music for an epic birthday party, romantic night in or health and safety video that needs a little 'lift', consider Guile's theme.

How important is the music to the *Street Fighter* series?

In a series like this, which strives to bring out the individuality and personality of each character, music is a hugely important part. It lets us express the background, feelings and mood of each character in a way that players will understand instantly. It's less about music that blends in with the game and more about bringing out the character. The key is that as soon as you hear the intro, the melody, even the timbre of a particular piece, you know exactly which character's music you're hearing.

Why do you keep the same signature tunes for each character with each game?

These characters are so iconic to players around the world, and their theme music pieces are classics. Of course, we update the music for each game in line with the game's style or to be more modern, or in ways that show the growth of the characters, but we prefer to do that based on the existing melodies by remixing them or rearranging them, rather than introducing new music. I think this is the best way to show that Ryu is still Ryu, or this is the new Ryu. In saying that, part of me does want to give the characters new tunes sometimes!

In many *Street Fighter* games, the music changes when a character is near KO. What do you feel this adds to the game, when included?

In a word, immersion. I'm sure all fighting game players get that feeling as they come to the end of a match where their focus gets heightened, so the way the music changes at that time can help them feel the developing situation. It also makes the game more exciting, of course. We've use this technique since way back in the series, and the development of audio technology should let us keep exploring new ways of achieving an even better effect.

PRIZE FIGHTERS

DISCOVER STREET FIGHTER'S CLASSIC LEGACY TODAY

Although Street Fighter's 30th anniversary was last year, that hasn't stopped Capcom from releasing a recent compilation of games to celebrate the popular series. ***Street Fighter 30th Anniversary Collection*** **features 12 arcade games from the popular series, including the original *Street Fighter*, five versions of *Street Fighter II*, the three *Alpha* games and all three games *Street Fighter III* titles, including the celebrated *3rd Strike*.**

Several games include the ability to play online, and save states are also included. The presentation throughout is absolutely faultless and there is a fantastic array of content available. In short it's a must own for any fan of the series.

GET IN THE RING

ESPORTS

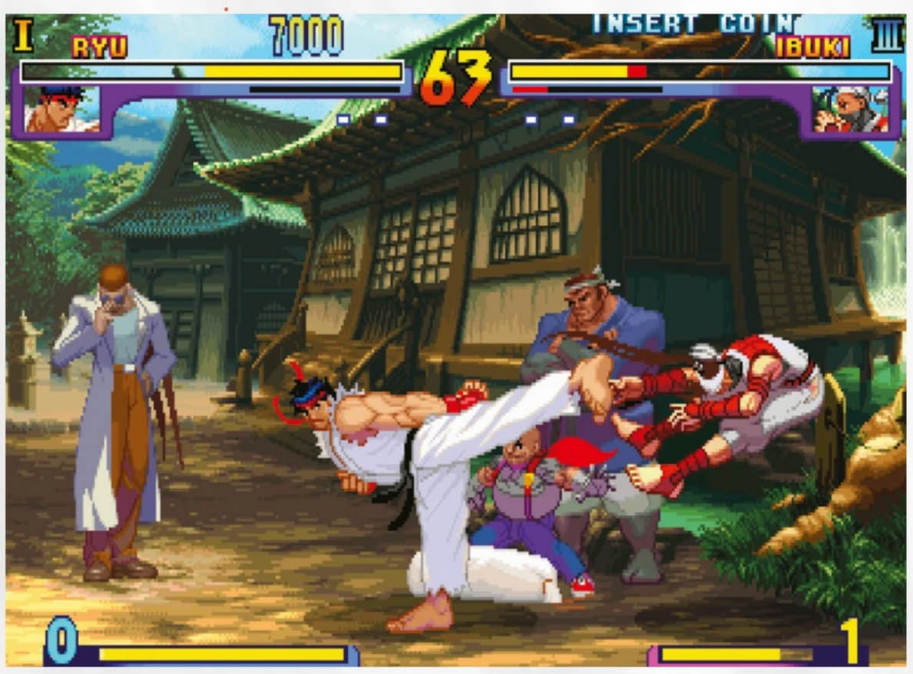
K.O.

HOW THE PROFESSIONAL SCENE KEEPS THE FIRE BURNING

***Street Fighter* isn't part of the competitive fighting game scene – *Street Fighter birthed* the competitive fighting game scene as a whole.** Or to be more accurate, *Street Fighter II* did. Prior to the 1991 blockbuster, most fighting games that allowed player versus player combat restricted the combatants to two characters with identical skillsets. Even the original *Street Fighter* included Ken solely for the purpose of having someone that matched up equally with Ryu. However, *Street Fighter II*'s character diversity and thrilling combat made competition inevitable and tournaments began to spring up in arcades around the world, with the first officially sanctioned by Capcom held in 1991 at Milpitas Golfland, California.

Throughout the Nineties, players would trade tapes of far-off tournaments to learn techniques used by players like Alex Valle and Daigo Umehara. Since then, the rise of the internet has allowed the fighting game community to strengthen considerably – players can communicate with ease, sites like YouTube and Twitch have made it easy to share technique videos and broadcast tournaments, and of course online gaming allows the best players to compete with each other remotely. The rise of the annual Evolution tournament series, supported by Capcom and other developers, has also provided a focal point for outsiders to see the best in action.

» Figurehead, Ryu has seen a good amount of play in tournaments across multiple games.



The fighting game scene can be highly influential in shaping the perception of games, which is most notable in the rehabilitation of *Street Fighter III*'s reputation. The series was not a strong performer in arcades, and received a tepid critical response when it arrived on the Dreamcast. But today, genre aficionados consider *3rd Strike* one of the greatest 2D fighting games, due to continued competition at Evolution and a famous comeback video in which Daigo Umehara parries a full super combo from Justin Wong.

"I think the competitive scene is awesome but I do believe that most players probably still don't know how awesome/important the competitive scene really is," says Justin, who holds a team *Street Fighter III: 3rd Strike* championship victory at Evolution alongside his many *Marvel Versus Capcom* wins. "Most players are casual players and they just play the game for fun and because of nostalgia purposes at this point." Still, nostalgia drew crowds back to *Street Fighter IV*, and in turn *Street Fighter IV* helped to grow the competitive community. When introduced at Evolution 2009, it attracted over 1,000 players on its own – considerably more than the 700 that showed up to the 2004 event across all games, but itself dwarfed by the 5,000+ that registered for *Street Fighter V* in 2016. What is it about *Street Fighter* that draws players to Evolution? "I think that the name alone, '*Street Fighter*' will always bring people back. Its a franchise that has been around before I even knew what videogames were and I will always support it," says Justin.

Of course, that's just the big event – plenty of other *Street Fighter* tournaments are held around the world every week both online and off, with officially sponsored events under the Capcom Pro Tour banner. And if the thought of glory alone doesn't motivate you, the most recent Capcom Cup had a prize pool of $380,000, so there's a great incentive to get out and prove your skills.

We spoke to Capcom's community manager, Matt Edwards, manager to discuss the finer points of fighting your friends and beyond.

When did you start realising *Street Fighter* had a big competitive scene?

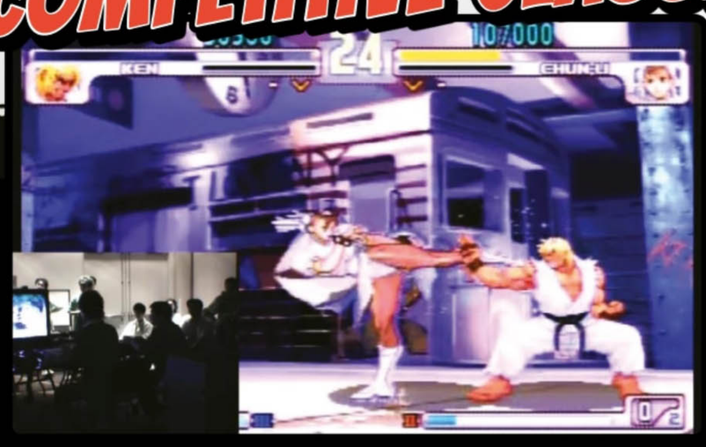
Personally? I can't remember the exact issue number but I remember *games™* ran a feature about the fighting game community, talking about players like Justin Wong and referencing Evo Moment 37. This would've been back in the early Noughties, back when I used to play *Street Fighter III: 3rd Strike* with friends on the original Xbox. That was the first time I became aware of competitive *Street Fighter* and its community.

Why do you think *Street Fighter III* had a big revival in Japanese arcades later in its life?

It's no secret that *3rd Strike* is one of the most

COMPETITIVE CLASSICS

OUR FAVOURITE TOURNAMENT MOMENTS FROM OVER THE YEARS...

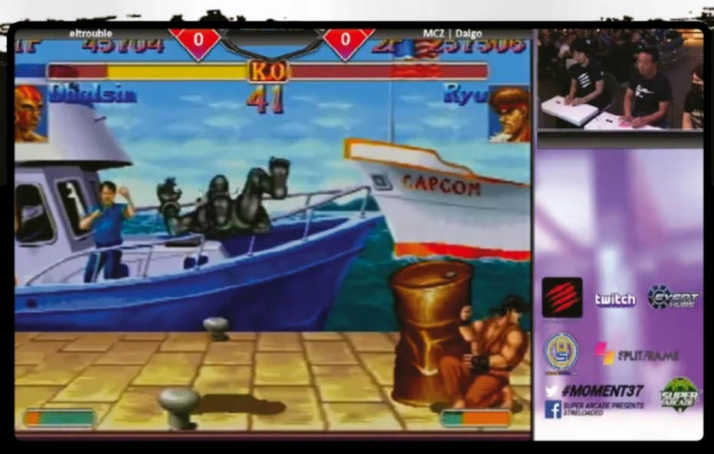


EVO MOMENT 37

■ Justin Wong has a commanding health lead over Daigo Umehara, and goes in for the kill with Chun-Li's Super Art. Daigo can't block it, as any hit will kill him, so he parries the entire combo with expert timing, then immediately launches his own combo for an epic comeback. The crowd goes wild and a viral video is born.

SNAKE EYEZ WON'T DIE

■ Fighting for the pride of his southern California team against its northern California rival, Darryl 'Snake Eyez' Lewis (Zangief) is the team's last hope – it's one versus five. In a match against Ricki Ortiz (Rufus), he manages to pull off extraordinary wins, baiting out his opponent's moves on near-zero health before hitting his own Ultra.



YOGA FIRED

■ During a *Super Street Fighter II Turbo* tournament at 37 Reloaded, Daigo Umehara's Ryu plays eltrouble's Dhalsim – a match heavily favouring eltrouble. But when a super Yoga Inferno leaves Daigo on a sliver of health, the Japanese legend fights back and knocks out his opponent from 90 per cent health – a rare comeback.

technically demanding entries in the main *Street Fighter* series. This is something that the Japanese community thrives off. They were the first to show the true potential of the parry system, and in recent years, they're still discovering new tech. It's one of the reasons why the Cooperation Cup – an annual *3rd Strike* tournament where teams of five face off against each other in Japan – is so entertaining to watch. There's always a chance you'll see something completely new in what many regard as the pinnacle of 2D fighting games.

Would you see *Street Fighter* as a series that caters to competitive gamers first, and casuals second?

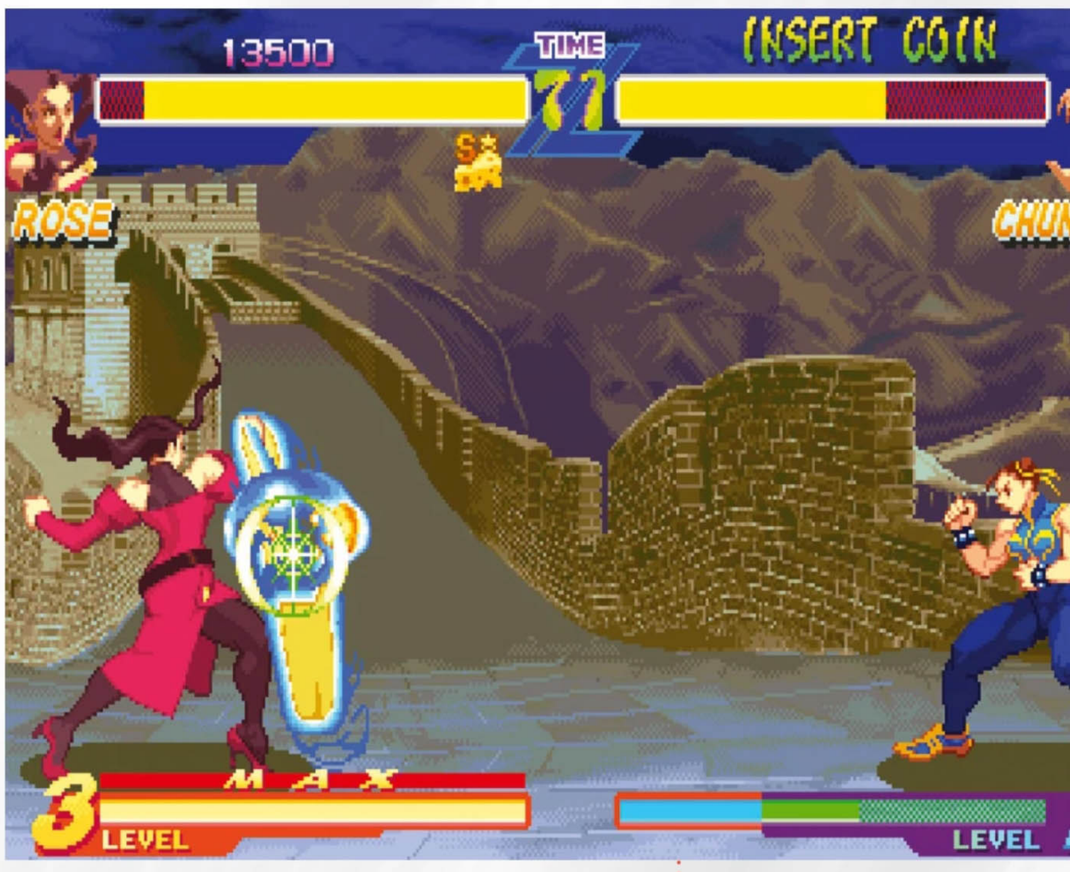
The life cycle of a fighting game is determined by the community that plays and supports it. That's why *Super Turbo* and *3rd Strike* maintain an active competitive scene even today while many other fighting game titles are comparatively stagnant. The mechanical base has to be finely honed for that to happen, though. That's what *Street Fighter* has been at its core since *Street Fighter II: The World Warrior*. It's a fighting game that can be enjoyed against the computer as you battle against a series of AI opponents with the chance of a secret boss at the end. But when you switch out the CPU for a human opponent – one that can level-up alongside you as you try out different characters and strategies – that's when Street Fighter becomes so much more. But Capcom will always encourage people to embrace the competitive side of the *Street Fighter* community. Without it, the hype moments and rivalries just wouldn't exist, and that's ultimately what *Street Fighter* is.

How has the competitive scene changed as online gaming has become popular?

When *Street Fighter IV* released on consoles back in 2009, it was the first time that the series was able to fully embrace the 'world warrior' mantra. The era of being a hometown hero or the best at your local arcade was essentially over. Players now had the opportunity to prove themselves against the best in the world, all from the comfort of their owning living room. This led to more players travelling to tournaments like Evolution in the US and Stunfest in France. They got valuable experience against international competition and we saw lots of new faces breaking into the Top Eight. Skip to 2018 and the impact of online gaming has gone even further. Streaming services like Twitch, YouTube and Facebook allow anyone with a smartphone, tablet or PC to watch a *Street Fighter* tournament as the action unfolds in real-time. Professional streamers and commentators work diligently to frame and narrate each match as professional *Street Fighter* players – some of which now command healthy salaries from sponsors as they compete for prize pools in the hundreds of thousands of dollars – throw down in *Street Fighter V: Arcade Edition*. That's where online gaming has taken the *Street Fighter* series.

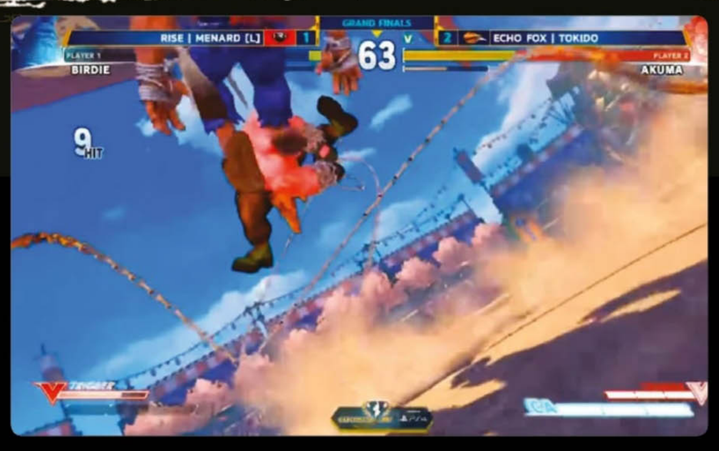
What influence does *Street Fighter* competitive play have on character balance?

It's fair to say that *Super Turbo*, *Alpha 2* and *3rd Strike* aren't the most balanced fighting games in existence. Chun-Li, in particular, dominates in the latter two games. But while these arcade games had to (for the most part) stick to their original forms, the modern *Street Fighter* titles can be patched and updated as necessary. Indeed, the dream is to have a *Street Fighter* that's perfectly balanced with every character match-up being even. Unfortunately, though that's impossible. If you change one frame to make a specific match–up more balanced you will inevitably affect five other characters in different ways. The best Capcom can do is to observe professional-level play at *Street Fighter* tournaments and keep an eye on the community tier lists for characters. This information – coupled with the mechanical insight of the development team – is how the character balance is regularly revised. It'll never be perfect, but I feel that *Street Fighter V: Arcade Edition* is one of the most balanced fighting games ever made. You only need look at the character diversity in recent Capcom Pro Tour tournaments to know this to be true. ✱



» It may seem impossible to pull of professional-level fighting techniques, but it's certainly possible with enough practice!

» Matt Edwards works with the *Street Fighter* community.



WATCH THE BIRDIE

■ In the grand finals of the Capcom Pro Tour 2017, Tokido (Akuma) has full health and is at match point, and his opponent MenaRD (Birdie) is on 15 per cent health. But MenaRD comes back, smashing two thirds of his foe's life bar in a single combo en route to victory – not only in that game, but ultimately the tournament.

CUSTOM CLASH

■ In the finals of the Battle By The Bay tournament in 1996, John Choi (Ken) is facing off against Alex Valle (Ryu). Both players are on low health in game one, when Valle decides to unleash his custom combo – which he hits, but fails to finish with. Choi fires back with his own combo, leaving Valle susceptible to a final dragon punch.

THE SOUND OF THE

What has made the music from Amiga games and demos last in gamers' memories? Seven magnificent Amiga composers talk to Andrew Fisher about the 'Paula' sound chip's legacy and their favourite tunes

How did you get into Amiga music?

Jason Page: I joined Graftgold in 1988, when the company was transitioning to Amiga and Atari ST games. I was responsible initially for C64 programming, but soon got involved in writing music and SFX. The first Amiga game I worked on was *Rainbow Islands* (sound only).

Barry Leitch: I was working at Catalyst Coders and I got to borrow an Amiga for a bit. I had a copy of Soundtracker and the first sample disk. I just went to town writing on it.

Allister Brimble: I saw an advert in a magazine asking for music, sound or graphics for PD company 17-Bit Software. I had been playing with some Aegis Sonix compositions which I sent to them and received a great reply, saying that they loved what I had done and would like to include it on their next release! 17-Bit turned into Team17 and things went on from there.

Tim Wright: It was a natural progression as a Commodore fanboy. Within a few days of getting my A500, I had Soundtracker and was composing pretty much a tune a day, until I'd used up all the sounds on the original ST-01 sample disc. Then I invested a few pounds in a Trilogic 8-Bit Sampler, and the world was my oyster! I was also keen to get into the demo scene – a founding member of Jester Brothers International, I guested on demos by Dionysus; *The Puggs In Space* demo went on to become a game made by Traveller's Tales and Psygnosis.

Mark Knight: Coming from the C64, I saw Soundtracker early on and knew I could work with it. I saw a lot of the early 17-Bit Software releases before I got an Amiga, but the sound quality blew me away.

Dave Lowe: Originally writing Z80 code on a ZX81, followed by writing Spectrum games (*Buggy Blast*, *Thrust*) – then moved to programming music on the Spectrum 128 sound chip (*Rasputin*). This led onto commissions for music on Spectrum, Atari ST, C64 and Amiga.

Jeroen Tel: Being a Commodore 64 game composer, the step to Amiga was easily made. I was intrigued by the sample playback possibilities and I was asked to write Amiga music for *Iron Lord* and *Supremacy*.

Why was the Amiga great for music?

AB: The Amiga was the first computer with in-built sampled sound, which sparked a new generation of sample-based music and software. Before this, only dedicated samplers were available to wealthy, well-established composers.

JP: The four sample channels helped! Without the Commodore 64, the Amiga wouldn't have sounded so great early on. Techniques developed over the 8-bit period were very much part of what made great Amiga music. The demo scene meant more people were aware of what could be created on the Amiga.

BL: The Amiga and Soundtracker program levelled the playing field for composers. You were no longer

Bio

NAME
Jason Page

AGE
45

OCCUPATION
Currently console developer relations engineer at Unity

WEBSITE
shockred.com and soundcloud.com/noothermedicine

FAVOURITE AMIGA COMPOSITION
Uridium 2

ALL-TIME FAVOURITE AMIGA TUNE
The Chaos Engine theme, closely followed by Turrican

FAVOURITE RECORD
Changes on a regular basis, but probably Pet Shop Boys – This Must Be The Place I've Waited Years To Leave

» Tim Wright and Brian Johnston created the *Lemmings* soundtrack.

» One of Richard Joseph's last public appearances, at the Retro Ball in 2005.

» In 2012 Mark Knight launched his *Reawakening* CD.

dependant on a friend who could write a music driver. Over time, people managed to squeeze out extra channels, so there was improvement that carried us to the CD-ROM era.

TW: The cheapest way to get into sample-based music. It was even used for a UK Top 40 single. Accessibility was a huge thing, in terms of bang for buck.

MK: It brought 'realistic' sounding music production to the masses that couldn't afford proper hardware to achieve the same result.

DL: The Paula chip and the 68000 processor. Both set out with complete forethought for the musician and programmer.

JT: Having four channels to play with opened up a whole new spectrum of possibilities. Making music using a tracker also became very accessible for hobbyists.

Tell us about your influences for creating music.

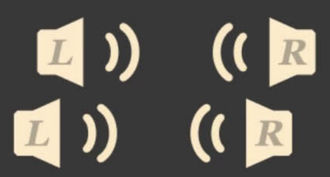
JP: Other composers (Richard Joseph, Chris Huelsbeck). Lots of demo scene music. I wasn't really in that scene, but just remember watching *Red Sector* demos and the *Wild Copper* demo.

BL: Usually, I've been influenced ▶

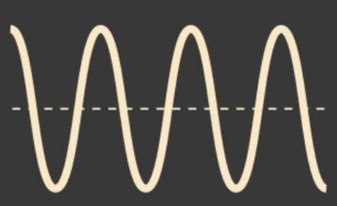
Number Crunching

3 Of the three custom chips in the Amiga, the Paula chip is responsible for sound (as well as controlling the floppy disk drive, serial port and reading input signals).

4 The number of sample channels available: two left and two right, giving stereo output.



Paula plays sounds as 8-bit PCM (Pulse-Code Modulation) samples.



8

64 Volume levels, with each channel having its own separate volume level.

28 KHz Maximum sample frequency that sounds are played back at (using direct memory access).

3,231 Mb The size of the UnExotica Amiga music archive, which can be searched by game, composer and title (exotica.org.uk).

Samba De Amiga

The music maestros present the ultimate Amiga playlist

Jason Page

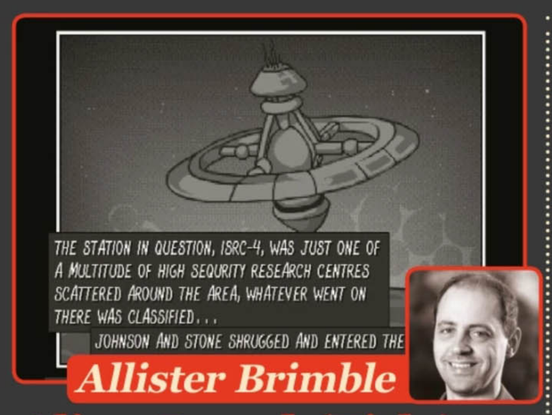
Uridium 2 (Title)

■ The synth-heavy title tune, with its great drum patterns, really suits the colourful attract sequence of this futuristic space shooter. The game in general also makes good use of sampled speech effects and some meaty explosion sounds.

Liberation – Captive II (in-game)

■ Tony Crowther and Ross Goodley's first-person RPG is set in a police state where killer robots are on the loose. The eerie in-game tune mixes suspense, military drums and metallic sounds to create a tense atmosphere.

Mark Knight



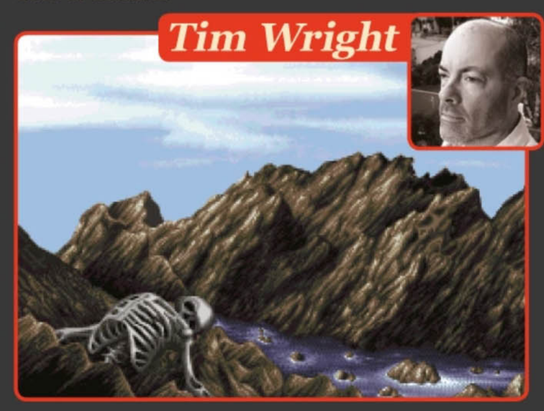
Allister Brimble

Alien Breed (Title)

■ Played over the introductory sequence and the title screen, Allister's five-minute opus sets the game's tone. The echoing sounds at the start merge into a fabulous electronic theme that never loses its creepy edge, perfect before exploring a 'deserted' space station.

Shadow of the Beast 3 (Game Over)

■ Known as *Funeral*, this is one of Tim's personal favourites from a well-made soundtrack. This is a beautiful, melancholy tune to end a game on. Of particular note are the twinkling chimes, adding a lot of texture.



Tim Wright

▶ by whatever I was listening to at the time, or if the programmers wanted a specific style. When I was working at Imagitec writing music for their games *and* Gremlin Graphics, I'd spend a lot of time listening to demo scene music.

AB: Jean-Michel Jarre, and 8-bit game composers David Whittaker, Rob Hubbard, Tim Follin, and Ben Daglish.

TW: Synth bands, such as Depeche Mode, Erasure, Howard Jones and the likes of Jean-Michel Jarre, Vangelis, Yellow Magic Orchestra and Tangerine Dream. I was also influenced by C64 musicians, such as Rob Hubbard, Galway, and Maniacs Of Noise.

MK: A *lot* of Commodore 64 music from a variety of musicians, and Jean-Michel Jarre.

DL: On computer music, nothing – hadn't heard any when I started.

JT: I come from a musical family – my dad's choir practiced at our house and my mother was a classical music fan. Game composers like Rob Hubbard, Martin Galway, and Ben Daglish really inspired me to become one.

What composing process did you use?

JP: For the original Graftgold player, I used NoiseTracker to write music and then keyed the music into the game by editing assembly code. After *Paradroid 90*, I wrote another player with more flexibility. Macros modified pitch, volume, sample loop position and such like. I wrote a PC editor that connected to Amiga, Atari ST, Mega Drive, and SNES directly. I could 'play' the PC QWERTY keyboard to enter/hear notes, but note information was sent directly to the platform. I could hear exactly what the final result would be without rebuilding code.

BL: Usually, I would go with a chord progression I had worked out, or an arpeggio. It varied a fair bit. Sometimes I'd start with the drums, a bassline, or a melody.

AB: I would come up with a new sound set and experiment. I used Soundtracker to enter notes and effects. Another reason why the Amiga was so great… find the sounds and compose. As simple as that!

TW: I would load up some random samples and start creating a drum pattern. Then a bassline... melodies would follow on. Occasionally I'd start off humming a melody, and build from there. The *Puggs In Space* theme tune began as a very basic, almost mathematically generated melody. I did look at how I could squeeze extra samples/notes into a song. Sampled chords helped a lot – one channel, but a two or three-note chord.

MK: It may have been samples in someone else's tracker module, other times I have come up with an idea singing in the shower. There's never been a proper process for me. Ideas come and go all of the time, wherever I am and whatever I happen to be doing.

DL: I always wrote on the piano. Later I used the ST to sequence the parts and wrote a program to convert MIDI data into an assembler text file the Amiga could read when pasted into my driver.

JT: We programmed a music driver and entered the notes in hexadecimal. After assembling the data I could hear what I programmed, went back and kept composing or corrected errors. For some games I used Protracker.

Where did you get samples?

BL: Anywhere I could rip them.

JT: I started with the ST-XX sample disks. I got hold of an Amiga sampler and from that moment on my samples became way more original. I ripped some samples from Protracker Mods that I liked.

Bio

NAME
Barry Leitch

AGE
47

OCCUPATION
Composer

WEBSITE
barryleitch.com

FAVOURITE AMIGA COMPOSITION
TFX (title theme)

ALL-TIME FAVOURITE AMIGA TUNE
Heatbeat – Scrambled Mind

FAVOURITE RECORD
Depeche Mode – Violator

» *Power Drift* wasn't a fantastic arcade conversion, but at least it had great music.

» The *Immortal* series of CDs features work by many Amiga composers. Head to maz-sound.com/immortal for more.

Frontier: Elite 2 (Title)

■ A game on the scale of Frontier needed a grand tune, and Uncle Art delivered. With its opening fanfare of trumpets, snare rhythms and John Williams style, budding pilots were prepared to head out into the final frontier.

Supremacy (Title)

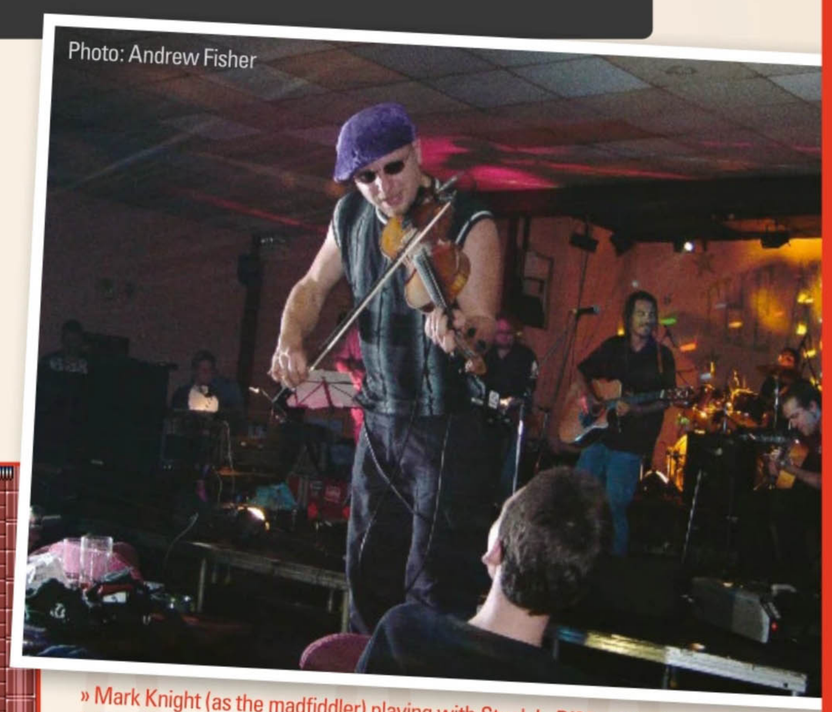
■ This is a tune that worked well across different formats, starting life on the Commodore 64. Here on the Amiga, though, the strong drum sounds and darker tone fit well with the gorgeous animated sequence of a god holding a galaxy in his hands.

Lotus Turbo Challenge 2 (title)

■ Barry's title tune really suits this racing sequel. Electro bass and vocal samples reminiscent of Yello build into a great Nineties dance tune, thanks in no small part to the awesome percussion.

"A lot of my output was done when I should have been studying for my A-Levels"

Mark 'TDK' Knight



» Mark Knight (as the madfiddler) playing with Stuck In D'80s at Back In Time Lite, 2005.

JP: Some early tracks used ST-01 (Simulcra) as well as my own sounds. Later games had very little RAM, so I generated waveforms in real time. The lead and bass sounds in *Fire & Ice* were 512-byte square waves. I'd modify the loop position to create the phasing pulse sound (reminiscent of C64 SID). It was far harder to source samples than today.

AB: I soon realised the importance of making my own sounds and these were often done on the hardware synths – Kawai K1, Korg O1, Yamaha TG77 and Kurzweil K2000.

TW: Vinyl, CDs, cassettes, even a microphone and just hit things or talk/sing into it. Back then, samples were largely unidentifiable so sampling commercial recordings wasn't a massive risk. Eventually I did buy some synths. I sampled my friend Shaun Morris' Korg DS8 and Korg M1, and these featured heavily in my *Shadow Of The Beast II* music.

MK: When I finished my GCSE's in 1989 I was given some cash my Mum had been saving up. I think it was supposed to help me continue in education.... but I bought a Roland D10 synthesizer. I got some good samples from that.

DL: I always took the music samples from synthesizers I owned. Short samples were used as is, but longer ones I would find a zero crossing point to enable them to loop so they could play melodies.

» *Paradroid 90* had an incredible soundtrack by Jason Page. He handled all the effects, too.

What were the biggest constraints?

JP: Always RAM. I might get 30K for a game, whereas others might get 30K per level. This was quite painful to work with. Those who bought the games didn't know what limitations we were working to.

BL: Several games I worked on, I got given the brief around 4pm Friday afternoon and told if they didn't have something by 5pm the game would ship without music (*Silkworm* and *Xiphos* are two examples).

AB: Sample rates were limited. With only 512K of RAM, the music often needed to come in at around 40KB. That is why many game tunes were simpler than you might find in demos.

TW: I was very lucky, because most of my musical output was for Psygnosis and they would think nothing of dedicating an additional disk for an intro.

MK: Channels, memory and time. A lot of my chiptune output was done when I should have been studying away for my A-Level exams.

Did you work on the ST?

JP: The ST was dull, especially coming from the C64. I managed to get a good arcing spark sound for *Paradroid 90*. I liked its ring mod. But apart from that, it wasn't much fun.

BL: I would compose on the Amiga, bearing in mind that I had to convert it afterwards. I'd plan to drop an entire channel, or combine a bass and drum line. I'd sit with the ST next to the Amiga, and convert what I could read on the Amiga into note data.

AB: I created several works for Codemasters. The sound chip was almost identical to the ZX Spectrum 128, so mostly 8-bit bleeps. The Amiga was a generation ahead. ▶

Bio

NAME
Allister Brimble

AGE
46

OCCUPATION
Music and sound design

WEBSITE
allisterbrimble.bandcamp.com

FAVOURITE AMIGA COMPOSITION
Alien Breed

ALL-TIME FAVOURITE AMIGA TUNE
Ghouls & Ghosts theme by Tim Follin

FAVOURITE RECORD
Jean-Michel Jarre – Chronologie

NAME
Tim Wright aka CoLD SToRAGE

AGE
50

OCCUPATION
Development manager at Numfum GmbH and managing director at Tantrumedia Limited

WEBSITE
coldstorage.org.uk

FAVOURITE AMIGA COMPOSITION
Shadow of the Beast III – Game Over, or Agony Piano Intro

ALL-TIME FAVOURITE AMIGA TUNE
Hired Guns by Brian Johnston – still amazing to this day!

FAVOURITE RECORD
Howard Jones – The 12" Album

Bio

NAME
Mark Knight aka TDK

AGE
44

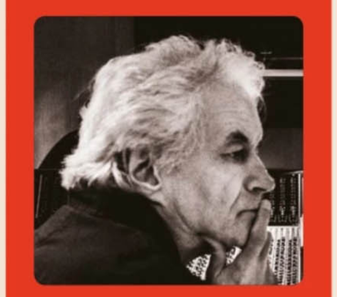
OCCUPATION
Freelance composer and sound designer

WEBSITE
sonicfuel.co.uk and flitkillsmoths.co.uk

FAVOURITE AMIGA COMPOSITION
Chubby Chubby Chip Chip

ALL-TIME FAVOURITE AMIGA TUNE
Klisje paa Klisje by Walkman (Tor Bernhard Gausen)

FAVOURITE RECORD
Currently the Chappie soundtrack



NAME
Dave Lowe aka Uncle Art

AGE
67

OCCUPATION
Musician

WEBSITE
uncleartretrogaming.com

FAVOURITE AMIGA COMPOSITION
Frontier: Elite II (Second theme)

ALL-TIME FAVOURITE AMIGA TUNE
Pass! Next question...

FAVOURITE RECORD
Strawberry Fields – The Beatles

Photo: Courtesy of Dave Lowe

» In 2015, Tim Wright remixed David Whittaker's *Shadow Of The Beast* soundtrack for a Bitmap Books Kickstarter.

» Among Allister Brimble's Codemasters work was converting the C64 soundtrack to CJ's *Elephant Antics*.

> **"Skilful composers worked around the limits and composed memorable tunes"**
> Jeroen Tel

▶ ***TW:*** I did have some of my music featured on ST versions of games, by means of a MOD file player.
MK: I had a 1040STFM purely to use as a MIDI sequencer (Cubase). It was the lesser machine in almost every way.
DL: Most Amiga music was implemented on the ST – an almost impossible task as there was no sampling chip available. To create the same music on its AY chip was a very unsatisfying experience.
JT: I only used the ST as a MIDI sequencer. Playing with the sound chip inside couldn't inspire me all that much.

Are you still involved in game music?

JP: Not full-time. I still write music for games if I'm ever asked, and if the project fits in with what I want to do. I advise on various panels and such like. Game audio is still something of a passion of mine.
BL: I still do the occasional game. I got to arrange the orchestral medley of *Top Gear Vegas* theme and *Horizon Chase* title theme for Video Games Live in Brazil last year which was challenging, and a life ambition to hear a piece of mine played by orchestra.
AB: I have never stopped working in games, my career has gone from 8-bit to the Wii. I am available today to compose for games – orchestralmedia.co.uk/portfolio.
TW: I tend to pick my projects now – the ones you feel you can do something new with – rather than just work on everything that's requested of me.
MK: I had a rather lengthy break from composition after *Dungeon Keeper 2* in 1999, concentrating on sound design, but I started back with *F1 2015* and I'm now working for myself as an audio content provider.
DL: Not so much these days but I am talking to some companies about follow-up games – they are under confidentially agreements so I'm unable to discuss them at present.
JT: I composed soundtracks on many different platforms. Right now, I primarily compose for PC and web-based games.

Have you remixed your own – or someone else's – Amiga music?

JP: I've remixed some of my earlier tracks. *Fire & Ice and Uridium 2* were on the *Immortal 3* CD, and *Paradroid 90* was on *Immortal 4*.
BL: I've done a few for the *Immortal* series but *TFX* title theme, which started as an Amiga MOD for the Anarchy party in 1992, was probably my favourite.
AB: I recreated my best-known tracks for my Kickstarter album, The *Amiga Works* (amigaworks.com) and more recently David Whittaker's *Amiga Works* for another Kickstarter.
TW: Recently, I have been remixing and remastering my back catalogue, and that's great fun. I've created cover versions of other people's work – tracks I've always had a soft spot for, or commission work.
MK: I remade a couple of my chiptune tracks for my TDK album, *Reawakening*. I've got a couple more on the go, which will get finished when I get time.
DL: I have remade some of my favourite compositions on an album called *Temporal Shift* available on uncleartretrogaming.com.

What are your thoughts on the overall longevity of Amiga music?

JP: Technical specs are one thing, but if the final music wasn't good, I doubt anything would be remembered with such fondness.
BL: I think they stand the test of time quite well, and don't sound too 'bleepy' like some earlier computers. You might be able to play one in the car and your wife wouldn't go, "What are you listening to now?"
AB: The Amiga's four channels inspired new ways of composing and utilising sampled sounds. People like David Whittaker and Chris Huelsbeck prove their compositions still sound great today. A good composition is forever! As for composers, they never die, just decompose.
TW: Just like 8-bit musical compositions, there will be people with fond memories of the melodies from back in the day. It does have a uniqueness because of the sound chip, and that makes it readily identifiable.
MK: I can't say that it's timeless for everyone. I often listen to old modules - not just to reminisce, but because there was some amazing music written on that machine.

» Jeroen Tel created the excellent in-game tracks for scrolling owl-themed shoot-'em-up *Agony*.

» *Iron Lord* was one of the first Amiga games that Jeroen Tel composed for.

» Dave Lowe was once again on musical duties for *ISS: Incredible Shrinking Sphere.*

JT: Good music never dies. Skilful composers worked around the limits and composed memorable tunes. It's amazing younger enthusiasts are appearing on the remix scene, some of which weren't even born when the Amiga launched.

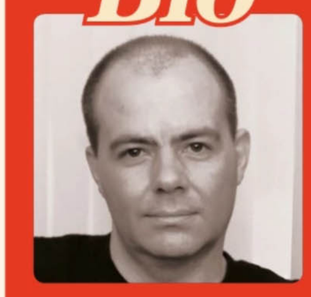
What are your memories of the late game composer Richard Joseph?

JP: We met at a Renegade Christmas party, and spent the whole evening chatting about music. I'd handled Mega Drive conversions of his games (*Gods*, *Chaos Engine* and one *Sensible Soccer*). Soon after, he asked me to work with him full-time. I couldn't refuse. I learned a hell of a lot from him. He lives on through the legacy that he left behind.

BL: I remember listening to his work and being annoyed at how great it sounded! I was very competitive, and *Xenon 2* had my favourite chord progression. I did a remix of *Gods* at the time because I liked the samples, and converted his *Speedball 2* music to PC. He was a great composer and he is sadly missed.

AB: Richard's technical capabilities were superb when creating tight looped, clean sampled sounds… something many struggled with. His compositions were amazing, but his ability to take other tracks, such as those by Jon Hare and arrange them with such limitations was an incredible achievement!

Bio



NAME
Jeroen Tel

AGE
45

OCCUPATION
Music composer and sound designer

WEBSITE
maniacsofnoise.com and soundcloud.com/maniacs-of-noise

FAVOURITE AMIGA COMPOSITION
Agony (in-game tunes)

ALL-TIME FAVOURITE AMIGA TUNE
Dizzy – alternative samba mod

FAVOURITE RECORD
Toto - The Seventh One

» *Lotus Esprit Turbo Challenge* offered a choice of four in-game tracks by Barry Leitch and Patrick Phelan.

MK: Good old RJ. I got the *Wing Commander* gig aged 19 because I had significantly undercut Richard with my quote. His studio experience really helped squeeze the best out of the Amiga. We didn't really get to know each other until the Bullfrog days when he worked on *Theme Park World* (winning a BAFTA for Best Sound), and we got on extremely well. He'd phone me to bitch about how the games industry was changing. Sadly missed!

DL: I didn't know Richard personally. I was aware of his name at the time – his music was always first class in composition and implementation.

JT: I met him at computer shows in London. He always had cool stories – he played in a band with Trevor Horn, now one of the world's most celebrated composers/producers. It came as a shock to hear he passed away. He will always be missed by many as a great personality and composer, but he left quite a legacy behind!

Chip Comparison

How did the Amiga's sound compare to its competitors?

Amiga

Custom Paula (Ports, Audio, UART and Logic) sound chip, four channels of 8-bit PCM samples (28 KHz), stereo output

■ The Paula chip's independence from the processor and high sample rate gave great quality sound. With technical trickery, more than eight channels at once were possible. The Amiga's sound outshone the Atari ST.

Rating: ★★★★★

Atari ST

Yamaha YM2149F SSG sound chip (based on the General Instruments AY chip), three square voice channels plus one noise channel, mono output (stereo output on STE)

■ Ditching the planned AMY sound chip, Atari used a Yamaha chip. Playing samples used up lots of processor time. The weakest 16-bit in terms of built-in sound, but renowned for its MIDI ports.

Rating: ★★☆☆☆

Mega Drive

Texas Instruments SN76489 and Yamaha YM2612 sound chips, four voice generators plus six-channel FM sound, stereo output

■ Both of these chips were used in Sega's arcade games and home consoles. The Yamaha's FM synthesis gave richer sounds. In the right hands, the Mega Drive made some amazing musical compositions.

Rating: ★★★★☆

SNES

Custom Nintendo S-SMP chip, featuring Digital Signal Processing (DSP) and on-board RAM, eight channels of 16-bit samples (8-48 KHz), stereo output (Dolby stereo capable)

■ With Sony's Ken Kutaragi designing the DSP (used for effects including echo), the versatile SNES sound chip was programmable using its own machine code language. It was harder to compose for, but more than capable of great music.

Rating: ★★★★★

Inside the Mega Drive

When Sega set out to replicate its arcade hardware in an affordable form, it ignited a console war and captivated a generation. Nick Thorpe speaks to key developers to learn about the technological factors that made this 16-bit console a classic...

If there's one thing that characterises Sega during its years as a console manufacturer, it's a relentless pace of technological development. By the middle of 1986, the company had put together the SG-1000, an exterior redesign in the form of the SG-1000 Mark II and the vastly upgraded Mark III. The design of the Master System, the export version of the Mark III, was finished and manufacturing had started. Having released four pieces of hardware since 1983, it might have seemed like Sega should take a break. However, none of the company's releases had helped it to claw market share away from the dominant manufacturer, Nintendo.

To try to make an advance in the market, Sega began work on a 'Mark V' console designed to achieve a true generational leap. In the book *Sega Mega Drive/Genesis: Collected Works*, Masami Ishikawa explains that the primary goals in producing the Mega Drive were to retain compatibility with the Master System, and to provide the basic performance of its relatively new System 16 board. This board was already powering hit games like *Fantasy Zone*, and would remain an active part of Sega's development plans for the remainder of the Eighties, hosting games such as *Shinobi*, *Alien Syndrome*, *Altered Beast* and *Golden Axe*. This project would ultimately become known as the Mega Drive (or Genesis, in North America). ▶

MEGA FACT

■ The Mega Drive hardware formed the basis of three Sega arcade boards: Mega-Tech and Mega Play ran Mega Drive games and System C-2 hosted new ones.

Sega Superstars

The developers who made the Mega Drive shine

Rieko Kodama

Artist and director, Sega (during the Mega Drive years)

Trip Hawkins

Founder of Electronic Arts

Mark Cerny

Founder of Sega Technical Institute and programmer

Matt Phillips

Director of Big Evil Corporation

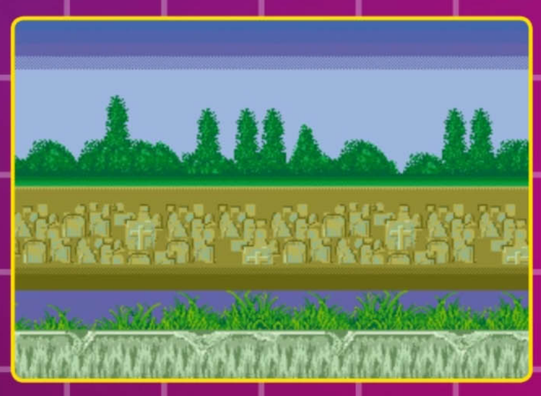
Takashi Iizuka

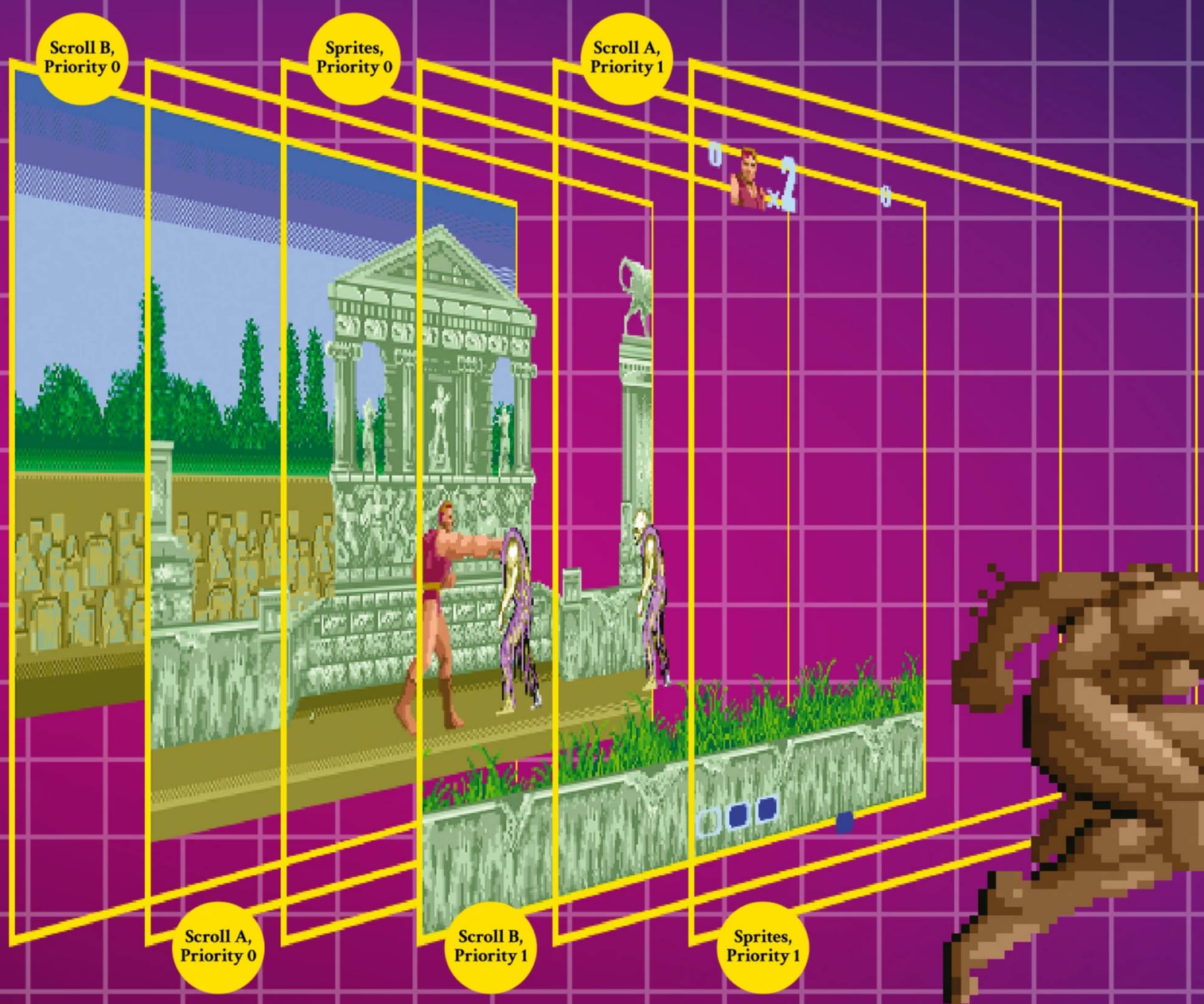
Game designer (Golden Axe 3, Sonic 3, Sonic & Knuckles)

You've been framed

The Mega Drive's multilayer display was a new feature for consoles – here's the complex process that goes into creating a frame...

01 The Mega Drive VDP draws three graphical layers, named Scroll B, Scroll A and Sprites. The Scroll layers are background tilemaps that can be scrolled in any direction and have limited animation, while the sprite layer is for the in-game objects that need to move around quickly and animate fully. These layers are then passed to the priority controller.





02 The priority controller ensures that items are drawn in the correct order. It starts with a fixed order of Scroll B at the back, Scroll A next and Sprites on top. However, if part of any layer has a priority bit set to 1 instead of 0, it is cut out and placed in front of everything with a lower priority, in the same B/A/Sprites order. Here's how it works:

SCROLL B, PRIORITY 0

■ This is the furthest part of the background, and the slowest moving. Note that the lower part of this layer isn't used because it wouldn't be visible.

SCROLL A, PRIORITY 0

■ The nearer portion of the background is here, and is moved faster than Scroll B in order to create a parallax scrolling effect.

SPRITES, PRIORITY 0

■ This is where the main action happens – your character and the enemies all appear here. This layer has its own priority system, too.

SCROLL B, PRIORITY 1

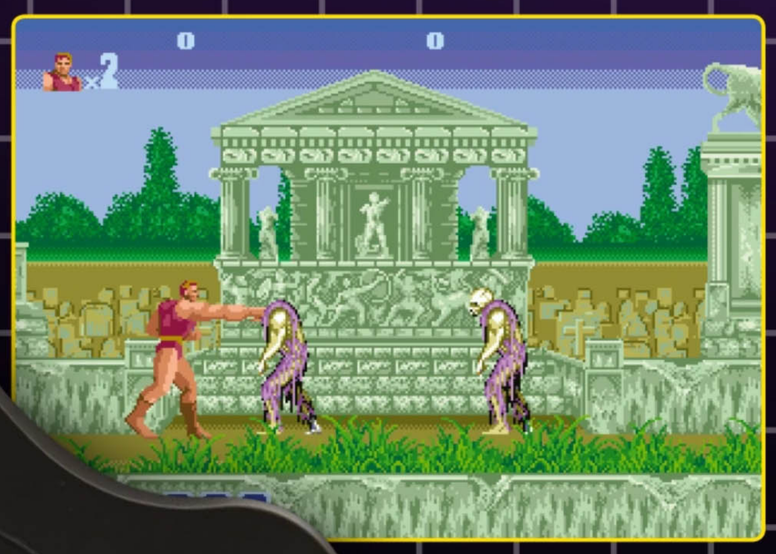
■ The free space on the lower part of Scroll B has been used to create a foreground, with the priority bit pulling it in front of even the sprites.

SCROLL A, PRIORITY 1

■ Areas not needed to draw the main background have been used for the HUD – although not all of it, curiously.

SPRITES, PRIORITY 1

■ The remainder of the HUD goes here, drawing over the top of everything else.



03 The frame is fully assembled, ready for display. If you're using a 32X, there's an extra layer added before the picture goes to the TV – and the regular Mega Drive graphics can be either overlaid or underlaid, depending on the needs of the game in question.

MEGA FACT

■ The largest official Mega Drive cartridge is *Super Street Fighter II: The New Challengers*, at a whopping 40Mbit (5MB) – over the theoretical 32Mbit maximum.

"I did not care for the NES because of its 8-bit limitations and the draconian licence agreement"

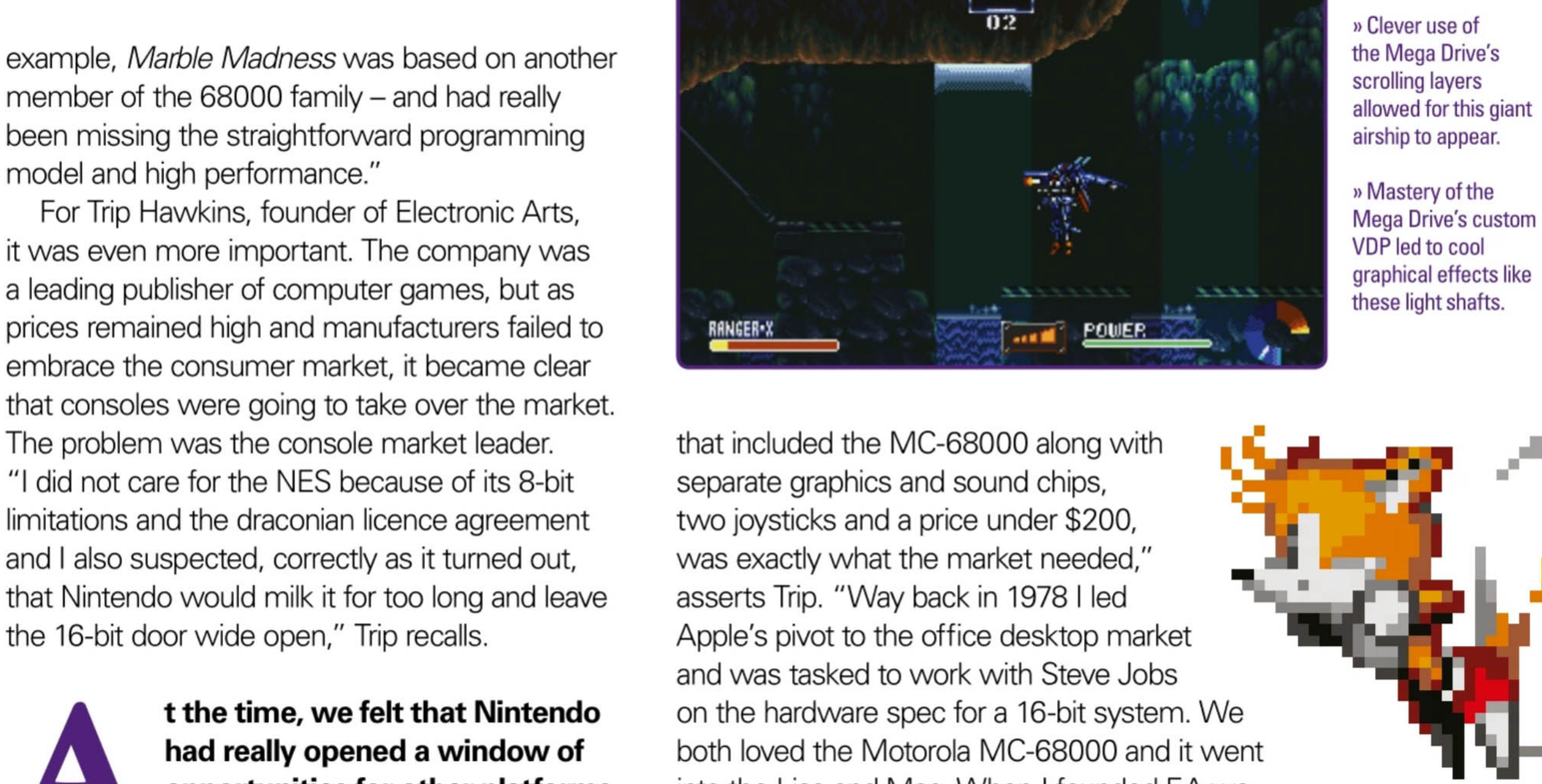
Trip Hawkins

▶ The most significant decision Sega took during the development of the Mega Drive was its choice of CPU. Again in *Collected Works*, Masami Ishikawa notes that this was the most important component choice issue – the hope was to use the popular Motorola 68000 CPU, the 16-bit CPU from which the System 16 gained its name. Introduced as a high-end part in the late Seventies, the processor was in mass use by the late Eighties. The big attractions such as *Hang-On* were using two 68000s per board, but the more economical System 16 board introduced in 1986 used just one.

However, the cost of the chip forced the hardware designers to consider an 8-bit alternative. Even the Atari ST, marketed as offering "power without the price" was over £200 at the time. The Mega Drive's retail price of 21,000 yen was less than half of that, roughly £95 in late 1988. In the Japanese book *Sega Consumer History*, hardware designer Hideki Sato explained that the issue ultimately came down to negotiations with Signetics, which manufactured 68000 CPUs. Sega had asked for a very low price, and eventually secured it for a blanket order of 300,000 chips.

For programmers and engineers, securing this CPU was crucial. Mark Cerny, who had spent much of the late Eighties in Japan programming games for the Master System was also enthusiastic. "It was wonderful to be able to use a 68000 CPU. I'd had some experience with them back when I was making arcade games – for example, *Marble Madness* was based on another member of the 68000 family – and had really been missing the straightforward programming model and high performance."

For Trip Hawkins, founder of Electronic Arts, it was even more important. The company was a leading publisher of computer games, but as prices remained high and manufacturers failed to embrace the consumer market, it became clear that consoles were going to take over the market. The problem was the console market leader. "I did not care for the NES because of its 8-bit limitations and the draconian licence agreement and I also suspected, correctly as it turned out, that Nintendo would milk it for too long and leave the 16-bit door wide open," Trip recalls.



» Clever use of the Mega Drive's scrolling layers allowed for this giant airship to appear.

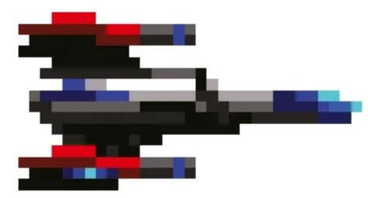
» Mastery of the Mega Drive's custom VDP led to cool graphical effects like these light shafts.

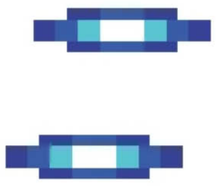
At the time, we felt that Nintendo had really opened a window of opportunities for other platforms by not shipping the Super NES in the US until 1991," Mark agrees. "Console sales peak around Christmas and New Year, and we had two full holiday seasons to show the US audience what the Mega Drive could do before the Super NES ever showed up!" From Mark's perspective within Sega, it makes sense that the Mega Drive would be the best choice to take advantage of the 16-bit open goal. But from the outside, electronics giant NEC and its PC Engine/Turbografx console could have seemed like the safer bet. Trip didn't believe so, though. "I never considered NEC a consumer company and never considered the Turbografx a real 16-bit system," he explains. "From a marketing and software standpoint I knew that NEC had no chance against either Nintendo or Sega."

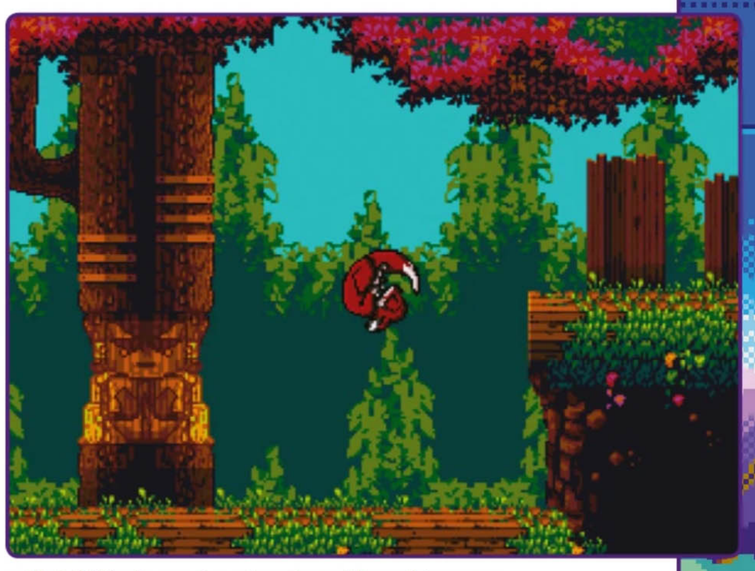
Ultimately, EA's backing was won on technical grounds. "Sega's design that included the MC-68000 along with separate graphics and sound chips, two joysticks and a price under $200, was exactly what the market needed," asserts Trip. "Way back in 1978 I led Apple's pivot to the office desktop market and was tasked to work with Steve Jobs on the hardware spec for a 16-bit system. We both loved the Motorola MC-68000 and it went into the Lisa and Mac. When I founded EA we bought Sun workstations for our best developers and they also had the 68000," he explains. The CPU perfectly fit the company's focus on home computers, too. "We had extensive experience and an enormous code base for the 68000 and had a great deal of content that also knew how to take advantage of a GPU and sound chip."

Matt Phillips is a developer with credits including *Homefront: The Revolution* and *Lego City: Undercover*, whose love for his first console has led him to develop the original Mega Drive game *Tanglewood*. "It's relatively very simple compared to the likes of Xbox One and PS4, which is both a curse and a blessing. Coding needs to be done to-the-metal, the machine has no operating system, no device drivers, and if you'd like to squeeze any kind of performance out of its tiny 7MHz CPU then everything needs to be done in raw ▶

» Takashi Iizuka counts *Comix Zone* as one of his favourite Mega Drive games, but has never played the final game.







» Matt Phillips is creating a brand-new Mega Drive game, *Tanglewood*, using old-school techniques and hardware.

"I was very excited to work on a system which had new features"

Rieko Kodama

» American and European copies of Sonic didn't include the line scroll effect Rieko Kodama mentions…

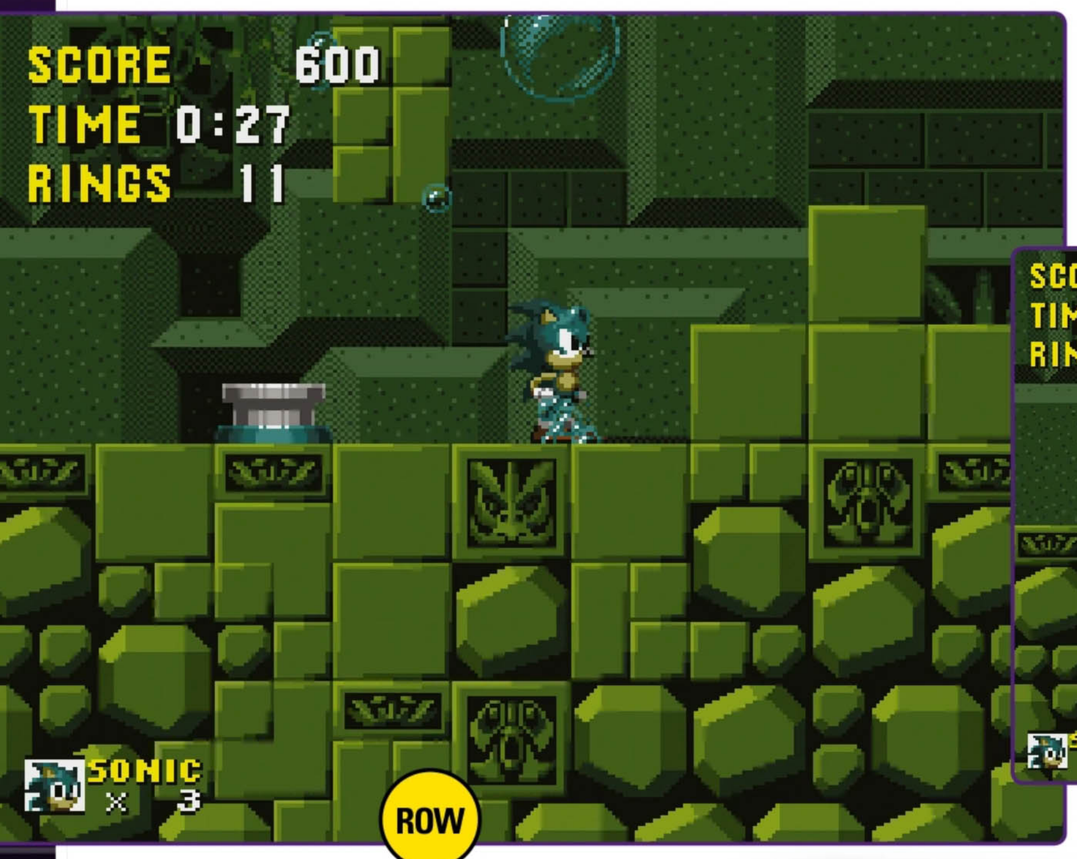
▶ assembly language." When asked about the console's strengths, he concurs with those who were there at the time: "The 68000 processor, without a doubt. It was an excellent choice for a games machine of the time, and I still keep finding things about it that impress me even today."

The 68000 CPU was a huge part of what made the Mega Drive work. Its adoption allowed everyone from Japanese arcade coders to European developers to transition to the machine smoothly. What's more, it was a powerhouse for its time – after all, this was a proper arcade CPU in a home console. Though the CPU's fast clock speed has been spun as a major advantage over the SNES and its Ricoh 5A22 CPU, the truth is that the two machines process a similar number of instructions per second – but that in itself is impressive, given that the SNES arrived two whole years later. However, the 68000 did possess real speed advantages in the form of a wider data bus, faster memory bandwidth and faster arithmetic performance.

While the CPU benefited from familiarity, Sega created a custom visual display processor (VDP) for graphics, an evolution of the Master System's VDP. "I was very excited to work on a system which had new features. I remember when I saw the Mega Drive board for the first time, this was before it was made more compact, it was bigger than the table," remembers Rieko Kodama, a veteran artist whose graphics appear in Mega Drive games such as *Altered Beast*, *Sonic The Hedgehog* and *Phantasy Star IV*. "The most exciting feature for me was the enhanced colour variation. I'd imagined that it would be much easier to draw three-dimensional objects now, which was difficult on the Mark III/Master System." That may sound odd to readers who know that the Mega Drive's colour capabilities are relatively weak, but as Kodama points out, it was still an upgrade: "It was limited, but I can't complain compared to the number of colours with the Mark III and Master System."

The Mega Drive didn't just show more colours than the Master System. Its display resolution was 45% higher, it could display up to 80 sprites, and it had four times the graphic RAM, allowing for more unique tiles to be held in data. The Mega Drive could also display two background layers alongside sprites, and was capable of manipulating them with a priority system and line scrolling for further complexity. "It became possible to show depth," says Kodama. "With two-layer scrolling and rastering and so on, we were able to create roads with depth in driving games, or show floating under water. Talking about my work, the Labyrinth Zone in *Sonic The Hedgehog* used these features. I think we were able to add a little more weight to Sonic's movements. I hope you've enjoyed the underwater action and the atmosphere of the labyrinth."

For Matt, the Mega Drive's graphical capabilities have been a constant thorn in the side. "The small video memory has been the project's Achilles' heel. What makes it worse is that the machine was originally designed to support twice the amount – the graphics chip supports 128KB of VRAM," he says. "I believe it was cut for cost reasons, and I think that was a big mistake." This was a decision made late in the hardware design process – the larger capacity had been experimented with, but the benefits were felt to be merely incremental gains. It's also worth noting that by mid-1988, a RAM shortage caused prices to quadruple since the beginning of the year."Another issue is its very limited palette size," Matt continues. "It can only display 61 colours at a time (excluding a shadow mode and some hardcore tricks). Thankfully I've been working with artists who have managed to squeeze the very best out of so little, but it's not been easy."



» …the Japanese game uses it to create wavy distortions that convey the feeling of being underwater.

The actual process of creating art for the Mega Drive varied from company to company. At Sega's internal studios, the increased artistic demands changed the development process. "Compared to the Mark III/Master System days, we certainly increased development time and design staff. As ROM capacity increased, so did the work for the designers," recalls Kodama. "However, we now had less pressure with the number of colours and how to draw the objects, since we had more leeway from an artistic point of view due to the evolution of the new system." Artists at Sega used a custom workstation known as the Sega Digitizer System. This hardware, which had evolved through the SG-1000 and Master System generations, consisted of a graphic tablet and a puck, a light pen for working with the screen, and two CRT monitors.

» Electronic Arts was a prolific Mega Drive publisher, and built much of its sports empire on the console.

Third-party studios used a variety of solutions, with Deluxe Paint on the Amiga proving particularly common amongst Western devs.

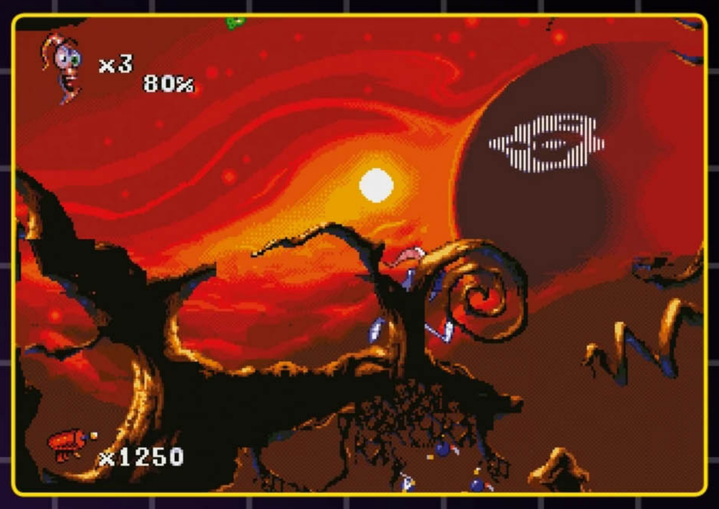
On the audio front, Sega opted for the YM2612 FM synthesis chip from Yamaha, noting in its development manual that it resembled the YM2151 chip used in its arcade games. An 8-bit Z80 CPU was included to drive this chip, which had the dual effect of replicating the System 16 set-up and enabling Master System compatibility. The chip provided six channels of FM sound, a low frequency oscillator to distort those sounds, and the capability to replace one of those channels with a channel for 8-bit digitised audio – often used for speech effects or sampled instruments. That was two fewer channels than the YM2151, and was no big deal compared to what was available in the computer market as any fan of the Amiga's Paula sound chip will tell you. However, this was still a huge advance for console sound. Bear in mind that Sega had ▶

MEGA FACT

■ In South Korea the Mega Drive was officially marketed by Samsung, under the names Super Gam*Boy and later Super Aladdin Boy.

Graphic scenes

Getting the best visuals from the system required artistry, programming and smart hardware use

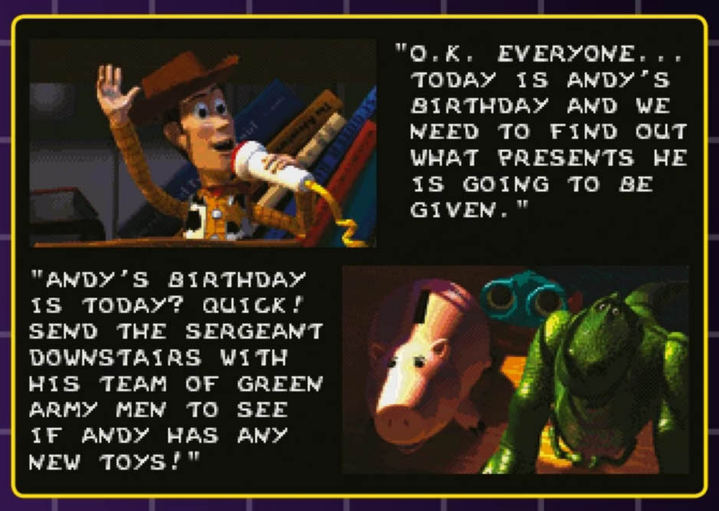


DITHERING

■ Thanks to the blurry RF and composite connections frequently used during the late Eighties and Early Nineties, nearby pixels would blend together on a TV set to create new colours and transparency effects. Artists used this technique on many consoles, but the Mega Drive's relatively limited colour palette meant it was employed especially frequently.

LINE SCROLL

■ The Mega Drive's graphics hardware can scroll individual parts of a single layer at different speeds. This can be used to create all kinds of unique effects – racing games use it for curves in the road, *Street Fighter II* uses it to add perspective to the ground, *Sonic 2* simulates additional background layers and *Rocket Knight Adventures* uses it for heat distortion.



SHADOW/HIGHLIGHT

■ This hardware feature enabled the brightness of on-screen colours to be modified, and was most often used to create transparent lighting effects, as seen in *Ristar*, *Vectorman* and *Ranger-X*. Because this produces shades outside of the normal Mega Drive palette, it allows developers to break the 64-colour limit – this *Toy Story* cutscene achieves 163 colours.

SCALING

■ The Atari Lynx and Neo-Geo had the ability to scale sprites built into their hardware, and the SNES could scale and rotate a background layer, but the Mega Drive had no such hardware function. However, the machine was in fact capable of producing scaling effects with clever software programming – this image from *Skitchin'* is just one example of that.

POLYGONS

■ Although the Mega Drive didn't have dedicated 3D hardware, the console was capable of producing a limited number of filled polygons using software alone. This was commonly used in flight simulators, as well as a limited number of racing games. *Virtua Racing* doesn't count though, as it used the Sega Virtua Processor enhancement chip.

Under the hood

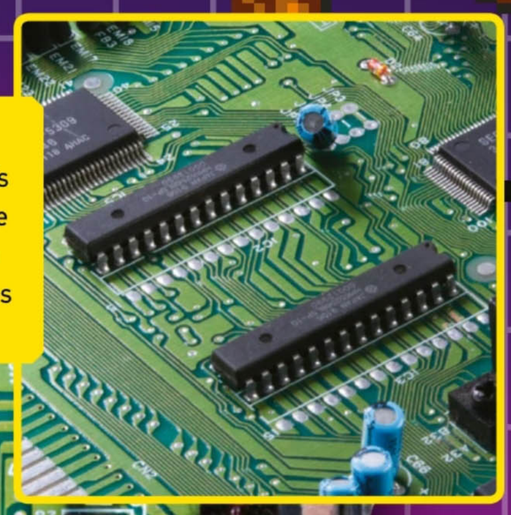
Take a peek at the chips that power your 16-bit dreams

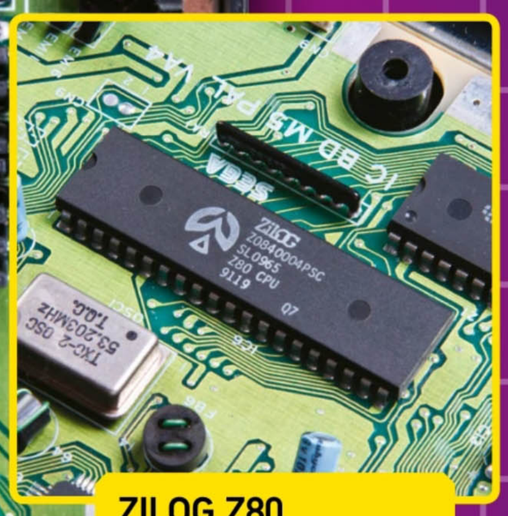
MOTOROLA 68000

■ This is the main processor for the Mega Drive, a 16-bit CPU that had been a staple of Sega's arcade games since 1985.

RAM

■ Two 32KB chips supply the Mega Drive's memory. RAM prices and availability were volatile in 1988, so the PCB is designed to accommodate both wide and narrow chips to hedge agair st shortages.





ZILOG Z80

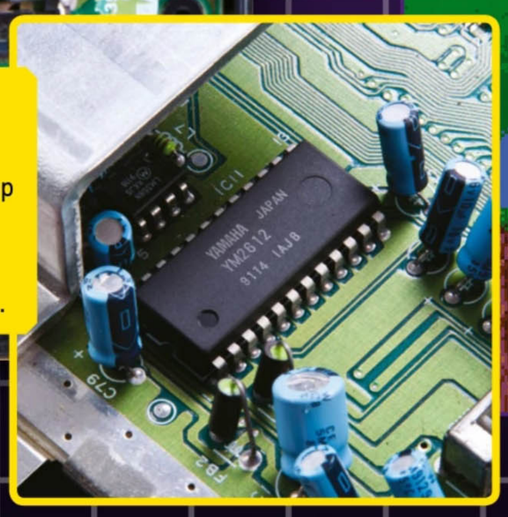
■ This 8-bit CPU is included as a sound coprocessor, though not every game actually uses it. This chip's inclusion is crucial for providing backwards compatibility with Master System games.

SEGA 315-5313

■ This is the visual display processor – the graphical heart of the Mega Drive, which handles two scrolling background layers plus sprites.

YAMAHA YM2612

■ This is the sound synthesiser chip used by Mega Drive games, providing up to six channels of FM sound. Sampled PCM sounds are also supported, for effects such as drum beats and speech.



» Konami was one of the many publishers that took a few years to hop on the Mega Drive bandwagon.

▶ only adopted FM sound chips in any capacity in 1985, and the FM sound add-on for the Master System (released in 1987) cost more than any standard game for the console.

Two dominant sound engines emerged for the Mega Drive. Sega developed SMPS in Japan, which was compatible with both the Z80 and 68000 but required composers to essentially be programmers as well. Sega's American branch had GEMS (Genesis Editor for Music And Sound Effects) developed, which supported a sequencer setup that was much easier on composers. This became used in many non-Japanese games. However, many third parties chose to use their own sound engines – Krisalis wrote a popular engine licensed to a number of developers, EA and Accolade both created their own tools, and Namco and Konami did the same in Japan.

The Mega Drive was designed for a range of connection options, most of which were previewed but never reached the market. These include a graphics tablet, a keyboard, a printer and a floppy disk drive. The one that mattered the most was the control pad. This went through a variety of designs, but all sketches included two major features – a three-button layout which took after the arcade JAMMA standard, and a curved design, quite unlike most official pads beforehand. This enabled designers to implement greater control complexity than in other console games, but it wouldn't suffice for the entire generation and a six-button model was introduced in 1993.

» American development studios like Sega Technical Institute were essential to satisfy demand for games.

» *Landstalker*'s isometric visuals were remarkable to Rieko Kodama back in the Nineties.

MEGA FACT

■ Because the Mega Drive removed SG-1000 graphics modes, it can't run the Master System game *F-16 Fighting Falcon* – even with a Power Base Converter.

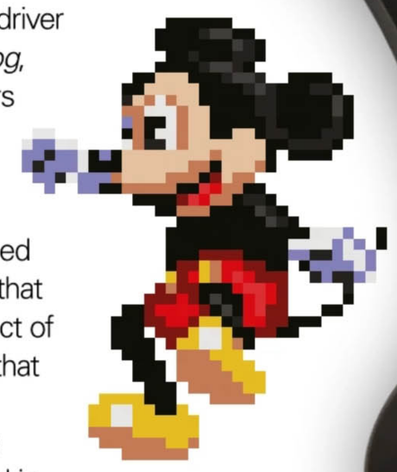
"The biggest early driver of hardware sales was Sonic"

Mark Cerny

But for all of the Mega Drive's technical capabilities, the system is nothing without its games. "The software sells the hardware – if there are no good games then of course the console will not be a success," Mark reminds us. Though Sega would still develop many games in Japan, one of Sega Of America's major innovations was to establish local development studios to better cater for non-Japanese tastes, which would prove to be vital as the machine was vastly more popular outside of Japan.

Japanese designers were aware of the Mega Drive's international success, but continued to work as normal. "I felt its popularity in the West when I heard about *Sonic*'s very good sales. At the time, I also heard that *Phantasy Star* was more popular in the West than in Japan," says Kodama. "That didn't have any particular influence on our design choices, but for creatures such as dragons that appear in RPGs, I bought and referred to illustration compilations from *Dungeons & Dragons* to HR Giger. So, you could say in general I was affected by Western illustrations and design."

Mark was at the forefront of the American development charge as he set up the Sega Technical Institute, which would go on to produce games including *Kid Chameleon*, *Sonic The Hedgehog 2* and *Comix Zone*. Other American studios included Sega Interactive and Sega Midwest Studio, and Sega would often contract external studios including BlueSky Software. Interestingly, despite having developed recognisable games, Mark remains unsure of the significance of the US-based teams in the Mega Drive's success. "The biggest early driver of hardware sales was *Sonic The Hedgehog*, which was developed at Sega headquarters in Japan," he explains, indicating a preference for the killer app theory. "The Sega Technical Institute and other US-based teams did some later work and helped keep the momentum going, but I suspect that the apart from the *Sonic* sequels, the impact of our efforts was pretty minor compared to that initial push."



Takashi Iizuka would work on both sides of the Pacific. "The first game I participated in development on was *Golden Axe III*, but I was there more for help and everything was such a new experience to me that nothing really felt 'difficult' to me," explains the game designer, who joined Sega straight out of university. "I did learn many of the limitations of the hardware while working on that title, from not being able to display a lot of sprites on screen, or having only two scrolling layers, or not being able to expand or shrink things," he recalls. "Shortly after that, during the development of *Sonic 3* I learned that all of the limitations can be addressed through the ▶

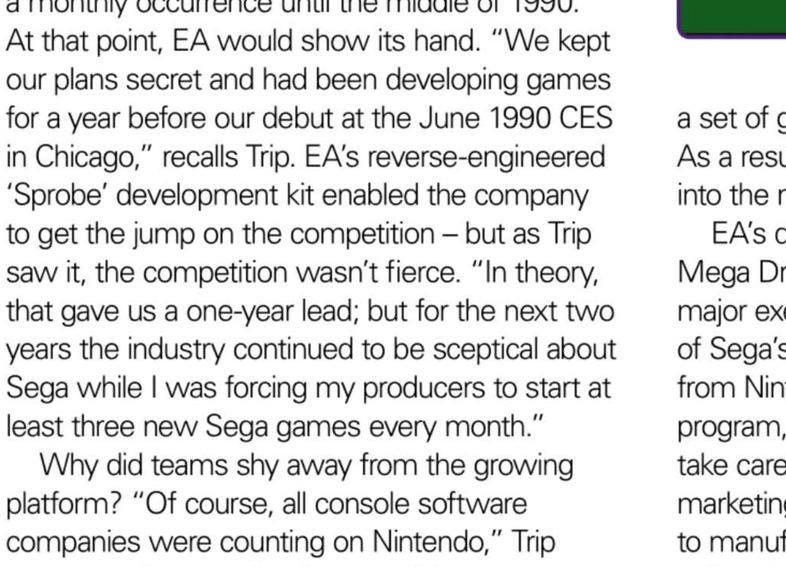
> "We kept our plans secret and had been developing games for a year before our debut at CES"
>
> Trip Hawkins

programmer's knowledge and ingenuity which unlocked the potential of the Mega Drive."

Having joined a renowned group of Japanese colleagues at STI, Iizuka was able to aim high. "There were technical limitations to the Mega Drive hardware, but there were also ways of creatively finding a solution. So, when I designed games I never forced myself to consider limitations. If I put these restrictions in place from the beginning, all I would end up doing is limiting my ideas and imagination," he recalls. "For example, the large airship that flies by in the early part of *Sonic 3* – there was no way the Mega Drive could have displayed a sprite that large, but we were able to display the airship in the game. We did it by removing one scrolling layer in a way one wouldn't notice a bit before we wanted to show the airship, then we used that extra layer to show this airship flying right past Sonic."

Still, hardware limitations were far from the only challenge Sega's designers faced. "People nowadays may find this hard to believe, but we didn't even have Windows PCs back when we were developing Mega Drive games. Game design all happened with only a pencil and some paper," Iizuka reveals. "We would draw a map out on graph paper all taped together, then match up the desired map design with the boxes on the graph paper and try and mentally simulate how that would look when digitized for display on a screen.

» The arcade board that ran Sega's *Golden Axe* used the same CPU as the Mega Drive, albeit at a faster speed.



» The *Puyo Puyo* games were easily ported as the arcade games used Mega Drive tech.

The only ones who had access to Sega's Digitizer were the artists who spent their days drawing pixel by pixel, not the designers."

Sega didn't have the means to satisfy a mass audience alone, so third-party support was crucial. However, it was slow to arrive. By the Mega Drive's first anniversary in 1989, the only non-Sega games in Japan were *Thunder Force II* and *Super Hydlide*. Third-party releases didn't become a monthly occurrence until the middle of 1990. At that point, EA would show its hand. "We kept our plans secret and had been developing games for a year before our debut at the June 1990 CES in Chicago," recalls Trip. EA's reverse-engineered 'Sprobe' development kit enabled the company to get the jump on the competition – but as Trip saw it, the competition wasn't fierce. "In theory, that gave us a one-year lead; but for the next two years the industry continued to be sceptical about Sega while I was forcing my producers to start at least three new Sega games every month."

Why did teams shy away from the growing platform? "Of course, all console software companies were counting on Nintendo," Trip points out, "and many of the computer software companies continued to avoid consoles due to the restrictive licences and costly ROM chips." Indeed, Sega was not much friendlier to third parties than Nintendo – the company typically wanted to control cartridge production and asked for hefty licensing fees. Sega also had a set of guidelines that prohibited certain themes. As a result, many companies were late entrants into the market.

EA's demonstration of its ability to create Mega Drive games without a licence earned it major exemptions. "We were not subject to any of Sega's rules, most of which they had copied from Nintendo. We were entirely outside their program, doing our own thing – we only had to take care in the use of their trademarks in our marketing materials," Trip explains. EA was able to manufacture its own cartridges (with distinctive yellow tabs) and get around concept approvals, and the company would go on to publish over 100 Mega Drive games between 1990 and 1997. Other companies would eventually get their own deals along these lines – Acclaim and Konami had their own cartridges that followed Sega's specs, while the likes of Accolade and Codemasters created cartridges with distinctive shapes.

MEGA FACT

■ Unofficial clones of the Mega Drive were in circulation as early as 1993, with the Scorpion XVI infamously appearing on the UK TV show *Bad Influence*.

» Amongst her own games, Rieko Kodama counts *Altered Beast* and *Phantasy Star IV* as favourites.

With hundreds of games having been developed for the Mega Drive, we're curious to know which games caught the eyes of the developers. While Matt cites Mark Cerny and Yuji Naka as programming heroes, it's a UK development that awes him. "A game that has stuck in my mind is *Sonic 3D*, for its FMV running from cartridge," he explains. "I've been exposed to the delights of ROM access times, and the glitches and lockups caused by trying to stream data from the cartridge too fast. I've since learned of the tricks they used to stream that FMV, and it only makes it more impressive."

Iizuka didn't have to look far to find something impressive. "At the time I was working on *Sonic 3* with other Japanese

» In lieu of early third-party support, Sega would license games from Capcom for conversion to the Mega Drive.

staff at Sega Of America, and in the room next to ours the American staff were working on *Comix Zone*. I thought the idea of having an action game happen within the frame of an American-style comic was fresh and interesting. I played the game a lot when it was in mid-development, but I have never played the final retail version of the game." Kodama's favourite came from Climax Entertainment. "I remember that I was so surprised to see *Landstalker* for the first time," she tells us. "Its pseudo 3D graphics with the quarter view was so unique and the background art and character art was fantastic."

It's fascinating to look back at the design choices that shaped one of the defining consoles of the era. But the truth is that the Mega Drive is so much more than a black box of chips. "Certainly a lot of the nostalgia derives from the software library, but that's not all, Sega crafted such a fun brand image as well! Remember WELCO METOT HENEX TLEVEL? I certainly do," Mark reminisces. "Hard not to smile when you think back to those days." Indeed, three decades on, the Mega Drive still makes us smile – and as non-developers, that doesn't take a 68000 CPU. ✱

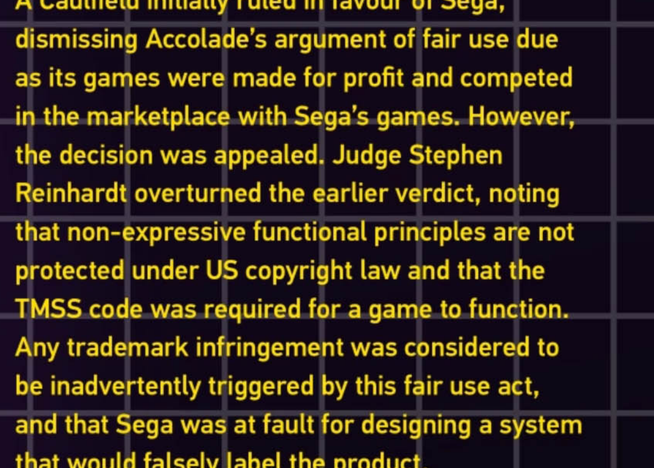
Liberty vs security

Security was one of the most controversial aspects of the Mega Drive – here's how one third party broke through it

One of the interesting things about the Mega Drive is its security system. Mega Drive consoles featuring the Trademark Security System (TMSS) expect to read the word 'Sega' at a specific ROM address, and the word also must be written to a designated RAM address before the VDP can be accessed. If these conditions are met, the system will display a message stating that the game was "Produced by or under license from Sega Enterprises Ltd" Originally, this was intended as a region locking measure – developer manuals referred to it as the "US security code" and early Japanese games were not designed to pass the check. This didn't matter to begin with, as early consoles didn't implement the check.

However, third parties wanted to develop for the Mega Drive without agreeing to the costly official licensing terms. Electronic Arts was one of those, and had reverse-engineered the console – with Trip Hawkins confident that EA would win if Sega tried to sue. "I had great lawyers and took the law very seriously. We understood how to correctly manage a clean room to avoid copyright infringement," he explains. "We waited patiently to confirm that the Genesis that debuted in the US in 1989 and as the Mega Drive in Europe in 1990 did not make any changes to the Japanese version that we had figured out. By comparison, while we also reverse-engineered the NES, we did not release any games based on this work because we could not find a way around the patented NES security chip."

Ultimately, this wasn't a fight that EA had, as its reverse-engineering earned the company a preferential licensing deal. However, Accolade took the unlicensed route when it released *Ishido: The Way Of Stones* and incurred Sega's wrath. "I was not surprised by Accolade's approach but



» It was Accolade's *Ishido: The Way Of The Stones* that caught Sega's eye and provoked a legal case.

when I went to visit them and compare notes I learned that they lacked legal sophistication," Trip remembers. "I gave them some advice and offered to collaborate but they went their own way." Sega implemented the TMSS check in newly manufactured Mega Drives, and Accolade coded its next releases to pass the check.

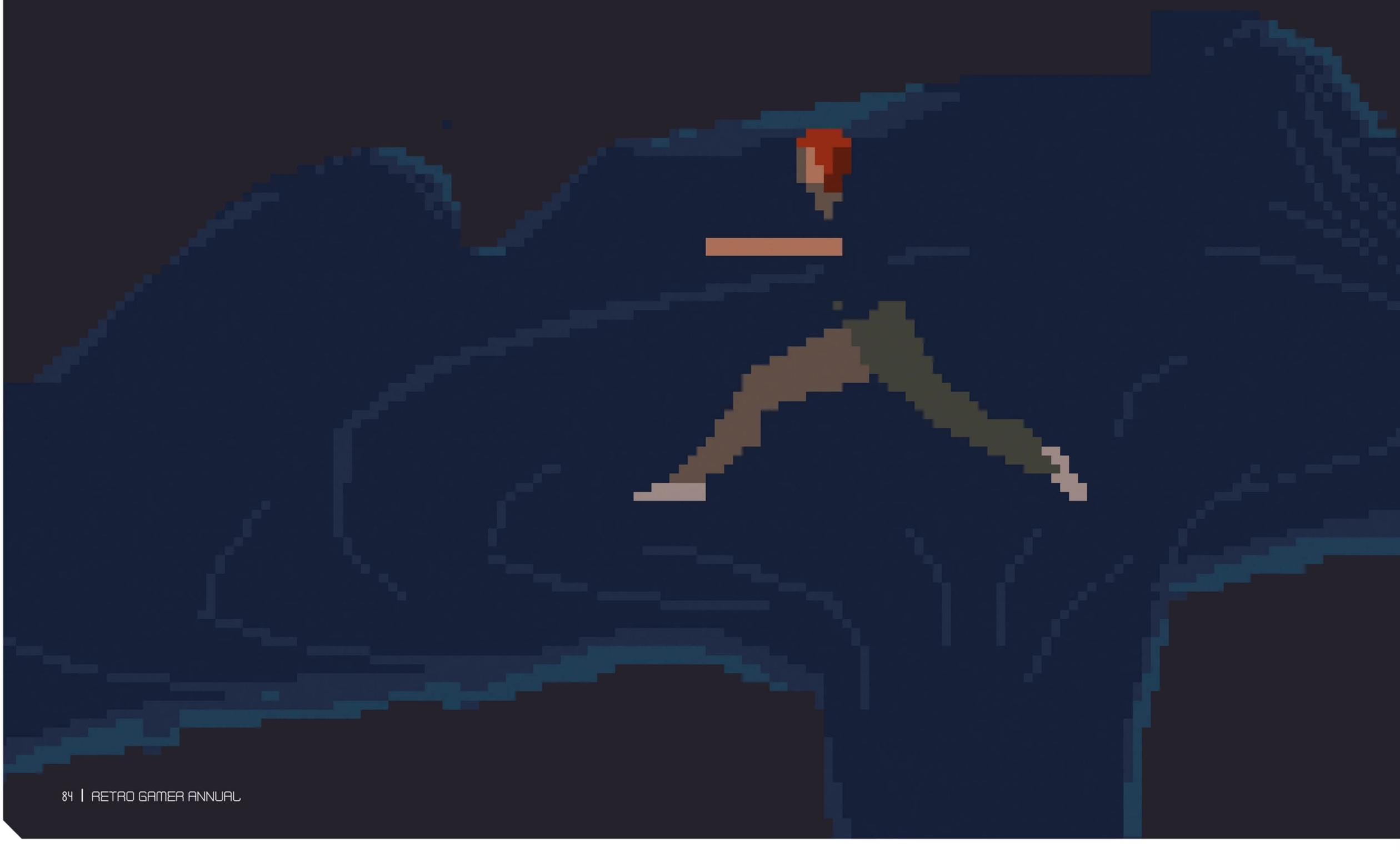
Sega launched a series of legal actions in response, alleging unfair competition, copyright infringement for using the TMSS code, and trademark infringement because Accolade's games triggered a message stating that they were licensed by Sega. Accolade filed a counterclaim, alleging that Sega's TMSS screen falsified the source of its games. Judge Barbara A Caulfield initially ruled in favour of Sega, dismissing Accolade's argument of fair use due as its games were made for profit and competed in the marketplace with Sega's games. However, the decision was appealed. Judge Stephen Reinhardt overturned the earlier verdict, noting that non-expressive functional principles are not protected under US copyright law and that the TMSS code was required for a game to function. Any trademark infringement was considered to be inadvertently triggered by this fair use act, and that Sega was at fault for designing a system that would falsely label the product.

Sega was dissatisfied with the outcome and petitioned for a rehearing, but ultimately the two sides settled under undisclosed terms in April 1993, bringing a year and a half of legal wrangling to an end. Accolade became a licensed Mega Drive developer, TMSS remained in Mega Drive systems, and a more specific method of region locking was ultimately implemented.

» The screen you were greeted with if everything was working correctly.

ULTIMATE GUIDE: ANOTHER WORLD

THERE AREN'T MANY 16-BIT GAMES THAT COULD TRULY BE DESCRIBED AS 'CINEMATIC', BUT THIS ACTION ADVENTURE MASTERPIECE EARNS THE TITLE AND THEN SOME. JOIN US FOR A TRIP TO A WORLD THAT'S JUST AS DEADLY AS IT IS BEAUTIFUL

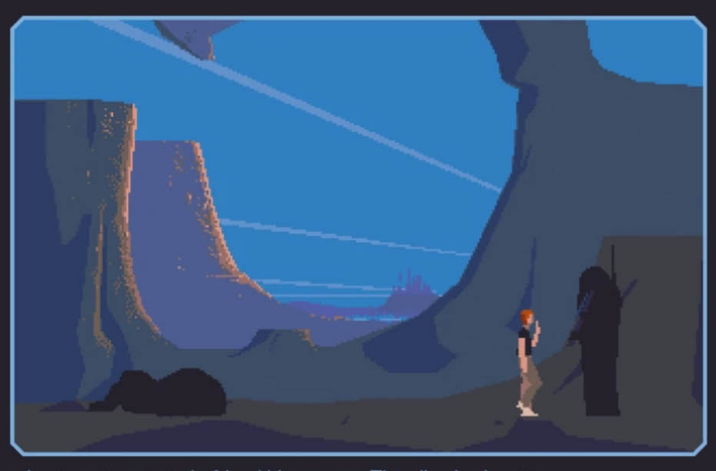


» Lester sips on a cool drink, shortly before leaving Earth behind forever.

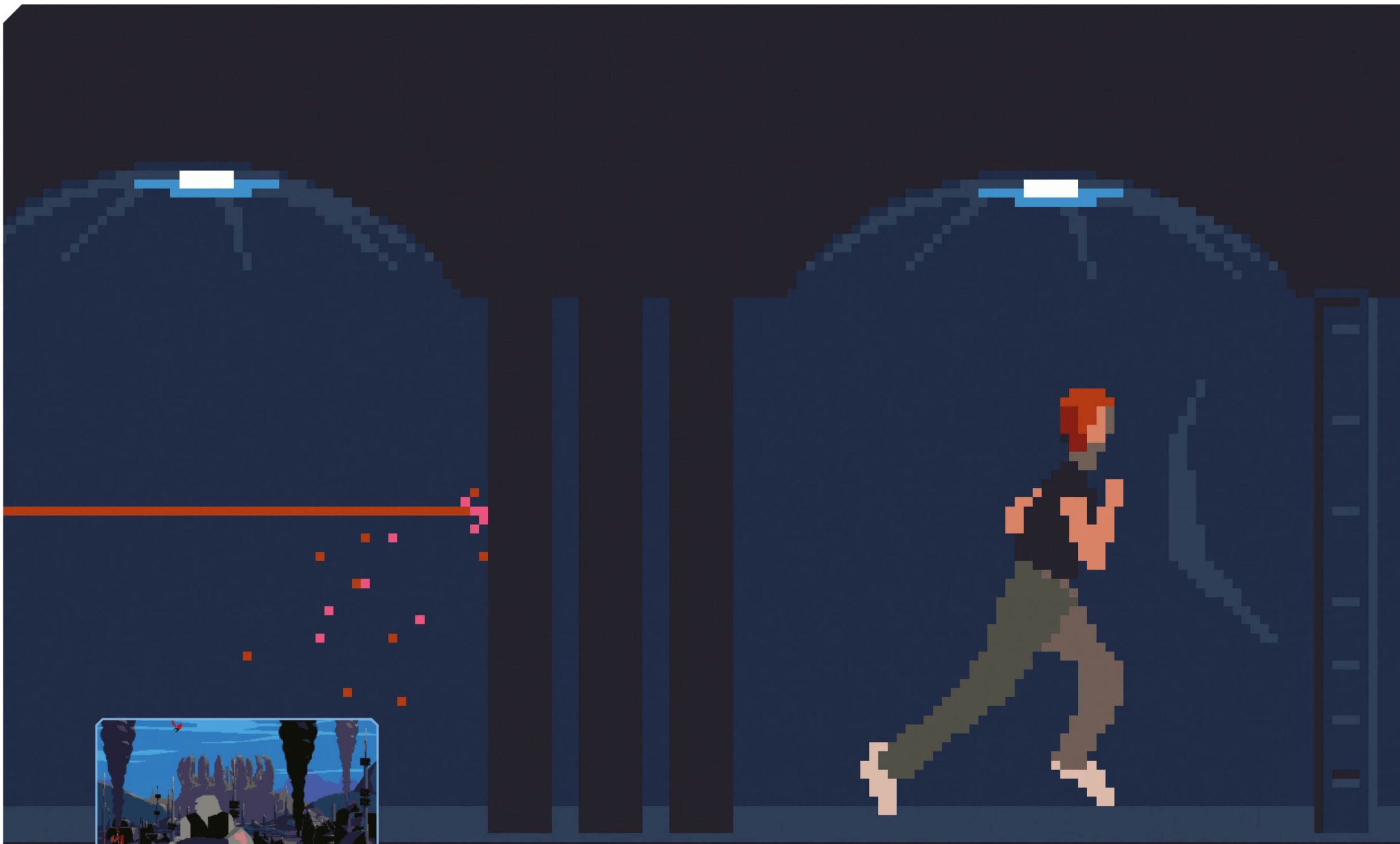
Lester Knight Chaykin is the sort of guy who, if he were real, would be the object of everyone's envy. Not only is he clearly a gifted physicist, he's the owner of a pretty neat Ferrari and a proud bearer of ginger hair. Indeed, everything seems to be pretty great for Lester, until he returns to the lab one fateful night for a cheeky bit of particle acceleration that goes horribly wrong. One errant lightning bolt overloads the system and suddenly Lester and his desk wind up underwater on a planet that is decidedly not the Earth we all know. We hate it when that happens.

But if the story of *Another World* as a game is that of a single visionary going horribly wrong, the story of the development is that of one getting things right. The game was primarily driven by Éric Chahi, who had previously worked as a graphic artist for Delphine Software on *Future Wars*. Though he wasn't a programmer on that game – that job fell to Paul Cuisset, who would go on to create *Flashback* and *Shaq Fu* – there was enough documentation available for the Amiga that Éric felt able to return to programming, which he'd previously done during the Amstrad days. This allowed him almost total control of the game, from concept to programming, graphics and even some sound effects. His only major collaborator for the game was Jean-François Freitas, who provided additional sound effects and composed the game's music.

As a result, *Another World* was not a normal game at the time it arrived. Normally, the sort of plot detail described above would be confined to a game manual or a text prologue, but thanks to its use of vectors, rather than predefined sprites, *Another World* was able to show cinematic full-screen animations in an era before full-motion video – and this meant that we were able to watch the events unfold for ourselves. What's more, the game looked the same, so when the player was unexpectedly thrown into the deep end and expected to rescue Lester from a watery grave, the game looked just as good. Though ▶



» Lester attempts to befriend his rescuer. The alien is about to demonstrate how unimpressed he is.



HEART OF THE ALIEN

Though *Another World* is widely regarded as a classic, you'd find few players who even know that it received a sequel. That's because *Heart Of The Alien* was tied to the Mega-CD and only released in North America and Brazil. The game arrived in 1994, well after the platform's initial hype had subsided.

As the title suggests, *Heart Of The Alien* deals primarily with Lester's alien friend Buddy and accomplice from the first game, who you'll play as. The game picks up where the original left off, with Buddy and a near-dead Lester flying in on the dragon-like creature from the first game's end sequence. A lengthy cinematic opening reveals more about Buddy and his world, showing that his home was attacked by hostile forces before he was imprisoned, and many of the first game's events are recapped from the alien's perspective, showing what he got up to while absent from Lester's view. The game's look and feel closely follow those of its predecessor, and ultimately provides firm closure to Lester's story.

The game was broadly well received, earning 91% from *Sega Pro* in the UK, 84% from Consoles+ and 85% from *Player One* in France. Éric Chahi was not involved in the development of the game besides approving the initial concept, and doesn't have a lot of love for it. He states on his website "neither the animations nor the game, entirely developed by Interplay, were up to the job".

▶ backgrounds were ultimately constructed as bitmaps rather than from polygons, the world maintains a matching minimalist look throughout, which gives the game a striking look.

***Another World* is best described as an action adventure game, which uses the platform genre as a base.** Your goal is to guide Lester to survival on a planet where all of the local lifeforms seem intent on killing him – a kind of 'Space Australia' environment. Right from the off, even the smallest flopping worm can carry some deadly poison capable of killing our hero, and that's to say nothing of the beast that chases you down if you can make it past those pests. It's just after this chase that you quickly learn about one of *Another World*'s major strengths, context-sensitive controls. Though Lester has a standard set of actions for most of the game, specific situations will require him to perform one-off feats like swinging a cage or picking up an object. In such cases, the single-button joystick controls respond naturally, with the action you're supposed to perform as a player matching up with your first instinct.

One of the great strengths of this system is that it allows the game to show you how things work, rather than telling you. After you first pick up a laser blaster, your interactions with enemies will teach you about its three capabilities – shooting enemies, shielding yourself and destroying obstacles. The game takes the same approach to its narrative, too. Soon after Lester's arrival on this hostile planet, he's imprisoned with a large humanoid alien. Though you never learn his name during the game (he's commonly nicknamed Buddy), you can tell from his actions that he's more than just someone to escape with.

Of course, the strong focus on the cinematic experience does result in a more rigidly defined solution than most platform games. Because Lester performs those context-sensitive actions rather than allowing the player to tackle problems dynamically within the game's systems, and because enemies have to be in specific places at specific times for crucial scenes, there's no variation from game to game. It's a short game, too – in its original form, a perfect game will take less than 20 minutes.

Still, when *Another World* arrived on the 16-bit computers in 1991 after two years of development, it was a revelation. Praise for the game focused on its unique control system, striking graphics and smart storytelling. *Amiga Power*'s Mark Ramshaw noted that "the intuitiveness of the controls is quite remarkable" in an 89% review, while *CU Amiga*'s Steve Keen gave the game 91% and opined ▶

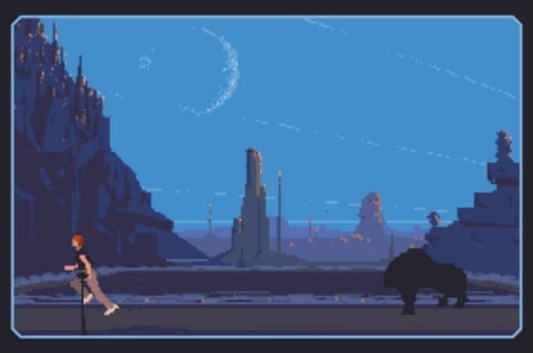
» You'll be able to see Buddy in the foreground or background, and sometimes even need to help him.

CONVERSION CAPERS

AMIGA

1991

■ As the original format for the game, the Amiga is a reference point for most other versions. It's worth noting that it's a bit shorter and harder than all except the Atari ST version. Still, you don't miss too much – some might even argue that the pacing is tighter.



APPLE IIGS

1992

■ This conversion comes straight from the SNES source code, and offers high-quality graphics and sound. The choice of screen modes does make a difference to the game's performance, which feels a touch slower than that of the other computer platforms.

3DO

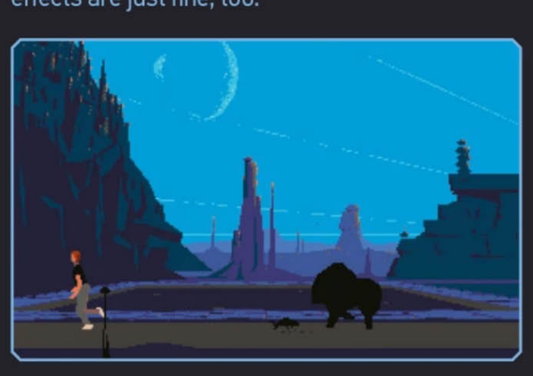
1994

■ As you can see, *Another World* received a major graphical overhaul here, as the backgrounds are now more detailed bitmap images. Éric Chahi has expressed a distaste for this look, finding that they made the game 'overworked', but you may feel that it's better – it's a matter of preference.

ATARI ST

1991

■ The Atari does a good job here, with only slightly different colours and a lack of music compared to the Amiga release – and given that the music was only present in the intro and ending sequences, it's no major loss. The sound effects are just fine, too.



MAC

1993

■ This is a straight conversion of the DOS release, with nothing major or minor to distinguish it. That's just fine by us, though, as both versions are perfectly good ways to play the game. As you might expect, you'll need an older Mac OS to run this.

PC (WINDOWS)

2006

■ This 15th anniversary version was converted from mobile and PocketPC, and features a second graphical overhaul. This one was by Éric Chahi and is in keeping with the original's look, working better at higher resolutions without losing the minimalist aesthetic.

PC (DOS)

1992

■ Responding to criticism of the original release, Delphine Software added more checkpoints to lower the frustration factor. Additional areas were also created to increase the play time – it's about 15 per cent longer. As a result, this is the first of the complete versions of the game.

MEGA DRIVE

1993

■ This version retains the lower resolution and improved controls of the SNES version, and features an arranged version of the soundtrack introduced in that game, this time by Tommy Tallarico. It's a good way to play the game, but a redundant one if you have access to a Mega-CD.

IOS

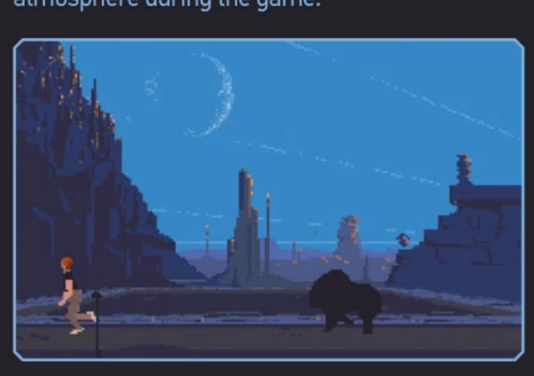
2011

■ This 20th anniversary version is an exemplary update, compiling everything into one package. The game is complete with its extra scenes, both the original and anniversary graphics, plus the original and remastered soundtracks with the console ones as a bonus.

SNES

1992

■ This runs at a slightly lower resolution than the home computer versions, but the jump move is now assigned to the buttons rather than the joystick, which is a welcome improvement. There's a new soundtrack, too, adding to the atmosphere during the game.



MEGA-CD

1994

■ The Mega-CD version is slightly different to the cartridge version, featuring an improved resolution and added loading delays. The big deal here is that the game contains an exclusive sequel, *Heart Of The Alien*. Frustratingly, this was only released in North America and Brazil.

AND THE REST...

■ Other versions of *Another World* include releases for Symbian mobile phones and PocketPC, which formed the basis for the *15th Anniversary Edition*. An impressive officially approved Atari Jaguar version was released on cartridge in 2012, incorporating the original graphics and the updated anniversary graphics. With a limited production run of well under a thousand copies, it now changes hands for hundreds of pounds. The *20th Anniversary Edition* (later known as the *25th Anniversary Edition*) was ported to PS3, PS4, Vita, Xbox One, 3DS, Wii U, Switch, PC, Mac and Android, and is more or less equal across platforms.

“Another World is the kind of landmark game that should be experienced by everyone that cares about the medium”

THE EXTENDED CUT

Later versions added to the Amiga and Atari ST’s ‘theatrical release’ – but what were the new scenes?

After the initial release of *Another World* was criticised for its short length, Éric Chahi added additional scenes to the game – by his own account working 16-hour days, seven days a week for two months. These take place shortly after Buddy rescues Lester from the dead end corridor near to the end of the game, and actually add some unique puzzles.

After Lester and Buddy escape the dead end, they end up outside a guard station. Buddy walks into it and feigns surrender – to pass, you’ll need to guide Lester around the outside and into the back entrance, allowing Buddy to overpower one guard while you engage the other in a gunfight. Once you’ve passed this, Buddy will throw Lester across a chasm. However, your alien friend fails to make the jump himself, preventing a deadly drop by clinging to a cloth shade. To rescue him you’ll need

» Buddy is being held up while Lester has to sneak around behind his aggressors.

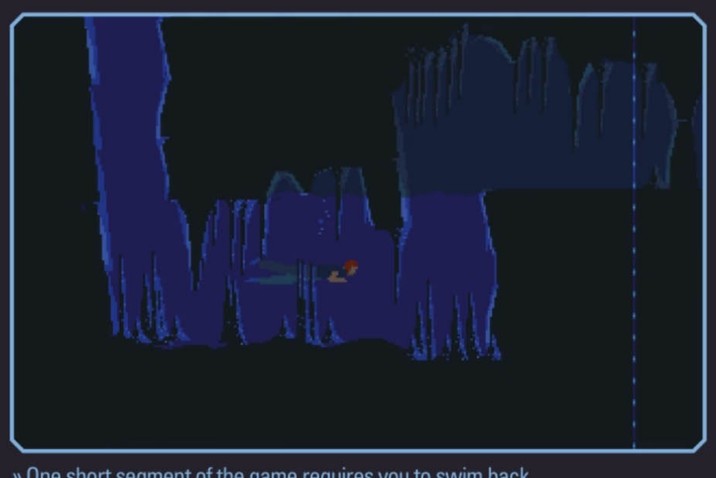
to fight through a palace, a feat which involves baiting a guard into blowing a hole in the floor with grenades, holding one alien up at gunpoint, and setting a caged beast free in order to scatter the waiting guards. Once you’ve made it back to Buddy, a floor will appear beneath him allowing a drop to safety, and the two of you teleport up to hijack a vehicle.

If nothing else, this sequence shows just how labour-intensive *Another World* was to create. For all the time that Éric Chahi spent working on it, this additional content only lasts about three minutes if played without error. The addition is welcome, but Amiga and Atari ST purists shouldn’t feel too hard done by for not getting it.

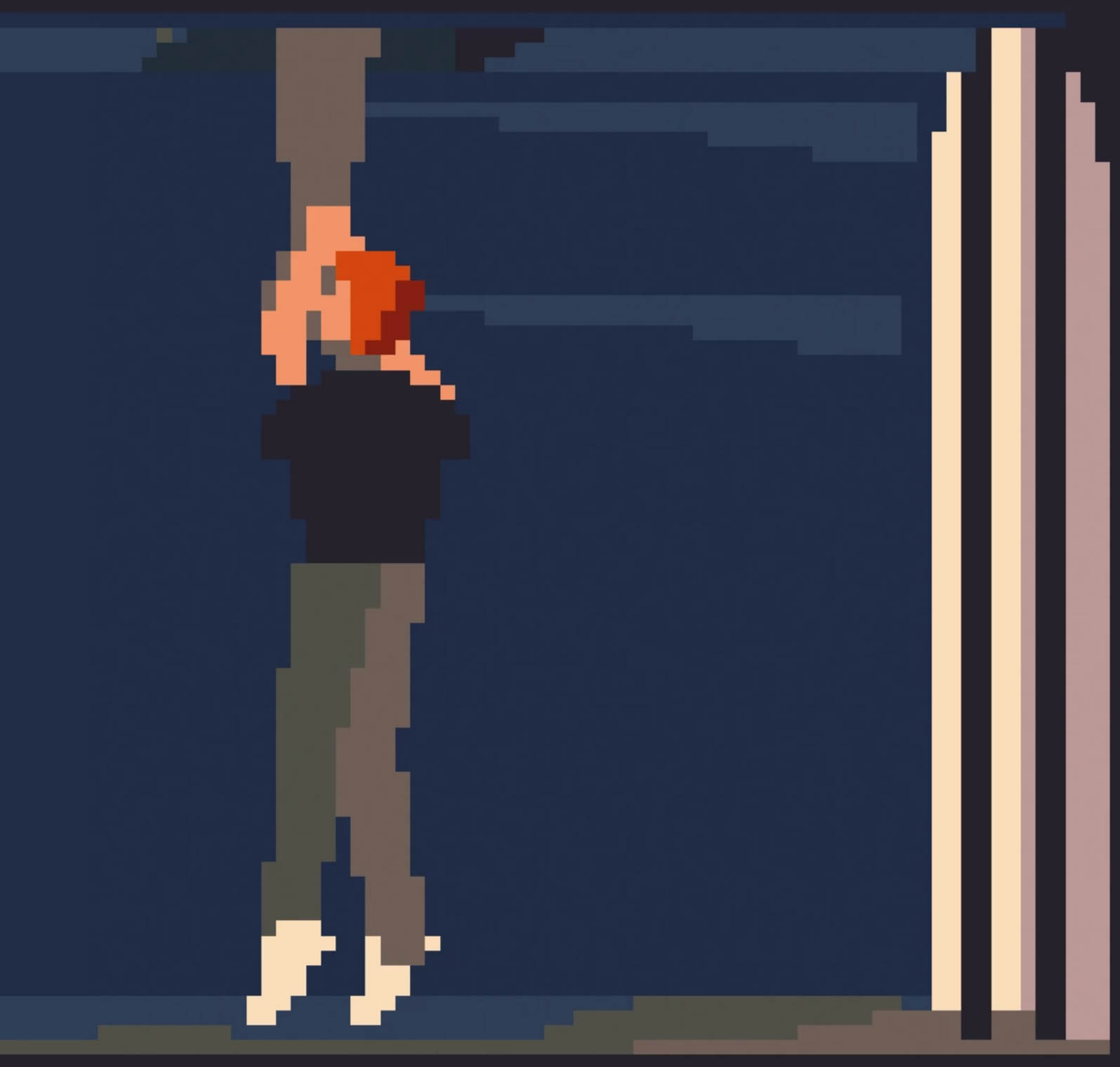
▶ that the polygon graphics were “refreshing and essential to the game’s addictiveness”. Reviewing the game for *The One Amiga*, Paul Presley awarded the game 93% and commented that “Quick cuts, close-ups and smooth animation all add to the tension and atmosphere created.”

Criticisms focused on the game’s short length, rigidity and focus on trial-and-error solutions. In a 90% review for *Zero*, Duncan MacDonald noted that “this is not *totally* unlike a Don Bluth game,” a sentiment shared by Trenton Webb of *Amiga Format*, who noted that “at its worst *Another World* has distinct *Dragon’s Lair*/*Space Ace* overtones”. He also complained that, “Time and time again it slays you with no chance or choice, then dumps you back further than you wanted to go.” Despite the criticism, he awarded the game 82% – the game’s low point in the UK press.

After the initial release, Interplay signed up *Another World* for an American release (renamed *Out Of This World*) and conversion to a variety of other platforms – but it did require some changes first. The game was extended slightly, with new scenes inserted immediately before Lester and



» One short segment of the game requires you to swim back through the cave you previously flooded.



» This infamous swimming pool gatecrash was censored in the SNES game, to minimise the appearance of bums. Really.

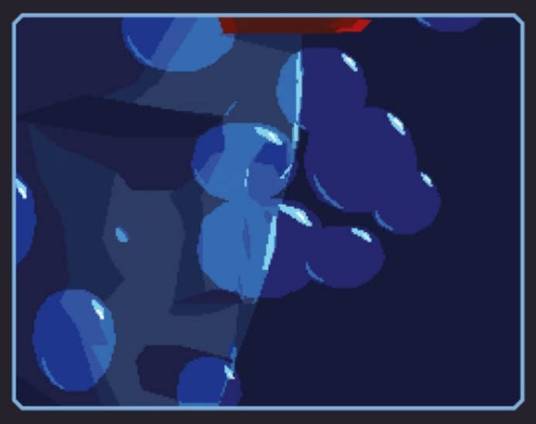
his buddy hijack a vehicle to aid in their escape. Extra checkpoints were added to minimise frustration, and in-game music was added for the console versions. Further revamped versions began to appear from 1994 with the release of the graphically overhauled 3DO game, and Éric Chahi himself would remaster the game in 2006 to mark its 15th anniversary. *Another World*'s story would be concluded in *Heart Of The Alien*, a much lower profile release for the Mega-CD. After this, Éric Chahi would work on *Heart Of Darkness*, an ambitious platform game that made heavy use of prerendered 3D and took many years to develop.

Another World is the kind of landmark game that should be experienced by everyone that cares about the medium. The game sold over a million copies and achieved critical praise. It has been cited as a favourite game by the likes of Hideo Kojima (*Metal Gear Solid*), Keiichiro Toyama (*Silent Hill*) and Goichi Suda (*Killer7*). What's more, there are few excuses not to try it. The game can be completed in an evening, and a significant effort has been made to keep the game available on modern devices. So if you haven't already, take a journey to *Another World* – just try not to step on the grass, as it'll probably kill you. *

BEAUTIFUL DEATH

Another World's cinematic tendencies meant that it featured some striking death sequences – check these out

CRUSHED BY ROCKS



DROWNING

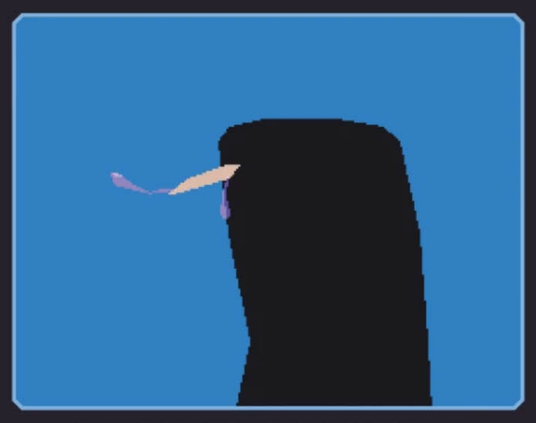
EATEN ALIVE

DISINTERGRATION

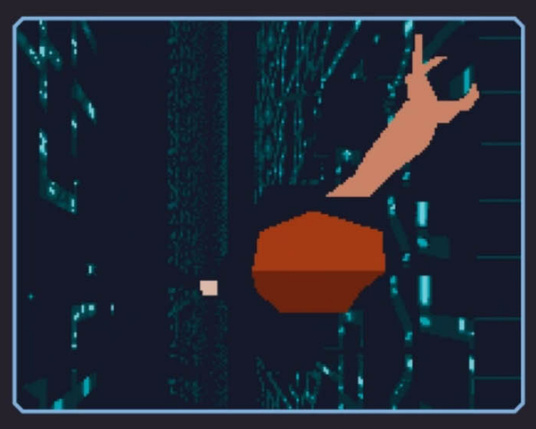
EXPLODED

PUMMELLED

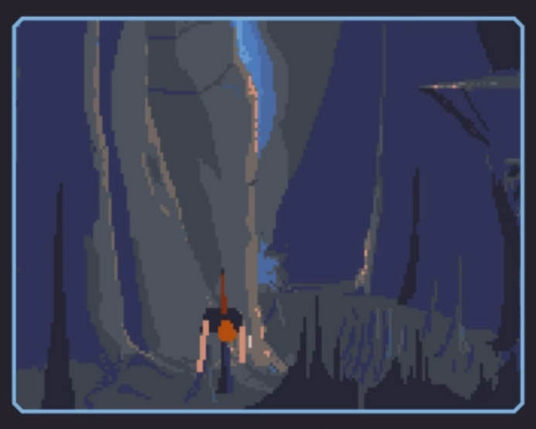
MAULED



POISONED BY A WORM



PLUMMETING



IMPALED

THE MAKING OF

CONTRA III: THE ALIEN WARS & CONTRA: HARD CORPS

CONTRA

THE 16-BIT WARS

NO MATTER WHICH SIDE OF THE 16-BIT CONSOLE WAR YOU WERE ON, YOU COULD COUNT ON KONAMI TO PROVIDE ONE OF THE BEST RUN-AND-GUN EXPERIENCES ON YOUR CONSOLE. NICK THORPE SPEAKS TO NOBUYA NAKAZATO TO FIND OUT HOW THEY WERE CRAFTED...

Back in the Eighties, Konami was the champion of the run-and-gun world. You might not have played *Contra* in the arcade, and you might not have even known it by its original name, instead discovering it as *Gryzor* or *Probotector*. However, anyone that did take on the game knew that it was great and that it was so difficult that you felt like it had given you a good kicking after every game. An arcade sequel, titled *Super Contra,* arrived shortly after the original, followed by a Game Boy spin-off titled *Operation C*. Konami then made a major decision: the third core *Contra* game would appear on the SNES.

The directorial reins for *Contra III: The Alien Wars* were handed to Nobuya Nakazato, who had previously directed the NES lightgun game *Laser Invasion*. Nakazato hadn't worked on any of the previous *Contra* games or the SNES, but he had an appreciation for the legacy of the series and the limitations that hardware had imposed on previous home versions. "The SNES itself was a relatively easy piece of hardware to work with," says Nakazato. "That fact, plus getting the teams that developed games like *Gradius III* and *Ganbare Goemon* to share what they had learned, allowed for a smooth development."

Having previously worked on the NES, Nakazato found the increased capability of Nintendo's new console liberating. "The NES could only display four palettes of four colours

» The European versions of both games used robots in order to avoid controversy.

» *Contra: Hard Corps* sets the tone early with this gigantic enemy.

simultaneously. So if a game used two palettes for player characters, like *Contra* did, that only left you two palettes for the background and all enemies," explains the director, who also contributed graphics to the game. "The SNES, on the other hand, allowed for 16 palettes of 16 colours. This meant we could do a lot more visually. We were able to incorporate unique colour combinations that accentuated the distinct looks of the game's variety of enemies."

"COMPARED TO THE NES, THE SNES COULD DISPLAY TWICE AS MANY SPRITES"

Nobuya Nakazato

Another thing was that hardware back then had tight restrictions on how many sprites you could display at once," Nakazato reveals to us. "If you exceeded this, you had to make whatever sprites were most important flicker to prevent them from not appearing at all." This technique had been instrumental in making the NES version of *Contra* work – notable examples include the second boss, which used a large number of sprites to convey waving arms. "Compared to the NES, the SNES could display twice as many sprites at a time. This allowed us to considerably reduce the sprite flicker you got when firing a lot of bullets."

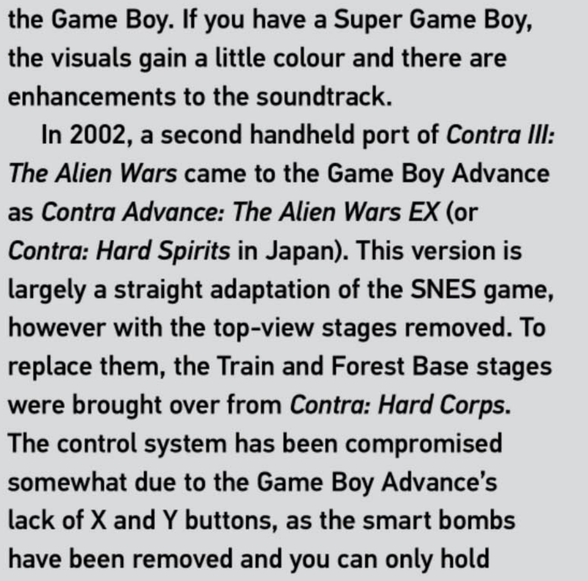
Of course, one of the key graphical features of the SNES was the Mode 7 scaling/rotation function. "I ran various tests for Mode 7 content in the run-up to planning the project. As I looked over the results, I came up with ideas for how to apply them. Konami had also started releasing arcade games, such as *A-Jax*, with rotation features, so I looked at those as well," explains Nakazato. One of these arcade games, *Chequered Flag*, was a top-down racing game which drew the circuit as a large rotating background. The new *Contra* game revived the top-down stages that featured in *Super Contra*, but gave the player full freedom of movement by using the same style of background rotation as used in *Chequered Flag*. This allowed for the stages to be designed as mazes, rather than straightforward assault courses.

Although Mode 7 was only used in two stages, it felt like a natural addition to the game design that made for an impressive use of the unique capabilities of the SNES. But what was truly impressive was something that had never been done before on the SNES – during the boss fight in the second stage, both the ground and the boss rotate. Displaying two layers ▶

» In many cases, the environment can be as deadly as the enemies hunting you down.

PORTABLE WARS

The handheld adaptations of Contra III that turned the bus into a battlefield



» Despite its best efforts, the GBA port of *Contra III* is markedly inferior to the SNES original.

Converting a high-quality, hardware-pushing SNES game to the monochrome Game Boy was always going to be a tough task, but Factor 5 did an admirable job with 1994's *Contra: The Alien Wars* (*Probotector 2* in Europe). Five stages survived the conversion to the handheld platform, with the jet bike stage failing to make the cut, and everything has been simplified a bit. The regular stages are shortened and the top-down stages no longer rotate. Additionally, it's strictly a single-player experience. It's no substitute for the SNES game, but is a very good run-and-gun game judged by the standards of the Game Boy. If you have a Super Game Boy, the visuals gain a little colour and there are enhancements to the soundtrack.

In 2002, a second handheld port of *Contra III: The Alien Wars* came to the Game Boy Advance as *Contra Advance: The Alien Wars EX* (or *Contra: Hard Spirits* in Japan). This version is largely a straight adaptation of the SNES game, however with the top-view stages removed. To replace them, the Train and Forest Base stages were brought over from *Contra: Hard Corps*. The control system has been compromised somewhat due to the Game Boy Advance's lack of X and Y buttons, as the smart bombs have been removed and you can only hold one weapon. The conversion isn't too well-regarded due to a somewhat dodgy engine with poor collision detection and modified enemy behaviour, as well as the other changes and omissions. If you have the choice between the two versions, get the SNES original.

CONTRA

AWESOME ARSENAL

Every character in Hard Corps has a unique arsenal – here's the lowdown on each

RAY POWARD

VULCAN LASER

■ It's a more powerful version of the standard-issue *Contra* weapon – straight rapid fire, with a slightly short range.

CRASH

■ This fires off slower, but more highly powered explosive rounds with a very short range, which explode upon impact or hitting the range limit.

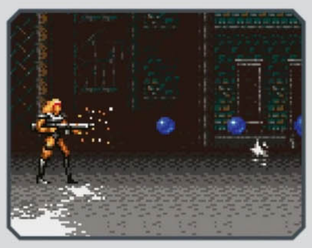
SPREAD

■ An excellent five-way shot, one of the most useful weapons in *Contra*, and one of the best weapons in gaming as a whole. Few enemies escape it.

HOMING

■ Tiny missiles that chase your foes until they hit and explode on something. Great for when you need to concentrate on movement over aiming.

SHEENA ETRANZI



GENOCIDE VULCAN

■ An extra powerful version of the primary weapon, with the standard narrow range and standard rate of fire.

SHOWER CRASH

■ Powerful explosives which fire in a curving arc, and thus have a shorter range than most weapons when fired forward.

BREAK LASER

■ A laser which has the power to penetrate entire waves of enemies, making it good for taking down massed hordes.

AX LASER

■ Kind of like the Spread, the laser fans out into a wide set of five narrow beams, before homing straight in on the nearest enemy target.

BRAD FANG

BEAST SHOOTER

■ An extraordinarily powerful rapid-fire weapon, where the shots fan out into a narrow cone shape.

POWER PUNCH

■ The closest thing to a melee attack in the game – its range is short, but the attack has unrivalled power.

FLAME THROWER

■ A powerful but short-range weapon that will rotate through a full 360 degrees as you turn around.

PSYCHIC BLASTER

■ A chargeable, twisting beam weapon which gains power the longer you hold the button before firing.

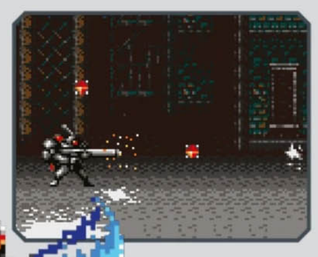
BROWNY

VICTORY LASER

■ It's another straight shooting weapon, but this one is practically as tall as the diminutive Browny itself.

GEMINI SCATTER

■ A machine gun-style weapon which fires boomerang bullets – they'll shoot out to a medium range before returning.



ELECTRO-MAGNETIC YO-YO

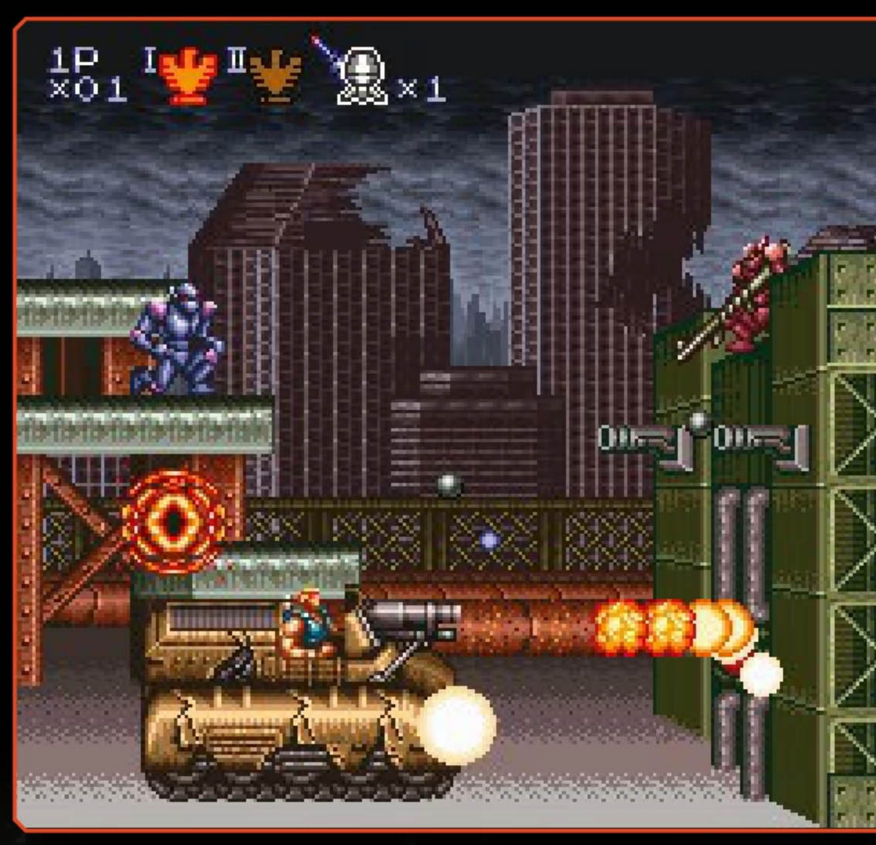
■ This can be fired in any direction, but will home in on enemy targets when the fire button is held down.

SHIELD CHASER

■ A circular shield protects Browny as long as the button is held, before being launched in the direction of enemies.

of rotation was theoretically impossible on the SNES. How was it achieved? "Actually, the ground isn't Mode 7," reveals Nakazato. "It's just a grey background with things like the road paint and cracks displayed as sprites on top of it." That sounds equally impossible, until we're let in on the trick. "The SNES had no sprite rotation feature, so we created animation patterns for 32 degrees of rotation, and by synchronizing these to the player's input, we created the illusion of two layers of rotation." Of course, this was one of many boss fights in the game and interestingly, it isn't Nakazato's favourite. "The inspiration for those ideas came from all sorts of things – films, novels, museum exhibits..." he tells us. "My personal favourite is the final boss, whose attack pattern changes according to a roulette."

As much attention was paid to the soundtrack as to the visual aspect of the game. "I asked the sound team for a heavy-hitting sort of sound like you find in Hollywood movies," the director recalls. The SNES hardware allowed for sampled sounds that brought this ideal to life, with pounding drum beats in the opening stage and orchestral sounds for moments of high tension. The music could even be dynamic in certain situations. "In particular, for the boss rush at the end of the game, we paid a lot of attention to making it more immersive by having the music change seamlessly according to what was going on in the game," says Nakazato, again revisiting a favourite part of the game.



» *Contra III*'s first level has you continuing the fight in a gigantic tank. Watch out, it's surprisingly fragile.

"WE'D ALREADY RELEASED THE SNES GAME, SO WE DIDN'T WANT IT TO LOOK INFERIOR TO IT"

Nobya Nakazato

IN THE KNOW

- **PUBLISHER:** KONAMI
- **DEVELOPER:** KONAMI
- **RELEASED:** 1992 (SNES), 1994 (MEGA DRIVE)
- **GENRE:** Run-and-gun

DEVELOPER HIGHLIGHTS

CONTRA
SYSTEM: ARCADE
YEAR: 1987

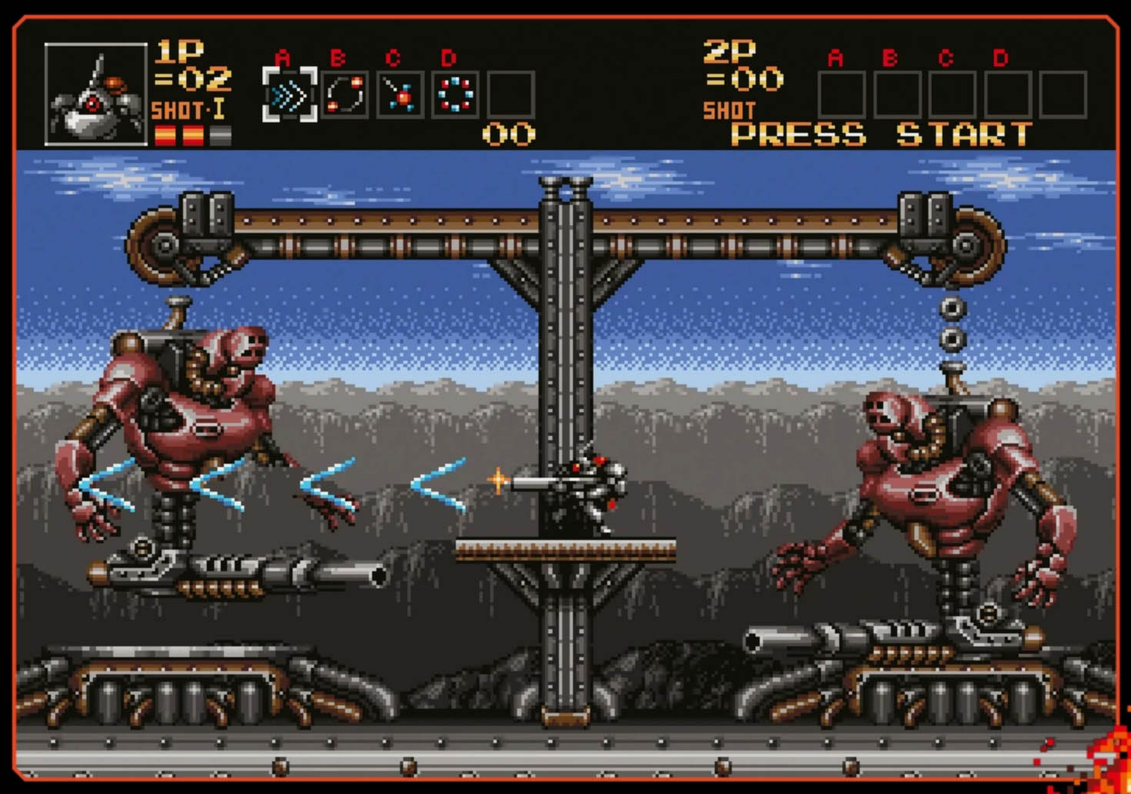
ROCKET KNIGHT ADVENTURES
SYSTEM: MEGA DRIVE
YEAR: 1993

VANDAL HEARTS
SYSTEM: PLAYSTATION, SATURN
YEAR: 1996

The press jumped on *Contra III: The Alien Wars* as soon as it was released in Japan in February 1992, under the title *Contra Spirits*. *CVG* awarded the game 91%, with Tim Boone saying, "If I was one of Nintendo's rivals I'd poop my pants if I saw this." Frank O'Connor was impressed with the way that Mode 7 graphics had been implemented in the game design, noting that, "the use of scaling and rotation in *Contra* isn't just a gimmick, it's an intrinsic part of the gameplay". *Mean Machines* gave it an incredible 95% at review. Richard Leadbetter was particularly impressed with the game's audio, praising the "atmospheric scores that almost rival *ActRaiser* in their brilliance", while Julian Rignall commented that, "It's so good it puts most of the coin-ops I've played to shame!"

Before the game made it to Europe, it had to undergo a slew of localisation changes. "When the NES versions of *Contra* were being developed there was greater sensitivity in Europe, mainly in Germany, towards depictions of violence in videogames, more so than today," notes Nakazato. "In light of this, for the PAL NES versions we changed all characters with guns to robots. The SNES game simply continued this." As well as these graphical changes, the name of the game was changed to *Super Probotector: Alien Rebels*, following on from the NES game. The changes barely dampened press enthusiasm – in a retrospective review in 1993, *Super Play Gold* awarded *Super Probotector* 90% and described it as, "A loud, brash, gratuitously violent over-the-top thing that tops any obvious rivals – on more or less any system."

"Nowadays, gaming culture has matured, and games for older audiences are rated accordingly, so we use the same characters worldwide," explains Nakazato. With the exception of the Wii Virtual Console release, subsequent rereleases have restored the *Contra* branding for European players – the Game Boy Advance, Wii U, 3DS and Nintendo Classic Mini: SNES versions all use the North American name and graphics.



» This mid-boss won't show up in every run, due to the non-linear nature of *Contra: Hard Corps*.

At the time of *Contra III: The Alien Wars*, Konami hadn't released any Mega Drive games. As with many third-party developers, the company had been restricted from developing for other platforms by its contractual agreement with Nintendo. Once it was able to develop for other consoles Konami backed the PC Engine, but soon had to devote resources to the Mega Drive due to the machine's international success. Nakazato's next directorial job was *Rocket Knight Adventures* for the Mega Drive, which meant that by the time his team began work on *Contra: Hard Corps*, it had excellent experience with Sega's hardware.

"We'd already released the SNES game, so we didn't want it to look inferior to it," Nakazato recalls. This was easier said than achieved – the Mega Drive is two years older than Nintendo's machine, and lacked the custom hardware that set the SNES apart. In most ways, it was harder to work with for Nakazato and the team. "Compared to the SNES, the Mega Drive had tighter graphical restrictions, such as the number of colours you could use simultaneously. On the other hand, it excelled at processing sprites quickly." Despite the challenges involved in working with the older hardware, the *Contra* team carried on undeterred. "Even though we had less colours to work with, we wanted the game to look good overall, so we put a lot of work into giving the presentation some pizzazz with things like the effects," Nakazato explains. "To take ▶

» What would be worse than having to escape an enemy compound? Doing it with fire chasing you.

» This impressive virtual reality mini-boss can transform into a variety of tricky adversaries.

advantage of [the fast sprite processing], we focused on researching animation techniques for large characters made up of multiple parts."

The results could be seen as soon as the game starts. What initially seems to be standard *Contra* fare soon gives way to the appearance of a multi-legged walker, an enormous robot which sets the city ablaze and uses rotation effects, and memorably a fantastically animated robot that chases you along a winding motorway as it runs towards the screen. That's all just in the first two stages, and isn't even nearly everything. It's no surprise that when we ask Nakazato about his favourite technical achievement with *Contra: Hard Corps,* he jumps straight to, "The large, unique, colourful bosses, which we created through a combination of parallax scrolling and the multiple joints technique that I just mentioned."

The sound of *Contra: Hard Corps* benefited from an approach tailored to the host platform just as well as the graphics did. "Back then, Konami had a separate department that handled sound-related development. Even when it came to modifying an engine for different platforms, the R&D team in that department created versatile tools for that purpose," Nakazato reveals. The Mega Drive wasn't capable of sample usage on the same scale as the SNES, with its sound chip better suited to producing raw, almost aggressively synthesised music. As a result

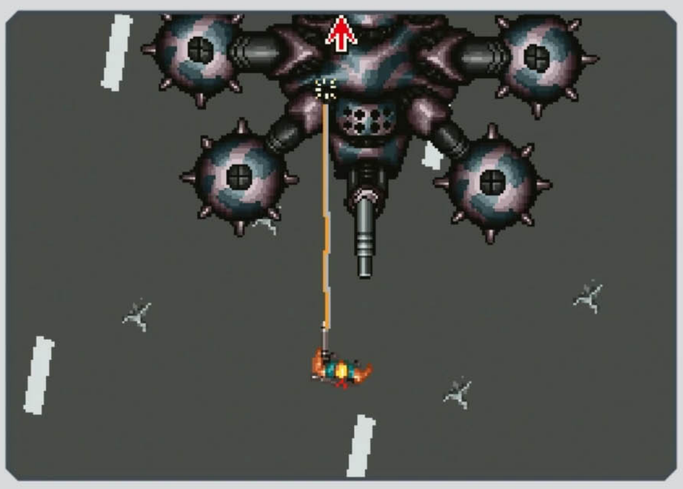
» Minor enemies in both *Contra III* and *Hard Corps* are more likely to outnumber you than outwit you.

of this, the *Hard Corps* team went for a more electronic soundtrack, mixing driving rock sounds with some deliberately alien sounds to tie into the theme of the game.

While the graphics and sound pushed the Mega Drive, the real revolution in *Contra: Hard Corps* came from how it was designed. "*Contra III* was developed with the idea that it would have enough content to hold up to multiple playthroughs. With *Hard Corps*, I basically kept this principle but added even more content to the game," explains Nakazato. "That said, I figured that if it took too long to complete the game, players might not want to do so repeatedly, so I kept the length of the game the same, but made it broader."

EPIC ENCOUNTERS

Both Contra III and Hard Corps feature some amazing bosses – these are the most memorable…



STAGE 2

CONTRA III: THE ALIEN WARS

■ This multi-part robot can be taken down in stages – each of its weapons can be destroyed as well as the target. It begins to spin faster as more damage is dealt, and eventually launches itself into the air before trying to crash down on top of the player.

STAGE 3

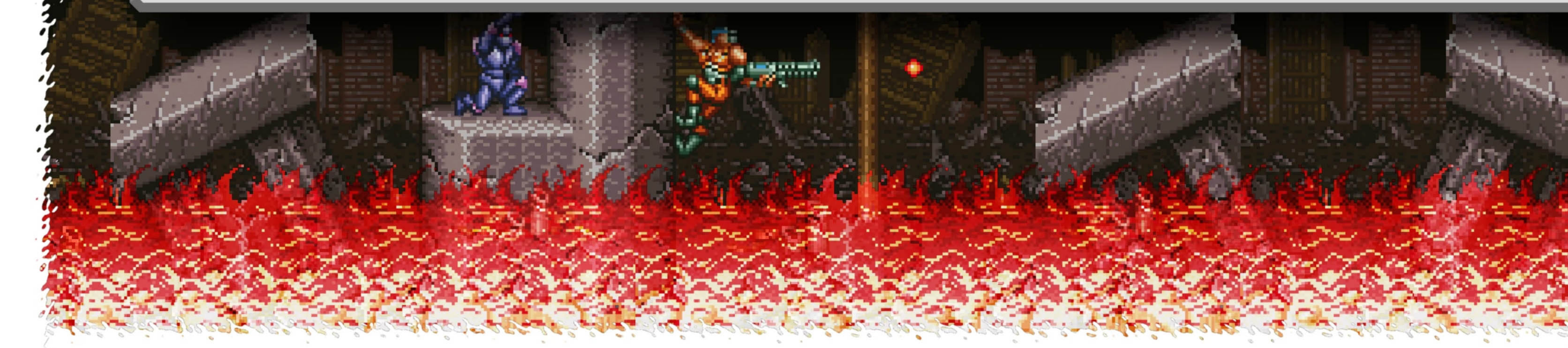
CONTRA III: THE ALIEN WARS

■ This Terminator-esque robot will stop at nothing to kill you, literally breaking through the wall to get at you. It attacks with ocular beams, fire breath and a spread of time bombs. You'll need to shoot this one in the head to see it off.

STAGE 4

CONTRA III: THE ALIEN WARS

■ This gigantic airship is shielded, so you'll need to dodge a barrage of bombs while you take out the two barrier generators. Once you've done that, you just need to destroy it – easier said than done as you jump between missiles.

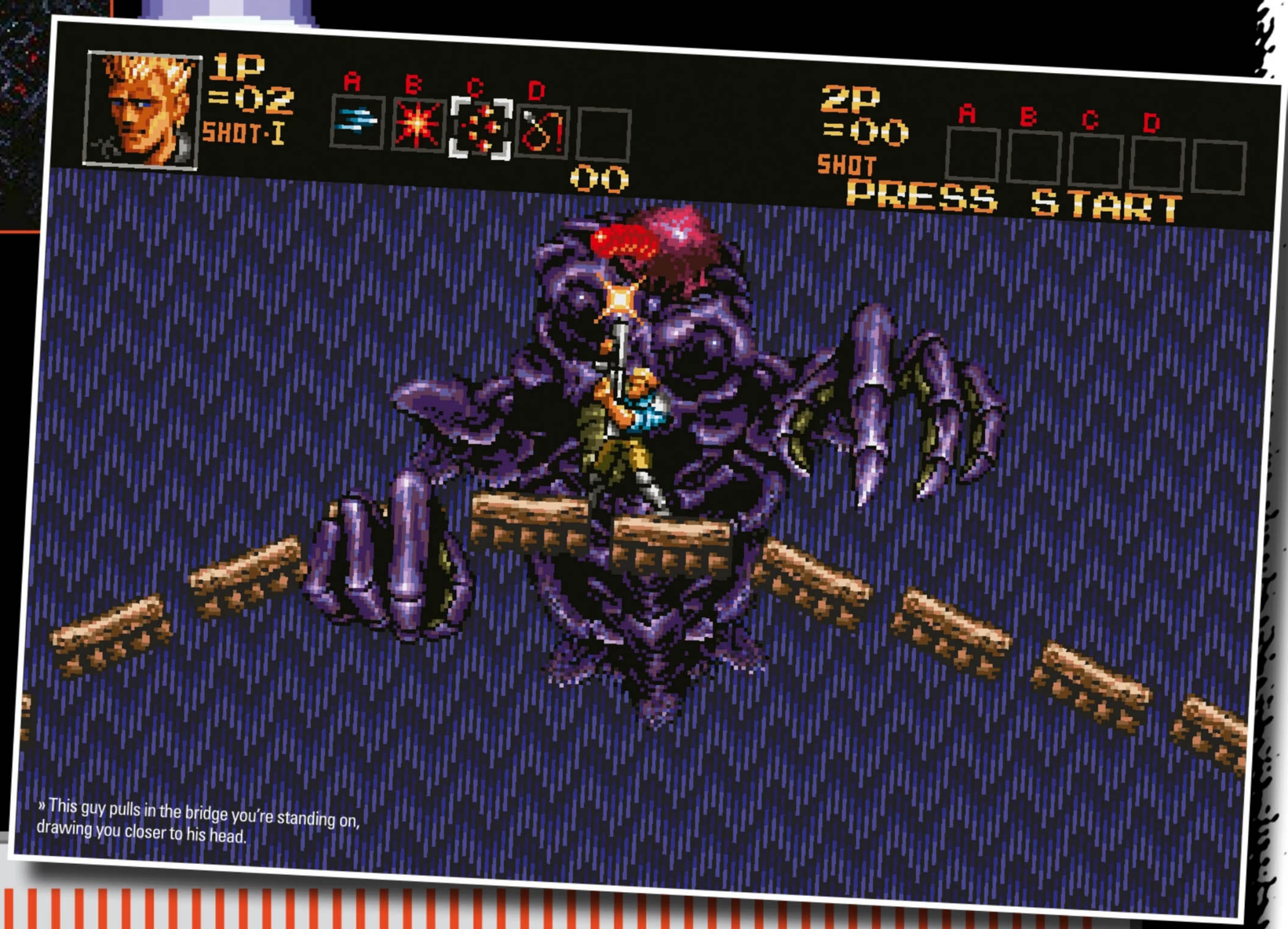


» The use of Mode 7 rotation allowed for mazes, revolutionising *Contra III*'s top-down stages.

The challenge of creating a game with more content but maintaining the same length per session gave us another interesting development – the most story-heavy *Contra* to date. While the short dialogue sequences and pre-mission briefings are nothing compared to the cutscenes of today, they were certainly out of the ordinary for *Contra*. "This came about purely as a result of prioritising making a fun action game. It wasn't that I was out to make a story-driven game," explains Nakazato. "My goal was to make a game that players wouldn't get tired of even if they played it over and over. So to help give them incentive to do so, I gave the game a ▶

"MY GOAL WAS TO MAKE A GAME THAT PLAYERS WOULDN'T GET TIRED OF"

Nobuya Nakazato



» This guy pulls in the bridge you're standing on, drawing you closer to his head.

STAGE 2 (CHASE)

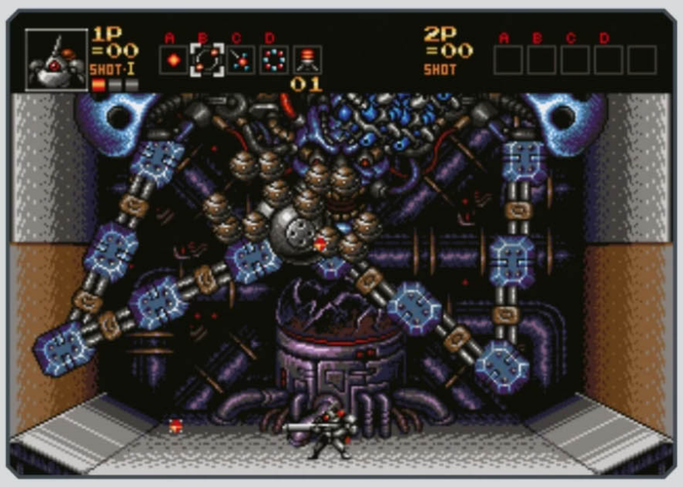
CONTRA: HARD CORPS

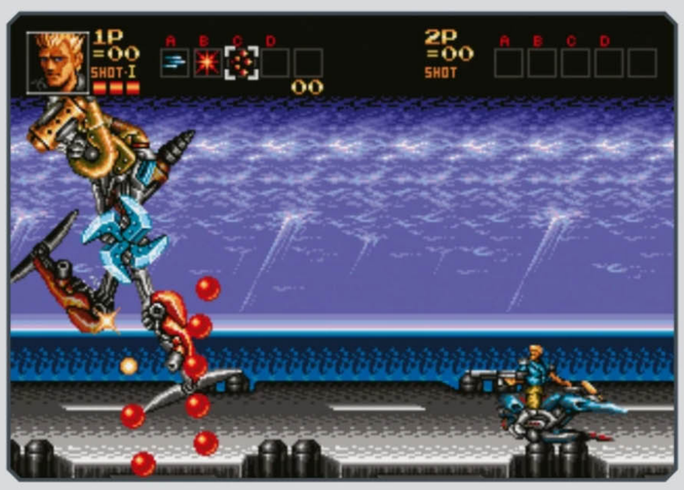
■ Going after Deadeye Joe will land you in a sticky situation – a highway pursuit with a gigantic robot, which swings spiked balls at you from its arms and launches bombs across the road. Attack it when it's level with your character.

STAGE 2 (LABORATORY)

CONTRA: HARD CORPS

■ This gigantic assembly line robot has gone crazy and now builds contraptions designed to crush you. You'll need to shoot it in the head to get rid of it, but it is only vulnerable while it's building something.





STAGE 6 (OCEAN)

CONTRA: HARD CORPS

■ After defeating three mini-boss robots, they transform into one giant enemy with various attack forms, much like *Gunstar Heroes*' Seven Force. Luckily there's no specific weak point to hit here, so blast away.

CONTRA

» This massive airship is a constant nuisance during the jet bike stage, thanks to its varied attacks.

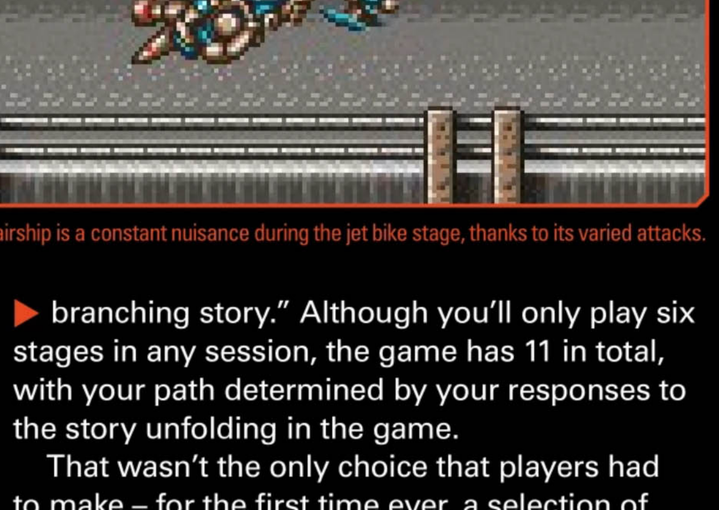
" I WANTED TO GIVE PLAYERS THE ABILITY TO HAVE FUN GOING THROUGH THE GAME MULTIPLE TIMES"

Nobuya Nakazato

▶ branching story." Although you'll only play six stages in any session, the game has 11 in total, with your path determined by your responses to the story unfolding in the game.

That wasn't the only choice that players had to make – for the first time ever, a selection of characters was offered. "Once again, this was because I wanted to give players the ability to have fun going through the game multiple times with different characters," Nakazato reveals to us. "It was also a test to see if fans would accept characters that were different from the macho military types of previous entries in the series." *Hard Corps*' cast of characters was certainly different, as the traditional *Contra* cast was replaced with a new set of four heroes. Ray Poward was a standard military man in the traditional *Contra* style, and Sheena Etranzi served as his female counterpart. Brad Fang was a more outlandish character design, as a genetically engineered cyborg werewolf, and the tiny robot Browny was the oddball of the bunch. For the first time ever, each of these characters offered players a different experience – each power-up icon gave a unique weapon depending on your choice of character.

Contra: Hard Corps was released in North America in August 1994, before landing in Japan in September and in Europe (once again as *Probotector*) in November. Critical reception was stellar once again, with *GamesMaster*'s Tim Tucker awarding the game 93% and declaring "it's everything you could conceivably need from a game." In *Mean Machines Sega*, the game was rated at 94% with Paul Bufton cautioning readers that "the difficulty setting may frustrate a great number of people, but all good things come to those who wait." *CVG*'s Rik Skews felt similarly enamoured, noting that "more than any other shoot-'em-up I've played *Probotector* delivers immense satisfaction when you complete a level," with his colleague Mark Patterson giving the game a 92% score.



Interestingly, the punishing difficulty level was less of a factor in the Japanese version of the game. Instead of experiencing one-hit kills, Japanese players were given a short life bar that made for a slightly easier game. We have to ask why this feature was removed for the export versions, but Nakazato quickly corrects us. "Actually, the reverse is true – the energy bar was added to the Japanese version," he explains. It seems odd that the intended design was for the West and adjusted for Japan, but there's a commercial reason behind it. "At the time, Japanese gamers were mainly into 'thinking' games, such as RPGs and strategy games. Games that demand quick reflexes, like action games and shooting games, tended to be somewhat less popular."

Unfortunately, *Contra: Hard Corps* isn't the most accessible game in the world due to its high price. You can expect to pay at least £70 for the North American release or the PAL *Probotector* version, and the Japanese release fetches considerably more. What's behind the scarcity of the game in its home territory? "As I mentioned, the genre itself wasn't as big in Japan as in the West," we're told by Nakazato. "There was that,

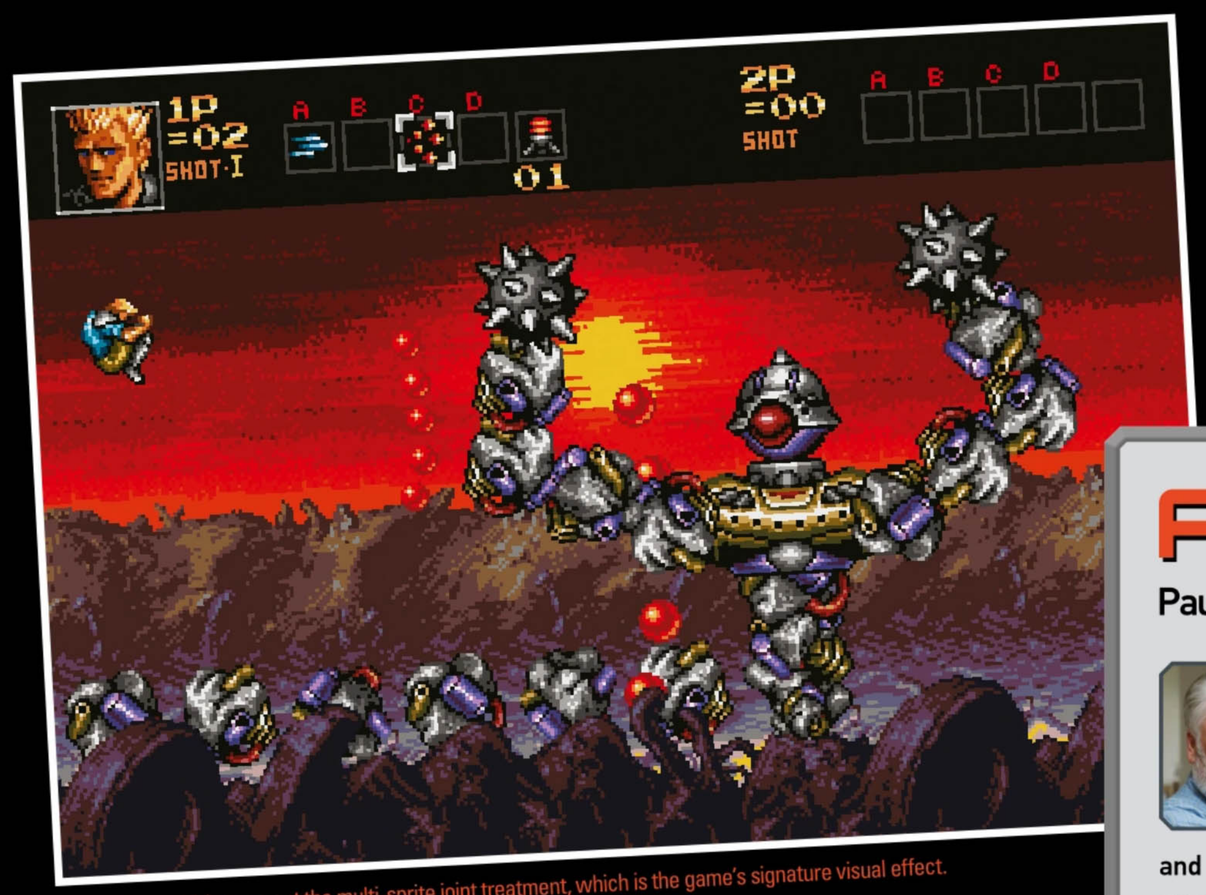
» Brad is the best character for speedruns, thanks to a weapon glitch.

CONTRA III: THE ALIEN WARS 101

■ *Contra III: The Alien Wars* is a one or two-player run-and-gun game in which you're tasked with fending off an alien invasion by blowing up every alien in sight. The game alternates between side-scrolling and top-down shooting sections.

CONTRA HARD CORPS 101

■ *Contra: Hard Corps* is a one or two-player run-and-gun game in which you're tasked with stopping a rebel general's plot by blowing up every enemy in sight. Depending on the choices you make during stages, the plot can branch in four different directions.



» Even mid-bosses get the multi-sprite joint treatment, which is the game's signature visual effect.

plus I do recall that with its print, we did take into account the installed base of the Mega Drive."

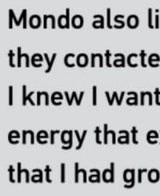
Nobuya Nakazato and the *Contra* teams managed to deliver two incredible run-and-gun games that not only represent the pinnacle of the *Contra* series, but are arguably the defining examples of the genre on their respective platforms. This is an achievement which shouldn't be underestimated – after all, the 16-bit years were a time when publishers still had platform loyalties and consoles were wildly different in terms of their architecture. But which is the better game? That question has been argued by series aficionados and console loyalists over the years, but no consensus has been reached. So if Nakazato were to take one of them to a desert island, would he choose *Contra III* or *Contra: Hard Corps*? "That sure is a tough question… but by means of going back to the roots, I'd choose neither and bring the NES *Contra* with me," is his diplomatic response.

It looks like the question of which 16-bit *Contra* is superior is destined to go on forever – SNES fanatics will always point to the Mode 7 stages and amazing soundtrack, while the Mega Drive defence force will always point to the increased challenge and crazy bosses that don't quite have a SNES equivalent. But the truth is that they're both incredibly fine run-and-gun games, and if you haven't got the experience to compare the two, it's high time you corrected that. We'll even let you in on a little secret – you don't have to pick a favourite. So what are you waiting for? ✱

Thanks to John Szczepaniak and Kosuke Iwakura for making this article possible.

ART ATTACK

Paul Mann on creating the artwork for Mondo's Contra III vinyl release



How did you become an artist?

My interest in art originated at a young age from my father, who was also an artist and photographer. I can remember him with an easel painting landscapes in oil paints. One day, when in first grade, I showed him some drawings I had done and he was amazed. From that point on, my parents gave me much encouragement. I always knew that art is what I would do for a living. It was just something I was born to do.

Did you have any prior knowledge of the game?

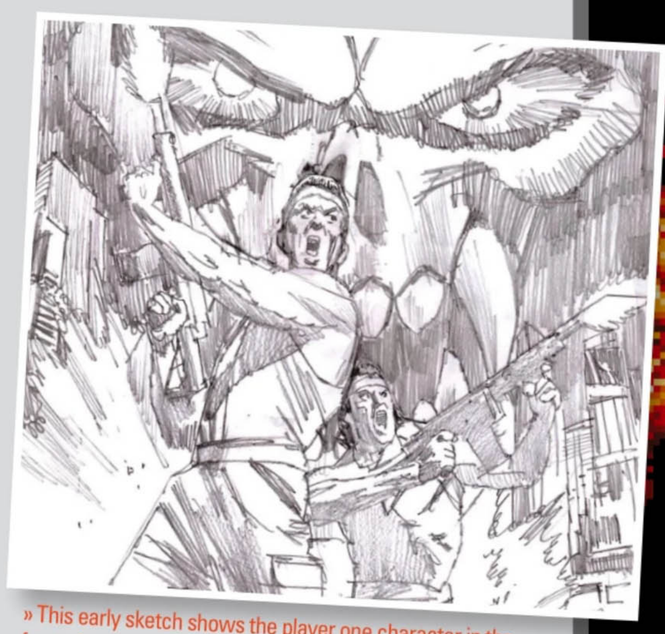
I had no knowledge of the game before I worked on the piece. I had to do some research. I also had help from several people who had grown up playing it. Once I began to find out more about the game it intrigued me and I was eager to start the project.

Where did you get inspiration?

I drew inspiration from a love of Illustration artwork that was done during the Sixties. My work emulates that style and design. Mondo also likes that style and that's why they contacted me to do the *Contra III* art. I knew I wanted my art to have the same energy that existed in the movie posters that I had grown up with, which involved tons of action, colour and excitement.

Did you listen to the soundtrack to get a feel for the game's tone?

While doing my research I listened to the soundtrack before I started my art in order to get a feel for the game. I knew my art had to have the same high energy and impact as the soundtrack did. I really liked the rhythm and the beat, which gave the game a high-paced motion.



» This early sketch shows the player one character in the front, the two are switched around in the final version.

How did you recreate the look of the main characters?

I would look at how they moved, how they were dressed and their mode of attack. I also researched the aliens, the backgrounds and the weapons. My challenge was to create this in a realistic style. For the main characters, I used my nephew as a model who had the right look and physique that was needed. I photographed him in many different action poses to get that realistic look. I first had to show Mondo sketches of the direction I wanted to go. After they approved that, I did full-colour comps. Then I moved to the final artwork that was painted in acrylic paints. I worked on this project for about a month, that's including research and approvals. The actual artwork took about four days.

THE MAKING OF SONIC THE HEDGEHOG 2

IN 1992, SEGA TECHNICAL INSTITUTE WAS GIVEN THE TASK OF DELIVERING A NEW SONIC GAME, WITH A SHORTER SCHEDULE AND A TEAM DIVIDED BY LANGUAGE. NICK THORPE FINDS OUT HOW IT WAS PULLED IT OFF...

» Mystic Cave Zone is full of hidden traps, like these spiked platforms that emerge from the walls.

DID YOU KNOW?

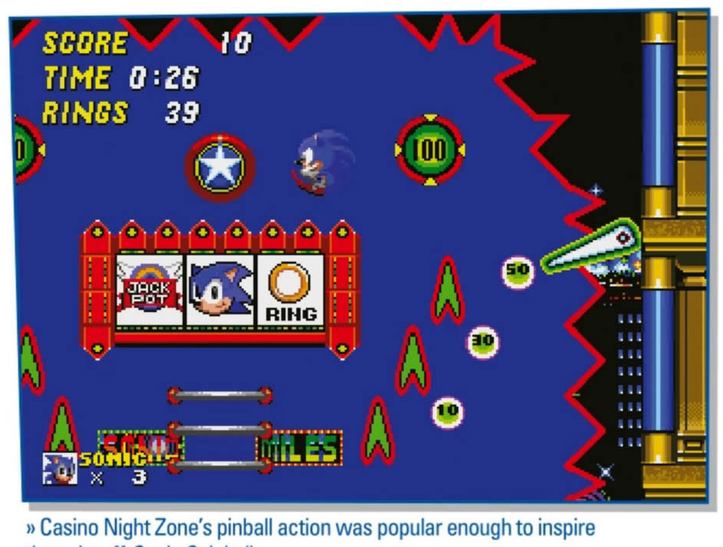
The original plan for *Sonic 2* included the terrifyingly-named 'Genocide City Zone' – later renamed to 'Cyber City Zone'.

Instant success sure can be a curse as much as a blessing. That's why you hear so much about the 'difficult second album' or a 'sophomore slump' – it's tough to follow a breakout debut. *Sonic The Hedgehog* was most definitely a breakout success, propelling Sega from a minority player in the home console market right into competition with industry giant Nintendo. No matter how difficult it would be to create a successor, you'd imagine the company would be moving mountains to make sure it happened. So you might be surprised to find that the company had allowed one of the key staff behind the success of the game to walk away.

"In the year that I set up Sega Technical Institute, I was shuttling back and forth between the Silicon Valley home of STI and Sega headquarters in Tokyo," explains Mark Cerny, who was a programmer on *Sonic The Hedgehog 2*. "On one of these trips, I learned that Yuji Naka, who was the programmer and overall driving force beyond the first *Sonic The Hedgehog*, had quit the company on completion of the project. This was quite a bit of a shock. Naka-san was brilliant, and had spearheaded any number of consumer hits, everything from arcade conversions like *Out Run* to original titles such as *Phantasy Star*. He was as much of a star in the Sega universe as Yu Suzuki."

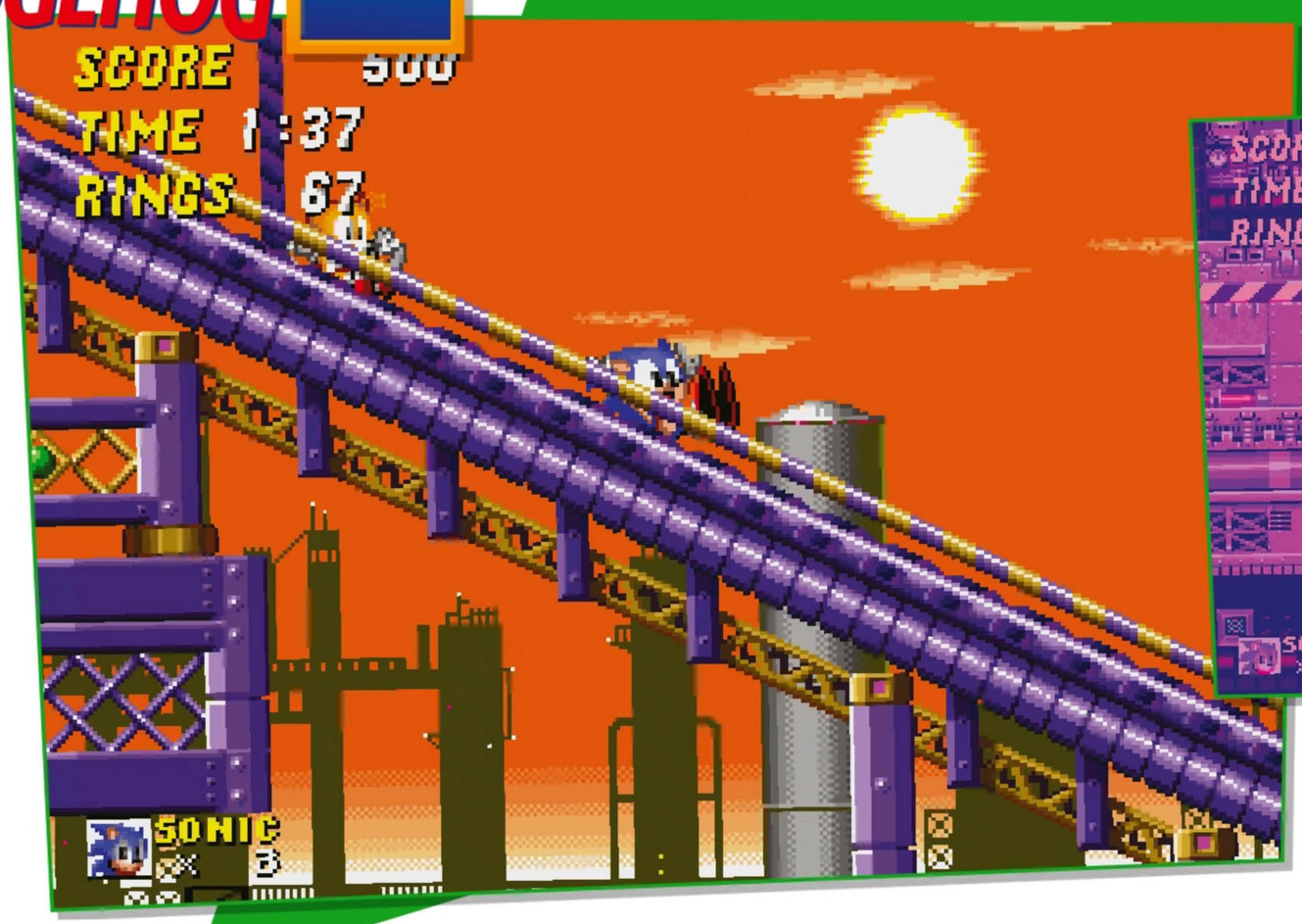
Mark wasn't about to let such a talented colleague disappear from the company and set about rerecruiting him. "It wasn't difficult at all to track down Naka-san, as I'd worked out of the same bullpen in Tokyo as he did for several years. His story was pretty simple: low pay, long hours, lack of appreciation and support from management. The pay issue was also quite simple: as an employee of the Tokyo headquarters, salary was based on seniority, and royalties did not exist." Still, this was something that Mark saw as an opportunity. "My pitch was that if he'd come to STI in the USA, we could compensate him much better. We didn't make any decisions as to what the next game would be, just that this time around, if he had a smash hit he would share financially in its success." The incentive worked, and Yuji Naka made the trip across the Pacific to join Mark's team. This allowed him to reunite with Hirokazu Yasuhara, the game designer on the original *Sonic The Hedgehog*, who had also moved from Japan to join Sega Technical Institute.

With two key members of the original team at the studio, the sequel project began. "We at STI were under the impression that *Sonic 2* was the obvious game to make," explains Mark. "So we pitched it as a 1992 holiday release, which would give us something like 11 months to do the game creation… and were told dismissively that 'it's much too soon' by one of the marketing execs." Apparently, this wasn't an uncommon problem. "It was frequently ▶



» Casino Night Zone's pinball action was popular enough to inspire the spin-off *Sonic Spinball*.

SONIC THE HEDGEHOG 2



» Chemical Plant Zone was originally a late-game stage, which is why it's relatively difficult.

"AT THE VERY BEGINNING, I DESIGNED THE GAME WITH 'BLUE SKY' IDEAS"

Hirokazu Yasuhara

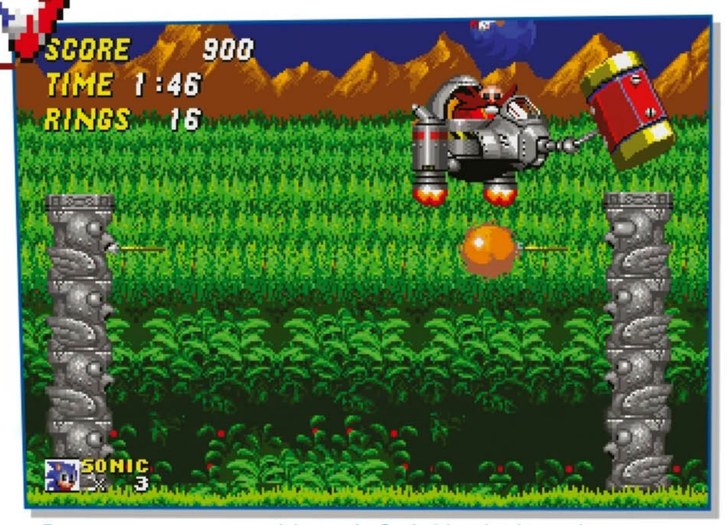
difficult to understand the relationship between the marketing team and the product development team," Mark continues. "For example, I can recall the same marketing exec dictating to the studio head exactly what game lineup to create – and yet, that plan only allowed for a five-month development cycle of some of the titles. Completely unrealistic, but that didn't stop the marketing exec from criticising the studio head as being 'uncooperative'."

This astonishing decision allowed the team to work on other concepts, and enabled Yasuhara to start dreaming big for Sonic's eventual return. "At the very beginning of the project, I designed the game with 'blue sky' ideas. When I made the original design, I thought we had about two years for the project," explains the designer. In recent years, he has shown off some of these ideas, including an ambitious time travel plot in which Robotnik takes over the world and Sonic must journey to the past to stop him – a concept which would later be explored in *Sonic CD*, which was developed by an entirely different team. "But after starting the project, the company forced us to change our schedule," the designer continues.

"Two months later, we were told that yes, we did need to create *Sonic 2* for 1992 holiday release," recalls Mark. "It wasn't much of a creative loss, in that we'd spent that time trying and failing to come up with a game concept as compelling as *Sonic*. But it did mean that instead of 11 months to create the game, we would only have nine months." It was a very high-profile project for a team that had only shipped two games previously. "It was very exciting. Actually, more like beyond exciting," remembers Craig Stitt, a level artist on *Sonic The Hedgehog 2*. "Surprisingly I don't remember feeling intimidated by it. Probably due to the fact I was young, naive. There was also a certain amount of confidence working with Mark Cerny, plus we had Yasuhara and Naka." While Craig wasn't feeling the pressure, the team was most definitely aware of the importance of the project. According to Yasuhara, "Sega was fighting against Nintendo with a 16-bit console battle at the time, so our team members understood that we were under big expectation from the market and Sega executives."

The team had a number of ideas of how to improve the game over the original. For a start, Sonic needed to be even faster. In the first game, his running speed was capped well below the maximum speed he could achieve – that would be lifted in the sequel. He'd also get a new move to help with this. "Almost all team members had naturally felt that Sonic needed the 'spin dash' after the release of the original *Sonic*," says Yasuhara. By crouching and pressing jump, the player would send Sonic into a spin, while still fixed in place. This could be further revved up by hitting jump again, and once the buttons were released Sonic would spin off in the direction he was facing, meaning that he didn't have to backtrack for momentum in order to tackle steep hills as in the previous game.

Another major addition to the game was the addition of multiplayer. According to Yasuhara, this was always part of the plan. "I wanted to give a friend for Sonic. So I implicitly imagined that *Sonic 2* would have two characters in it," explains Yasuhara. "If there were two characters in game, brothers and sisters could play at the same time." This character eventually developed as Miles 'Tails' Prower, a little fox. In regular gameplay, Tails worked under CPU control, with an AI routine that had him mimic Sonic's moves and attempt



» Boss structures are more elaborate in *Sonic 2*, but they're rarely very challenging.

DID YOU KNOW?

Sonic Mania's Mirage Saloon Zone is inspired by a mocked-up desert stage seen in early *Sonic 2* images.

CRUNCH TIME

Thanks to the prototypes that have leaked out of Sega over the years, we can see exactly how the last couple of weeks of development played out...

18 SEPTEMBER 1992, 2:26PM

- At this point the game is using a prototype title screen illustration.
- **All stages are implemented and ground layouts are complete.**
- Hidden Palace Zone and Wood Zone have had their stage graphics removed.
- **Sonic will die if he hits spikes during his post-damage invincibility.**

Who got through act 2? Hint: he's not a blue hedgehog. Fix it.

21 SEPTEMBER 1992, 10:06AM

- The finalised title screen is added to the game.
- **Emerald Hill Zone is made easier by adding rings and moving enemies.**
- Aquatic Ruin Zone is made easier by adding rings and deleting enemies.
- **Casino Night Zone's slot machines gain reward/penalty coding.**
- Mystic Cave Zone's object placement receives some minor adjustments.
- **Oil Ocean Zone's boss arena is broken (Sonic falls straight through oil).**
- Death Egg Zone boss is made harder.
- **Hidden Palace Zone's remaining enemy graphics and code are deleted.**
- Spike behaviour is corrected.
- **The Super Sonic transformation sequence is added to the game.**
- Special Stages 1-5 and 7 receive new some object layouts.
- **A rough version of Sonic's end sequence is added to the game.**

Get Sonic to pilot the plane. We don't do animal cloning.

22 SEPTEMBER 1992, 4:47PM

- A trademark symbol is added to the game's title screen.
- **Aquatic Ruin Zone's layout is tweaked by moving pillars and changing the moving platforms around.**
- Hill Top Zone's layout is tweaked by moving rings and enemies.
- **Wing Fortress Zone is made easier by adding rings and moving items.**
- Wing Fortress Zone's boss is made easier (laser no longer destroys platforms).
- **Super Sonic's transformation sequence is corrected to check for Chaos Emeralds.**
- Ring requirements for Special Stages 2, 4 and 5 are decreased for Sonic and Tails.
- **Special stages are recoloured.**
- The staff credits sequence is added to the game's conclusion.

24 SEPTEMBER 1992, 5:27PM

- Oil Ocean Zone gains spikes beneath oil slides to fix a bug that causes Sonic to slide.
- **Metropolis Zone gains spikes above screw paths to fix a bug that embeds Sonic in the wall.**
- Wing Fortress Zone cutscene bug is fixed (Super Sonic no longer jumps to his death).
- **The invincibility sparkle effect is replaced with a new one.**
- Code is added to make Sonic/Tails lose their shields after passing an end of level signpost.
- **Tails gets his own continue icon.**
- Tails' ending is added to the game.
- **A bug is added to Super Sonic's ending, resulting in corrupted graphics.**
- Extra names are added to the staff credits.

24 SEPTEMBER 1992, 7:25AM

- The finalised level select screen is added to the game.
- **Oil Ocean Zone gains spikes in various places to ensure players use pressure cannons.**
- Oil Ocean Zone's boss arena is fixed.
- **Metropolis Zone is made easier by adding extra checkpoints.**
- Metropolis Zone now sends players to Sky Chase Zone after Act 3, rather than Act 2.
- **Sky Chase Zone now features Sonic as the biplane pilot in Tails-only mode.**
- Death Egg Zone now properly clears checkpoint data, removing a frustrating instant death bug.
- **End-of-level graphics no longer mistakenly calls Tails 'Sonic'.**
- Super Sonic's ending graphics are added to the game.

25 SEPTEMBER 1992, 11:00PM

- New attract mode demos are recorded and added to the game.
- **The game is made harder by converting many extra lives to other items.**
- Casino Night Zone's flippers and Crawl enemies are moved to avoid crash bugs.
- **Oil Ocean Zone gains even more spikes to ensure players use pressure cannons.**
- Wing Fortress Zone is made harder by removing rings.
- **Death Egg Zone boss spawn point is moved to the far right of the stage.**
- Super Sonic's underwater colours are fixed.
- **Code is added to revert Super Sonic back to his normal form after passing an end of level signpost.**
- Special Stage 6 receives a new object layout.
- **Ring requirements for Special Stages 5 and 7 are increased for Sonic and Tails.**
- Ring requirements for Special Stages 3-7 are increased for Sonic or Tails alone.
- **Super Sonic's ending is fixed.**

Game is finalised and sent for production!

29 SEPTEMBER 1992, 9:33AM

- The end post in Casino Night Zone is raised by a few pixels.
- **Ring monitors no longer cause the ring counter to glitch by ignoring the 999 ring cap.**
- Fixed bugs relating to interacting with certain objects while hurt.
- **Fixed a graphical glitch when using Teleport in 2P mode.**
- The spelling of Thomas Kalinske is corrected in the staff credits.

Game is sent out for production as Revision 01!

Does this feel a bit unfair? Maybe make it easier, guys.

Who broke the end sequence? Put Sonic in the centre please!

SONIC THE HEDGEHOG 2

ECHO BOOMS

The original Mega Drive game isn't the only way to play Sonic 2...

Like most of Sonic's early games, *Sonic 2* has had too many compilation and plug-and-play appearances to count. However, a few conversions have shown the hedgehog's second adventure a bit of extra love that might make them preferable to the original. The first is *Sonic Jam*, the *Sonic* compilation for the Saturn which includes his four Mega Drive outings. As well as allowing you to play the locked-on *Sonic 2 & Knuckles*, this game offers revised Easy and Normal difficulty modes in addition to the original game's layout. Time Trial and Chaos Emerald modes have also been added.

Sonic 2 for iOS and Android, released in 2013, was ported from the ground up by Christian Whitehead and Simon Thomley. The game has new support for widescreen displays, achievements, and Knuckles included as standard. The biggest new feature in the game is an extra hidden stage – an exclusive finished version of Hidden Palace, with new graphics, new enemy attacks and a custom boss that actually ranks as one of the best in the game.

Lastly, M2 developed 3D *Sonic The Hedgehog 2* for Nintendo's 3DS in 2014. This emulation adds a Ring Saver mode, which gives you ten free rings and lets you keep half of your rings whenever you get hit. Additionally, an unlockable Super Sonic mode lets you skip the special stages. The biggest addition here, however, is stereoscopic 3D, adding depth to the backgrounds that would be impossible to display on other systems.

DID YOU KNOW?

The manual for *Sonic 2* actually shows the title screen used in prototypes, rather than the one used in the finished game.

▶ to catch up if he fell behind. However, a second player could grab a pad at any time to take control of Tails, giving little brothers and sisters the world over an invincible helper character with which to get involved.

Co-op wasn't Tails' only use. "Naka-san pulled off some technical magic and created a split-screen racing mode which turned out extremely well," recalls Mark. This used the Mega Drive's rarely seen interlaced mode to present a squashed but fully-detailed play area for both players, allowing them to compete across a limited selection of stages,with the winner determined across the best of three categories (fastest finish, most rings collected and most item monitors broken).

"We knew we needed a flashy bonus stage – and ended up creating a pseudo-3D dash down a half-pipe," explains Mark. This can largely be credited to Tim Skelly, who produced the 3D renders which gave the stage its rollercoaster feel, with additional graphics by Yasushi Yamaguchi and stage design by *Shinobi* director Yutaka Sugano. "Certainly, it was visually exciting, though I never could shake my feeling that the gameplay had been deeper in the rotating bonus stage in the first *Sonic* game," Mark confesses. The reward for beating all of the special stages was much more memorable – with all seven Chaos Emeralds and 50 rings, Sonic could transform into Super Sonic. This golden version of our hero gained permanent super speed and invincibility, but lost one ring per second.

Sonic 2 also needed to be bigger than its predecessor. Thankfully, in this regard, the team was given a big boost as it was allowed to use an eight-megabit cartridge, which was twice as large as that used in the original game. This primarily allowed for more variety – *Sonic 2* wasn't much longer than the original game, but it had more of everything, including animations,

» After the impressive loops of the first game, Sega upped the ante with corkscrew paths.

"TO BE HONEST, WE HAD GOOD TIMES, AND A LOT OF NOT SO GOOD TIMES"

Craig Stitt

» Item boxes give random items in multiplayer mode – and sometimes, even negative ones.

enemies and even music. This was once again provided by Masato Nakamura, the composer of the original game's music and the bassist for the popular Japanese band Dreams Come True. The game's music was being written at the same time as *The Swinging Star* – an album which would set the record bestselling Japanese album. You can hear this in *Sonic 2*'s ending theme and the song *Sweet Sweet Sweet*, which both use the same melody.

Compared with the original game, almost twice as many unique stage themes were featured in *Sonic 2*. These were lifted straight from the time travel plot, but shorn of context – Hill Top Zone's dinosaur enemies make a lot more sense when you learn that it was meant to take place in the ancient past, and Chemical Plant Zone definitely would have fit a future in which Robotnik had taken over the world. Casino Night Zone also came from that 'bad future' concept and was a real standout, thanks to its slot machine and pinball mechanics. "The high concept of *Sonic* is 'speed'," explains Yasuhara. "When I used spring gimmicks in *Sonic*, I noticed they were similar to pinball tables and flipper gimmicks." Similarly, the gameplay changed in Sky Chase Zone, which saw Sonic riding the wings of a biplane on the way to Robotnik's Wing Fortress. "I guess the idea of Sky Chase Zone was inspired by Hayao Miyazaki's anime movie *Future Boy Conan*," Yasuhara tells us.

With all the extra content required, the creation of *Sonic 2* naturally involved many more staff than the original game. However, due to the circumstances at Sega Technical Institute, both Japanese and American developers were involved. "The original plan had involved about a dozen members of the Tokyo game development team forming the backbone of the STI organization, but Sega headquarters fumbled the immigration process and all visas were denied," reveals Mark. "Sega had actually applied for O-1 expert visas for the team – these are for 'nationally or internationally recognised' individuals with 'a record of extraordinary achievement.' So Naka-san would (and did later) qualify for one of these, but not the 23-year old artist they wanted to send over. Sega was actually blacklisted by the American embassy in Tokyo for a while after this!"

» The popular half-pipe special stage has been frequently reused throughout the *Sonic* series.

As a result, the studio was primarily staffed by American developers prior to *Sonic 2*. "While that was fine for the projects such as *Dick Tracy* or *Kid Chameleon*, it created challenges when trying to create a game that needed to hit the quality level of *Sonic 2*," says Mark. "This was made worse by language issues and cultural issues. The Japanese and American staff could barely talk to each other, and though I was hoping a mentor/mentee relationship would develop between the more senior Japanese members and junior American members, it never happened."

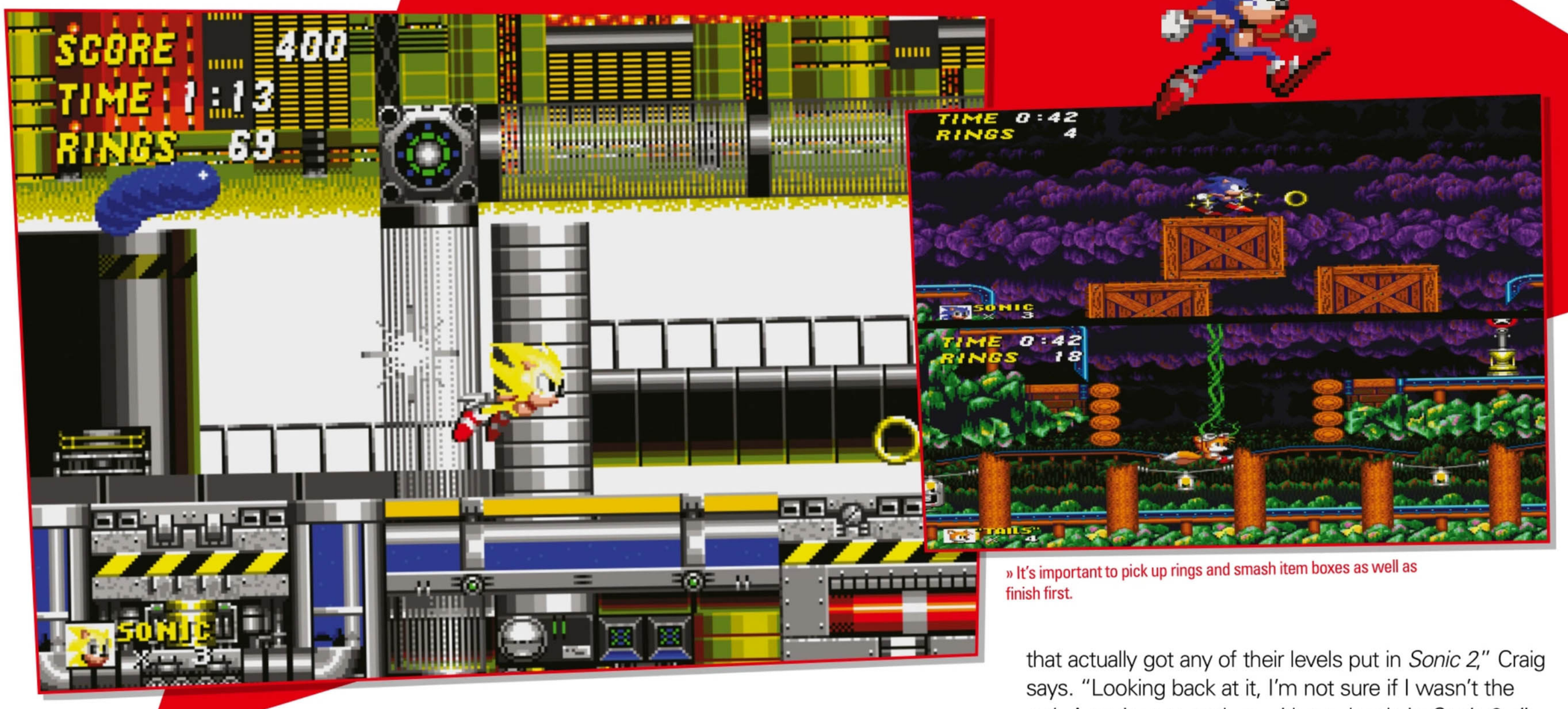
"To be honest, we had good times, and a lot of not so good times. I don't think there was a lot of 'learning' going on for the most part," says Craig of the mixed team. "Yasuhara was an easy person to work with and I never felt he looked down on the Americans on the team. Yamaguchi was also easy to work with. On the other hand, Naka was an arrogant pain in the ass. He had no interest in working with any of the Americans."

"I remember that the most difficult issue was unification of art style," says Yasuhara. "Lead artist Yasushi Yamaguchi tried to check all of his teammates' art styles of stages and enemies at the same time, while drawing his own stages, enemy designs and animations. The original team member Jina Ishiwatari also came to help his work, but Yasushi still didn't have enough time to sleep." This is an issue that Craig also recalls. "There were a *lot* of problems meshing the art from the American artists with Yamaguchi's," the artist confirms. "Not only was Yamaguchi's art incredible, he was a machine. He worked incredible hours ▶

DID YOU KNOW?

Sonic 2's cheat codes refer to dates – the level select is Yuji Naka's birthday and the debug mode is Sonic 2's birthday.

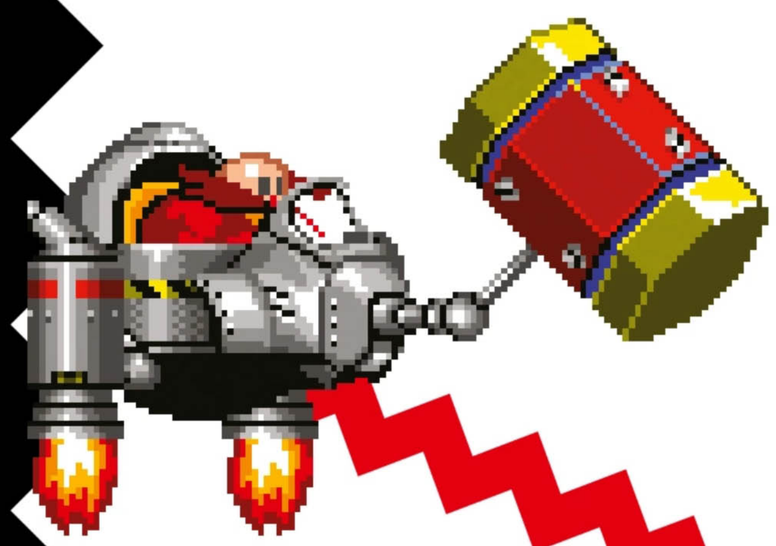
SONIC THE HEDGEHOG 2



» It's important to pick up rings and smash item boxes as well as finish first.

"I REMEMBER A LOT OF ANGRY ARTISTS FINDING OUT THEIR LEVELS HAD BEEN CUT"

Craig Stitt



and reworked and perfected his levels over and over again. I think the one that went to through the most changes (that I remember) was Chemical Plant Zone. I would come in one day and it would be beautiful… then come in the next day and it would be completely different and even more beautiful."

Craig's work wasn't immune to this problem. "Besides the infamous Hidden Palace Zone, I also did Oil Ocean Zone," he explains. "With Oil Ocean, if I remember right, Yamaguchi came in and redid the distant background. That kind of hurt, but I couldn't argue because I didn't like what I had come up with." This problem also reared its head with Craig's other stage. "The same is true with Hidden Palace. The foreground art is still some of my favourite, and I think fits in the *Sonic* universe beautifully, but the background… I *hate* and was never happy with. I was hoping Yamaguchi would be able to rework it as well, but that never happened." Despite being one of the first stages implemented in *Sonic 2*, Hidden Palace Zone was ultimately dropped due to time constraints.

In fact, that's one of the most notable things about *Sonic 2* – despite the short development time, a huge amount of the content created for the game never made it in. "There was a *lot* of wasted/unused art in *Sonic 2*, more so than any other game I've worked on… at least for any game that actually shipped," Craig recalls. "I remember a lot of angry artists finding out their levels had been cut. I was among those when I found out Hidden Palace had been cut… well, sort of cut." As it turns out, the brunt of the cuts were made to the work of the American staff. "I was one of the lucky American artists that actually got any of their levels put in *Sonic 2*," Craig says. "Looking back at it, I'm not sure if I wasn't the *only* American to end up with any levels in *Sonic 2*…"

Part of the problem, according to Yasuhara, was that there simply wasn't enough time to implement everything in the game in the nine month development period. "At the development time, we didn't have enough time to sleep. I just dived and lived in the *Sonic 2* world," explains the game designer. "I did choose some new gimmick ideas to drop off, but the underlying reason was always because development time was short." Were there any ideas that he was sad to lose? "All of them," he responds. "If I can, I'd like to make my original version of *Sonic 2*."

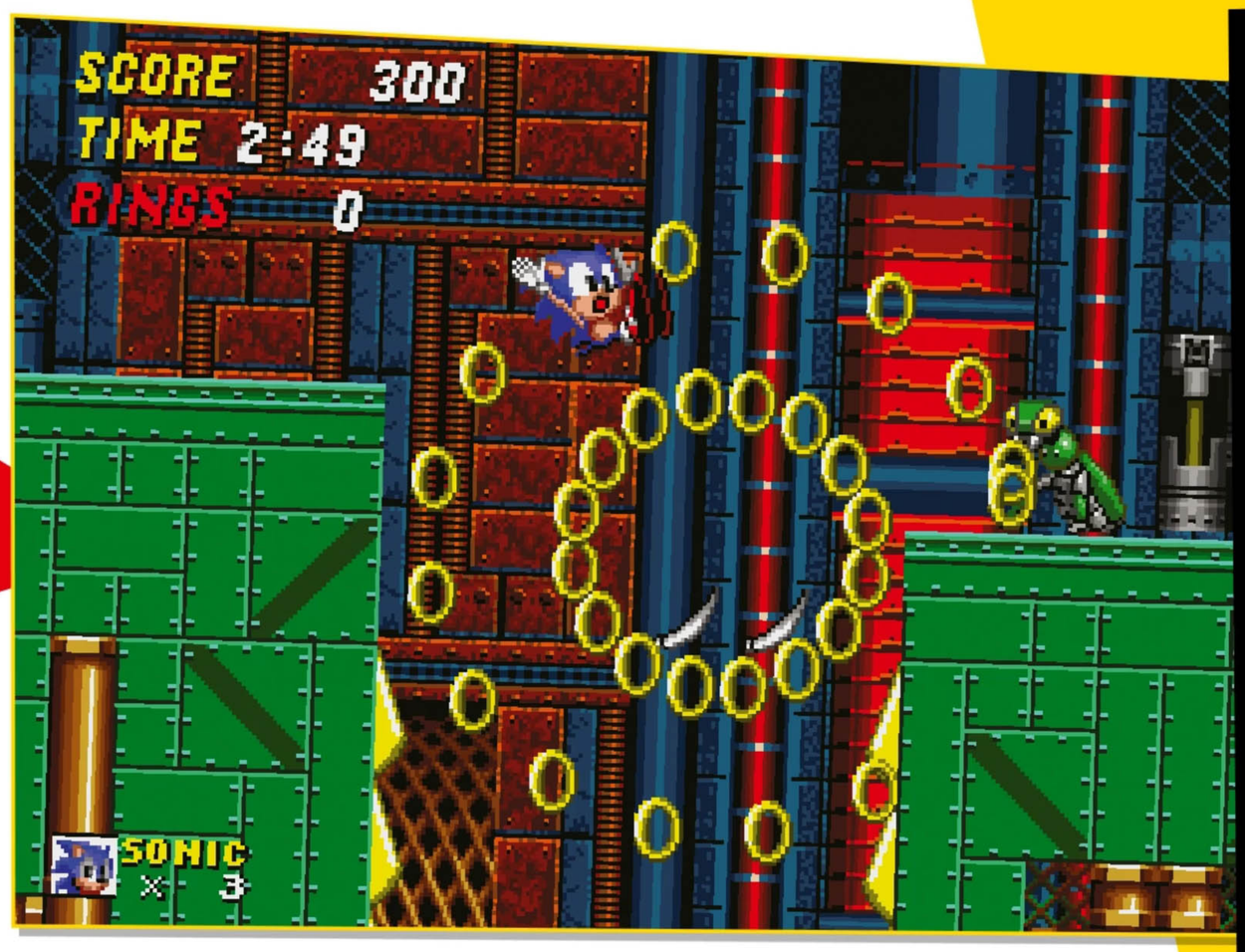
Development continued at a frantic pace right up until the deadline, with bugs being squashed left and right, presentational polish being added and difficulty being adjusted. *Sonic 2* only actually became playable from start to finish within the last 48 hours before the first retail-ready build of the game, and even that build had enough problems that it was only used for the earliest cartridges, with a revised ROM built a few days later.

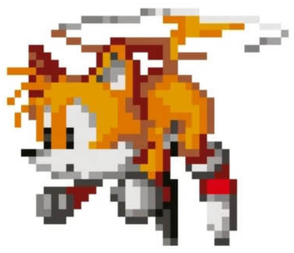
Sega made a major event of *Sonic 2*'s release. The hype machine had started up early in 1992 with a few mocked-up screens based on the existing art assets. In the summer, a special prototype version had been sent to Nickelodeon to feature on the show *Nick Arcade*, where *Clarissa Explains It All* star Melissa Joan Hart memorably struggled to get to grips with the game. All sorts of promotional items were sent to retailers, including dry-erase boards to count down to the release date and T-shirts to give away as preorder gifts. A holographic cartridge label was even considered, but ultimately scrapped due to cost.

However, the biggest deal was the near-simultaneous worldwide release of the game – a true rarity in that era. It was a massive undertaking, with air freight required to get the game to all retailers on time. Even this was celebrated – Sega Of America produced stickers commemorating "The Great *Sonic 2* Shipment" with Emery Worldwide, while 50 Sonics greeted the three chartered planes carrying copies of the game at Heathrow Airport. Japan received the game on 21 November 1992, while North America

DID YOU KNOW?

Due to misplaced rings, it's impossible to get a Perfect Bonus in the second acts of Aquatic Ruin Zone, Casino Night Zone, Mystic Cave Zone, Oil Ocean Zone and Metropolis Zone.

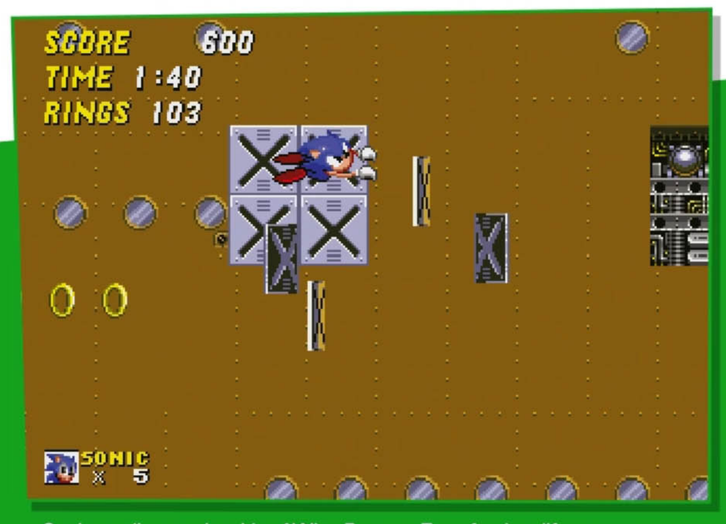




and Europe received it on 24 November 1992 – a date Sega referred to as "Sonic 2sday," and one conveniently placed just in time for Thanksgiving and the run up to Christmas.

When it came time for review, *Sonic 2* dazzled the critics. *Sega Power*'s 89% score was the low end of the consensus, with Dean Mortlock commenting that, "*Sonic 2* is effectively how the first *Sonic* should have been done." *Sega Zone* awarded the game 92% and *Mega Drive Advanced Gaming* gave 93%. *Mega, Sega Pro* and *CVG* all landed on 94%, with *CVG*'s Paul Anglin commenting that, "The levels are absolutely massive, with so much to do and so much to find that you'll bust a gut trying!" *MegaTech* went one per cent higher with 95% and *Mean Machines Sega* one point higher still with 96%. At the top, *Sega Force*'s reviewers gave *Sonic 2* an astonishing 97%, with reviewer Chris Knight saying that the game had "the kind of graphics and totally addictive gameplay most developers would kill for".

GamesMaster was the only major critical outlier – in fact, its 65% score for the game is the most memorable aspect of the magazine's first issue. The main bone of contention was the game's difficulty. "I managed to complete all the levels in one evening – using just one continue," commented writer Andy Lowe. "The first was dead easy to complete and so is this. There's just no challenge involved in *Sonic 2*, so it becomes a bore and a real let down," added Les Ellis. Other critics were split on the issue. In *Mean Machines Sega*, Julian Rignall assessed the game as being, "Much, much tougher than the original. There's no way even *Sonic* experts could call this easy!" Contrasting this view was *CVG*'s Tim Boone, ▶



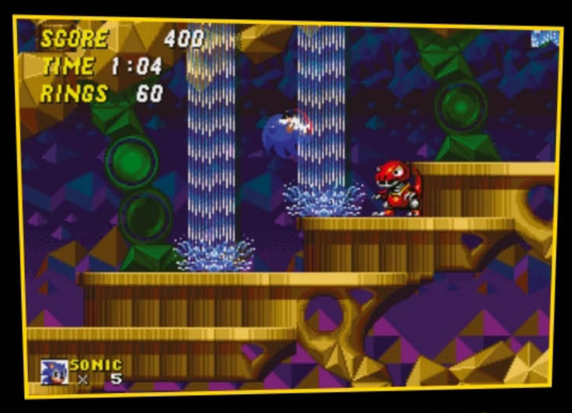
» Our hero clings to the side of Wing Fortress Zone for dear life as parts peel off in the high winds.

RAIDERS OF THE LOST ART

Sonic 2 generated a legendary amount of unused stages, enemies and animations – here's a selection

HIDDEN PALACE ZONE

■ This area was meant to play a pivotal role in the original plot, and was one of the first stages added to the game. Nothing was added to the in-game version after the summer of 1992.



WOOD ZONE

■ As far as we can tell, this dense forest stage didn't make it too far before being scrapped – it only features in one prototype build, featuring no enemies and slightly broken collision.

CASINO NIGHT ZONE

■ The pinball-style stage originally sported a drastically different look, based around neon colours and card suits. It would ultimately be completely redrawn.

SPEED BUMP

■ In the earliest leaked build of *Sonic 2*, the blue hedgehog would actually be hurt if he stumbled into it at high speed! Imagine if that made it into the final game...

TITLE SCREEN

■ The original title screen for *Sonic 2* was similar to that of the first game, featuring the first stage's scrolling background. This title logo did appear in the 8-bit versions of *Sonic 2*.

OTHER SPRITES

■ Lots of enemies and items also went unused...

SONIC THE HEDGEHOG 2

TAILS, YOU WIN

We examine Sonic's foxy friend and his own star turns

Designed by Yasushi Yamaguchi as the companion that *Sonic 2*'s two-player design required, Tails has become one of Sonic's most iconic friends. As the story would have it, young Miles Prower was a bit of an outcast amongst his peers due to the unique twin tails that gave him his nickname, and he started following Sonic around to become as cool as his self-assured hero. This was something Sonic came to accept, even when Tails followed him into battle against Robotnik.

In the 25 years since his debut, Tails has become known as the clever and rational gadget expert amongst Sonic's friends. His most famous ability is flight, achieved by spinning his tails around at high speed in helicopter fashion. However, while this ability is shown in *Sonic 2* when Tails tries to catch up to Sonic, a player-controlled version of this trait wasn't introduced until later *Sonic* games.

Despite being a bit of a pest (particularly when he'd lose your rings in the Special Stage), Tails became one of Sonic's best-loved companions, remaining present even during a recent push to de-emphasise Sonic's ever-expanding entourage. What's more, he's starred in more spin-off games than any other *Sonic* character.

TAILS AND THE MUSIC MAKER

SEGA PICO

■ The sidekick's first starring role was in an edutainment game for Sega's oft-forgotten kids' console. Children should be able to learn about basic musical concepts and instruments, with some light platforming and pinball action thrown in to keep things on-theme.

TAILS' SKY PATROL

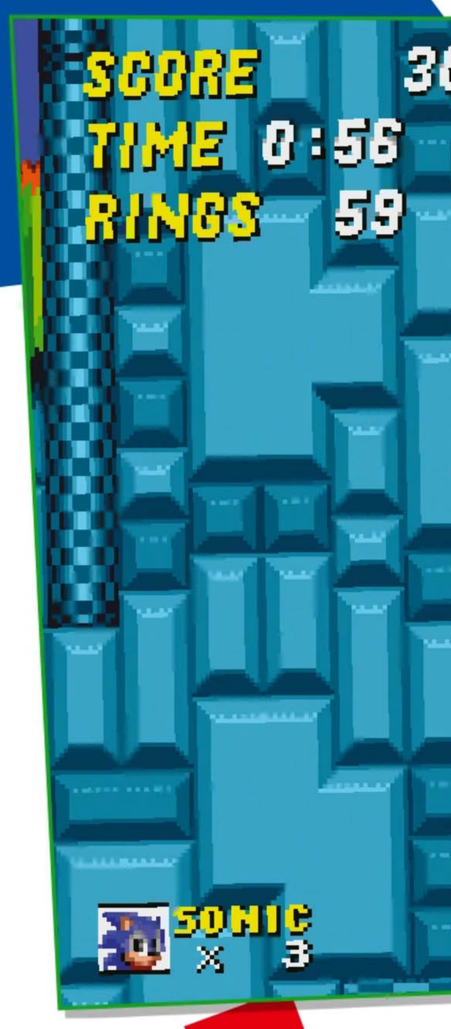
GAME GEAR

■ Originally exclusive to Japan, this shoot-'em-up has since appeared on many compilations. Tails must defeat the evil Witchcart, who turns her foes into crystals with magic. Don't let the cutesy graphics fool you – this is a game which will have you tearing your hair out in frustration.

TAILS ADVENTURES

GAME GEAR

■ This platform game is easily the best effort in Tails' solo career. Trading speed for smarts, the game has a heavier puzzle emphasis than Sonic's platform games. Tails has to use bombs to attack, and a variety of gadgets are required to complete stages and defeat the Battle Kukku army.



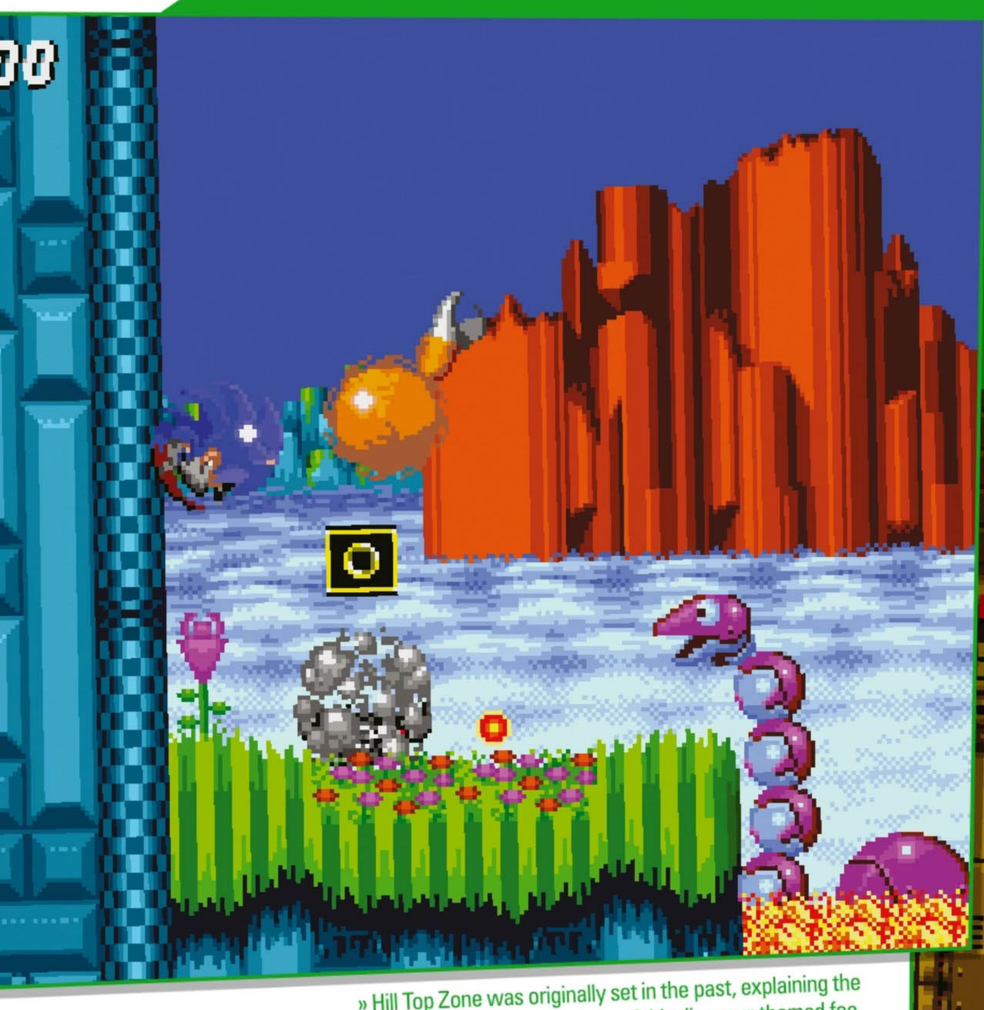
"I HAD THE FEELING THAT SONIC IN THE SCREEN WAS REAL DURING DEVELOPMENT"

Hirokazu Yasuhara

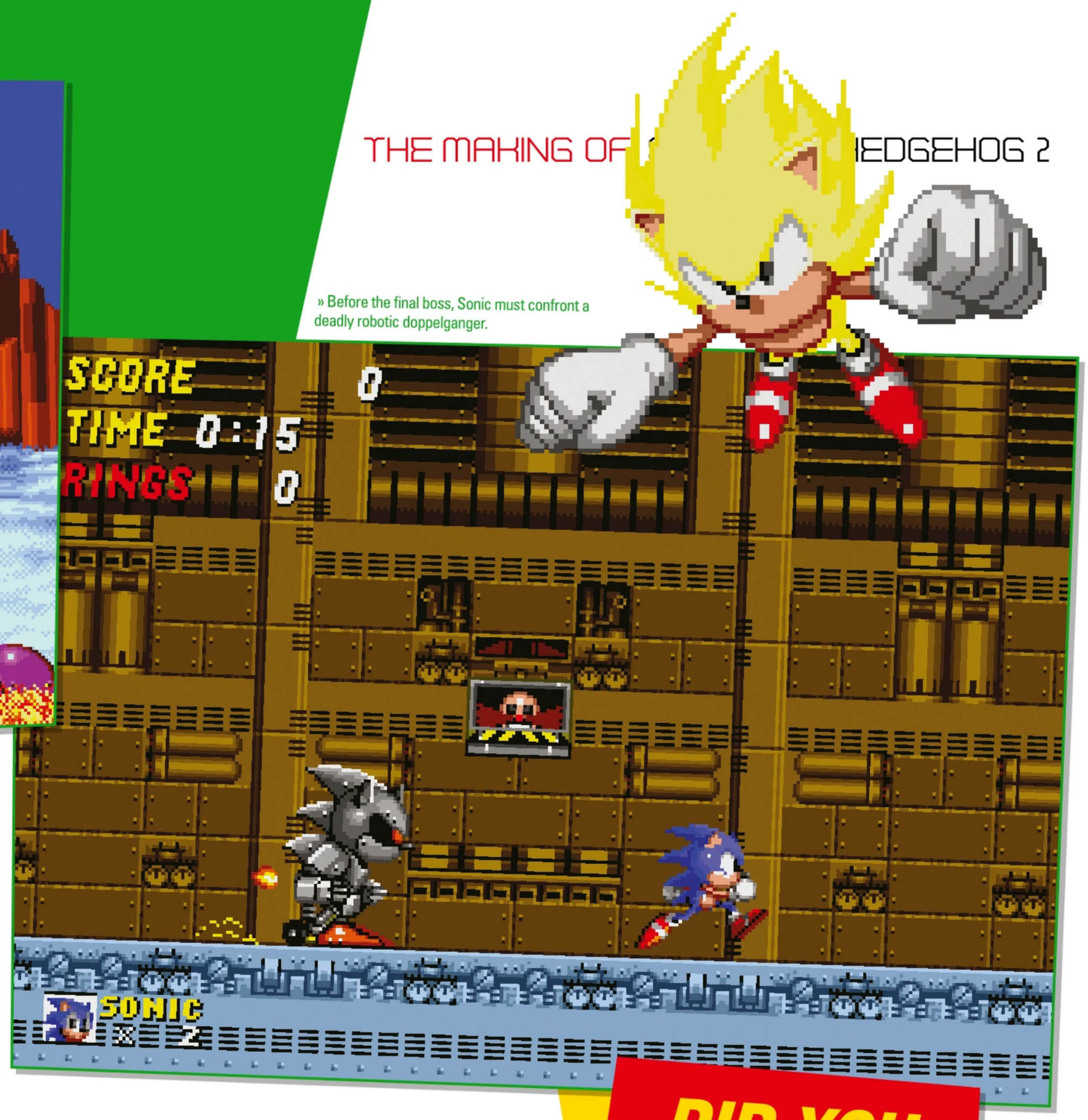
▶ who felt that only limited improvement had been made stating, "Initially it's not that much harder than the first game, but things do improve on later stages." In *Mega*, Neil West felt, "*Sonic*'s only Achilles heel is the lack of real challenge."

Concerns over the game's difficulty didn't stop players from rushing out to buy *Sonic 2*. Over 6 million copies of the game were sold, putting it behind only the original game as the second-best selling Mega Drive game of all time. A sequel soon went into production, but the unique mix of Japanese and American staff would definitely not be repeated. "While I felt, as a whole, we had worked well together (and I may be biased because my art made it into the game), it was clear that Naka did *not* feel the same way," explains Craig. "At one point I was told that for *Sonic 3* I would be the senior artist (you can imagine how excited I was at the prospect of that!). But Naka said that he refused to do *Sonic 3* unless he had an entirely Japanese team. Not only that, he wanted a separate set of offices for 'his' team with their own keycards so no one else at Sega Technical Institute

» In Sky Chase Zone, Sonic and Tails track Robotnik's heavily defended airship in a tiny biplane.



» Hill Top Zone was originally set in the past, explaining the presence of this dinosaur-themed foe.



» Before the final boss, Sonic must confront a deadly robotic doppelganger.

could come into their office." Craig and the other American staff would instead go on to work on the spin-off *Sonic Spinball*.

Mark had already moved on from Sega by that point, but had also caught wind of the split between Japanese and American staff at Sega Technical Institute. "Ultimately, of course, it was my responsibility to foster these relationships, and I really regret that I didn't devote more time and attention to bridging the cultural divide," he laments. For Yasuhara, who stayed on to work on *Sonic 3*, it was a good idea executed in the wrong environment. "I think trying to establish a multicultural team was meaningful, but it should not be done for a project with a very tight schedule," explains the designer, who would ultimately stay in the USA for the majority of his career.

Despite the discord, there's no denying what the team accomplished. *Sonic 2* was a huge sales success and is considered a true classic. When **Retro Gamer** readers voted on the top 150 games of all time in 2015, it reached 14th place, higher than any other game in the Sonic series. With that in mind, we asked the staff why they thought *Sonic 2* surpassed the original.

"Certainly, that's flattering to hear, but I don't have much of an explanation," says Mark, who isn't actually so sure that the sequel was better. "With *Crash Bandicoot*, or even *Uncharted*, the sequels were definitely better than the first titles. You could call it 'growing pains' – the first games had many missteps, and much was learned that could be applied to the sequels. But *Sonic The Hedgehog* wasn't like that, it was simply magical. I remember the first time I played *Sonic*, it was fresh and fun and beautiful. I think my favourite moment was the rising water sequence, it was a near-perfect blend of technology, art and animation. So I guess my opinion differs. Still, *Sonic 2* was a very nice game and I'm grateful to have been able to be part of its creation."

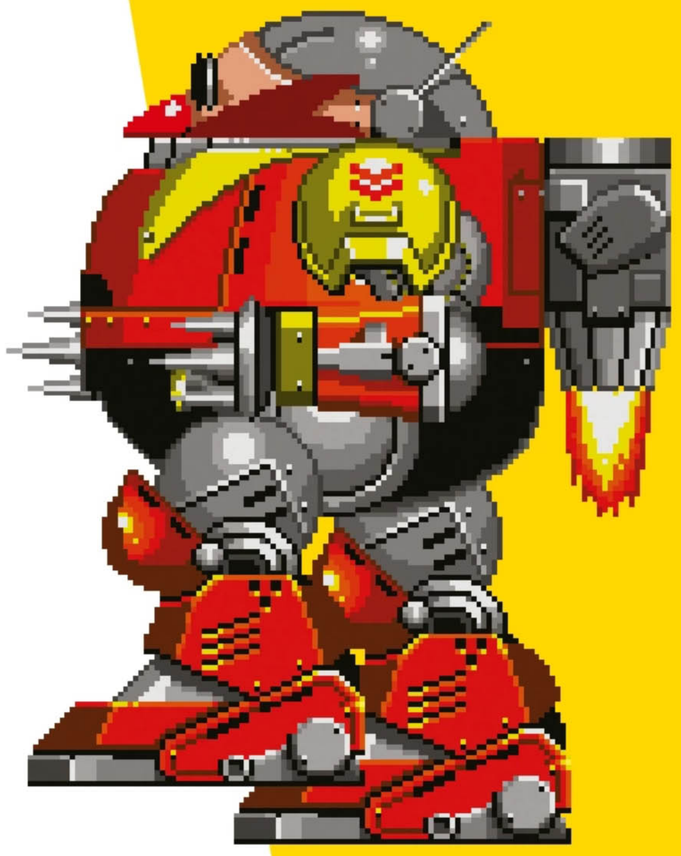
» Tails suffers a setback as Sonic speeds ahead in the two-player racing mode.

For Craig, it comes down to how the pressures of game development limit first-time developments, something he would later experience with his own platform game hero. "I've found with many games, the second game is better than the first," explains the artist. "Kind of regardless of how good the first game is, the second is a little (or a lot) better. I believe the reason for this is because the second game is actually the game the developers *wanted* to make the first time, but didn't have time or the technology. I found this to be true with *Spyro The Dragon*. Most of the cool things in *Spyro 2* we wanted to have in the original *Spyro The Dragon* but ran out of time (like Spyro being able to swim)," he continues. "Little things get added in the second game that really add a lot to the gameplay (like Sonic's spin-dash) and the look of the game is finally solidified."

But for Yasuhara, the ongoing popularity of the game brings to mind a surreal experience during development. "I had sometimes gotten the feeling that Sonic in the screen was living and real during game development. I had felt I needed to give him more stages and more gimmicks so as not to make him bored. Maybe it was the lack of sleep, but then again I think sometimes such a sort of calling comes when the character has 'magic' unintentionally," the designer recalls. "I think Sonic himself felt happy playing with you, and that's why you chose *Sonic 2* even after so many years." And maybe it's a bit sentimental of us, but we think back to the children we were when we first played *Sonic 2*, that's how we felt too. *

DID YOU KNOW?

The first hints of Dr Robotnik's original Japanese name 'Eggman' were seen here, as his name is painted on the side of the Wing Fortress.



INSIDE THE CHAOS ENGINE

WHAT DOES IT TAKE TO MAKE A 16-BIT SHOOT-'EM-UP EXCEPTIONAL? A DASH OF STYLE, A PINCH OF STEAMPUNK INSPIRATION AND SOME SLOW-COOKED AI ROUTINES. NICK THORPE SPEAKS TO MIKE MONTGOMERY AND MORE ABOUT THE THINKING GAMER'S SHOOT-'EM-UP

CHAOS ENGINEERS

OUR INDOMITABLE INTERVIEWEES

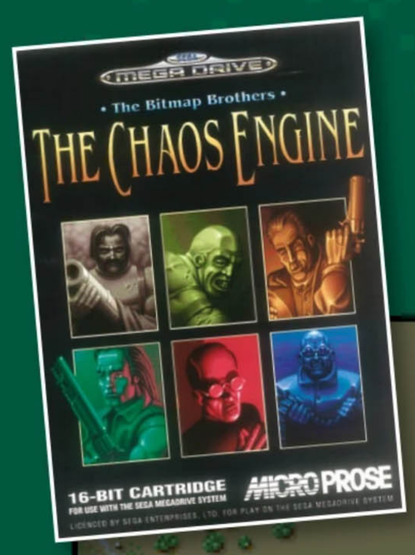
MIKE MONTGOMERY
Cofounder, The Bitmap Brothers

DAN MALONE
Artist, The Bitmap Brothers

ANDY NUTTALL
Staff Writer, Amiga Format

IN THE KNOW

- **PUBLISHER:** RENEGADE SOFTWARE
- **DEVELOPER:** THE BITMAP BROTHERS
- **RELEASED:** 1993
- **PLATFORM:** VARIOUS
- **GENRE:** RUN-AND-GUN



It's funny to think how language changes and evolves. When *The Chaos Engine* was released 25 years ago, the term 'steampunk' had yet to permeate the public consciousness – rather than conjuring images of people in top hats and goggles operating machinery festooned with brass valves and analogue gauges, it was more likely to draw a blank stare. But *The Chaos Engine* is most definitely a steampunk game.

The plot is simple: Baron Fortesque has been experimenting with early computers, but also time and space, and has created a machine known as the Chaos Engine. It quickly becomes self-aware and, as self-aware machines tend to do, turned on its creator. Suddenly Victorian England is beset by bizarre happenings – both man and beast are mutated into ravenous monstrosities, and even the landscape itself has

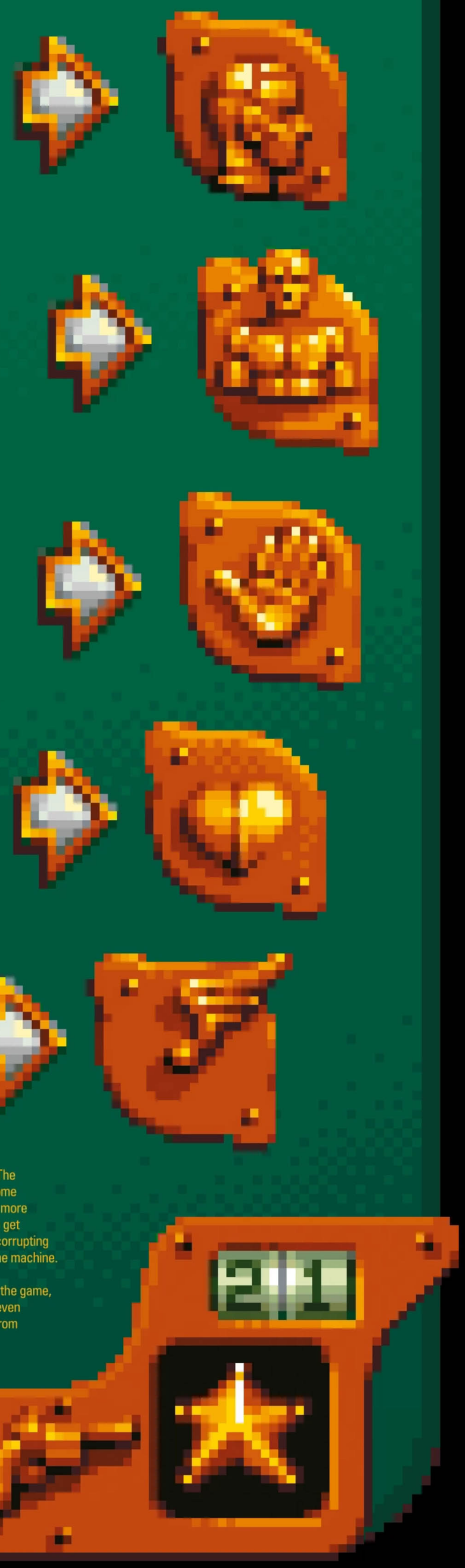
» You'll frequently get ambushed by monsters when important events happen, including node activations and key grabs.

become warped. With no other good options available, a team of mercenaries is hired to go in and take the machine down by force.

The public got its first look at *The Chaos Engine* in magazine previews as far back as late 1991, and a rare glimpse of the game in action was afforded to viewers of *GamesMaster* early in 1992. "You could see from their early demos that it was going to be a classic," says Andy Nuttall, who reviewed the game for *Amiga Format* back in 1993. "Magic Pockets hadn't long been out, so they were at the top of their game. It was that tingly feeling that you got when you knew the history of a top game developer and knew what they were capable of, and then you start to see that magic working on a new game."

The top-down shooter was already very recognisable, even at an early stage. Obviously taking influences from the likes of *Commando* – "Did it?" Mike Montgomery, managing director of the Bitmap Brothers, cuts us off. Apparently, the conclusion drawn by many contemporary magazines was not quite on the money. "To be quite honest, the game that influenced us the most was probably *Gauntlet*." This makes sense – the labyrinthine levels and emphasis on co-operative play seen in *The Chaos Engine* are definitely qualities you'd associate with Atari Games' arcade hit. "Everything is influenced by something, subconsciously or consciously, but I think it was more subconscious – this was the designers getting together and saying, 'This is what we would want to play,'" Mike elaborates.

"THE GAME THAT INFLUENCED US THE MOST WAS PROBABLY GAUNTLET"
Mike Montgomery



» Above left: The enemies become progressively more bizarre as you get closer to the corrupting influence of the machine.

» Left: Late in the game, enemies will even ambush you from upper levels.

SOLDIERS OF FORTUNE

GET TO KNOW THE SIX HIRED GUNS THAT REPRESENT HUMANITY'S ONLY HOPE OF STOPPING BARON FORTESQUE'S CREATION

GENTLEMAN

SPECIAL ITEM: **MAP**

■ If you're playing solo, the Gentleman may be the ideal choice of partner. He's more intelligent than most of the other characters, and more durable than the Preacher. He also carries a map as a special item, making him invaluable in later stages.

NAVVIE

SPECIAL WEAPON: **DYNAMITE**

■ The Navvie is a bit sluggish but tough as old boots, packing serious firepower and a good chunk of health. Dynamite is a hell of a special weapon too, destroying every enemy on screen in one massive explosion. He's not too quick on the uptake though, so he's not an ideal CPU player.

BRIGAND

SPECIAL WEAPON: **SHOT BURST**

■ This is not the type of chap you would ordinarily want to trust, but his balanced stats make him a great choice for new players. He's reasonably fast and can take a few hits, and the useful shot burst special power allows him to fire a one-off ring of bullets in all directions.

▶ It's astonishing how much of the final game's quality was evident so far from release, but *The Chaos Engine* had already been in development for over half a year by this point. The Forest and Workshops graphics looked pretty much complete, and the level layouts were already complex and interesting (though decidedly different from their final incarnations, with far more items). Enemy sprites and player characters are all easy to identify as being close to final, if not final, and there was even an early version of the equipment screen in there. For any fan of the developer, the game caught the eye. "Dan Malone is a master of that style; I loved what he and the others had done with the sort of stippled relief to make everything look metallic," says Andy. "Plenty of games used a similar trick, but the Bitmaps' stuff just had that look – you knew instantly who had made the game."

What couldn't be gleaned from those early previews was the game's amazing soundtrack. The techno tracks set the pace of the action with pounding beats and had a dynamic element, as new sections would kick in at various points – for example, near the end of a stage. "I remember the audio as a whole being really strong; Richard Joseph was a genius," says Andy. "The sound and speech effects were fantastic, really suited to the game and helped build the strong atmosphere." Indeed, the voice that would declare "Node activated!" and "Special power!" is as iconic a part of the game as any.

However, the game's most memorable audio was composed outside of the Bitmap Brothers camp. Joi, an alternative dance act comprised of brothers Farook and Haroon Shamsher, composed the theme that accompanies the intro sequence. It's an unforgettable track, opening with a siren and other industrial noises set against drum beats, and one that took advantage

» It's hard to tell, but we're playing with the CPU's assistance here. It covers us well as we take out the upper-left enemy.

THUG

SPECIAL WEAPON: **MOLOTOV COCKTAIL**

■ Here's a book you can judge by its cover – the Thug is as dumb as a sack of hammers, twice as ugly and three times as hard. He's not quick but he's got high health and his weaponry packs a punch – in particular, his special is great for carving a path through massed mutants.

MERCENARY

SPECIAL WEAPON: **BOMB**

■ This guy is the professional of the bunch, and he has suitably balanced stats to match. He's not outstanding in any specific area but proves reasonably good in all of them, and his eight-way blasting bombs can be thrown down to lower levels from above for an advantage.

PREACHER/SCIENTIST

SPECIAL ITEM: **FIRST AID KIT**

■ This guy is clearly meant for a supporting role – his high intelligence will help to carry less-experienced players, and the first-aid kit will keep him alive longer than that limited life bar might suggest. Just don't blame us when he runs in and nicks all the good power-ups.

"WE GAVE THEM ALL DIFFERENT ATTRIBUTES, SIMILAR TO WHAT YOU'D DO IN AN RPG"

Mike Montgomery

of the Amiga. Of course, such a collaboration was not unusual for the Bitmap Brothers, given its previous work with licensed music on *Xenon 2*.

But what was astonishing about those early previews was that three characters were on screen at all times, compared to two in the final game. At this point in the design, even with two human players, the presence of a computer-controlled partner was a constant. It was ultimately dropped, but the fact that it was even considered showed how much faith the Bitmap Brothers had in *The Chaos Engine*'s major distinguishing point – its artificial intelligence. If you weren't playing with a second player, you'd have a CPU-controlled partner to fill that role.

Each of the six controllable characters didn't just play differently in your hands – they behaved differently when controlled by the computer. "The thing with the characters was that we gave them all different attributes, similar to what you'd do in an RPG," says Mike. "It was very important that for each character, that people knew that they were different. Otherwise, what was the ▶

» Some levels have multiple exits. As a rule, the harder the exit is to access, the better a position you'll start in on the next stage.

Q&A: DAN MALONE

THE BITMAP BROTHERS ARTIST RECALLS HIS EXPERIENCE OF WORKING ON THE CHAOS ENGINE

How long did *The Chaos Engine* take to develop?

Me and Phil Wilcock started talking about it when we were still doing *Speedball 2*, so maybe a couple of months before actual production started, and we were just sketching out ideas, characters and look – basically just doing it freestyle, really. When it started coming together and went into development in earnest, I'd say it was six months while I was doing *Speedball*, I was doing both games, and for about a year and a half after? I can't remember to be honest, but it was quite a long project. It was two years, basically.

We'd guessed that – based on the early previews we have seen, it was looking advanced as early as late 1991.

Yeah. We were going to do it three-player, and once that was abandoned the game tightened up, because we had a clear target then. The tile sets for each level, they're pretty much my favourite tile sets that I've ever done – they are squeezing every single pixel possible. And then there was map building and I'd talk to Simon Knight, who was doing the layout for the levels – he'd give me the layout and I'd... tweak it slightly, so that I could get all the features in. It was a pretty efficient process, but there was a lot of work.

It sounds like you had a lot of freedom over the look of *The Chaos Engine*?

Oh yes, complete freedom. I'd been reading this story in *2000AD*, I can't remember what it was called but it was steampunk, if you like. There was a lot of talk, Phil was reading *The Difference Engine* and books like that, and the name '*Chaos Engine*' just popped up like that. Yeah, we had a lot of freedom really – it was the last enjoyable game I worked on that got released!

» Dan's artwork squeezes a lot out of the Amiga's memory - the detail on the rocky ledges is quite extraordinary.

How did you come up with the designs for the six characters – in fact, was it even always just six characters?

There were about 12 characters originally – there was a female character, a guy with a fencing mask on and a shotgun, there were other characters. But when you're getting down to it, you need to get the game done, so we took it down to six and committed to two-player, and it worked. The inspiration for the characters, I wanted them to feel exotically old. The Navvie for instance, he's a railroad worker – he's a great character because he's really heavy with the unions, and the industrial revolution. He's one of my favourites because, 'What the hell's a Navvie?' – well, he works on the railroads, would've been in the Crimean War, that kind of thing. So I really wanted to have that Victorian feeling, that feeling that it's another time.

***The Chaos Engine* is unusual for a game of this type in that it only has one boss encounter, with the Chaos Engine itself. What inspired the design of that imposing enemy?**

I only had a few tiles left that we could use, so it was nowhere near what I wanted, but we'd run out! I just put together what I had left and took a few tiles out of the sewer background so I could use them for the end, but you look at it and apart from his head in the middle animating, there's not a lot going on. We were scraping the barrel by that point! We just couldn't get that kind of big boss encounter into the game – it would have been nice to, though.

▶ point of having characters?" These attributes would ultimately determine how closely each character would follow the 'ideal' line of play – and in fact, a lot of work was put in to ensure that the CPU didn't just do all the work for the player.

"What we actually did was we played it as a two-player game, and then we spent a lot of time analysing what the players were actually doing in real life, and then tried out hardest to code that in," says Mike Montgomery, the managing director of the Bitmap Brothers. "What we'd do is we'd actually have two computer players in testing, and people would just watch it and make sure it was working, and then just keep tweaking it until it was right." This was one of the tasks that would ultimately serve to prolong the development of the game, but the effort was worth it – AI characters behave convincingly, providing cover fire when you need it and pushing forward often, occasionally blundering into traps just like we do.

Andy's memories of the AI centre on one of its more amusingly traits.

"I remember the CPU stealing all my stuff! In two-player I expect to have to fight for collectibles, but in one-player to break open a stash of loot or have a monster drop stuff, to then have the Amiga nip in before me and pick it all up," he recalls. That wasn't the only impact the AI had on his experience. "The enemies felt really good, like they were deliberately avoiding your fire but still possible to kill with a few quickly developed tactics," he remembers. "I don't know how 'intelligent' they were; they were hyped as intelligent so I was expecting them to be, and they certainly felt advanced."

Useful AI partners were important, though, as *The Chaos Engine* wasn't a simple run-and-

» Things really start to heat up in Fortesque Mansion. The carnage rarely lets up, even when you have puzzles to solve.

gun affair. The levels were mazes, hiding many secrets and often multiple exits. Anything you did had consequences, from altering the stage layout to triggering a monster ambush. Making progress was as much about smart decision making as it was twitch reactions, and the game even de-emphasised traditional genre staples – for example, the game only features one traditional boss fight. "I think we were trying to break the mould slightly," says Mike. "Most other games had end of level bosses, but that's not what *The Chaos Engine*'s about, really."

The Chaos Engine finally arrived on the Amiga in early 1993, and the press heaped accolades on it. At the lower end of the scale, *CU Amiga* gave it 81% with the assessment that it was "by no means the best that the genre has to offer, but it's a frantic blast all the same." *Amiga Action* awarded the game 92%, commenting that, "It's obvious that the Bitmap Brothers' sole intention is to get back up on the award-winners' ▶

BATTLEGROUNDS

THE FOUR STAGES YOU'LL FIGHT YOUR WAY THROUGH IN ORDER TO REACH THE CHAOS ENGINE ITSELF

FOREST

■ The grounds surrounding Baron Fortesque's mansion had previously been well-kept ornamental gardens. Ever since he unleashed his crazy contraption, everything has been turned upside down – the forests have become a maze, boiling rivers of mud have appeared, and everything is out to get you. Mutants emerge from the trees to shoot at you, gigantic frogs leap into your path, and indescribable organic constructs shoot matter at you in a mortar-style fashion. Frankly, you don't want to be around when it lands – it hurts a lot, and we haven't even accounted for side-effects.

WORKSHOPS

■ Just look at the windows here – the lights are definitely on, but we have no idea who's home. We shouldn't spend time worrying about that though, as the things that aren't hiding from us are incredibly dangerous. Hulking ogres patrol the alleyways in this area, and they're just the start of your troubles. You'll also have to contend with steam vents, sentient oil blobs, dangerous gun turrets and weaponised whirlwinds. If you somehow manage to survive all of that, there are some lovely legless Cyclopean mutants wandering about – they're quick and possess deadly shots.

MANSION

■ At some point during this stage, you'll find yourself saying, 'I could have sworn I've been here before,' and you'll be absolutely right – not every path leads forward. We can't say whether this was the doing of the Chaos Engine or just the Baron's own attempt to stop anyone from coming too close to his work. However, we can say for sure that those gigantic disembodied hands are a mark of the machine, as are the hulking giants that like to hurl projectiles from above. Oh, and then there are the clones of your characters that will happily shoot you on sight.

CELLARS

■ The lair of the machine is buried deep beneath the mansion – and what do machines like to protect themselves with? A pat on the back for anyone who guessed 'more machines', as this place features robots that can jump down from above you, mini tanks and far more. If you can make it to the final stage, you'll come face to face with the Chaos Engine itself – a nightmarish construct that seems to have absorbed its own creator in its own madness.

CONVERSION CAPERS

THE CHAOS ENGINE SPREAD ITS MALIGN INFLUENCE ACROSS MULTIPLE PLATFORMS – WHICH ONE FARED BEST?

AMIGA 1993

■ The original release, and the one against which all subsequent versions are measured. Chief advantages over rival platforms include the quality of the pounding background music and the excellent intro theme. Some players also prefer this version's muted colour palette – it wasn't used often for conversions.

MEGA DRIVE 1993

■ The Mega Drive version offers a taller field of vision and puts specials on a second button, but colour contrast is higher due to a more restrictive palette, and the soundtrack is downgraded. Get the PAL version – it runs at the correct speed and is the only version of the game to offer adjustable difficulty.

ATARI ST 1993

■ This doesn't match the Amiga version, chiefly due to technical limitations – inferior scrolling, fewer colours and the absence of music and sampled speech. Still, it's hard to argue that ST owners were short-changed, as this is still one of the most accomplished blasters available for the format.

SNES 1993

■ The SNES version offers a narrower field of vision than the Mega Drive version, but does a much better job of replicating the Amiga soundtrack. As with the Mega Drive version, the game benefits from having specials mapped to their own button, and the NTSC release runs faster than the Amiga game.

AMIGA (AGA) 1993

■ The improvements available to owners of advanced Amigas, such as the 1200, are so modest as to be tough to spot. Better colour handling allowed for a more appealing palette to be applied to the otherwise identical sprite work. All subsequent versions would use this look as a basis.

AMIGA CD32 1993

■ Owners of Commodore's console get a version of *The Chaos Engine* that is almost a direct port of the AGA version. The difference is the intro – instead of the original tune and gigantic dinosaur, we instead get an animation with voice acting, showing the creation of the game's titular monstrosity.

MOBILE 2005

■ Despite some major musical alterations, this is a surprisingly smooth version of the game. Unlike the other versions the display is vertical, and some notable level design changes have been made for reasons we can't fathom. If it didn't have to be played with a phone keypad, it'd be pretty nice.

PC 1993

■ The PC version plays well and introduces a floating HUD which allows players to see more of the screen during play. That's great and all, but the music here – particularly the brilliant intro – has been majorly compromised and sounds like it should have been utilised in a circus instead.

RISC OS 2000

■ This rare version arrived rather late in the day, having been shelved by the original publisher due to poor game sales on Acorn's machines. It offers visuals and sound on par with the Amiga 500, with the exception of a greater vertical resolution that allows you to see more of the stage in a single screen.

PC 2013

■ This is the excellent AGA Amiga version, but with some subtle enhancements – full 360-degree movement, online leaderboards and online co-operative play. There are also some optional graphical filters, smoothing and a bloom effect, which can be turned on if you like that sort of thing.

▶ podium." *The One* gave the game 85%, Andy Nuttall's review in *Amiga Format* gave the game 90%, and Stuart Campbell gave it 89% in *Amiga Power* – a score remarkable enough that publisher Renegade took out an advert in *Computer Trade Weekly* declaring the game "So good, even that b*st*rd Stuart Campbell likes it!"

Did Mike and the rest of the team expect such a positive reception? "Of course we did. We were the Bitmap Brothers," he responds without hesitation. The game was then converted across a variety of computer and console formats, coming out well in every case. The game was retitled *Soldiers Of Fortune* in North America, where the Preacher was also retooled into the Scientist. A sequel soon went into production, but found a smaller audience due to the decline of the Amiga market. Still, the game remains in demand, with the 2013 PC rerelease being the most convenient way to play today.

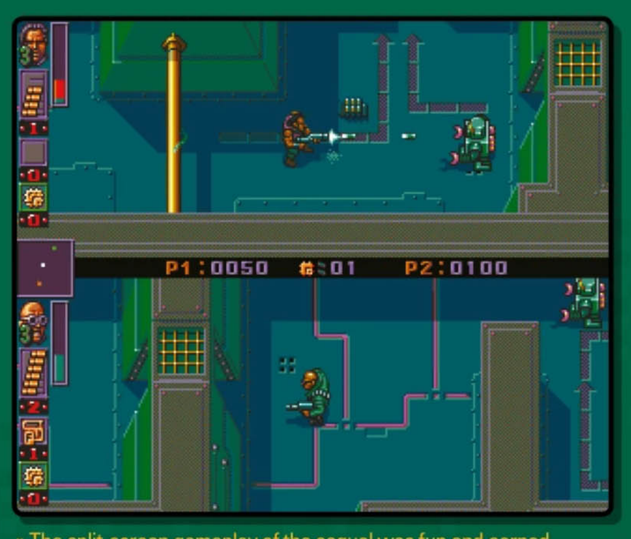
Revisiting *The Chaos Engine* reveals that it's hard as nails, but still a lot of fun. Andy recently took the time to do so himself, and came to a similar conclusion. "A while ago my son and I were talking about two player co-op and head-to-head games, and I talked to him about *Spy Vs Spy* and *The Chaos Engine*/*The Chaos Engine 2*. I found them all in the loft, and we had a fun few hours revisiting them. They really stand up today, we had a lot of fun," he confirms. Of course, there's a painful twist that many gamer parents will be familiar with: "Unfortunately he's already a lot better at games than I am, but it's still great sharing the nostalgia with him and he digs it."

It's unlikely that we'll ever see *The Chaos Engine* and its crew back in action, but that's something which feels surprisingly okay. We'll always treasure the memories we made playing this game, whether the partnership was between an AI Brigand and a lonely Navvie player, or a father and son arguing over who gets to pick up the food. When we feel like creating new ones, the original game is just as good as ever. ★

THE DIFFERENT ENGINE

THE STORY DOESN'T STOP WITH THE CHAOS ENGINE – BARON FORTESQUE SURVIVED. DAN MALONE AND MIKE MONTGOMERY SHARE THEIR MEMORIES OF THE CHAOS ENGINE 2...

At the end of *The Chaos Engine*, you destroy the titular mechanical menace and everything is presumably okay. But in fact, you end up caught in a time singularity, along with Baron Fortesque. Disaster! He can get you back to Victorian England, but you're going to have to follow his instructions – and even then, only one of you can go back with him. As a result, the Brigand, Gentleman, Navvie and Mercenary must do battle, performing the Baron's tasks while sabotaging one another in order to ensure that you're the one that gets to go home.



» The split-screen gameplay of the sequel was fun and earned critical acclaim, but fans were left divided by it.

"It was *Spy Vs Spy* that influenced that, to an extent," says Mike. "We wanted to make it different. We really didn't want it to be a sequel just for a sequel. We could have probably called it something different as well." Despite being a major departure from the original formula, it makes sense – after creating a convincing artificial intelligence partner, repurposing it as a challenging opponent is a smart move.

"We had strong ideas at the end of *The Chaos Engine* which were essentially discarded, which is the way of these things," says Dan Malone. "The time travel thing – nah, I wasn't into that. Although I enjoyed doing the different flavours for each level – Aztec, Japanese, all that kind of thing, and I liked the extra moves that we did. But the whole game didn't have the pulse and the kinetic energy of the original *Chaos Engine*. I'd love to reboot it actually, a *Chaos 1.5* or something. I wanted to take them to the New World – the Civil War, play with things like that – but it would start in Victorian England. But you're limited with what you can do."

When *The Chaos Engine 2* finally arrived in late 1996, the game was reviewed well by the few Amiga magazines that remained in publication. *Amiga Computing*, by this point incorporating *Amiga Action*, gave it 92%, and *CU Amiga* gave it 90%. *Amiga Format* gave it 85%, noting that it was best in two-player mode. "I really liked *The Chaos Engine 2* with its split-screen and head-to-head mode, and I'm sorry that my magazine (*The One*) shut down before we could get to review it," says Andy Nuttall. "I think it too is a bit of a classic." However, the game has a lower user rating than the original on popular Amiga games sites.

» *The Chaos Engine 2* gives different objectives before each stage, adding some variety over the first game's missions.

Unlike the original, *The Chaos Engine 2* was never ported to other platforms. "To be quite honest, it shouldn't have come out on anything," Mike states bluntly. "Well, that's not quite true. The biggest problem is that we should have canned it earlier. The Amiga market was dead by the time that it came out. The sales were pitiful. We're a commercial company to an extent, and we should have made the commercial decision to either can it or move it to another platform. It cost us a lot of money."

Was there no option to port the finished Amiga game across to those other formats, to try to recoup the loss? "The publishers weren't interested because the Amiga version didn't do anything – but of course the Amiga version didn't do anything, because the Amiga was dead anyway," The result was that *The Chaos Engine 2* would be the last outing for these characters, as the Bitmap Brothers moved on to other projects.

"I think it was pretty good, and if it had been on a different format it might have sold well. I know how little it sold, and I'm not telling you, but considering how little it sold you'd be surprised by how many people know about it," says Mike. That's what he ultimately takes comfort in, despite the commercial disappointment. "People liked it, people found it interesting. It sold very little, but it's not forgotten."

THE MAKING OF

DAYTONA USA

IT MIGHT BE THE BEST ARCADE RACER EVER, AND ALL IT TOOK WAS A PARTNERSHIP WITH A MILITARY SIMULATION COMPANY, A USA RESEARCH TRIP AND THE LEGENDARY AM2 TEAM. SEGA'S CREW REVEALS HOW DAYTONA USA BECAME THE KING OF SPEED...

DAYTONA USA'S PIT CREW

The developers that helped Daytona rule the circuit

TOSHIHIRO NAGOSHI

Director and coproducer, *Daytona USA*

MAKOTO OSAKI

Game Planner, *Daytona USA*

DAICHI KATAGIRI

Programmer, *Daytona USA*

TAKENOBU MITSUYOSHI

Composer and vocalist, *Daytona USA*

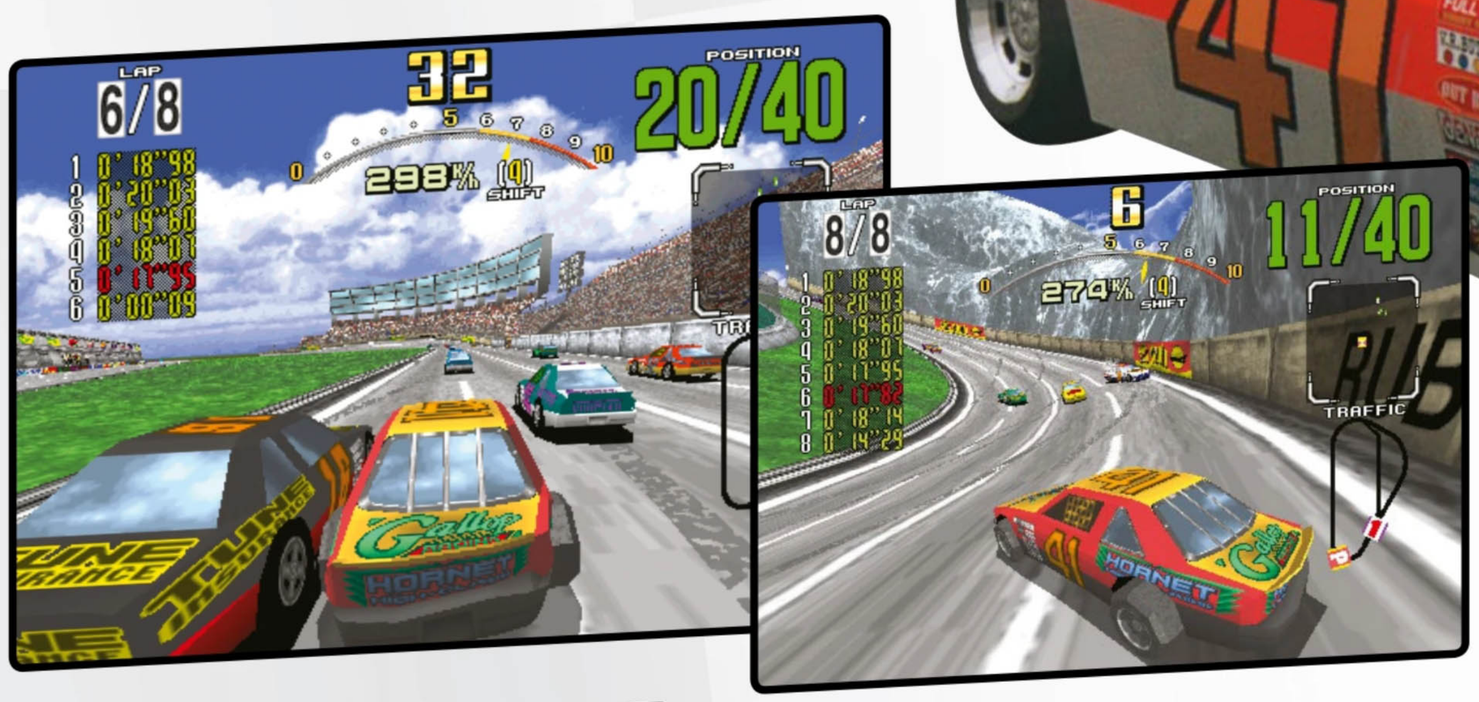
PATRICK MICHAEL

Director, *Daytona Championship USA*

There aren't many game developers that have come to be specifically associated with common natural phenomena, but when you talk about Sega people tend to bring up blue skies. From the Green Hill Zone to *OutRun*'s Coconut Beach, many of the best Sega games seem to take place in a colourful eternal summer, where a car crash will only upset your partner a little and environmental destruction can be undone by a heroic hedgehog. *Daytona USA* fits right into that happy little world, and it doesn't just feature blue skies, it even has a song about them. The result is a game that doesn't just stand alongside the likes of *Turbo, OutRun, Super Monaco GP* and *Sega Rally* as part of a proud arcade racing heritage, but which perhaps defines it.

Daytona USA was the product of an arcade arms race. Companies were competing to have the most impressive hardware, and racing games seemed to be the chosen area of combat. Namco's *Winning Run* and Atari's *Hard Drivin'* had kicked the genre into 3D in the late Eighties, and Sega's *Virtua Racing* had set new standards for speed and detail in 1992, but the company was already looking at developing a successor to the Model 1 technology that powered that game. To do this, it entered a partnership with the American military simulator developer GE Aerospace, which was subsequently bought by Martin Marietta. ▷

DAYTONA USA



» Using manual transmission allows for higher speeds and more nuanced control of the vehicle while drifting.

"I REMEMBER IT BEING QUITE A NEW EXPERIENCE FOR ME"

Toshihiro Nagoshi

▶ One of the people involved in developing this new technology was Toshihiro Nagoshi, director and producer of *Daytona USA*. Although he worked on the software side of development, his presence was important due to Sega's design philosophy. "Sega as a company traditionally developed the hardware and software parallel," he explains. "Pushing hardware development forward alone would sometimes overlook the functions necessary for software development. There was also the risk of adding unnecessary functions. To avoid such situations, it's quite efficient to develop both the hardware and the software that would be running on it, at the same time." It was Nagoshi's involvement in this process that provided the concept for *Daytona USA*.

"When I went to the US to have a meeting about the Model 2 system board, I happened to get the tickets for a [NASCAR] race," remembers Nagoshi. "That was the first time I ever watched such a race, as in Japan, car racing typically meant Formula 1 for the vast majority of people. I remember it being quite a new experience for me." Nagoshi returned to Japan determined to create a stock car racing game – and not only did he get that wish, he led development as the director of the game and one of two producers (the other being Yu Suzuki). "It was a huge responsibility for me, but at the same time, this was a game implementing the new technology for the first time, and being able to create such a game as a leader is not a chance that comes by often," Nagoshi explains. "I tried my best to have as much fun as I could. But of course, in reality it was not that easy, and I often found myself stuck in thought."

In order to get the project off on the right foot, Nagoshi undertook plenty of research. "I consumed as many videos and books about NASCAR as I could get my hands on. However, despite the extensive research, it was difficult to convey the excitement and fascination of NASCAR racing to the staff in Japan at the time." One such member of the team who found himself confronted with an unfamiliar racing discipline was game planner Makoto Osaki. "I was not familiar at all with stock car racing," he confesses. "At the time Formula 1 was the motorsport trend in Japan, which I knew much more about." However, he took the job extremely seriously. "I bought a sports car," he responds when asked about the research he did for the game. "I also watched the movie *Days Of Thunder* more than 100 times!" We're not quite sure which action shows more dedication to the cause.

Programmer Daichi Katagiri wasn't hard to get on board. "I was very much interested in motorsports,

RACING DYNASTY

Daytona USA has been revisited frequently over the last 25 years

DAYTONA USA

SATURN/PC, 1995

■ The first major home conversion of the game is somewhat notorious for its poor framerate, letterboxed presentation and short draw distance. Despite these graphical deficiencies, the game plays authentically and boasts a proper CD rendition of the arcade soundtrack, as well as a Saturn/PC mode with additional cars.

DAYTONA USA CHAMPIONSHIP CIRCUIT EDITION

SATURN, 1996

■ This update fixes the graphical problems of the previous version, and adds new cars and tracks. However, the music has been remixed and most of the vocals have been removed, and the handling has been noticeably changed from the arcade game.

DAYTONA USA CIRCUIT EDITION

SATURN, 1997

■ For the Japanese market, *Daytona Championship Circuit Edition* was further revised. Handling was brought closer in line with the arcade game, graphical performance was improved further and the original music was added as an option alongside the remixed music.

DAYTONA USA DELUXE

PC, 1997

■ Based on the *Championship Circuit Edition*, this PC conversion is designed to run at a higher resolution than the Saturn game it was based on. It also boasts the return of the original Hornet and an additional track, Silver Ocean Causeway, which is found only in this version of the game.

DAYTONA USA 2

ARCADE, 1998

■ This is the only *Daytona USA* sequel to feature 100 per cent new content. The game features a choice of three cars and three new brand-new tracks to get to grips with – an oval inside a dome, a theme park and a city. The music has a harder rock feel, with Dennis St James and Takenobu Mitsuyoshi providing vocals.

IN THE KNOW

» PUBLISHER:
SEGA

» DEVELOPER:
AM2

» RELEASED:
1993

» PLATFORM:
ARCADE

» GENRE:
RACING

» Eagle-eyed *Sonic* fans would be able to spot a cameo in one of the tracks.

enough to buy a sports car myself. I used to follow Indy car racing, stock car racing, and Formula 1. I also played many racing games as well," he explains. His preparation for the game was similarly intensive. "I actually drove a car in real life and experienced its behaviour. I also played a whole lot of racing games, enough to become number one in Japan for lap times. I became avidly interested in anything car related, and made sure to experience what was fun about it."

Development was a relatively smooth process technically, as Katagiri recalls. "There was some work involved in setting up the development environment, but compared to modern GPUs, the graphic rendering was mostly handled by the Model 2 hardware itself, so the new technology did not lead to more work for software development," the programmer explains. "What did take time though was the new expressive method of texture mapping, and much trial and error was done to find what approach is the most effective and what visual expression is required within the hardware limitations."

While the struggles with texture mapping were imposed by technological progress, another major challenge was one imposed by the sport itself – a large number of racers. At its busiest, the CPU controls 39 of the 40 racers on the beginner track. "This was realised through various lines of trial and error, while monitoring performance loads for each. We prepared patterns where all cars were fully controlled, and also having CPU auto-drive from sampling," explains Katagiri. By carefully identifying areas where players wouldn't notice compromises, the AM2 team was able to save on CPU load. "We also prepared multiple collisions from light grinding to full-on grinding, and achieved precise grinding detection as long as the processing load could be afforded, and had the lighter processing load for grinding among the cars in far distance," Katagiri says. "Collision adjustment was difficult to implement, due to heavy processing load when many cars raced closer."

Things likely wouldn't have gone so well had it not been for the experience that much of the team had gained while creating *Virtua Racing*. "There were many references to *Virtua Racing* during development. I had created the camera controls as well as the basis of the pit crew movement using human shaped CG from live monitoring," explains Katagiri. "I also had a lot of experience regarding game balance with Yu Suzuki, when adjusting CPU drivers. This experience was invaluable when balancing the 40 cars racing in the beginner circuit." Nagoshi also found that he was

» Sometimes, your biggest problem is CPU racers crowding out the racing line. Get out of the way!

DAYTONA USA 2: POWER EDITION

ARCADE, 1998

■ The updated version of *Daytona USA 2* makes the beginner track a more traditional race course, and offers a special race that allows for all three tracks to be raced one after another in one sitting. The original Hornet also returns as an extra car, with its original handling model intact.

DAYTONA USA 2001

DREAMCAST, 2001

■ This game pretty much ignores *Daytona USA 2* and builds on the previous home versions of the original game, with vastly upgraded graphics and all of the *Daytona CCE* tracks plus three new ones. The handling is somewhat twitchy, but can be adjusted in the North American and European versions of the game.

SEGA RACING CLASSIC

ARCADE, 2009

■ This is a re-release of the original *Daytona USA*, with a new modern cabinet and 720p display. However, Sega couldn't use the *Daytona* branding (or vocals) as the race track had an existing agreement with arcade manufacturer GlobalVR, and the link option was cut down to four players.

DAYTONA USA

XBOX 360/PS3, 2011

■ This is basically the same emulation of the original as used in *Sega Racing Classic*, but with all the *Daytona* branding reinstated. Online races support up to eight players, and the game benefits from the addition of survival and karaoke modes. For arcade authenticity, no other home version comes closer.

DAYTONA CHAMPIONSHIP USA

ARCADE, 2017

■ The latest game in the series brings a big graphical upgrade to the original three tracks, and offers graphically overhauled mirror mode versions of each. Additionally, there's a new championship mode in which you progress through circuits with top-three finishes.

DAYTONA USA

THREE SEVEN SPEEDWAY

BEGINNER
8 LAPS

SONIC WALL

» Dinosaur Canyon's Brachio Curve is a great place to gain speed and practice slipstreaming.

BILLIARDS CRASH

■ Initiate a drift as you pass the signboard on the right. From an entry speed of 324km/h, you can maintain a speed of 290km/h through the turn. Gotta go fast!

MAIN STAND

■ This shallow corner is easy – stay low on the inside and adjust out towards the centre of the road as you exit the turn. The main danger here is traffic.

MILLION SLOT ARCH

PIT LANE

■ You can cut across this by keeping to the extreme right of the lane, or by deliberately bumping into the advertising boards on the left.

ROYAL STRAIGHT

TARGET LAP TIME
00'18"00

ROULETTE CURVE

■ While Sega's old tactics video suggests drifting through this corner, we prefer to start from the outside and hit the apex normally. You've got just enough handling capacity to make it!

able to draw on his experience with the previous game. "It was invaluable for me to have the experience of the basics of 3DCG video expression, such as the approach to camera and lighting."

As we mentioned earlier, *Daytona USA* was born of an arcade technology race, and Namco was preparing its own breakthrough racing game – *Ridge Racer*. Like *Daytona USA*, it used texture mapping to reach new heights of 3D realism. A rivalry was inevitable, and it wasn't just something puffed up by the press. "Since *Ridge Racer* was also a racing game using texture mapped polygon, I of course had it marked as a rival," admits Osaki. "I remember going to a playtest to play *Ridge Racer*," says racing game fanatic Katagiri. "I felt it was a really speedy and cool racing game, but the direction we were going for was different, so it did not pressure me in terms of the technological aspect. But I do remember feeling that I did not want to lose in the expressive methods of the game."

We were always being compared. I still think *Ridge Racer* was a great game," Nagoshi agrees. "However, the direction the two games aimed for was completely different. *Ridge Racer* had its fascination as more of simulator. *Daytona* was going for funky entertainment. That is why both games still have fans today." Though the games are quite different, they did share a number of features, and one of those was the implementation of drifting, allowing you to slide around corners. "Initially, the cars didn't drift in the game," remembers Nagoshi. "If you think about it, if you were drifting in an actual NASCAR race, you are on a clear path to death! But as soon as the decision was made in the direction that the game will not be a simulator, but a powerful and happy driving game, I thought drifting would be the necessary addition to the game."

"The difficult part was how to implement the 'trigger' for the car to start drifting," recalls Osaki. "If a car is

» The chicane here often catches people out, but a good drift right will see you through.

"THERE WERE MANY HEATED DISCUSSIONS WITHIN THE TEAM"

Toshihiro Nagoshi

created to drift naturally, then the stability in the straights would become compromised, making the game too difficult to play. So, we aimed for car controls that allowed quick lane changes, and player intended controls when entering a drift. In the final release, players triggered drifting in 'Manual Transmission' mode by shifting from fourth down to second."

Patrick Michael directed 2017's *Daytona Championship USA*, the latest arcade iteration of the series, and spent a great deal of time observing the original game and its players. "We knew that the handling should not be touched," he asserts. "It can be driven in so many ways depending on your skill, all of which are rewarding. Only a player who is willing to invest time in it will discover all of its subtle nuances. Perfectly timed shifting is the secret to the best times and it has become such an obsession that there are now extensive guides online to the exact timing of changes and drifts and the perfect racing line to take." Getting it right is tricky, but mastering the skill leads to some exhilarating moments. "The joy of dropping down two gears and sliding around a corner or in the case of Seaside Street Galaxy spinning 360 on a corner and recovering to power down the straight was amazing."

Though *Daytona USA* would only feature a trio of tracks and one car with automatic and manual transmission, many hours were spent perfecting each aspect of the game. "We experienced various hardships during development, but when something was not going well (which usually meant that driving the car was not fun), it would always come down to, 'Should we change the cars handling?' Should we adjust the shape of the circuit?'" Nagoshi recalls. "There were many heated discussions within the team."

One of these discussions was about what sorts of tracks needed to be included in the game.

DAYTON-AAA-AAA-AAA

Composer and vocalist, Takenobu Mitsuyoshi, explains how he created the sound of Daytona USA

Were you familiar with stock car racing before working on *Daytona USA*?

I did not even know the word 'motorsports'. I learned things about stock cars and how popular it is after we started the development of this project.

Vocal tracks were unusual in racing games in the early Nineties – why did you choose to use these?

I remember we were particularly aware of the racing game *Ridge Racer* from Namco which was released earlier than our project.

The music in *Ridge Racer* featured high-quality sound, and its genre was techno music, ideal for a racing game, which was quite a new approach. It made us think of a different approach in sound entertainment. I sang the songs myself because that was the fastest way to get the demo music in the game. So, as you know, now you hear it in the arcade machines around the world singing *Let's Go Away* in my voice.

What were your inspirations for the lyrics in *Daytona USA*'s songs?

I quoted the words that naturally came from the melody and phrase. With *Let's Go Away*, I reflected the image of a goal to be aimed for and dashing through it. As for *Sky High*, there was a clear and high blue sky that was meant to be flown in. The English lyrics were checked and cleared by a native English speaker.

On the Model 2 hardware, songs were constructed from a series of samples rather than played as a single audio file. How did you work around this limitation?

I split the vocal track by its time axis, and assigned them to keys of a keyboard. I think I was able to create the variation by changing play sequence and loop points.

How much reference material did you have when composing songs for *Daytona*?

At the time I had my own desk in the development team and I was in an environment where I could have the instruments for composition and the ability to load the composed music to the system board. I was able to observe the game being developed every day, so I played the sound effects and music out of the machine in development every day and every hour.

Do you have a favourite song from *Daytona USA*?

Aside from the three songs for each race track

» We've pretty much been blaring out *Let's Go Away* on repeat for the entire duration of this issue's work time.

in *Daytona USA*, there is one secret track called *Pounding Pavement* in the game. This track is the only one without an exclusive song track, and the music in the three main songs were recomposed to create a new one.

This development of creating songs using sampled material had been finalized in this song, where I had been able to create something new within the 'limitation', and use such limits as a new expression. As my methodology had been realised here, this song for me is especially meaningful.

Daytona USA is still popular with gamers and can still be found in arcades now. Why do you think the game has so many fans today?

I think the reason is the chosen subject of the game as it was something popular in the US and other countries. In this popular theme, there was elements of 'battle against other players', which is possible only in the videogame. All elements, including graphics and sounds, were focused on an engaging virtual experience, so that is one of the reasons why this game is not just a straight recreation of stock car racing.

Added to which, I would be happy if the repeated English phrases sound from the machine, which was a product of being able to take advantage of hardware limitations, is part of what makes the game memorable to fans.

» *Daytona USA*'s vocal tracks are iconic to the point that home versions often include karaoke modes.

DAYTONA USA

DINOSAUR CANYON

ADVANCED
4 LAPS

PLESIOSAUR'S HEAD

■ This section as you come out of the tunnel is tricky. At an entry speed of 334km/h, initiate a drift to the right at the middle of the left turn and blast onto Tricera Road at 320km/h.

PTERA POWER STATION

■ At an entry speed of 320km/h, start your drift as you pass the second right turn sign. You can get through at 290km/h, and stick to the right as you exit the turn.

TYRANNO TUNNEL

TRICERA ROAD

STEGO SLOPE

■ Stay on the right as you enter the curve – just before the bend, you'll see tyre tracks heading left, which is where you should start your drift. Drop to 270km/h to make it around safely.

TARGET LAP TIME
00'48"00
(0'55"00 ON FIRST LAP)

BRACHIO CURVE

■ This is a nice gentle curve where the big danger is your fellow racers. Stay on the inside and get ready to turn left and enter the tunnel once you pass the checkpoint.

BRONTOSAUR'S TAIL

LAKE ARCHETON

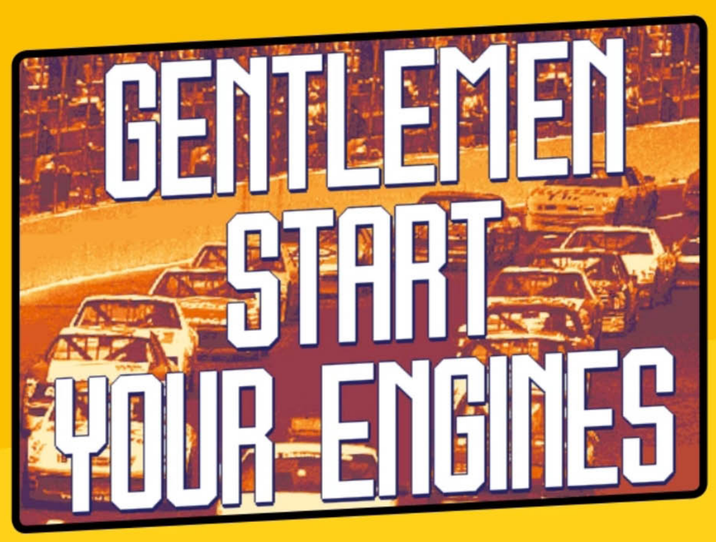
THE RUINS OF JURA

THE FOSSIL OF DRAGON

■ Enter from the left, and drift as you reach the tyre tracks going right. At an entry speed of 315km/h, you should be able to maintain 280-290km/h through the apex.

CHICANERY

Daytona USA has a few cheats and Easter Eggs, even in the arcade – here's how to find them...



MUSIC SELECT

■ Hold one of the VR buttons on the 'Gentlemen, Start Your Engines' screen to pick a song. The fourth button (furthest to the right) will play the secret song Pounding Pavement.

PLAY THE SLOTS

■ As you go past the slot machine in Three-Seven Speedway, you can press start to stop the reels. If you can line up a trio of lucky sevens, you'll get seven extra seconds on your timer.

LOSE YOUR SPONSORS

■ If you drive the wrong way up the pit lane in Dinosaur Canyon, you'll enter a small tunnel area. On the wall inside is a message that tells you just how badly you've been driving.

DEVELOPER HIGHLIGHTS

HANG-ON (PICTURED)
SYSTEM: ARCADE
YEAR: 1985

VIRTUA RACING
SYSTEM: ARCADE
YEAR: 1992

OUTRUN 2
SYSTEM: ARCADE
YEAR: 2003

▷ "I thought it was imperative to include the oval circuit, the beginner track. Having NASCAR as the theme of the game, the oval was the correct choice. However, the game should not be completed as a simulator since this was about having entertainment content," explains Nagoshi. "Above all, a game, and users' needs of such are multifaceted. The oval course is simple and high-speed fun, but the game would be sold not only in the US, but in Japan and Europe as well, and users would also want circuits that necessitate the type of technical driving. We needed to have different courses while we used NASCAR as the motif."

Due to the colour palette limitation of texture mapping of that time, we separated the imagery of the course using trees and blue sky for the beginner circuit, rocky vales for the intermediate circuit, and bridges and buildings for the expert circuit," Nagoshi continues. The intermediate course, Dinosaur Canyon, took place over four mid-length laps with 20 racers and is Osaki's favourite track – "I liked the downhill section before the last turning point," he recalls. For expert players, Seaside Street Galaxy offered a 30-car race over two long laps, and included many tricky turns that required real mastery of the car's handling.

However, Osaki recalls that it was actually the beginner course that underwent the most revision. "Initially we had tried a traditional oval (like the Bristol Motor Speedway) and also made a course with the exact same dimensions as Daytona International Speedway, but this turned out to be rather repetitive in 'steering rhythm' in terms of gameplay," he explains. "Through trial and error, we eventually decided on a tri-oval layout that needed strong braking at the final turn. Also NASCAR is known for its numerous laps, so we made one lap shorter in time, so that players can turn many laps in a race." This work ultimately paid off, though. "The Beginner circuit is my favourite," says Nagoshi. "Being a combination of three curves, the circuit looks easy to make. But the curvature and banking angles were tested thousands, no, more like tens of thousands of times. I believe that in a driving game, the beginner circuit will take the most time to have the right adjustments."

> **"THE IDEA WAS TO MAKE AN EIGHT-CAR BRAWL WITH CONTACT"**
> Toshihiro Nagoshi

Daytona USA's tracks have become iconic, reappearing in almost every game to bear the brand, including *Daytona Championship USA*. What is it about these three circuits that makes them so ripe for revisiting? "I could be clichéd and say 'if it ain't broke don't fix it' but I think for me certainly it is a perfect progression of difficulty and a snapshot of timeless track design," says Patrick. "We could not think of releasing a new title without preserving these tracks for future generations of arcade players."

Another of the major factors that drew people to the game was its multiplayer capability – up to eight cabinets could be linked together, and many an arcade linked together the enormous deluxe cabinets as a showpiece. Realising that the game would attract players of all skill levels, the team adjusted gameplay accordingly. "The idea was to make an eight-car brawl with lots of contact. As a driving game, the driving ▷

» Hitting the pit lane doesn't really give you any great benefit and takes up loads of time, but it looks cool.

HIGH SCORE TUNES

■ By entering certain initials on the high score screen, you can hear hidden tunes from older Sega games. Try O.R (*OutRun*), V.F (*Virtua Fighter*) and S.H (*Space Harrier*) to start with.

POSING JEFFRY

■ While racing in Seaside Street Galaxy, stop in front of the statue of Jeffry and press start repeatedly to make him rotate. If you continue, he'll even do a handstand!

DAYTONA USA

SEASIDE STREET GALAXY

EXPERT
2 LAPS

THE STATUE OF JEFFRY

ASTEROID BELT

■ The uphill climb will limit your speed here. You only need to drop a little speed to drift past the statue of Jeffry onto Cosmos Street – from 270km/h to 255km/h should do it.

COSMOS STREET

SIRIUS SKYSCRAPER

STARRY SKY HALL

MOON LIGHTHOUSE

TARGET LAP TIME
01'50"50
(1'57"50 ON FIRST LAP)

PEGASUS PASTURE

CASSIOPEIA CITY

■ Counter-intuitively, you want to go left of the pillars in the right turn here, as it'll leave you in a better position to drift through the next turn past Starry Sky Hall.

QUASAR BENDS

TEARDROP OF MOON

■ Follow the tyre tracks into the drift again here. From an opening speed of 270km/h, you should be able to maintain 245km/h as you pass the Moon Lighthouse.

SOUTHERN CROSS ROAD

SATURN'S RING

■ This is possibly the most deceptive corner in the entire game. Keep your foot on the gas and come in from the left. Start your drift at the second left turn sign, aim for 280km/h through the bend.

STARLIGHT BRIDGE

PLANET HARBOUR

SASA

SAILING SHIP

SPACE SHUTTLE

COMET CURVE

■ Enter this one from the right and be prepared to brake hard. As soon as you reach the first sign, start drifting – you'll need to come down from 300km/h to about 200km/h to make it through.

» One wrong move in the early part of Seaside Street Galaxy will see you wiped out by a roadside pillar.

▷ of the car is of course the basis of the game, but obstructing other players and even making them crash is something that can be done only in a game. I thought these aspects of racing would be an important characteristic of *Daytona*," explains Nagoshi. "The pleasure from smart driving is important, but this could be experienced in a time attack trial, so the emphasis on the multiplayer was on how we could maximize the feeling of engagement in a continuous battle."

To be engaged in such a battle, you need players to remain clustered together to some extent – and the game was designed to ensure that this happened. "The catch up (rubber-banding) made it the perfect multiplayer experience, even the most inexperienced player still has fun," explains Patrick. "It was very subtle for its time and makes a win feel achievable for everyone. I have watched three generations of a family play *Daytona* together in an arcade in the US and despite the difference in age and ability, it was still a close fought battle." With players more inclined to think they'll win next time, the potential for repeat play is high. "In multiplayer it is still a hugely social game with eight-player setups still generating queues of people who want to play together."

When *Daytona USA* was finished, very little was left undone. When asked about what he might have liked to include that ultimately didn't make it into the game, Nagoshi doesn't have a whole lot to offer. "It is probably possible now, but maybe having a race with the actual number of cars in a NASCAR race, and real car damage from collisions that affect race performance," ventures the director and producer. "But it would still not be a simulator, it would have entertainment at the core."

» Crashes, as usual for a Sega arcade racer, are quite spectacular on the unfortunate occasions when they happen.

» Here's a nasty set of twists that can often lead to a bad crash.

Daytona USA was first location tested in August 1993 before a wider release in January 1994, and it quickly became an arcade phenomenon. It was the perfect game for its time – the graphical technology was cutting edge, the vocal soundtrack was memorable and the game design was first class. What's more, it was available in a variety of cabinet options to suit operators, meaning it popped up everywhere. Small locations picked up the standard cabinet or twin model, while operators in need of a showpiece could link up eight deluxe cabinets with additional screens for spectators.

"I think it was at a seaside arcade on the south coast," says Patrick of his first encounter with the game. "I was there for the weekend with a group of friends. I think it was the attract sequence panning across all four monitors that drew us to it. We found a four-player setup and I seem to remember we spent a lot of cash trying to master Seaside Street Galaxy." *CVG*'s reviewer Rik Skews gave the game a score of 96%, describing it as "the best arcade game I've played in years" and noting that it was "one of the few games where mindblowing graphics and sound add to the gameplay instead of trying to hide a weak product".

The game is often considered anecdotally to be one of the best-earning arcade games ever thanks to its multiplayer capability and extraordinary longevity, though figures are hard to come by. The game's success meant that a home conversion was a guarantee, and it arrived for the Saturn in April 1995. This suffered from a number of graphical issues, but still achieved scores of 8/10 from *Edge*, 5/5 from *Maximum*, 92% from *Mean Machines Sega* and 94% from *Sega Pro*. The Saturn version was ported to PC in late 1996, and was not so well received as it inherited all of the drawbacks of the source material despite arriving well over a year later.

"THE FORCE FEEDBACK OF THE WHEEL WAS THE BEST PART"

Makoto Osaki

There's a long legacy associated with *Daytona USA*, but few of its successors had the same staff behind them. *Daytona USA Championship Circuit Edition* was largely handled by the consumer software team that had produced the excellent Saturn conversion of *Sega Rally*, and *Daytona USA Deluxe* was handled by a PC team converting their work. While Nagoshi was at the helm for *Daytona USA 2001*, was codeveloped by Genki. *Daytona Championship USA* was largely developed by Chinese staff, under the supervision of Sega Amusements International. All of these games have avoided straying too far from the formula, with only *Daytona USA 2* daring to scrap the original tracks and music completely – not coincidentally, this was the game with the most members of the original team on board, with Nagoshi as producer and Osaki as director.

It's easy to understand the nerves in departing too far from the classic game, as *Daytona* still casts a very long shadow over the arcade racing genre. "I must say it was a very frightening prospect to revisit such a classic," admits Patrick, whose nerves came despite work on other major Sega franchises such as *Sega Rally* and *Sonic & Sega All-Stars Racing*. "The remit was first and foremost do not change the perfect recipe." It's an interesting phrase – the perfect recipe. *Daytona USA* has remained popular over the last 25 years, frequently popping up in lists of the greatest games, and it can still be found in arcades today, so it's no wonder that Sega has repeatedly remade and reissued the game. But what is it that gives the game such staying power? "It's very hard to quantify. Part of it is the nostalgia, certainly for the older players but there are so many factors that make it such an amazing game," says Patrick. "It is an incredible multiplayer experience but the depth of the handling model still makes the single-player leaderboard a target for all us obsessives. But it is the magic of Mitsuyoshi-san's soundtrack that binds it all together."

What does the original Japanese team think? "I assume it's because of the passion toward the theme of the stock car racing which both users and developers keep in their hearts," says Katagiri. "I am very grateful to everybody involved in getting this game available to play." For Osaki, everything comes down to the arcade experience. "I think it's because the multiplayer racing was fun, and especially the force feedback of the steering wheel was the best part in this game," explains the planner. "The NASCAR racing of bumping into other cars to get ahead matched the system. This feeling from force feedback can only be experienced in arcades, so I think that way the game is still fun to play today."

But what about Toshihiro Nagoshi, the man who became most associated with the series? "Frankly speaking, I am not sure about it. But I think the dedication that went into my first game development as a team leader, as well as all the staff involved, meant we could make this content that has been long supported and loved," he says. "It simply means that we did our absolute unsurpassable best, in order to entertain players of the game. That is why this spirit remains my motto to this day." It's a spirit that has led Nagoshi and his teams to produce the likes of *Super Monkey Ball*, *F-Zero GX* and *Yakuza* – but for some of us, *Daytona USA* still flies sky high above them all.

» We've come into this drift too fast and we're going to end up sliding out to the side. Oh no!

GOLD

128 *GoldenEye's development*

130 *Art production*

132 *Nailing the level design*

134 *Audio and visual design*

136 *Adapting the Bond licence*

138 *Making the multiplayer mode*

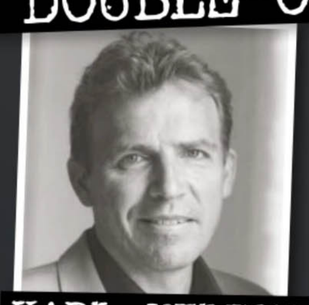
RARE'S TOP DOUBLE-O AGENTS

MARTIN HOLLIS

Producer and director

Favourite Bond film:
From Russia With Love

Preferred multiplayer mode:
Archives – Licence To Kill

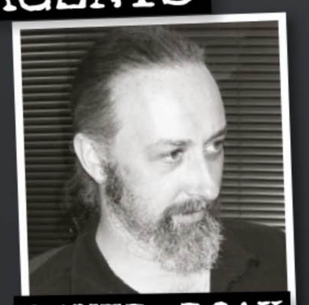


KARL HILTON

Scenic art director

Favourite Bond film:
The Spy Who Loved Me

Preferred multiplayer mode:
Complex – Golden Gun, first to ten kills. And no radar!



DAVID DOAK

Original screenplay

Favourite Bond film:
Goldfinger

Preferred multiplayer mode:
Temple - One-shot kills

ENEYE

GOLDENEYE TURNS 21 THIS YEAR SO WE GATHERED TOGETHER THE NINE MEMBERS OF THE ORIGINAL DEVELOPMENT TEAM TO TALK ABOUT THE CREATION AND LEGACY OF THEIR SEMINAL N64 SHOOTER. PAUL DRURY SHAKES THE VODKA MARTINIS

Gamers knew the score in the Nineties. Rare made platformers, you played first-person shooters on PC and any game based on a film was going to be awful. Then came *GoldenEye 007* and changed all that.

It was released two years after the film had hit the big screen, only a few months before the next entry in the franchise, *Tomorrow Never Dies*, came out, and with no great expectations of success, even from the team that had developed it. It went on to shift a staggering 8 million copies, making it the third biggest selling title on Nintendo's 64-bit console, and invariably appears in the echelons of those perennial 'Best Ever Games' lists. It also made number ten in **Retro Gamer**'s definitive countdown in issue 150, in case you were wondering.

That success is perhaps even more remarkable when you consider that for the majority of the dev team, *GoldenEye* was their first professional title. Indeed, Tim and Chris Stamper, the heads of Rare, had to remind the team that "this wasn't their university project" as development dragged on for over three years. Yet the fact that most of the team were new to the business meant they weren't constrained with notions of what was and wasn't possible in game design. If they thought of a good idea, they tried to implement it.

This naivety yielded some groundbreaking results. The game pioneered body-specific hit reactions, disconnecting the gun from the camera, the use of a sniper rifle, environment mapping (look closely and you'll see low-res reflections of your surroundings on shiny surfaces) and even dual-wielding of weapons, all features which have become fixtures in the shooter landscape. More than that, *GoldenEye* proved that a story-driven FPS could work on consoles… and that deathmatches never really get old.

Gathering together all nine core members of the team has been inspiring. Some stayed at Rare and worked on its spiritual sequel *Perfect Dark*. Some went on to set up Free Radical, the home of the *TimeSplitters* series. Some have stayed in games, others have moved on but all can agree on two things: being part of the *GoldenEye* team was an experience they will never forget and playing as Oddjob in multiplayer is always cheating.

» Home console first-person shooters at the time were seen as tricky to pull off, but Rare managed to do it in style.

» *GoldenEye* has its fair share of explosions, and then some.

MARK EDMONDS

Director of photography

Favourite Bond film: Skyfall

Preferred multiplayer mode: Temple – Grenade launchers and Licence To Kill

B JONES

Costume designer

Favourite Bond film: Goldfinger

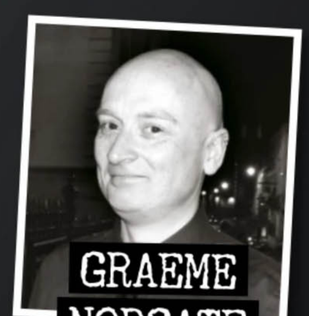
Preferred multiplayer mode: Stack – First to 20 kills, remote mines

STEVE ELLIS

Second unit director

Favourite Bond film: Casino Royale

Preferred multiplayer mode: Temple – Golden Guns and Licence To Kill



GRAEME NORGATE

Original music and sound effects

Favourite Bond film: Live And Let Die

Preferred multiplayer mode: Bunker – slappers only

GRANT KIRKHOPE

Original music

Favourite Bond film: Casino Royale

Preferred multiplayer mode: Egyptian – Licence To Kill

DUNCAN BOTWOOD

Production designer

Favourite Bond film: On Her Majesty's Secret Service

Preferred multiplayer mode: Archives – Pistols only, one-shot kills

Polishing GoldenEye

Mark Edmonds on developing a first-class FPS

For Mark Edmonds, his first contribution to the development of *GoldenEye* was sat alone in a room in the Stamper mansion, filleting joints.

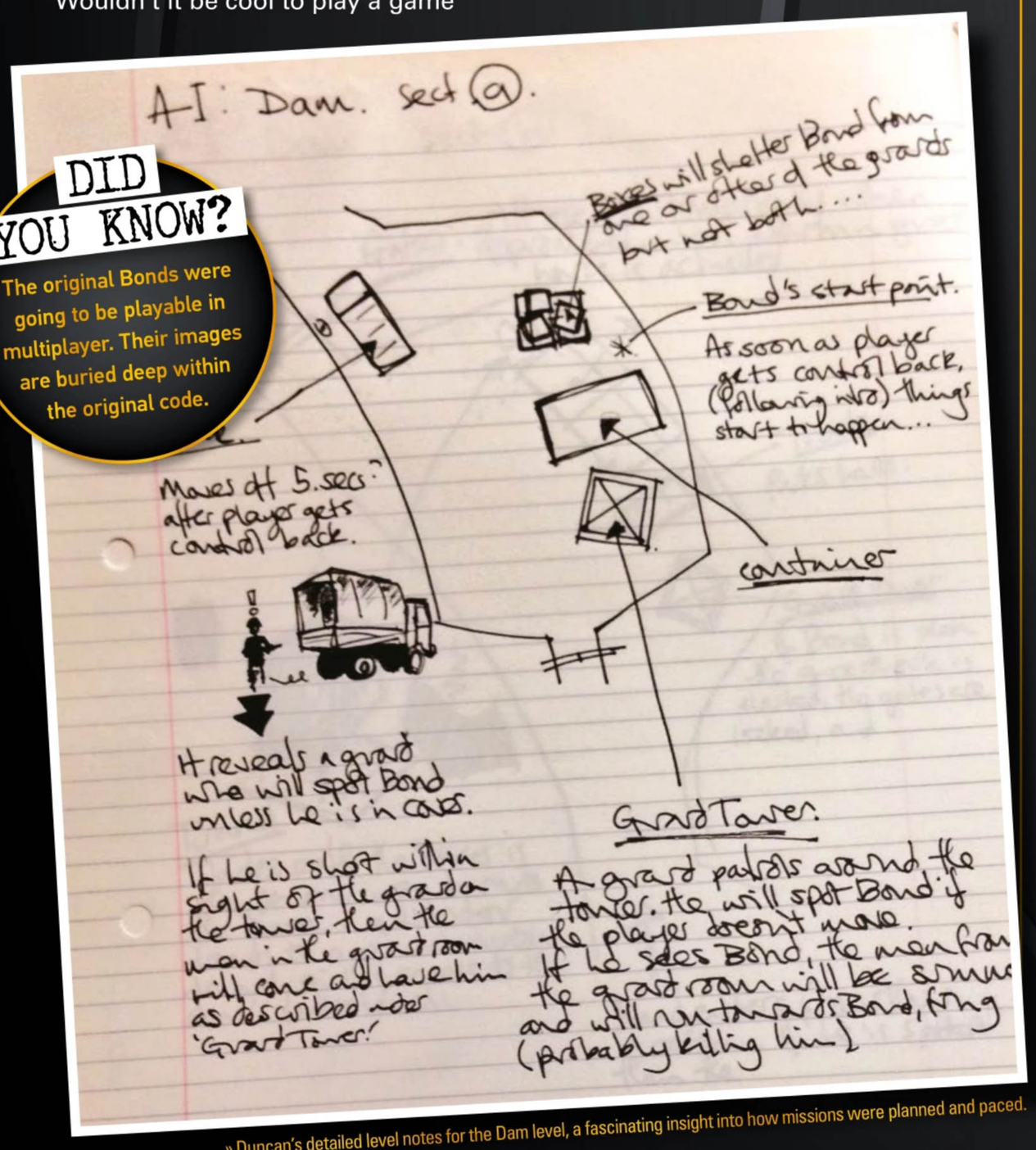
"I didn't really know what I was working on," explains Mark, understandably. "I was asked to investigate creating filleted joints for an animated 3D character system; basically, a smooth skin over joints, like an elbow, rather than just having a solid block for an upper and lower arm. I had no idea it was connected to *James Bond* but I must have passed the test because I got moved over to the stable block and onto the team proper. It was great just to be working on my first videogame!"

Programmer Mark joined project leader Martin Hollis and artist Karl Hilton and the trio got to work on early builds of *GoldenEye*. Initially, the game was heavily influenced by Sega's *Virtua Cop* with Bond following a predetermined route through levels. "We were using this amazing new invention called the analogue stick to aim a crosshair," grins Mark. "But then we thought, 'Wouldn't it be cool to play a game like *Doom* with actual 3D graphics? That would be a new experience!' And we knew the Nintendo 64 was capable of rendering 3D graphics from any orientation or direction."

» The bars get flack for being intrusive, but having a dynamic HUD was unheard of at the time.

The team decided to take Bond 'off the rails', though knowing exactly what the N64 was capable of required a good deal of faith. Its development system used high-end Silicon Graphics machines, a pleasure to work with, if prone to overheating, whilst the specifications of Nintendo's forthcoming console were yet to be finalised. "I vaguely remember being disappointed seeing the tech demos

» Mark dons a tuxedo at E3 in 1997.



» Duncan's detailed level notes for the Dam level, a fascinating insight into how missions were planned and paced.

DID YOU KNOW?

The original Bonds were going to be playable in multiplayer. Their images are buried deep within the original code.

LOCATION, LOCATION

Jetting around the world with Bond

ARKANGELSK DAM

■ Your first mission takes at the Byelomorye dam. It's a heavily guarded location, but weapons like the sniper rifle make things easier.

FACILITY

■ Starting off in the bathrooms you have to make your way through the laboratories, and eventually the bottling room.

RUNWAY

■ You need to escape in a plane, but first you need to fight through a platoon of soldiers. Good job you have access to a tank, eh?

> **"We were using this amazing new invention called the 'analogue stick'"**
>
> Mark Edmonds

running on the first development consoles," admits Mark. "But once our own artists got going onto the project, they managed to make the graphics look good!"

Mark beavered away on the *GoldenEye* engine, taking art created in such packages as Alias and GameGen and rendering them in game. He helped develop the system which handled the motion captured animations, pioneering in their day, and worked on the enemy AI, so your foes could at least attempt to outwit your agent before crumpling in agony when you shot them in the groin. Yet despite all these innovative features, the team really wasn't sure anyone else would be impressed.

"It was amazing to travel to the E3 show in 1997 but I don't remember much reaction to the game there," says Mark. "It probably wasn't the right environment for people to get into it. It was only afterwards when the reviews started coming that I realised people actually did like it."

RARE'S VERY OWN M

MARTIN HOLLIS ON LEADING THE TEAM

What was your reaction to being told you were to head up a team making a *Bond* game?

Oh, I wasn't approached. I'd heard on the grapevine, from my team leader on *Killer Instinct*, Mark Betteridge, I think, that the *Bond* licence was floating around. A couple of guys from the *Donkey Kong Country* team were going down to a press party for the film *GoldenEye* and Nintendo had told its friends at Rare there was a possibility we could make a game to go with it. Later, I heard they weren't going to take on the licence, so I went straight to Tim Stamper and said I'd like to do it.

Was he delighted you had stepped up to the challenge?

He didn't look chuffed or anything. He just said, 'Well, you better make a document then, Martin.' So I did. And it was all my own work, teacher.

We've seen that 'Top Secret' document online and it's impressive how many of those ideas, from the variety of missions to the effect of bullets on the environment, made it into *GoldenEye*.

I never really looked at it after a while. Once we were 20 per cent in, we just concentrated on making the game, not what I'd written. It's astonishing how much from the document made it into the final game. That was partly luck.

It was also down to the team you put together. How did you go about recruiting people to the project?

Of course I wanted good people, enthusiastic about the *Bond* universe... though not all of them were. They were just incredibly good craftspeople. I actually made a list of everyone in the company involved with development and scored them out of ten. I wrote notes on the side, too, and I spoke to Simon Farmer in production about each one and he'd tell me, 'Oh, you don't want them...' He knew if they were suitable for the project.

You sound a bit like M from the Bond films, with a dossier on everyone.

Well, I did wear all black at the time and had a confident swagger. It's hard to know how they viewed me. I was the only one who had made a game professionally before. Rare tended to hire people not from the games industry.

Was there an advantage to this being their first game – that your team didn't know what they couldn't do?

Oh certainly. I didn't know what we couldn't do either. It was supposed to be a three person project and take nine months or something. No one told me it would take three years and about ten people because no one knew.

Given it took so long to develop, were the Stamper brothers constantly harassing you to get it finished?

It's astonishing how little bother we got from them. They had the whole company to administer plus the financial agreement meant *GoldenEye* was a low risk project for Rare. And they might have been a little bit frightened of me. Why? I was extremely self-assured. That's putting it nicely. The Stampers created the environment, they hired the people I could pick from, we never had to worry about the project being cancelled or being forced in a different direction and we had their trust. Their role was huge.

Didn't Nintendo, worried about the violence that took place in the game, ask you to put in cutscenes at the end of each level, showing everyone who had been killed getting up and shaking hands?

Yes, and I know when you read that it seems ridiculous but you have to look deeper at feedback like that. It was all about the close up killing. You could see the pain and suffering – they'd get down on their knees and then you'd shoot them again in the head. It felt personal. Unsurprisingly, this didn't sit well with Nintendo. I was trying to negotiate a line between being true to *Bond* and Nintendo's family-friendly brand. We did soften some things round the edge – I think we dialled down the redness of the blood by 20 per cent.

Were you pleased you literally stuck to your guns?

Many people at Rare, Nintendo and the world in general have been incredibly nice to me, for decades! *GoldenEye* is such a good thing to have on your CV and was such a pleasure to make.

'I WASN'T EXPECTING THIS, MR BOND,' MARTIN RECEIVES A *GOLDENEYE* GONG AT E3 IN 1998.

MARTIN CHECKS HIS OUTFIT BACKSTAGE AT E3 IN 1997.

WE'VE LOST COUNT OF THE HOURS WE'VE WASTED PLAYING *GOLDENEYE*'S MULTIPLAYER.

BOND BLUEPRINTS

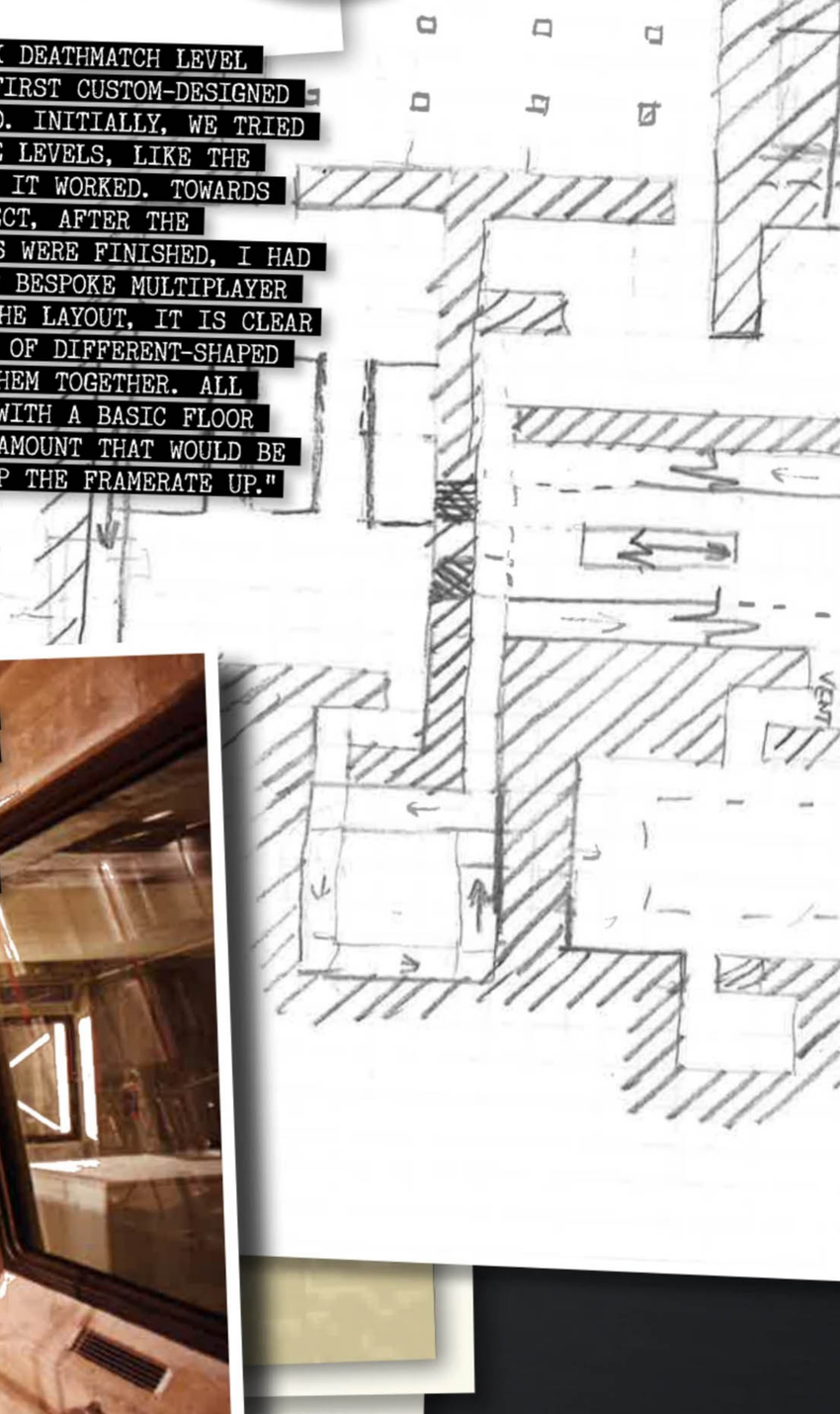
KARL HILTON TALKS US THROUGH THE VARIOUS DESIGN ASPECTS OF KEY PARTS OF RARE'S 007 GAME

"IT'S HARD TO SAY WHEN THIS WAS DONE, AS THE PROJECT RAN FOR TWO YEARS. I THINK THE BLUE DOTS WILL BE FROM DAVID DOAK, SHOWING POTENTIAL SPAWN POINTS FOR GUARDS. THE LEVEL WILL HAVE ORIGINALLY BEEN BUILT VERY CLOSE TO THIS DESIGN, BUT THEN, AS WE ACTUALLY PLAYED THE LEVEL, I WOULD OFTEN GO IN AND MAKE CHANGES BASED ON DAVE'S REQUESTS; BLOCKING A VIEW OR OPENING UP AN ALTERNATIVE ROUTE ETC."

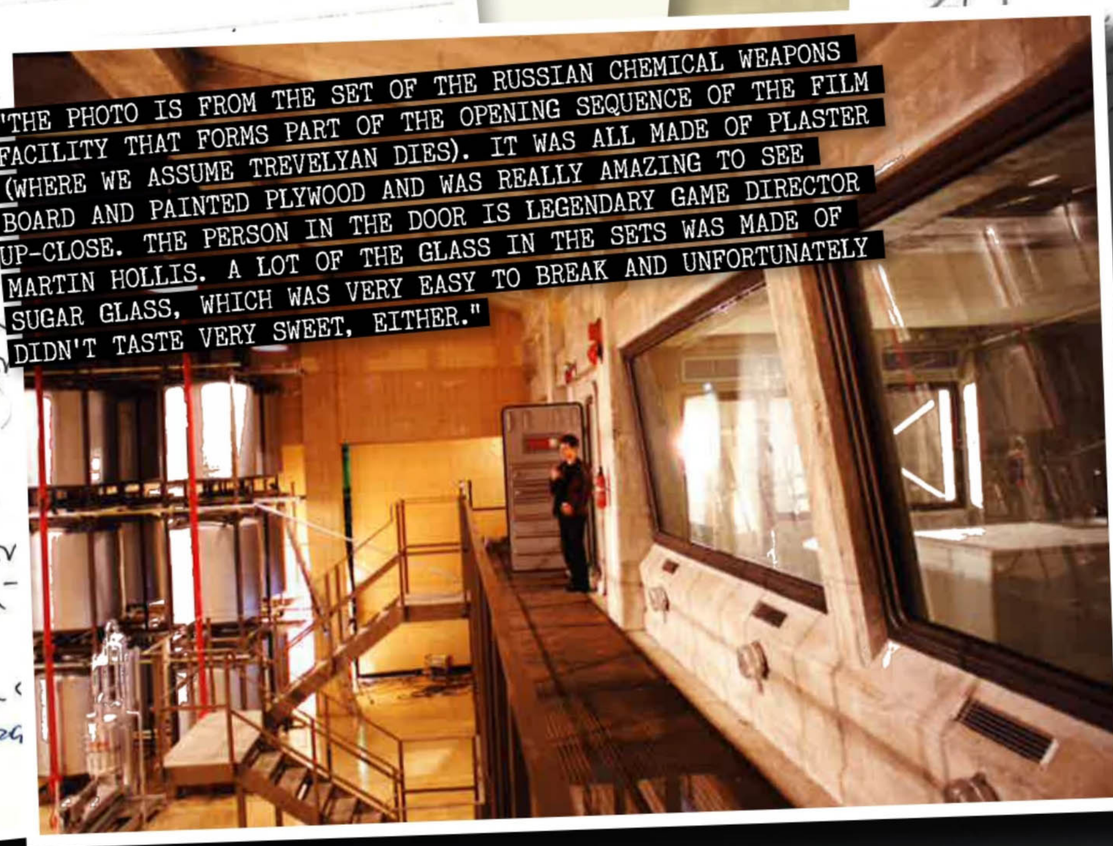
DID YOU KNOW?

GoldenEye is the third best-selling Nintendo 64 game with 8.09 million units shifted. *Mario Kart* was second with 9.87 million and *Mario 64* is first with 11.89 million.

"THIS IS THE COMPLEX DEATHMATCH LEVEL WHICH WAS THE VERY FIRST CUSTOM-DESIGNED DM LEVEL THAT WE DID. INITIALLY, WE TRIED SOME ADAPTED IN-GAME LEVELS, LIKE THE FACILITY, TO SEE HOW IT WORKED. TOWARDS THE END OF THE PROJECT, AFTER THE SINGLE -PLAYER LEVELS WERE FINISHED, I HAD SOME TIME TO DEVELOP BESPOKE MULTIPLAYER LEVELS. LOOKING AT THE LAYOUT, IT IS CLEAR I'M TRYING OUT A LOT OF DIFFERENT-SHAPED SPACES AND LINKING THEM TOGETHER. ALL LEVEL DESIGNS BEGAN WITH A BASIC FLOOR PLAN TO CONTROL THE AMOUNT THAT WOULD BE DRAWN TO TRY AND KEEP THE FRAMERATE UP."

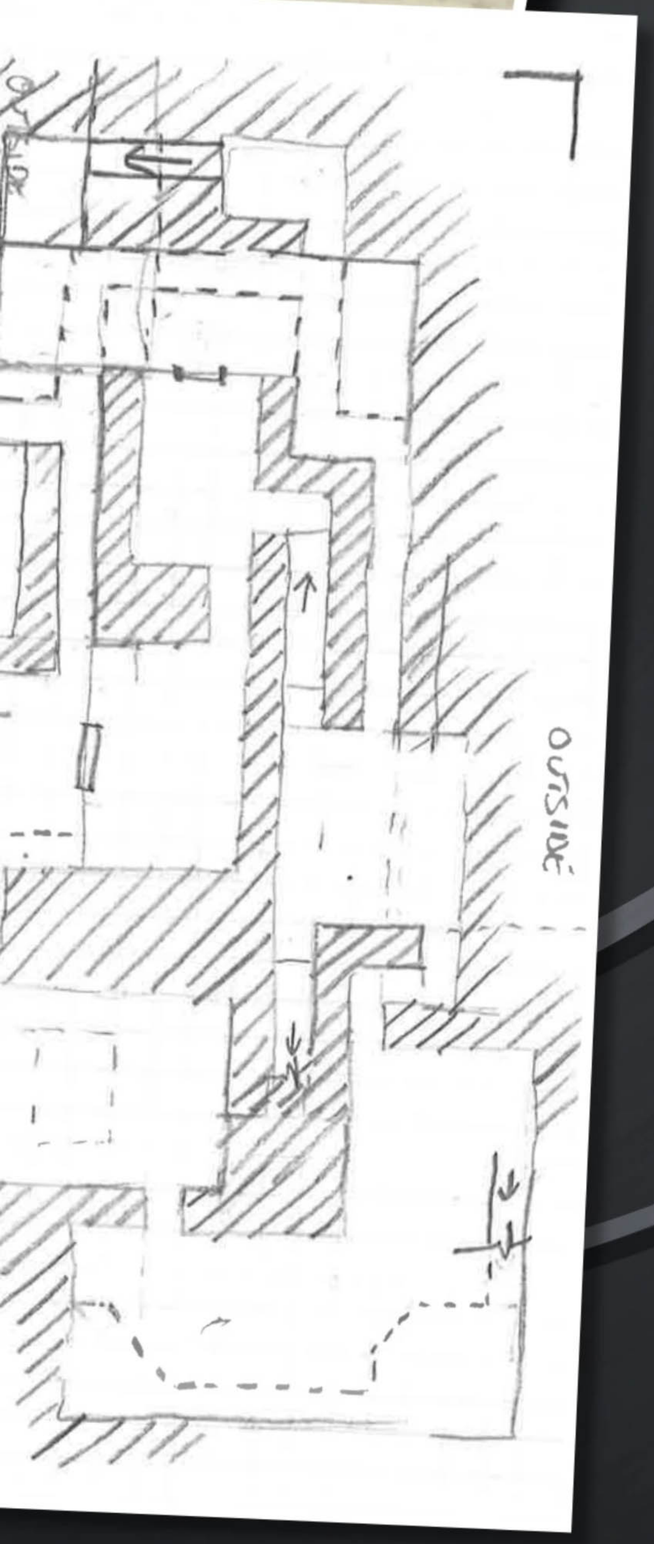


"THE COLUMN INITIALS ON THE LEFT REFLECTS WHO WAS RESPONSIBLE FOR 'BLOCKING OUT' THE LEVEL, SO THE D ARE DUNCAN WHO BUILT THE INITIAL LAYOUT FOR THOSE LEVELS AND THEN HANDED THEM OVER TO ME FOR TEXTURING AND LIGHTING. LEVELS THAT HAVE 'A K' ARE ONES WHERE I BLOCKED OUT AND TEXTURED AND LIT. B IS FOR B JONES WHO WAS MAINLY CHARACTER ART AND ANIMATION, BUT DID ALSO CONTRIBUTE ON LEVELS. I DON'T RECALL ANY FIGHTS AT ALL. IT WAS GENERALLY A 'WHAT'S NEXT, WHO'S AVAILABLE' DISCUSSION, ALTHOUGH I REMEMBER BEING PARTICULARLY KEEN TO DO THE FRIGATE."



"THE PHOTO IS FROM THE SET OF THE RUSSIAN CHEMICAL WEAPONS FACILITY THAT FORMS PART OF THE OPENING SEQUENCE OF THE FILM (WHERE WE ASSUME TREVELYAN DIES). IT WAS ALL MADE OF PLASTER BOARD AND PAINTED PLYWOOD AND WAS REALLY AMAZING TO SEE UP-CLOSE. THE PERSON IN THE DOOR IS LEGENDARY GAME DIRECTOR MARTIN HOLLIS. A LOT OF THE GLASS IN THE SETS WAS MADE OF SUGAR GLASS, WHICH WAS VERY EASY TO BREAK AND UNFORTUNATELY DIDN'T TASTE VERY SWEET, EITHER."

"THE OUTSIDE BUILDINGS ARE NOT REAL BUILDINGS. THEY WERE ABOUT AN EIGHTH SCALE MODEL DIORAMA BUILT OUT ON THE RUNWAY AT LEAVESDEN. THE MOUNTAINS WERE A HAND-PAINTED FLAT BACKGROUND PANEL. THE DARK PATH CROSSING THE FOREGROUND WAS AN ACCESS GAP THAT THE MODELLERS COULD USE TO REACH IN TO THE CENTRE OF THE MODEL. THE SKY IS DEFINITELY REAL. THIS SET WAS USED FOR THE SCENE WHERE THE MIG FIGHTER CRASHES IN TO THE SEVERNAYA COMPLEX AND BLOWS UP THE DISH AFTER THE FIRST GOLDENEYE IS SET OFF."



Cheat Master

THE BEST GOLDENEYE CHEATS, AND HOW TO UNLOCK THEM

PAINTBALL MODE

■ This aesthetic option swaps out all the bullet holes in the game for lovely splotches of brightly coloured paint. Unfortunately it doesn't affect characters so you can't paint enemies with it.

UNLOCK IT BY: Speed your way through the Dam level on Secret Agent mode in 2:40 or under.

DK MODE

■ This insanely easy-to-unlock cheat distorts all the character models to give them giant heads, tiny bodies and oversized arms. Needless to say it makes it very easy to get headshots with it activated.

UNLOCK IT BY: Finishing the Runway stage in less than five minutes. Even Boris could do that.

INVINCIBLE

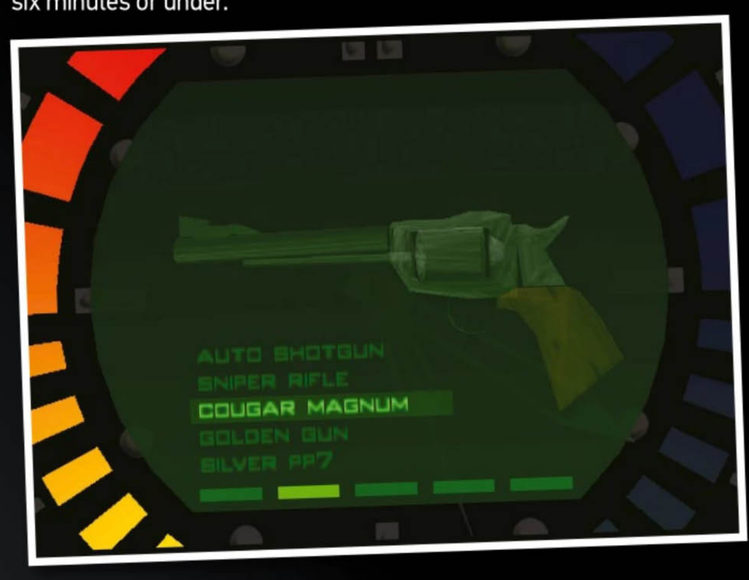
■ *GoldenEye* can be pretty tough and some of the later stages are phenomenally hard. Take away some of the pain by making James Bond invincible to everything in the game.

UNLOCK IT BY: Get through Facility on 00 Agent mode in 2:05 minutes or under.

ALL GUNS

■ Why would you not want access to every gun in the game? Of course you would. You can even access the tank using this. Just be aware that weapons won't come with any ammo.

UNLOCK IT BY: Complete Egyptian on 00 Agent difficulty in six minutes or under.



TINY BOND

■ This nifty cheat shrinks you to half your usual size. While the viewpoint does take a while to get used to, it does mean that all enemies find it very hard to hit you. Use this to your advantage.

UNLOCK IT BY: Blast your way through Surface 2 on 00 Agent mode in 4:15 or under.

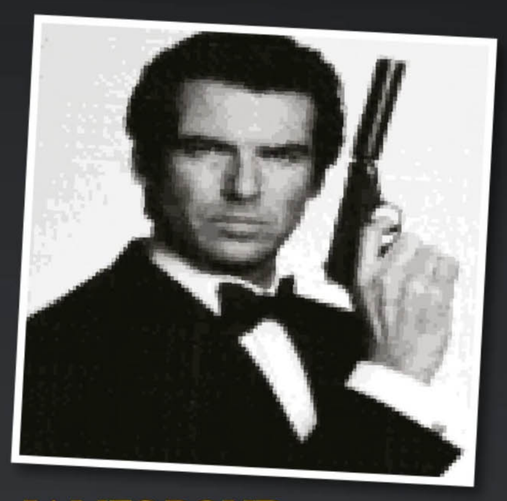
TURBO MODE

■ Make things a little easier for yourself by greatly increasing Bond's mobility, which should make it a lot simpler to escape guards and get yourself out of tricky situations. It does take a while to master, though, so persevere with it.

UNLOCK IT BY: Finish Silo using Agent mode in 3:00 or less.

Heroes And Villains

Meet the cast of GoldenEye

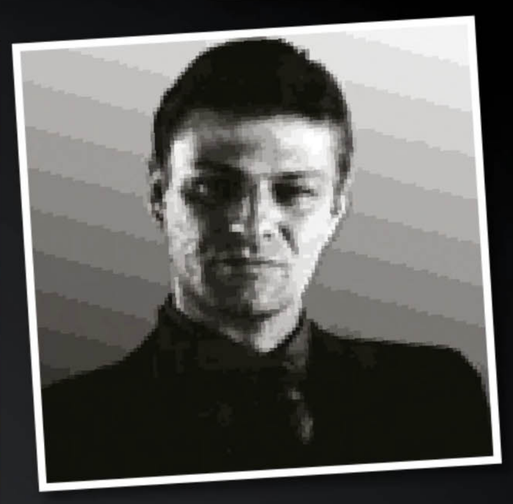


JAMES BOND

■ *GoldenEye*'s protagonist is tasked with preventing Janus from firing the *GoldenEye* satellite. Pierce Brosman plays the iconic role and would do for a further three films.

NATALYA SIMONOVA

■ This hacker ends up accompanying Bond on several missions after they encounter each other as prisoners. Izabella Scorupco depicts her in the film.



ALEC TREVELYAN

■ You first meet 006 during the second mission, but see him executed by Colonel Ourumov. Bond soon discovers he's survived and is Janus. He's played by Sean Bean.

XENIA ONATOPP

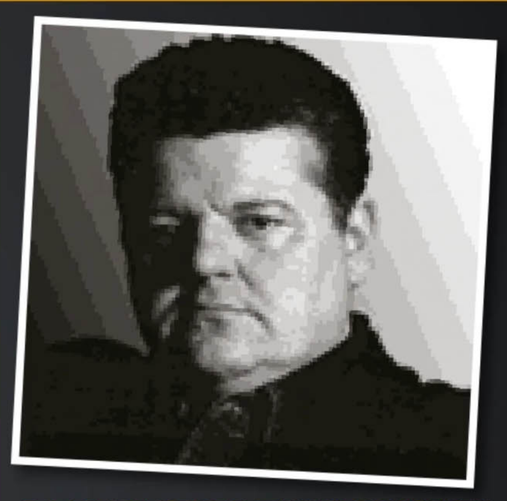
■ Mercenary Xenia is incredibly dangerous and likes to kill men by squeezing them to death between her thighs. In the film she's played by Famke Janssen.

GENERAL ARKADY OURUMOV

■ The rogue Russian general is a thorn in Bond's side for most of the Arkangelsk missions. He's played by Gottfried John.

BORIS GRISHENKO

■ "Invincible" computer hacker Boris trips an alarm in Bond's first encounter with him and then pulls a gun on the secret agent. He's played by Alan Cumming.

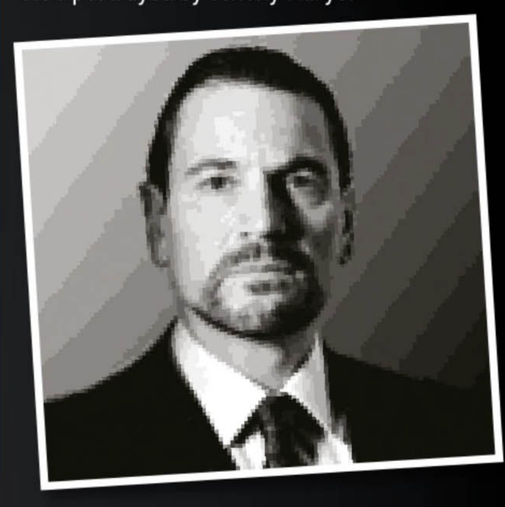


VALENTIN ZUKOVSKY

■ This Russian gangster helps James Bond out in a couple of levels, as he doesn't want Janus muscling in on his territory. He's played in the movie by Robbie Coltrane.

DIMITRI MISHKIN

■ Mishkin captures Bond and takes him to the Archives level. He eventually admits that he knows Bond isn't a traitor and helps him. He's portrayed by Tchéky Karyo.



ON HER MAJESTY'S MO-CAP SERVICE

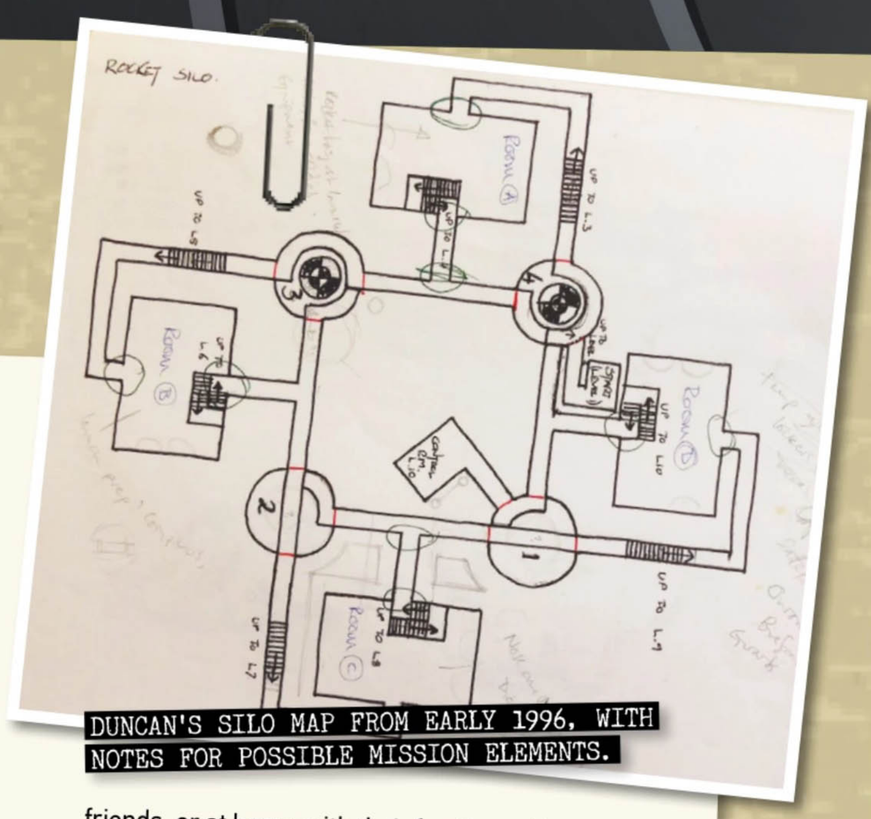
DUNCAN BOTWOOD ON FALLING OVER A LOT

"I often say, 'I died a thousand times for *GoldenEye 007*'," says Duncan Botwood, whose dedication to making the game the best it could be involved physical as well as mental strength. On top of his role as game designer, shaping mission structure as well as the layout of levels, he became the reference model for the various agonising reactions when enemies took a hit. "Motion Capture data was good at picking up very human movements like flinching, and you could easily tell the difference between me throwing myself on the floor versus me being pushed to the floor. So I had to stand in position with my eyes shut so I didn't flinch, and B [Jones] would walk quietly up to me and shove me hard to make me fall over. Multiply that by eight per position because of covering all the angles and you get a full coverage of animations... and bruises."

DUNCAN BACKSTAGE AT E3 IN 1997.

Duncan, who stayed at Rare until the end of the Noughties and now works for Ubisoft in Canada, assures us it was worth the pain. "I'm sure *GoldenEye* has opened doors for me, though my favourite part has been people coming up to me at work saying they played it at college with their friends, or at home with their family, and loved it. It's great to know that people had such a positive experience and I never tire of hearing it."

He also mentions he specifically designed the Egyptian temple to have high ceilings because he liked using the grenade launcher trajectories to bounce grenades off the top of doors he was running through to take out people chasing him. Now there's a tip for your next deathmatch, folks!



DUNCAN'S SILO MAP FROM EARLY 1996, WITH NOTES FOR POSSIBLE MISSION ELEMENTS.

Behind the iron curtain

WRITER DAVID DOAK ON GOLDENEYE'S LEVEL DESIGN

David Doak smiles rather proudly when we ask him about the legacy of his innovative work on mission design and enemy AI for *GoldenEye*.

"My favourite moment was meeting the original Valve guys at ECTS, a UK trade show, in 1998 and them joking that *GoldenEye* had forced them to redo a bunch of stuff on *Half-Life*. They went on to do all right."

When David joined the team in late 1995, plenty of the basic gameplay was in place. The controls were responsive, the core loop of 'encounter enemy, shoot them, move to next' worked efficiently and the audio and visuals gave solid feedback. "The obvious issue was that levels were fairly barebones," he explains. "They had been constructed to test gameplay, though even at this stage, there were innovative features which staked out the ambitions for the game, like the alarm system in Severnaya Bunker. It could be triggered by a guard who ran to press a big red button or set off by the cameras 'seeing' Bond. The FPS paradigm of the day was *Doom*, which had you shooting monsters and collecting coloured keys to open doors and we really wanted to step away from that."

» You can cause all sorts of wanton destruction and if you're lucky, you might damage someone, too.

Though David acknowledges that at its most basic, this involved reskinning the 'keycard' concept with decoders, covert modems and all manner of gadgetry, he was determined to vary the pace and rhythm of levels. "Severnaya Bunker 1 has a lovely, juicy density to it," he enthuses, "a very simple, small space but, particularly on higher difficulties, there is a lot to do with juggling objectives, alarms and enemies. The Bunker 2 cell escape was pleasing to set up; the stealth came together well and was something that felt fresh, in a pre-*Metal Gear Solid* and *Thief* world. And obviously Facility is a continuing source of chuckles that Dr Doak is in there..."

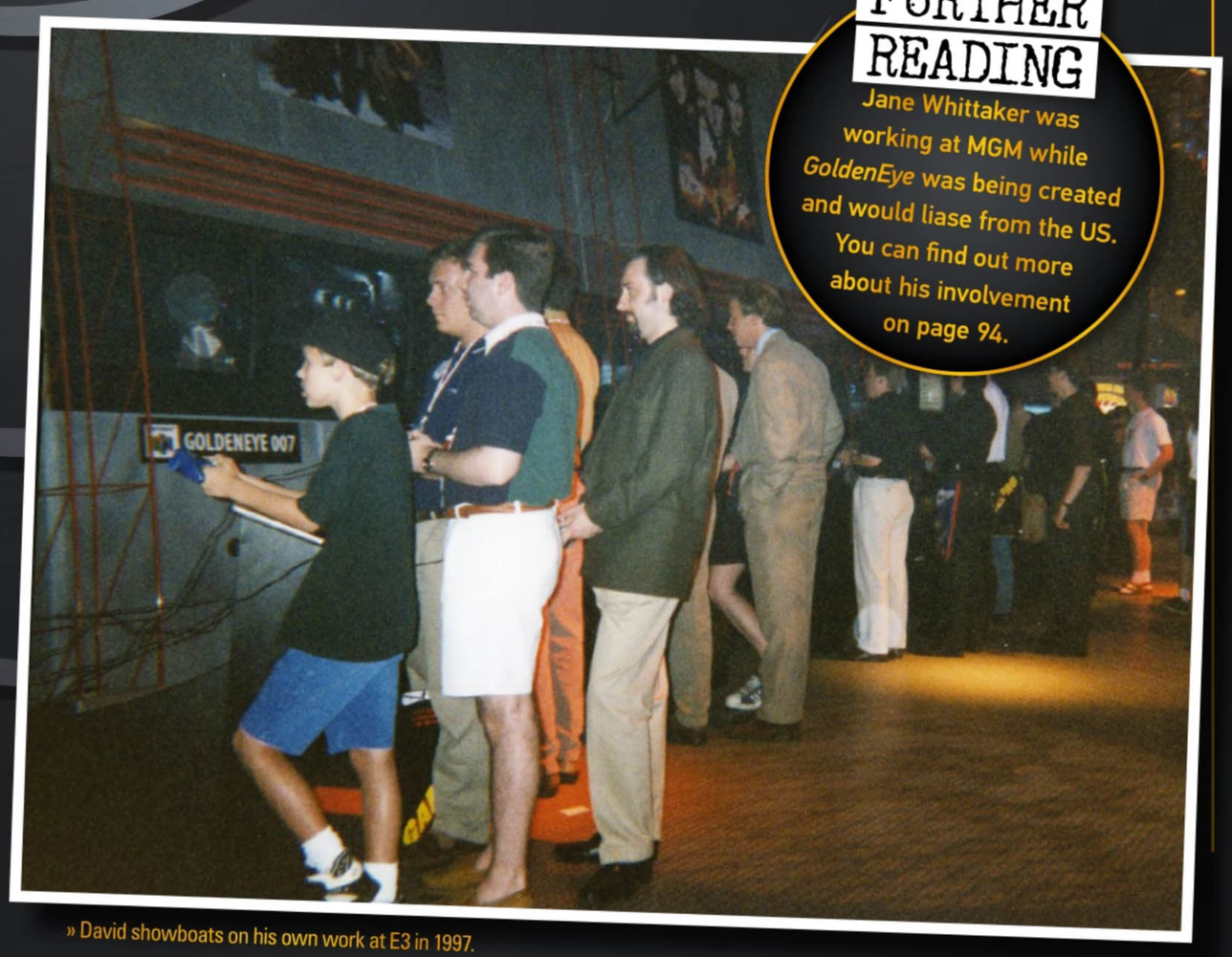
Yes, David makes a prominent cameo as the scientist/secret agent, though most of the team are featured somewhere in the game, whether as the faces of nameless guards or doing silly turns on computer monitors. Despite being satisfied with the variety of mission goals and interesting level design the team achieved, David is the first to admit not everything they tried quite came off. "Some level setups were exercises in damage limitation. For the more open levels like Runway and Depot, it was hard to construct meaningful gameplay and the results are patchy. And the Escort missions seemed like a good idea at the time. I mean, what could possibly be more fun that having your performance judged on whether Natalya would randomly throw her head in the path of a bullet or walk into an explosion?"

Notwithstanding a few misfires, the story mode was groundbreaking in offering the player choices. Should you go in with all golden guns blazing or use your license to kill sparingly? Guards could be sneaked past but how satisfying it proved to take out goons with a flurry of headshots. The way your foes responded to your actions and the surprising, sometimes exasperating, interventions of NPCs all created the sense that this was a living, bleeding world.

"Refining the AI was largely a process of brokering deals with Mark Edmonds," says David. "I'd make my case that a feature would allow me to script a more interesting setup, Mark would shake his head, explain how it wasn't possible then go back to his desk and do some coding wizardry to make it happen. Legend."

"Severnaya Bunker 1 has a lovely, juicy density to it"

David Doak



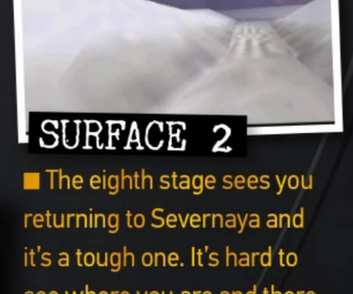
» David showboats on his own work at E3 in 1997.

FURTHER READING

Jane Whittaker was working at MGM while *GoldenEye* was being created and would liase from the US. You can find out more about his involvement on page 94.

LOCATION, LOCATION

JETTING AROUND THE WORLD WITH BOND



SEVERNAYA SURFACE 1

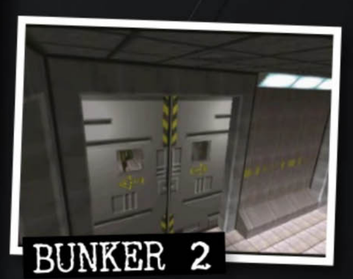
■ This tough level requires Bond to make his way into a satellite control bunker. It's tricky as there's lots of open ground and very little cover.

BUNKER 1

■ You're still stuck in Siberia and have to navigate this underground base. Fortunately it's still being built and not heavily armed.

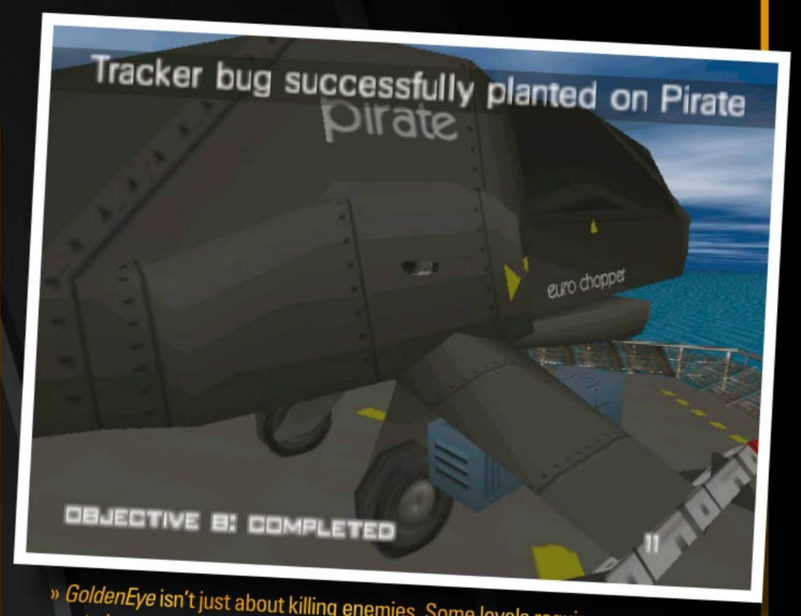
SURFACE 2

■ The eighth stage sees you returning to Severnaya and it's a tough one. It's hard to see where you are and there are guards everywhere.



BUNKER 2

■ You start this stage holed up in jail next to Natalaya. This is a tough stage as you need to keep her safe whilst retrieving several items.



» *GoldenEye* isn't just about killing enemies. Some levels require you to bug things. And also require you to kill enemies...

Dressed to kill

B Jones on keeping the style and design authentic for GoldenEye

Location, location

Jetting around the world with Bond

Kirghizstan

Silo

■ This is a tough stage, as you have to navigate bland-looking environments and plant explosives in all the fuel rooms.

Monte Carlo

Frigate

■ Bond's stop in Monte Carlo is so he can plant a bug on a very dangerous helicopter. Unfortunately it's stashed away on an armoured ship.

Mexico

Teotihuacan

■ Congratulations, you've reached one of the secret levels of the game, which is based on the classic Bond film, *Moonraker*.

El-Saghira

■ This stage is only unlocked after completing all the other levels on 00 Agent setting. You need to grab the Golden Gun and stop Baron Samedi.

On the *GoldenEye* credits, B Jones role is listed as 'costume designer'. It might be a tongue-in-cheek reference to the world of film, but it proved surprisingly apt as no one is more adept at fashioning a pixel tuxedo than she is. "We originally had three other Bonds in the game," she explains. "I had to make different tuxedo textures within a 64x32 pixel texture. Moore got the white one with the carnation, Dalton got the double breasted and Connery got the classic Sixties tux. And all their faces came from my reference books."

With no handy internet libraries to consult in the mid-Nineties, much of the look of *GoldenEye* came from B's extensive collection of *Bond* books and memorabilia. Character photos were scanned, gadget manuals were carefully studied and lunchtimes were spent watching the *Bond* back-catalogue on videotape. "We only had a half hour break so we'd get through them in 20 minute segments and it took ages," she laughs.

The team did have some access to the film set and lugged their swanky new digital camera to Leavesden Studios in Hertfordshire to photograph as much as they could. "That camera was huge, really heavy and cost about two grand," she remembers, "but it was how we got most of our reference material, like for Statue Park and inside the main Archanglsk complex both before and after it was blown up. I used that same camera to take the photos of faces we used in the game. I would take front, side and back of the head shots and stitch them together. This was before Photoshop so all I had was this pixel painter called NinGen and just 38x32 pixels for the textures. You try drawing any believable human face in that!"

» Steve and B accept the accolades at E3 in 1998.

Two decades on and it's quite easy to raise a Roger Moore-esque eyebrow at the blocky heads in the game but at the time, this was pioneering work, as was the use of motion-capture to give character movement a sense of realism. The initial setup was a 'flock of birds' magnetic system in which all of the markers on the body were directly attached to the computer by cables. "The capturing unit was mounted halfway up one wall and you had to be quite careful with the moves or else it would come flying off the wall and hit the performer," she winces.

Perhaps the most effective use of this new technology was in making your foes look like you'd really slugged them. Shoot them in the shoulder and they would recoil in pain; shoot them in the head and they'd crumple to the floor. "We wanted the animations to look like the victim wasn't expecting it, so we got [team member] Duncan Bottwood to close his eyes and I'd suddenly slap him on the shoulder without telling him. We didn't want that split second of bracing to be visible in the capture. We even had ropes tied around his waist to pull him off his feet. We had plenty of soft mats around but I don't think we could have got away with it in today's health and safety-conscious environment..."

It was this attention to detail in every aspect of *GoldenEye*'s visuals that helped make the game so immersive. Since leaving Rare, B has worked in film and TV, including credits on *Doctor Who* and *Guardians Of The Galaxy*, but still keeps in touch with her old coding buddies. We wonder if she ever felt conscious of being the only woman on the team or if gender stereotypes ever got in the way? "No and no, and clearly you don't know me," she replies, bluntly.

» Some levels will end early if you kill civilians that you're not supposed to.

» They don't appear as often as we'd like, but you do get to play around with the odd *Bond* gadget.

> **"We originally had three other Bonds in the game"**
> B Jones

THE SOUND OF GOLDENEYE

WITH GRAEME NORGATE AND GRANT KIRKHOPE

When you joined the *GoldenEye* team, did you think, 'This is the easiest gig in the world we just need to do a version of the theme tune!'?

GN: It was certainly a massive headstart having the *Bond* theme to play around with, but I never thought it was going to be an easy ride. A good theme played badly is still going to absolutely stink! I originally approached the music with more 'variations on the theme' rather than using segments of the theme itself, so tracks like the Train and the Depot are more in the style of *Bond* soundtracks. Then I thought to myself, 'Stop trying to be a clever dick and just use the flipping melodies!'

GK: Graeme asked me to work on *GoldenEye* with him as he was so busy with *Blast Corps*. I had a total love for *Bond* so getting to mess around with that iconic theme was the best thing ever!

Were you at a disadvantage producing music for a cartridge game rather than a CD-based system?

GN: True, the N64 was the only console using cartridges at the time, and with CD you didn't have to worry about RAM limitations. But a cartridge system was more versatile compared to using CD back then, given that we wanted to give the game music some degree of interactivity. For instance, on the Severnaya Bunker level, if an alarm detects the player, the music changes. It's a simple change, but seamless. With a late Nineties CD system, the music would pause while the laser was seeking the appropriate track. A knackered disc or worn out machine and that could be a few seconds... you could have been killed in that time! Plus with a CD, you were limited to about 45 minutes for the soundtrack and we clocked up over two hours for *GoldenEye* in the end.

Let's get techy - what kind of tools were you using to produce the audio?

GK: I was using Cubase as my DAW (Digital Audio Workstation) and I got most of the sounds from a Roland JV 1080 and an EMU Proteus FX. I'd sample instruments and then squash them down as small as they could go without them sounding too horrendous and then get them into the N64 so I could use them.

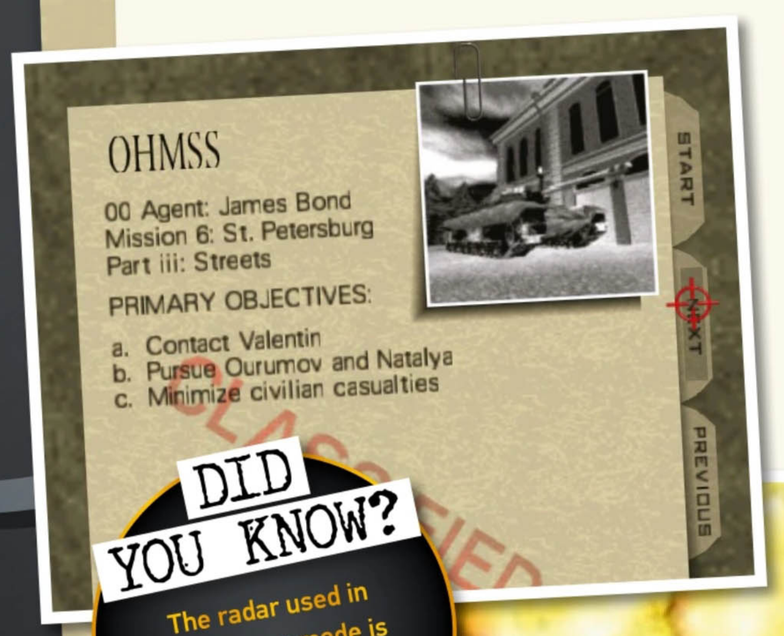
GN: For the first four months, I didn't have N64 hardware so I was writing using synths and samplers with the knowledge that the 'Ultra 64', as it was known then, would be able to play 100 sounds at once. The SNES only had eight sound channels so this was paradise. Or so I thought. Note to self: don't believe the hype. It was possible to play that many sounds as long as you didn't want to do anything else, like display graphics, so 12 to 16 simultaneous notes seemed to be a good compromise. After a couple of months of hard work by Rare's audio coder, we had noises coming out of the hardware.

SOME LEVELS LET YOU DUAL-WIELD. ALTERNATIVELY, CHEAT, THEN EVERY LEVEL OFFERS IT.

> "A CARTRIDGE SYSTEM WAS MORE VERSATILE COMPARED TO USING CD"
>
> Graeme Norgate

Audio can sometimes be an afterthought when developing a game...

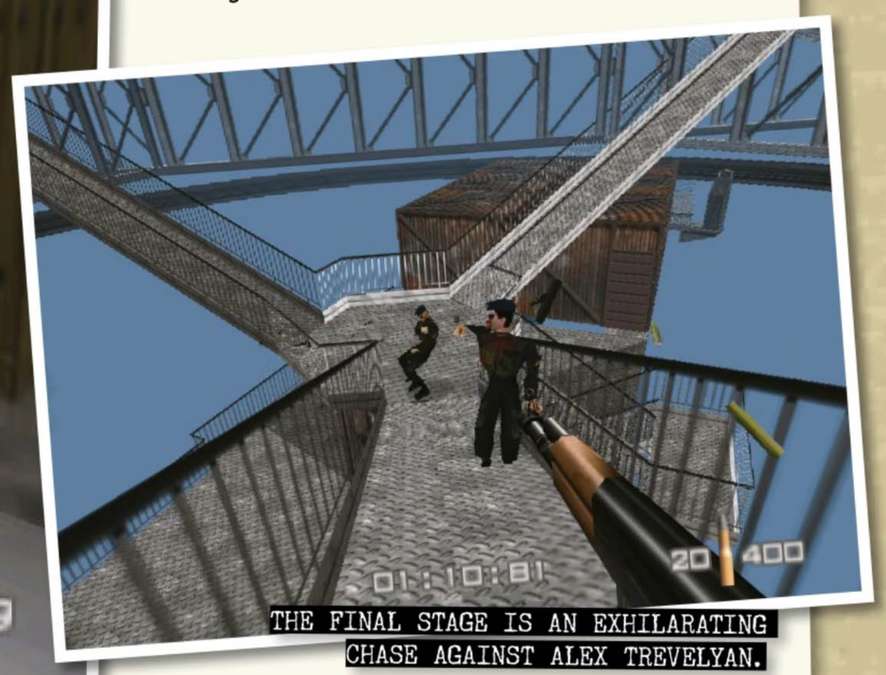
GK: Not in the eyes of the people at Rare. All the composers were really pushed to write the best music they could. Tim Stamper was particularly on the case when it came to music. He was always asking us to think of ways to make it better.



DID YOU KNOW?

The radar used in multiplayer mode is actually a texture for the oil drums featured in the game.

EVEN THE WEEDIEST WEAPON CAN CAUSE MASSIVE DAMAGE IF YOU USE IT TO SHOOT OIL DRUMS.



THE FINAL STAGE IS AN EXHILARATING CHASE AGAINST ALEX TREVELYAN.

Reloading Goldeneye

RARE'S SEMINAL SHOOTER HAD ITS FAIR SHARE OF SPINOFFS

GOLDENEYE 007

VIRTUAL BOY

■ There's little info on this canned Virtual Boy game. Not even the name of its publisher. Based on the information available at Unseen64 it would have most likely been released before Rare's N64 hit (the last Virtual Boy game was released in 1996) and it sounds like a *Roadblasters*-inspired driving game.

GOLDENEYE: ROGUE AGENT

NINTENDO DS

■ While this is effectively a massively cut-down version of the home console game it's nevertheless different enough to deserve its own separate entry. This was one of the first first-person shooters to be released on the console and it's surprisingly decent to play, too, utilising a similar control system to the *Metroid Prime Hunters*.

GOLDENEYE 007 RELOADED

PS3, XBOX 360

■ The success of Activision's Wii game meant it received a HD port to the HD consoles of the time. The most obvious change to the game is enhanced graphics, but changes have been made elsewhere as well. There's also a new M16 mode, which offers objective-based missions once the original story has been rinsed.

GOLDENEYE: ROGUE AGENT

XBOX, GAMECUBE, PS2

■ EA' previous three *Bond* games, *Agent Under Fire*, *Nightfire* and *Everything Or Nothing* had done well commercially and this was a 'sequel' to the greatest *Bond* game of all time. What could go wrong? Well everything really. It was incredibly weak, with mechanics largely revolving around the abilities of your agent's *literal golden eye*.

GOLDENEYE 007

WII

■ Activision's second Bond game remains the best-received game of its four releases. The biggest change is that Pierce Brosnan has been replaced with Daniel Craig. Mechanically it's been updated, too, taking into account more modern FPS tropes like regenerating health and destructible environments.

GOLDENEYE 007

XBOX 360

■ Ah, what could have been. News of a Xbox 360 version of *GoldenEye* first arrived in 2008 but then development stalled. It wasn't until 2016 that popular Rare source, Rare Thief uploaded 30 minutes of footage to YouTube, allowing gamers to see what would have most likely been the definitive version of Rare's hit game.

DID YOU KNOW?

The team initially planned to reload guns by unplugging and reinserting the controller's rumble pak, but Nintendo soon quashed the idea.

Licence to Thrill

How Rare adapted a Bond movie for joypads

Karl Hilton can still remember when Martin Hollis popped the question. "He opened with, 'Do you like *James Bond*?'" chuckles Karl, who was the first person to join Martin on the team as lead artist. "I was a big *Bond* fan and it sounded great fun but I was definitely worried about the reputation that movie tie-in games had back then. I'd just started at Rare and knew they didn't release bad games but I do remember looking at *Blast Corps*, which was being made next door to us, and thinking it would probably be much more popular than the movie-tie in we were starting on."

Given some of the licensed dross released prior to *GoldenEye*, Karl's concerns were understandable, though at least with their game they had some support from the production company. Visits to the studio allowed much useful photography of sets, props and costumes to be taken and the team received a draft of the script. "We weren't given any strict guidelines on what we could do so we immediately started 'padding' out the story to generate more content," explains Karl. "We wanted to visit all of the major locations even if Bond doesn't go there in the film. Plus we could use almost anything from the *Bond* universe."

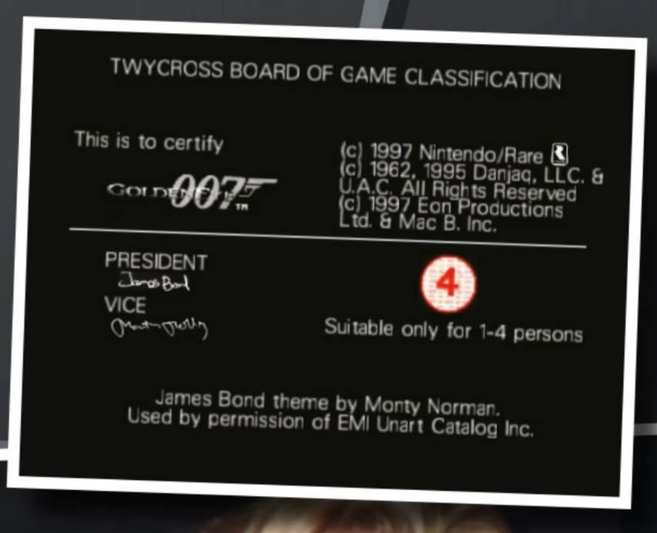
Karl saw the potential for drawing on the older Bond films he had grown up with, particularly those starring his favourite Bond, Roger Moore. He initially wanted to include the Liparus submarine base from *The Spy Who Loved Me* but realising this was too complex, he instead opted for the Drax shuttle base from *Moonraker*. The many nods to the wider Bond world and the clever way the camera flew into the back of 007's head at the start of each level really helped players feel like they were morphing into the suave secret agent. "We wanted to emphasise that the player was James Bond but in an FPS you rarely get a chance to see yourself," Karl says. "This seemed like a perfect way to remind the player. Roger Moore played Bond, Pierce Brosnan was playing Bond at the time, now you can step into Bond's shoes, too."

Subtle touches, like the cinematic curtain of blood that descends the screen when you die and the cuff of your tuxedo clearly visible when you check your watch for important mission information, all added to that authentic Bond feel. The watch also served another purpose, explains Karl. "We all agreed that keeping screen clutter to a minimum would give you the most immersive feeling and the watch helped you feel like you were 007 and not a generic FPS player. Although we did always joke about how short-sighted our Bond appeared to be, staring at his watch so closely."

» The Sean Bean Principle applies to *GoldenEye*. Spoilers: he dies.

> **"We wanted to emphasise that the player was James Bond"**
> Karl Hilton

Which brings us to our key question: just how important was the licence? The game was undeniably an exceptionally well-crafted shooter, with many innovative features, but without *Bond*, would it have had the same critical and commercial success? "What could have been construed as a violent first person shooter was opened up to a much broader family audience because, culturally, James Bond is allowed to kill people and not be seen as bad," argues Karl. "It meant children could ask parents for the game! I hope it would have done well anyway that but I doubt it would have had the penetration into popular culture that the James Bond link gave it. I think *Perfect Dark* supports this to some degree. It was, in almost every way, superior to *GoldenEye*, as we'd learned so much from our first game-making attempt, yet it sold less than half [the copies]. The chance to play as James Bond is a great selling point."


TWYCROSS BOARD OF GAME CLASSIFICATION

This is to certify

GOLDENEYE 007™

(c) 1997 Nintendo/Rare
(c) 1962, 1995 Danjaq, LLC. & U.A.C. All Rights Reserved
(c) 1997 Eon Productions Ltd. & Mac B. Inc.

PRESIDENT
VICE

4

Suitable only for 1-4 persons

James Bond theme by Monty Norman.
Used by permission of EMI Unart Catalog Inc.

» Karl (left) and Steve compare their happy/sad faces at E3 in 1998

Location, Location

Jetting around the world with Bond

ST PETERSBURGH

STATUE

■ The first of five stages set in Russia's second biggest city. Here, you have to meet up with ex-KGB agent, Valentin Zukovsky.

ARCHIVES

■ The large level requires you to escape from several of Dimitri Mishkin's men and rescue Natalaya.

STREETS

■ There are two ways through the stage and it's being timed, so you can't dawdle on either. Luckily, you gain access to a tank.

DEPOT

■ This rather dull stage has you trying to locate Alec Trevelyan's train. It's easier said than done, though.

TRAIN

■ The last level of St Petersberg is excellent as it requires you to fight your way through an incredibly well-guarded train.

MULTIPLAYER MADNESS

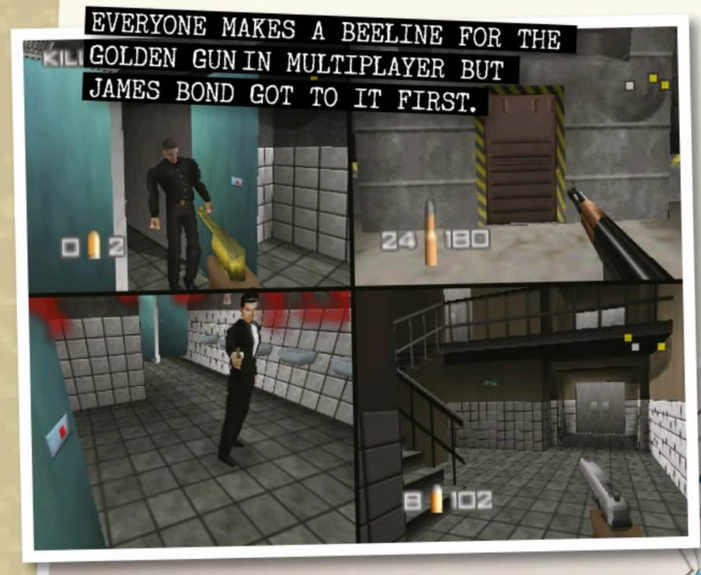
STEVE ELLIS ON MURDERING YOUR FRIENDS

Had *GoldenEye*'s multiplayer modes always been on the 'wish list' of features?

To be honest, I don't remember discussing multiplayer before we started doing it. We'd been too busy making the rest of the game! It wasn't until something like April 1997 that work actually started on it and it progressed incredibly quickly by today's standards. Because it came so late in development, we had already finished work on the animation so we had to make do without any animation for moving while crouching. There just wasn't time to do anything about that.

Was multiplayer prompted by you and the team playing *Bomberman* or *Doom* deathmatches together?

I don't think we ever played multiplayer *Doom* because we didn't have any PCs but we certainly spent a lot of time playing *Bomberman* at lunchtimes and we also had an early, unfinished version of *Mario Kart 64*. It was more that the things which would be good seemed obvious to us, and we just got on with doing them and playing the game every day to see what was working and what wasn't.



EVERYONE MAKES A BEELINE FOR THE GOLDEN GUN IN MULTIPLAYER BUT JAMES BOND GOT TO IT FIRST.

How did you go about turning an almost complete single player game into a multiplayer one?

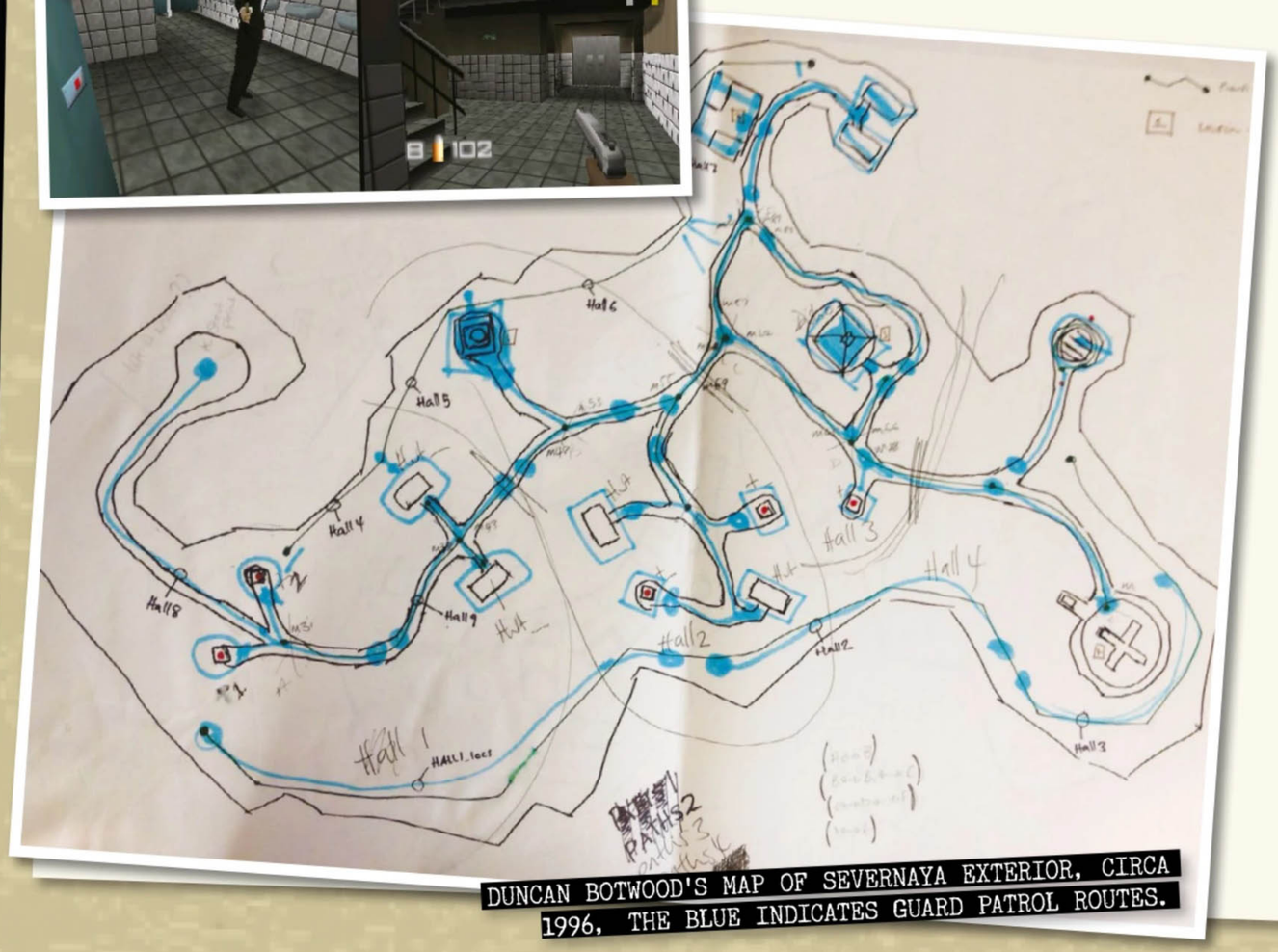
I had to introduce the concept of a 'player' into the game and gather all of the player's properties – their position, direction, health, ammo, animations and hundreds of others – into one place and then go through all of the tens of thousands of lines of code and make sure that anything that accessed player data was aware that there might be more than one player in the game. Hundreds, possibly thousands, of now-invalid assumptions had to be fixed, one by one. And because the game had been coded in C, which doesn't encourage programmers to be as structured as they would be with C++, the code had been written in a fairly freeform way with bits and pieces of data scattered all over the codebase.

It sounds a mammoth task.

We didn't know whether it would work when we started. My biggest doubt was whether it could work at an acceptable framerate. If it was going to be rendering up to four times as many triangles, maybe it would run at a quarter of the frame rate and be unplayable? The only way to find out was to do it, and of course some of the levels weren't available in multiplayer for those exact reasons, but luckily a good number of them performed well enough that it was worth continuing.

Didn't you keep everything multiplayer secret from the Stamper brothers?

I wasn't under instructions to frantically switch to another window if Chris Stamper entered the building, but then we didn't tend to see much of



DUNCAN BOTWOOD'S MAP OF SEVERNAYA EXTERIOR, CIRCA 1996. THE BLUE INDICATES GUARD PATROL ROUTES.

"MY DOUBT WAS WHETHER IT COULD WORK AT AN ACCEPTABLE FRAMERATE"

Steve Ellis

him so it would have been easy to keep it quiet without trying. I can't remember exactly when Martin told them about it, but it was well after the proof-of-concept stage. Obviously I was proud of what we'd achieved and Chris's reaction to good work was always positive.

Didn't Chris worry that multiplayer wouldn't be fun because you can see where your opponents are?

I never thought split-screen would have that kind of problem because if you're spending time looking at the other screens, you're probably not looking at your own enough to stay alive. I do remember arguing with Karl Hilton about the radars. He hated them so eventually I added a cheat to allow players to switch them off. It said something like 'Happy now, Karl?' when you activated it.

Multiplayer wasn't all you worked on, of course.

Growing up, I'd spent a long time doing assembly language programming on the Spectrum and later the Amiga, so I did a lot of low-level programming and optimisation for *GoldenEye* like texture mapping, RSP Microcode and demand-paged virtual memory, which simulates having more RAM than you actually do have by fetching things into memory only when they're needed. Sorry to get technical. I worked on visual effects like explosions, smoke and bullet holes and added the hidden Spectrum emulator. Lots of other stuff.

How important was multiplayer to the success of *GoldenEye*?

I think it challenged some people's assumptions about how fun split-screen multiplayer could be and I think it got a lot of attention for that. Without it, I don't think we'd be talking so much about the game 20 years later, despite its other 'firsts'.

Huge thanks to all the team for their time and to Graeme, Duncan and Karl for use of their original photos and artwork.

DID YOU KNOW?

GoldenEye features a ZX Spectrum emulator and ten games, buried deep within the code. You can access it with a N64 emulator and the relevant patch.

LOCATION, LOCATION

JETTING AROUND THE WORLD WITH BOND

CUBA

JUNGLE

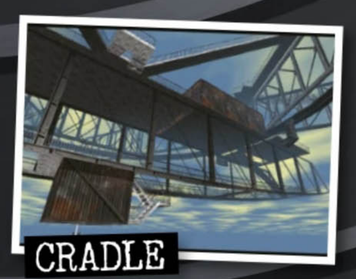
■ You've been shot down by a missile and must escape this guard-infested jungle. You'll also have to watch out for Xenia Onatopp.

CONTROL

■ This mission has you leading Natalaya to a computer so she can hack it. You'll come under fire once she starts, so protect her.

CAVERNS

■ Here you navigate lots of identical looking caves and finding security cards to open otherwise impenetrable doors. Not fun.



CRADLE

■ The final stage features another time limit and has you trying to stop Trevelyan from realigning the GoldenEye satellite.

SHOOT TO KILL

OUR OWN PERSONAL PICKS FROM Q'S LAB

SNIPER RIFLE

■ It's certainly not the easiest gun to use, but it does have amazing range, allowing you to kill from a safe distance, without fear of being shot.

AUTOMATIC SHOTGUN

■ You'll need to get close, which isn't ideal, but the reward is a powerful blast that will turn your opponent's insides into mincemeat.

ROCKET LAUNCHER

■ The great thing about this piece of metal is that you don't need to be super-accurate. Just make sure to get them in the blast radius.

REMOTE/ PROXIMITY MINE

■ Perfect for those levels that have lots of annoying nooks. Plant a couple and wait for your opponent's swears of frustration.

GOLDEN GUN

■ It's only available in the story mode via cheats, but it was available to use in multiplier mode. It's highly coveted because it can kill with a single shot.

KF7 SOVIET

■ This is possibly one of the most balanced weapons in the game, with good ammo, decent range and plenty of stopping power.

KLOBB

■ Named after Nintendo's Ken Lobb, this wonderfully pathetic piece of hardware is only really worth using when paired. It's such an iconic gun we had to include it.

RC-P90

■ This weapon has everything – great penetration, an insane magazine capacity and extremely good damage. It also fires ridiculously fast.

DD44 DOSTOVEI

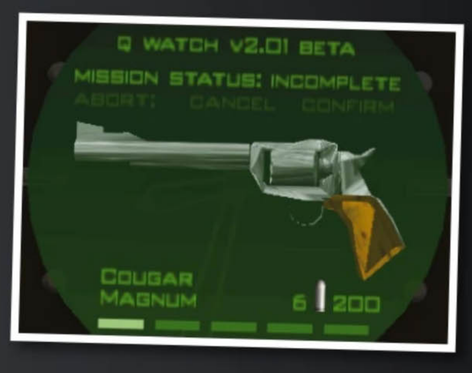
■ It's not quite as accurate as the PP7, but it does carry more bullets and we all know that it's bullets that kill people.

MILITARY LASER

■ This laser has no ammo limitations, making it extremely useful in a gunfight. It also boasts fantastic stopping power and looks cool.

GRENADE

■ You have to be quite skilled at throwing them, but the splash damage caused by lobbing a well-timed grenade should not be underestimated. Lob em and run.



COUGAR MAGNUM

■ Accuracy is massively impaired but the stopping power on this thing will halt a rhino. Plus it makes you feel like you're Clint Eastwood, which is nice.

AFTER REVOLUTIONISING 3D GAMING WITH SUPER MARIO 64, NINTENDO HAD THE UNENVIABLE TASK OF DELIVERING A WORTHY SUCCESSOR. NICK THORPE TALKS TO YOSHIAKI KOIZUMI TO FIND OUT HOW HIS TEAM DELIVERED ITS SUN-DRENCHED SEQUEL...

» This poor Chain Chomp is very hot, so Mario has to cool it down by using the FLUDD.

» Other areas of the island can be seen from a distance in backgrounds, like Pinna Park and Ricco Harbour here.

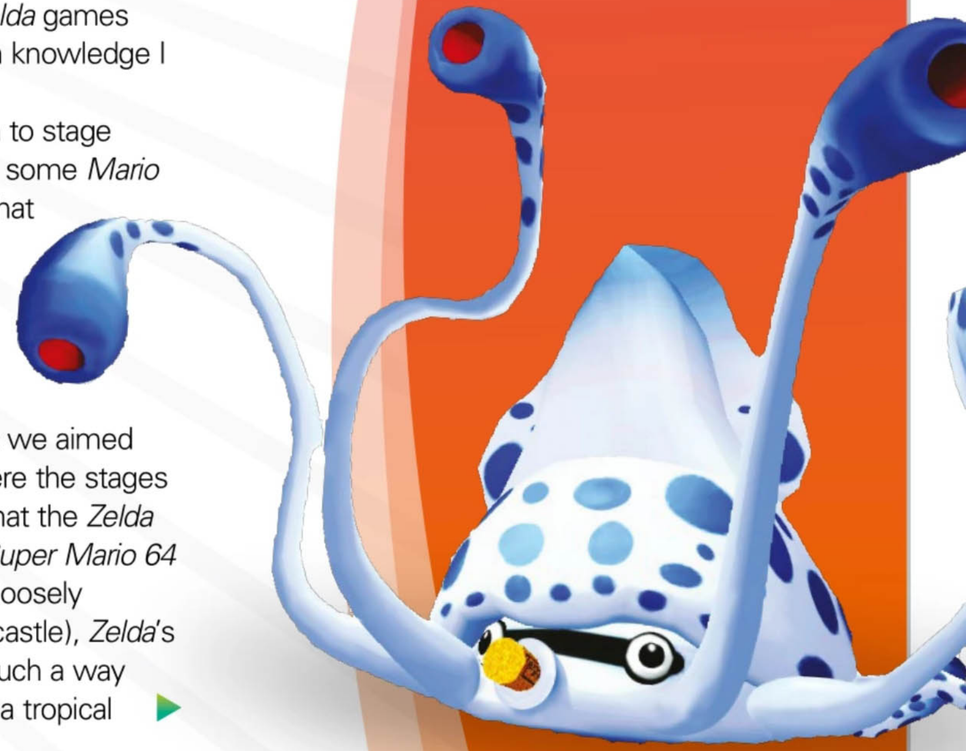
» You can clear goop from above using FLUDD's hover nozzle – just don't fall into it!

"We felt that setting the game somewhere other than the Mushroom Kingdom would give us new ideas" Yoshiaki Koizumi

Sometimes, no matter how much you respect Nintendo, you wouldn't want to actually work there – thanks to its successes, there's an enormous weight of expectation attached to whatever the company does. Take *Mario*, for example: having delivered one of the best games of all time in the form of *Super Mario Bros. 3*, the company had to deliver a next-gen sequel worthy of the series for the SNES. It succeeded with *Super Mario World*, landing it in the same situation again – and the company still managed to deliver the goods. In fact, *Super Mario 64* was arguably more impressive than *Super Mario World*, as Nintendo had to master 3D game design and did it first time. So sure enough, when the GameCube made its way to market, Nintendo found itself in a familiar predicament once again.

How do you improve on a game that revolutionised an industry? The thrill of *Super Mario 64* was in the introduction of 3D environments, and the way in which Mario interacted with them. The team at Nintendo EAD would have to tackle both of those aspects of the game, and they chose to start with the environments. "I wanted to create expansive stages that would be worth exploring," says Yoshiaki Koizumi, who worked as the director of *Super Mario Sunshine*. "After *Super Mario 64*, I worked on *The Legend Of Zelda* games and I wanted to use the 3D game design knowledge I picked up from them in a *Mario* title."

This meant taking a different approach to stage design, even to the point of setting aside some *Mario* traditions. "When we were visualising what kind of world we'd want to explore, we felt that setting the game somewhere other than the Mushroom Kingdom – as we'd normally do – would give us some new ideas that we could make use of," explains Koizumi. "Another point we aimed for was to create a seamless space, where the stages are linked together by terrain." It's here that the *Zelda* influence becomes obvious – whereas *Super Mario 64* featured a series of abstract stages only loosely connected by a hub (that being Peach's castle), *Zelda*'s 3D environments are interconnected in such a way as to feel like a cohesive world. "I chose a tropical



» Abstract backgrounds and floating platforms? Yup, this can only be a secret stage.

island as the setting, making it somewhere that was rich in variety and also could feel like somewhere you'd want to go yourself," explains Koizumi. "I wanted to create a game where you could feel like you were sightseeing on holiday."

The result was Delfino Island, a new setting for the *Mario* series, shaped like and named after a dolphin in tribute to the development codename for the GameCube. The usual platform game tropes didn't apply here as everything had to be on-theme, meaning that there was no room for slippery ice worlds. All of the locations on Delfino Island are themed around things that you would expect to see at a resort – public tourist attractions, like an amusement park, a beach and a hotel, as well as the more functional locations including villages and a harbour. Likewise, the Mushroom Kingdom's inhabitants weren't to be found in abundance. Instead, Mario would interact with the inhabitants of the island, the palm tree-headed Piantas and the shell-wearing Nokis.

Delfino Island made for a beautiful setting, but it wasn't one that instantly lent itself to a particular style of game. In fact, while a platform game seems like the most logical successor to *Super Mario 64*, Koizumi recalls the team looking in different directions to begin with. "When we were making prototypes, we were exploring the idea of a disaster recovery mission-style game. We experimented with a lot of different things before we switched over to making it a platform action game," the director explains. "It was a challenge coming up with ways to include new elements (like having people) without it seeming odd."

» Mario isn't entirely reliant on the FLUDD, he can still jump, slide and pound the ground.

Wait, "people" in a Mario game? That's right – and you can see this for yourself. When the game was revealed at Nintendo's Spaceworld show in 2001, a trailer was shown in which a young girl is seen in the background. The game was also set to use a new form of coin, the Sol Coin, which could be spent – something not usually done with the coins of the Mushroom Kingdom. A clue as to what they could be spent on lies in the unused data on the game disc, which contains messages relating to a train system that Mario could purchase tickets for. This doesn't appear in the final game, as Mario instead travels via warp points, like in *Mario 64*.

In fact, examining this first trailer is fascinating, because very little of what is shown in it made it to the final game. The island setting, Mario's moves and

BRIGHTEST SHINES

THERE ARE 120 SHINES TO COLLECT IN SUPER MARIO SUNSHINE – THESE ARE FIVE OF THE MOST MEMORABLE...

GLOOPER BLOOPER BREAKS OUT

RICCO HARBOUR

■ This is a memorable and pretty early boss fight. Our big inky friend wants to spray his goop everywhere, so Mario needs to use FLUDD to clean it up. Then he'll need to pull off the Blooper's tentacles one by one (how violent!), before tugging at its mouth in order to deal damage.

EELY-MOUTH'S DENTIST

RICCO HARBOUR

■ There's horrible pollution all over Eely-Mouth's teeth, and it's Mario's job (now dabbling in dentistry) to give them a good pressure clean. How? First you need to dive into the polluted waters of Noki Bay, then use the hover nozzle to blast water downwards. Just be sure not to drown...

THE SECRET PACHINKO BOARD

DELFINO PLAZA

■ There's a boat in Delfino Plaza, which passes under a bridge before leaving for the wide open sea. Jump up into the bridge and you'll warp your way to this giant pachinko board. Mario himself is the ball here, and the plucky crimson-capped hero requires some guidance to collect the eight red coins here.

> "When we were making prototypes, we were exploring the idea of a disaster recovery mission-style game" Yoshiaki Koizumi

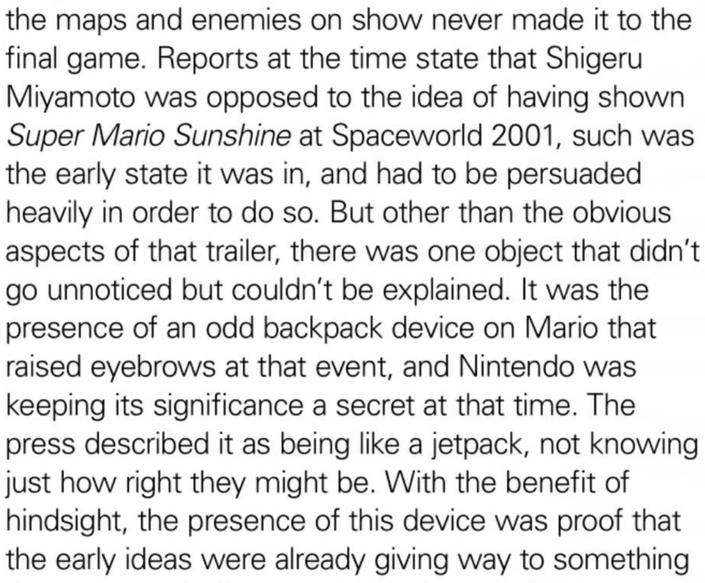
» Clearing goop off of pollution-spewing enemies is a remnant of an earlier concept.

the pollution theme are all more or less correct, but the maps and enemies on show never made it to the final game. Reports at the time state that Shigeru Miyamoto was opposed to the idea of having shown *Super Mario Sunshine* at Spaceworld 2001, such was the early state it was in, and had to be persuaded heavily in order to do so. But other than the obvious aspects of that trailer, there was one object that didn't go unnoticed but couldn't be explained. It was the presence of an odd backpack device on Mario that raised eyebrows at that event, and Nintendo was keeping its significance a secret at that time. The press described it as being like a jetpack, not knowing just how right they might be. With the benefit of hindsight, the presence of this device was proof that the early ideas were already giving way to something that was much closer to the final game design.

Mario's new tool was FLUDD – the Flash Liquidiser Ultra Dousing Device, according to its inventor Professor E Gadd. The device could rapidly store and discharge water, allowing it to perform a variety of functions of both offensive and defensive utility. "We thought that making playing with water the theme of the game would make this tropical world even more fun," Koizumi recalls. It was certainly a shrewd move, as Mario gained a family-friendly weapon. What's more, on a tropical island setting there should have been plenty of thematically appropriate opportunities to work water sources into stage design.

"In an early prototype, the player wasn't searching for Shine Sprites, and instead the story was set on an island that was slowly being polluted by enemies," Koizumi reveals. "The idea was that you'd wash the pollution away with FLUDD and also use it to defeat the boss enemy, the source of the pollution." Looking at the very first trailer for the game, you can see this idea in action – enemies spreading pollution are clearly present, and there's a gigantic enemy roaming about the place. But, as familiar as this sounds, such gameplay only makes up a portion of what's actually in *Super Mario Sunshine*. "A part of this was left in the game in the form of cleaning off graffiti to defeat enemies, or save people," says Koizumi. "Ultimately we decided to switch the theme to the platforming action you see now, and when we did so, we removed some of the FLUDD abilities and whittled them down to four."

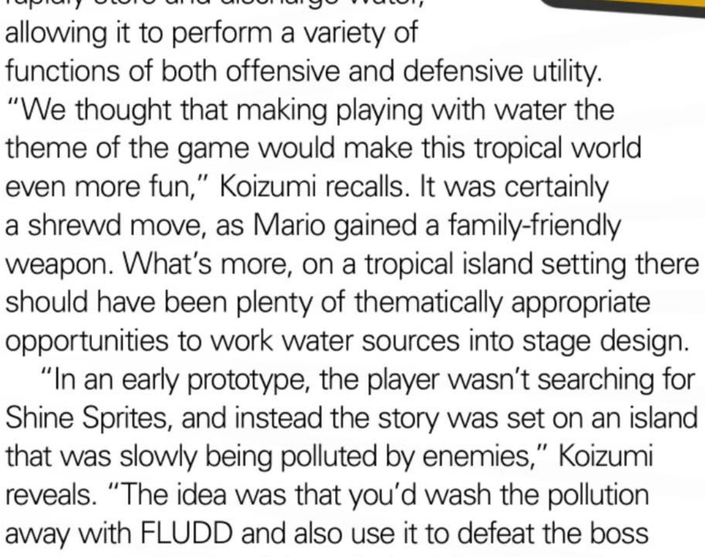
Cutting back on FLUDD's functions might not have been a bad idea, as the device certainly takes a major role in *Super Mario Sunshine*. In fact, in a weird way, it's possible to describe FLUDD as the star of the ▶



THE SECRET OF THE VILLAGE UNDERSIDE

PIANTA VILLAGE

■ This task reveals a whole different side to the village – you'll need to get underneath it with Yoshi to find the entrance to a secret stage. Once you're there, Shadow Mario will steal FLUDD, and you'll rely on strong Piantas to throw you between platforms.



THE SAND BIRD IS BORN

GELATO BEACH

■ Don't you know about the bird? Everybody knows about the bird. If you can make your way into the broken egg in the tower on Gelato Beach, you'll be transported to atop the Sand Bird. Your goal is to collect eight red coins without falling off, which is harder than it sounds as it occasionally decides to rotate 90 degrees.

HYDRO HEAVEN

SUPER MARIO SUNSHINE JUST WOULDN'T BE THE SAME WITHOUT FLUDD, THE VERSATILE WATER CANNON THAT GAVE MARIO SOME NEW MOVES

SQUIRT NOZZLE

■ Your standard hose or water pistol attachment, which is necessary in a wide variety of situations – you'll clean graffiti, extinguish fires and fill containers with this attachment. Pressing the Y button will put your viewpoint behind Mario's shoulder, enabling you to aim more accurately when targeting tricky enemies.

HOVER NOZZLE

■ Though you can use these twin downward jets to attack from above, their most common use is as a pseudo-jetpack that can keep Mario aloft for a few seconds after a jump. If you're using this to clean graffiti, make sure you pull backwards just before your jets cut out, or you'll land smack-bang in the goop.

ROCKET NOZZLE

■ When triple jumps, spin jumps and even wall jumps can't get you where you need to go, build up some water pressure and then let it off for an almighty blast into the sky. This will easily let you to leap tall buildings. There are limitations, though - you can't blast off while swimming.

TURBO NOZZLE

■ Using the force of FLUDD's tank being discharged at high pressure, Mario can run fast and even jet through water – like when people strap fire extinguishers to wheelchairs. It's a surprisingly sustained effect and Mario is pretty hard to handle, but it does let him stick two fingers up at old rival Sonic.

» Delfino Plaza is a stunning location, especially as the GameCube has the power to draw it all in one screen.

▶ show in *Super Mario Sunshine*. Many of the game's objectives involved using FLUDD to clean up graffiti and pollution, and the four new moves that Mario gains would be impossible without it. FLUDD was even given some screen time as a character – thanks to the artificial intelligence bestowed upon it by Professor E Gadd, FLUDD could actually talk. But the addition of the device didn't come without problems.

"The difficulty of jumping onto platforms has been an issue in 3D platforming games since *Super Mario 64*. To ease the problem, users could use FLUDD to shoot water downwards so they could fall down as if they were experiencing low gravity," says Koizumi. "We put a limit on the amount of water available, and it was actually a lot of work for us to place water sources!" The need to incorporate water sources is one which is usually cleverly dealt with – you can see how the team has included fountains and puddles and even an indoor swimming pool in locations throughout the game. However, sometimes even this isn't enough, and the game rewards you with a water bottle for defeating an enemy. It's an inelegant solution, but one which proves necessary given the constraints imposed by the design.

Luckily, the level design as a whole was something that Nintendo had a better idea of how to handle. The biggest advantage of the GameCube hardware was that it could render larger and more complex game worlds, and Koizumi and his team relished the chance to work with them. "With the extra space in the stages, we were able to set up shortcuts by preparing jump platforms to make it easy to get around, and

» The scale of some enemies in *Super Mario Sunshine* is terrifying – look at this Big Wiggler!

build the stages so users were free to choose their own route to move through them – for example, by running around on the roofs of buildings and so on," says Koizumi. This recognises one of the fundamental joys of *Super Mario 64*, which was seeing how you could get into odd places – for example, on top of Peach's castle in the hub world. Nintendo rewarded that exploratory spirit in *Super Mario 64*, and it would do so again in *Super Mario Sunshine* – even in the hub world. While some of the level entrances in Delfino Plaza are nice, ground-level portals, there's more to discover – you've got to find a warp pipe on top of a building to get to Sirena Beach, for example.

However, there was a danger that players would fail to map out the new, larger spaces in their heads – one that the team was fully aware of. "When designing open stages, you have to consider that if the player doesn't have a way to tell where they are in the stage, they can easily get lost," Koizumi tells us. "In *Super Mario Sunshine*, we put large landmarks in the stages, so players could move around using those as indicators of their position." With that concern dealt with, the team was free to populate these larger stages with fun things to do. "We decided to create multiple missions that took advantages of the space," Koizumi continues. "We designed the stages so that not only did they have a main goal, but you could also reach sub courses, and of course we also included collectables like Blue Coins and so on."

The courses in *Super Mario Sunshine* certainly do add more in the way of additional subcourses, as compared to *Super Mario 64* – Sirena Beach has the whole hotel interior of course, and there are one-shot extras like the Sand Bird's tower on Gelato Beach. But the biggest and most prominent addition of extra courses comes in the secret stages. Unlike the main stages, these are exercises in pure platforming and they're typically pretty abstract – while all the game's main courses are rooted in believable tropical island locations, the secret stages are floating in midair with bizarre backgrounds. The most interesting thing about them, though, is that they tend to leave you without one of the game's biggest distinguishing points by taking away FLUDD. "We removed FLUDD from the secret courses because we wanted to add some variation to the difficulty," recalls Koizumi. "The advantages of FLUDD are its ability to let you make low-gravity jumps. Put the other way, by removing FLUDD it makes the jumping more challenging!" Indeed – some of *Sunshine*'s most challenging stages are those in which you haven't got FLUDD.

"We designed the stages so that not only did they have a main goal, but you could also reach subcourses" Yoshiaki Koizumi

With all of the attention on FLUDD, there's actually a returning character that people tend to forget about when *Super Mario Sunshine* is discussed – good old Yoshi, who had by this point become a star outside of the *Mario* series, thanks to games like *Yoshi's Island* and *Yoshi's Story*. "Yoshi appeared as a guest character in *Super Mario 64* as well, but you couldn't play as him. So in *Super Mario Sunshine* we wanted to add Yoshi as a playable character you can ride on," says Koizumi. This was the first game since Yoshi was introduced in *Super Mario World* where Yoshi could be ridden by Mario as he was in that first appearance, and he was a bit different. But as it turns out, there's a reason for that according to Koizumi: "Well, strictly speaking, it's just a graffiti version in this game, and not the actual Yoshi!"

As always, Yoshi hatches from an egg, but in this game he'll only respond to the presence of the various fruits scattered throughout each stage. Once you tempt him out with the correct treat, Yoshi is as faithful a companion as ever – he'll put the extra effort in and struggle at the end of a jump to grab you some extra air time, he'll whip enemies into his awaiting mouth with his incredibly lengthy tongue, and he even adds an extra drum track to the music, just as he did in *Super Mario World*. But this

graffiti Yoshi doesn't like water – he'll dissolve if he falls in – and he can shoot juice from his mouth, in a bizarre and sticky twist. However, you don't get a whole lot of opportunities to use Yoshi – he's present for the missions he needs to be in, but he's not found nearly as regularly as in a game like *Super Mario World*.

The anticipation for *Super Mario Sunshine* was palpable, and it's not surprising that the press dedicated huge reviews to the sequel to one of the biggest games ever. However, *Super Mario Sunshine* wasn't a game like *Super Mario 64*. It was bold in a different way – where *Super Mario 64* had to strike out a template for 3D platforming as a whole, *Super Mario Sunshine* had to play with that now-established wisdom, and, in many ways, buck Mario's usual trends. Structurally, this was a game much like *Super Mario 64*, but with messy and experimental innovations thrown in to keep things fresh. In short, this was an evolutionary game rather than a revolutionary game, and the difference still colours the reaction to *Super Mario Sunshine* today.

As you might have expected, *Super Mario Sunshine* launched to critical acclaim when it hit the streets of Japan in July 2002. As the localised releases followed over the next few months, the reviews stayed excellent. If you look at review aggregators today, the average score for the game is 92% – a staggering achievement that any developer would be proud of. NGC's Geraint Evans awarded the game 96% and declared that it was everything you would have wanted it to be, and IGN's 9.4/10 review noted it as being the best single-player game available for the GameCube. Even the often curmudgeonly *Edge*, while noting that the game wasn't quite as good as *Super Mario 64*, still offered the game 9/10 and, preceding Kanye West by some years, declared it "the second best platform game of all time. *Of all time*".

However, as astonishing as it might seem given the praise this indicates, it's clear that certain elements of the gaming press felt a tad let down by the game. Gamespot was probably the most outspoken – Jeff Gerstmann's 8/10 review found a number of points to criticise. "On its own merits, *Super Mario Sunshine* is a solid game with a really distinctive look and some great moments, but it also has its fair share of shortcomings," said the reviewer. "While some

» It's rare to see mirrors that look as good as this in games today, never mind 2002.

"We removed FLUDD from the secret courses to add variation to the difficulty" Yoshiaki Koizumi

» Creative thought was required to work series staples like Boos into a tropical island setting.

gamers will be able to look past or even embrace the fact that *Super Mario Sunshine* sticks extremely close to *Super Mario 64*'s formula, others will find that the game suffers from a lack of innovation. The game's technical issues and often-gimmicky design are still tougher to ignore, and they combine to make the game seem surprisingly unpolished and somewhat rushed at times," he concluded, referencing his criticism of FLUDD and the game's often wayward camera.

The criticisms certainly aren't invalid. *Super Mario Sunshine*'s camera is often wayward, depicting Mario as a silhouette and all objects around him as a basic question mark as it gets stuck behind a wall. The fact that FLUDD and its additional moves never returned could also mark it out as a gimmick. And if it feels like the game had a short development cycle, Gerstmann could well be right – after all, there was just a year between the release of the final game and the Spaceworld 2001 prototype that it barely resembled. It's certainly telling that a third of the game's 120 Shines are attributed to the hub world of Delfino Plaza, rather than any of the main courses that Mario explores. Yet ultimately, this didn't matter a great deal to the players themselves. *Super Mario Sunshine* was the best GameCube platform game available by a country mile when it released, and sold by the bucketload, shifting 5.5 million copies – fewer than previous main *Mario* games (in fact, only half of what *Mario 64* sold) but still comfortably multi-platinum, and that's a big deal as it wasn't a launch game and never came bundled with the console.

When looking back at his own favourite achievements with the game, Koizumi singles out the visuals enabled by the GameCube. "The 3D rendering performance was quite high for the hardware at the time, so I feel like we succeeded with the graphics to make the world feel real," Koizumi recalls. "I felt ▶

LET'S DO THE ODYSSEY

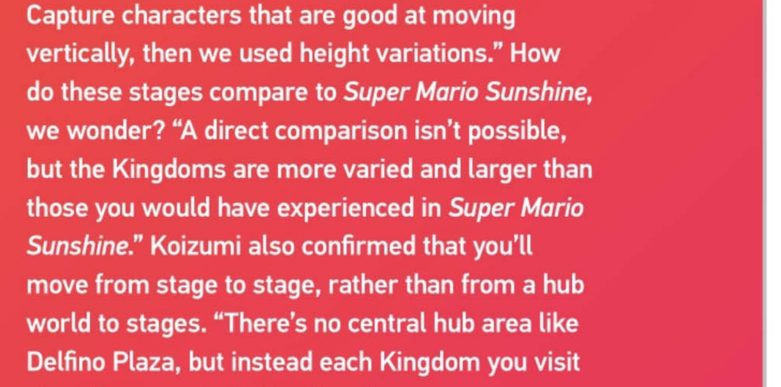
HOW SUPER MARIO SUNSHINE'S DESIGN HAS INFLUENCED NINTENDO'S LATEST ADVENTURE

It's fair to say that *Super Mario Sunshine* was considered a bit of an odd duck at the time it was released. The use of more realistic urban environments was a big departure for Mario. So too was FLUDD, the tool that helped *Mario* clean up Delfino Island, thanks to the way it changed how Mario interacted with his environment.

Skip ahead some 16 years and the recently released *Super Mario Odyssey* is the first *Mario* game since *Super Mario Sunshine* to employ open 3D environments and mission-based progression. While you won't see FLUDD, ice levels are most definitely back, it's also fair to say that *Odyssey* is revisiting many of *Sunshine*'s eccentricities. For a start, the game mixes more fantastical environments with ones that draw heavily from our real lives, such as the urban New Donk City – and as in *Sunshine*'s prototype stage, it will feature actual humans. The game is also set to feature another sentient tool for Mario to wear, which greatly affects how he interacts with the environment around him.

When we remark on the similarities, Koizumi reveals that it was a coincidence of development, "Mario's had companions on his adventure before, like FLUDD and Luma, but this isn't actually what we were initially aiming for with Cappy," he explains. "In the same way that FLUDD in *Super Mario Sunshine* can erase graffiti and attack enemies, the origin for Cappy in *Super Mario Odyssey* was in the game design. It was after we gave him some personality and character that we ended up with what we have now."

Cappy is, much like FLUDD, a versatile companion which fulfils a number of gameplay functions. "Cappy plays an important role in Mario's moves in *Super Mario Odyssey*. Mario can throw his cap to destroy things in the stage or use it as a platform to jump long distances," says Koizumi. "You can also use a power that lets you control objects or enemies in a stage by hitting them with your cap." With a simple flick of the wrist, Mario flings Cappy at sentient creatures and takes control of them – you can tell they've been hit with Capture because enemies gain Mario's distinctive red cap and moustache. "We



are always trying to come up with new moves for the player to do in our 3D *Mario* platformers," Koizumi continues. "We implemented this Capture ability that lets you use the abilities of various objects as a way to include more moves in this game than ever before. Players can create their own gameplay experience by looking at enemies and objects and imaging what kind of moves they'd be able to do."

This new ability has caused a rethink of how stages are designed, as compared to *Super Mario Sunshine*. "In the world that Mario is exploring in *Super Mario Odyssey*, there are a variety of Kingdoms (ie stages) both large and small," says Koizumi. "Kingdoms where you can use the new Capture move to control fast-moving characters are very wide. But for stages where you can Capture characters that are good at moving vertically, then we used height variations." How do these stages compare to *Super Mario Sunshine*, we wonder? "A direct comparison isn't possible, but the Kingdoms are more varied and larger than those you would have experienced in *Super Mario Sunshine*." Koizumi also confirmed that you'll move from stage to stage, rather than from a hub world to stages. "There's no central hub area like Delfino Plaza, but instead each Kingdom you visit plays its own role in the story."

Super Mario Odyssey is on sale now. Give it a try and you'll be able to see for yourself if it lives up to all the critical acclaim (it does).

SUPER MARIO SUNSHINE

SIGHTSEEING GUIDE

MAKE THE MOST OF YOUR TIME ON DELFINO ISLAND WITH OUR HANDY GUIDE TO ALL THE MOST EXCITING TOURIST ATTRACTIONS

PIANTA VILLAGE

■ Generations of Piantas have called this village home. Residents live up in the trees, while enormous wild mushrooms thrive on the ground below.

NOKI BAY

■ The home of the Nokis is a land of steep cliffs and abundant waters. Unfortunately, since Mario has arrived, pollution has taken hold in the sea here.

CORONA MOUNTAIN

■ Residents of the island like the hot springs at the foot of this volcano, but Mario will have to venture into its dangerous lava caves to succeed here.

GELATO BEACH

■ Sun-lovers will want to head to this beach at the south of Delfino Island, as it's the biggest around – just watch out for the marauding Wigglers that pop up.

SIRENA BEACH

■ As the night draws in, visitors to Delfino Island retreat to this beach, famed for its magnificent sunset views and the four-star Hotel Delfino.

PINNA PARK

■ The small island that makes up the 'tail' of Delfino Island is host to an amusement park, featuring exciting rides and maybe even a giant metal Bowser...

RICCO HARBOUR

■ The biggest port on Delfino Island is unsurprisingly full of boats, and is said to be the best place on the island to eat some freshly caught seafood.

BIANCO HILLS

■ This picturesque residential community is located in the rolling hills, right by a magnificent lake. Gentle breezes keep the famous windmills spinning.

DELFINO AIRSTRIP

■ This small airstrip serves as the entry and exit point for all air travel to the island. We'd expect something bigger – maybe most tourists travel by boat?

» Clever use of space gives Pianta Village hidden depth – this hanging pathway is under the main level.

"We lived up to the challenge of making a more realistic Mario game compared to the visuals you'd expect" Yoshiaki Koizumi

we lived up to the challenge of making a slightly more realistic Mario game compared to the visuals you'd normally expect." It's fair to say that many of the effects were breathtaking – the sunset lighting at Sirena Beach and the heat haze visible in the distance in Delfino Plaza really drove home the feeling of a tropical island. However, the water effects stole the show – the gentle waves of the game's sea, with sunlight reflecting off its surface, were amongst the most realistic ever seen in a videogame, and still look fantastic today.

Reflecting on *Super Mario Sunshine*, it seems like it would always have been in a tough spot. Following up a game like *Super Mario 64* is hard, and while *Super Mario Sunshine* was criticised for not being different enough, we can only imagine what people would have thought of some of the other ideas being considered for the game. There had already been a surprised reaction when the GameCube's launch was accompanied not by a *Mario* platform game, but *Luigi's Mansion* – a ghost-hoovering spin-off. We can very easily see a situation in which players would have baulked at a *Mario* disaster recovery game instead of something more like *Super Mario 64*. If *Super Mario Sunshine* disappointed some, that's only because it was following a game that redefined an entire genre. Some of its experiments didn't quite come off as well as hoped, but that actually makes it more endearing – it's a sign that Nintendo is always looking for new directions for its veteran mascot.

Still, *Super Mario Sunshine* is a fantastic game. You can see that from the high review scores and the sales, you can see it in fan attempts to remake the game (including a fantastic Nintendo DS version), and you can feel it when you play the game – there are few things in gaming as fun as knocking over a Wiggler with sand dunes, or finally catching that pesky Shadow Mario. And that's what matters at the end of the day – *Super Mario Sunshine* might not have had quite the same impact as its predecessor, but games aren't about impact, they're about entertainment. And 16 years on, *Sunshine* is still as entertaining as ever.

DELFINO PLAZA

■ The commercial hub of Delfino Island is also the hub world of the game. Merchant Piantas set out their stalls with fruit, and boats ferry goods to and fro.

» A more industrial environment, like Ricco Harbour, gives Mario apparatus to climb.

INSIDE THE XBOX

MICROSOFT MAESTROS

The developers who dared to think outside the box

SEAMUS BLACKLEY
Xbox CTO

ED FRIES
VP of Games Publishing, Microsoft Game Studios

OX

MICROSOFT IS ONE OF THE TITANS OF TODAY'S CONSOLE GAMING WORLD, BUT IT WASN'T ALWAYS THIS WAY. NICK THORPE SPEAKS TO THE MEN BEHIND THE MACHINE AND ITS GAMES TO FIND OUT HOW THE WINDOWS COMPANY INVADED THE LIVING ROOM...

The idea of Microsoft making a games console in 1999 was fucking ludicrous!" Seamus Blackley's recollection isn't wrong, but such a notion seems like ancient history today. Microsoft is now established in the console gaming industry, with a tenure that is soon to match the likes of Sega and Atari's hardware ventures, so it's easy to forget a time when journalists openly questioned how such a "terminally uncool" company could make a successful incursion into an entertainment business. But the Xbox did succeed thanks to a band of committed gamers, a forward-thinking approach to development and a boatload of cash – and there's never been a better time to get into the console than today, thanks to its cheap games.

The Xbox story begins with Seamus Blackley, who in the late Nineties was at Microsoft and in charge of entertainment graphics on Windows – essentially, getting multimedia and gaming applications working nicely. "Sony announces the PlayStation 2, and they say it's going to replace the PC," recalls the industry veteran. "I had the roadmaps of all the graphics card manufacturers – 3DFX, Nvidia, ATI. I was visiting my girlfriend who was at that point living in Boston, flying there, and I realised that the roadmap for graphics from the guys making cards for the PC was going to far exceed the performance of what PlayStation

XBOX

> **"When it was looking bad, people called it 'Coffin Box' – Your career's in the coffin if you work on that!"**
>
> Seamus Blackley

▶ was going to do." The only problem for Seamus was the PC platform itself. "I'd been making PC games at that point for many years. You have to pander to the lowest common denominator, so you can never make a game that actually uses the full performance of any of these things, whereas on console you can because obviously you've got a single hardware target."

The appeal of a single platform was somewhat rooted in Seamus' recent development history. "I had nothing to lose but I was also passionate, because I had this titanic and horrible failure with the game *Trespasser*," notes Seamus. The *Jurassic Park* tie-in was ambitious – its environments, physics engine and rendering techniques were far beyond what most games had to offer in 1998, but it was shoved out of the door early and required a monstrously powerful PC to run acceptably. Together with fellow DirectX engineers Kevin Bachus, Ted Hase and Otto Berkes, Seamus drew up a plan for a "DirectX Box" console. "Our entire goal was to make a box for developers, because we were all developers," Seamus explains.

» Instead of porting PC properties, existing Microsoft developers like FASA Studio worked on new games, like *Crimson Skies*.

Rather than using the custom components of its competitors, the team chose to employ largely off-the-shelf PC parts in the hardware design. "At that time, everybody made games on the PC. All the PlayStation games – even Nintendo, the PC was the development platform. They would have a target, and then they would compile it for this other platform, because the PC had all the tools," explains Seamus, explaining the philosophy behind this choice. "So the basic, simple thought is why don't we just have the target platform also employ that architecture? Then it's super trivial and nothing gets in your way. If we can do that, then we should have a huge advantage in making better content, and in a content business that's the win."

To get that content, the DirectX team would have to work with Microsoft's established gaming division. "I'm someone who loves games, and I had left the Office side of the company to run Microsoft's game business because of that," remembers Ed Fries, former vice president of game publishing at Microsoft. "I had worked for about four years to grow Microsoft's game business on the PC and we had done well there, so we were just starting to think about how we could grow more and faster. That involved thinking about getting into the console world, where we hadn't really done anything yet. So that was what was in my head when the guys from the DirectX team first walked into my office and proposed the original Xbox." Ed would soon find himself as part of that team, managing Microsoft's internal Xbox software development efforts, and after launch he became responsible for third-party relations, too.

Selling the Xbox vision was easier said than done, in part because the Xbox as a consumer entertainment device didn't fit the company culture of selling business software. "One of the huge problems we had was that we were at the Windows company," Seamus explains. "We said, 'Hey, we want to make this games console,' and every Microsoft guy who had been steeped in operating systems said, 'Oh yes, Windows for the living room – it'll run Windows and we can upgrade it,' and we would freak out and say, 'No, it's fixed, that's not how this business works.' We had to explain to them that the console business was a business in which you sold content, and made money from the content, not from the operating system." Seamus and the Xbox team would have to fight an uphill battle against corporate caution, and soon learned that the best way to fight it was to make out that there was no battle at all. "There were a lot of people who said it should be Windows for the living room, and we surfed on that – we let people believe that because it helped us. Members of our tiny little rogue tribe, we understood that the end result was going to have to be no operating system."

While an internal political battle is no surprise, what comes as a shock is that despite being aware of the company's power and resources, the games industry was also sceptical of Microsoft's chances

» Seamus Blackley credits Bill Gates, seen here unveiling the Xbox, as being a key internal supporter of the console.

» *Halo 2* generated an enormous $125 million in sales on launch day.

in the console market. "For the first six months, Xbox was me and Kevin going around and giving a presentation for developers," recalls Seamus. "We had a meeting with the president of one of the big Japanese game companies. He proceeded to tell me that Xbox was going to fail, that no American console could succeed, and that I was going to be unable to get Microsoft to do it, and that nobody was going to believe that Microsoft would carry through." That wasn't the only hostile response Seamus endured, as another incident at a large publisher's Canadian studio illustrates. "The guys who ran that office took me aside and told me I couldn't speak there because they didn't believe Microsoft would do a console, and that I could pull it off. The whole audience was waiting for 40 minutes while they grilled me."

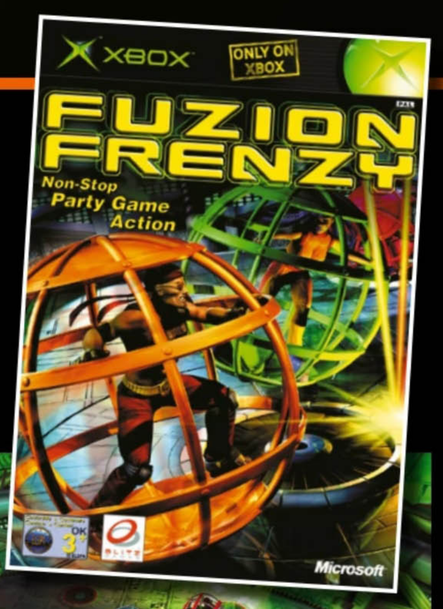
Right up until the green light was given, other people wanted to have their say, and the Xbox team found itself fending off attempts to turn the project into Web TV, a tablet and other such things that were closer to Microsoft's comfort zone – as well as attempts to kill it stone dead. "When it was looking bad, people called it 'Coffin Box'," remembers Seamus. "Your career's in the coffin if you work on that! People would say this to me and I'd say 'No, it's going to succeed' and then I'd drive home crying."

What ultimately kept the project from failing was the support of the company's old guard, from the early Windows days. "A few people who were around from that era, and remembered what it was like, were reminded of it by what we were

» Rare utilised the power of Xbox to make Conker look fluffier than ever before.

Q&A: PHILIP OLIVER & ANDREW OLIVER

The men in charge of Blitz Games look back at the creation of the first published Xbox game



» Designed as the Xbox's answer to party games like *Mario Party*, *Fuzion Frenzy* sold enough to warrant a sequel.

How did you get the job of producing *Fuzion Frenzy* for Microsoft?

Philip: When Microsoft decided to enter the console market they sensibly decided to contact many major developers around the world. Blitz Games was growing fast and gaining a great reputation for mass market, fun character-based games. They wanted to launch with a variety of first-party games that appealed to different player types and one of the slots they were trying to fill was a party game. This fitted our profile well and we were invited to pitch.

What were the advantages and disadvantages of the Xbox hardware compared to the competition?

Andrew: It really was a standardised PC in box. This meant it was extremely familiar and easy to develop for, especially for any developers that came from PC development. In fact, Microsoft told developers to just get on and write the games, ASAP, with high spec PCs and console-style controllers.

How long did development of *Fuzion Frenzy* take?

Philip: We learnt Microsoft was planning a console in summer 2000 and pitched Blitz Party in the Autumn. November and December saw us getting the team together and getting the project underway. To win the contract, not only did it need to be a great compelling game, we had to agree to have the game mastered by the end of August 2001. Microsoft assured us things would move fast from their side and so we immediately put developers on making minigames, as we only had ten months of development time.

How did you come up with the minigames found in *Fuzion Frenzy*?

Andrew: We had a team of about 35 people on the game and split them into three subteams. Within these subteams we paired artists with programmers and each had to create a prototype game a week for the first two months. Then, working with our Microsoft Producer, Gordon Hee, we picked the ones that were working best and dropped those that looked problematic or just weren't fun. The next phase was to work up the chosen prototypes to more polished games, with depth, AI and fitting the chosen art style. It was massive parallel development and it worked really well and resulted in 45 minigames and the metagame. *Fuzion Frenzy* was completed on schedule and was the first mastered game for Xbox, in fact it appeared on shop shelves a week ahead of the Xbox itself!

» *Fuzion Frenzy* will be backwards compatible on the Xbox One when the Xbox One X launches on 7 November.

What audience was the setting and cast of *Fuzion Frenzy* designed to appeal to?

Philip: We wanted to ensure there was a consistent style running through all the games, even though they were all very different in gameplay. So, whilst designers and programmers were prototyping fun minigames, the art team were working on characters and art styles that would bind everything together coherently. They took inspiration from the skaters and boarders scene and then we decided to give it a strong futuristic sport arena look, taking inspiration from films like *Blade Runner* and *The Running Man*. We worked with JD Alley, the Microsoft Art Consultant to finalise the style.

How did you feel about *Fuzion Frenzy*'s sales and critical reception?

Andrew: I think the reception and sales, around half a million copies for the opening selling quarter, were all pretty reasonable and justified. Obviously, we'd hoped for more, but the small install base, and cost of additional controllers limited its potential. The development team continued development with *Fuzion Frenzy 2* with online play, as we knew that in the new year Microsoft would be launching the Live service and *Fuzion Frenzy* would make an obvious launch title for the service. Sadly, slow sales on the original boxed version meant they halted development of this version.

Later, sales continued to rise and over a million copies were sold. We were in constant contact with our producer and we convinced them it was worth making a sequel. However, due to internal politics at Microsoft, whilst they agreed to a sequel, they put the game out to tender and we had to bid competitively to win the rights to develop it. Hudson Soft was chosen as the developer of the sequel and they used a lot of our concepts.

We are extremely proud of *Fuzion Frenzy* and the team that built it. Those ten months were a pretty intensive time for all involved, but it was fun to develop and we so pleased that so many people found it fun to play and still fondly remember it.

BARGAIN HUNT

IF YOU WANT TO GET YOUR XBOX COLLECTION OFF TO A FLYING START, CHECK THESE OUT...

AMPED..... £0.50

■ This is an enjoyable snowboarding game, featuring free-roaming action that wouldn't become commonplace until later in the decade.

CHRONICLES OF RIDDICK: ESCAPE FROM BUTCHER BAY..... £1.00

■ This first-person adventure is a fantastic prison break tale, which allows you to both attack from the shadows and enjoy brutal brawls.

DEAD OR ALIVE 3..... £0.50

■ This fast-paced fighting game boasts phenomenal graphics and multi-tiered arenas to smash your opponents through.

FABLE: THE LOST CHAPTERS..... £0.50

■ This Classics version of the ambitious Lionhead RPG has even more content than the original, with extra areas, quests and more.

HALO: COMBAT EVOLVED.. £0.50

■ The FPS which almost single-handedly propelled the Xbox to success is an essential purchase for this crazy price.

HALO 2..... £0.50

■ It's the bestselling Xbox game ever! For this price, you might as well buy four copies and get a good old fashioned LAN party going.

NINJA GAIDEN..... £1.00

■ It's tough, but this 3D revival of Tecmo's classic franchise is a fast, stylish and very violent hack-and-slash adventure. Heads *will* roll.

PROJECT GOTHAM RACING 2..... £0.50

■ Bizarre Creations' sequel occupies the middle ground between arcade excitement and hardcore simulation.

TOM CLANCY'S SPLINTER CELL £0.50

■ This stealth classic is at its best on Microsoft's console, thanks to longer levels and a tougher challenge all-round.

TOP SPIN TENNIS..... £0.50

■ This doesn't let you give Tim Henman the Wimbledon victory he craved, but that's about all this excellent tennis game doesn't do.

TOTAL..... £6.00

» *Knights Of The Old Republic* was a big exclusive draw for *Star Wars* fans and RPG fans alike.

doing with Xbox and helped us out," Seamus recalls. "Chief amongst them was Bill Gates, but also Rick Rashid who ran Microsoft Research and Rick Thompson who ran the hardware group, and many, many others who loved the spirit of the thing, and backed us up politically in ways that I didn't even understand that we needed."

After getting the green light, Ed had less than two years to put together a launch line-up. As well as commissioning games from respected external studios, Microsoft employed what Ed calls an "all hands on deck" approach to game development internally. The teams that had been responsible for the company's successes in PC gaming were involved, but for various reasons didn't bring the old properties across. "It didn't really make sense to take *Flight Simulator* over, but it was certainly considered at times," Ed recalls. "The guys at Ensemble Studios looked at *Age Of Empires* and had multiple Xbox prototypes that they were developing, but none of those ended up turning into something real. The FASA group had a lot of contributions, *Crimson Skies* is a well-loved original Xbox game, and that came out of a PC game that the group had developed a few years earlier." While not a conscious choice, this ultimately gave the Xbox an identity distinct from Microsoft's PC gaming heritage.

For all of the gaming expertise that already existed within Microsoft, the team that would ultimately make the biggest impact was a new acquisition, Bungie. The team had a good reputation from the *Marathon* and *Myth* games,

» *Ninja Gaiden* put the Xbox to great use, displaying a number of impressive graphical effects.

"As far as Bungie goes, I definitely bet everything on Halo… All was going to get was the team and Halo"

Ed Fries

but had hit financial trouble and was up for sale. "As far as Bungie goes, I definitely bet everything on *Halo*," says Ed. "I had to do a deal with [minority Bungie owners] Take-Two, and basically the way we put the deal together was they got the back catalogue, all the old work and brands from the past, and all I was going to get was the team and *Halo*." The promising first-person shooter had already been revealed for PC and Mac, but Microsoft decided it'd be a great Xbox exclusive.

Did I know then that *Halo* would be the killer app? In a lot of ways, we didn't really know what we were doing," confesses Ed. "We had never done a game in the console world before. We were getting a lot of mixed feedback – a lot of people looked at *Halo* and thought it looked like a PC game, they thought it wasn't colourful enough, the characters weren't cartoony enough. There was a nagging feeling that because we had come from a PC heritage, that this was the game that appealed to us, but it wouldn't to the regular console audience." Knowing that the office favourite might not be universally appealing, the team made sure to back a safer bet too. "At the same time we were working with Lorne Lanning, who is a super talented guy with his *Oddworld* franchise which had been proven successful on the PlayStation," Ed explains. "That was another game we were excited about, so we launched both games with a pretty similar amount of marketing support."

What helped every team was that the system was easy to work with. This was the biggest goal for the system, and by all accounts the team delivered on this front. Chris Sutherland was at Rare as the company transitioned from GameCube to Xbox, and remembers the move being relatively painless. "As you'd expect with Microsoft, there was plenty of documentation so it wasn't too tough to move over," the programmer recalls. Former Bizarre Creations developer Stephen Cakebread was also impressed with the developer support, particularly when it came to tools. "They were a significant step up from the tools on other platforms, and eventually they even surpassed what was available on the PC," he explains. "Even though the Xbox had better raw performance numbers over the competition, I think the improved environment for devs is what made the most difference." It was a big win for the team, and one which Seamus considers to be a signature achievement for the platform. "Sony and Nintendo got away with treating their developers terribly," he says of the pre-Xbox years. "The thing that I'm most proud of, that I think everybody can be most proud of, was that Sony suddenly had to do developer support."

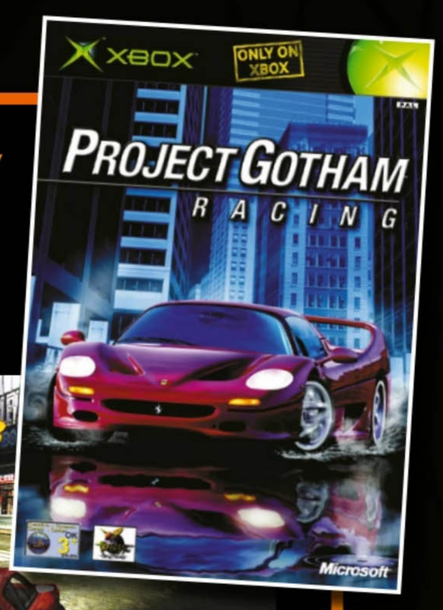
It also didn't hurt that as a piece of hardware, the Xbox was a beast. The system packed a 733MHz Intel Pentium III CPU, a custom Nvidia GeForce 3-based GPU, 64MB shared RAM and a DVD drive. The machine also included an 8GB hard disk – a first in console gaming. This was a big advantage, as former Bizarre Creations programmer Stephen Cakebread explains: "The HDD was faster than a DVD, so if you copied files from the DVD to the HDD you could load them much faster next time around, with the additional bonus that you could load from both the HDD and DVD at the same time! (eg, loading levels from one and streaming music from the other)." Overall, the Xbox had the specification of a decent PC of the time (which still would have cost twice as much as an Xbox on launch), but as the Xbox wasn't burdened with the task of running Windows and its developers didn't have to worry about supporting lesser systems, its gaming performance was astonishing.

When the press finally got their hands on the Xbox, reception was broadly positive though there were some reservations about the console's look, as well as the enormous joypad nicknamed the 'Duke' by players. "You should ignore ▶

» Richard Branson sells the UK's first Xbox at the Virgin Megastore on Oxford Street.

Q&A: MARTYN CHUDLEY

The man in charge of the Project Gotham Racing series remembers the start of the series



» *Project Gotham Racing* was warmly received on its debut, netting 8/10 scores from *Edge*, *Game Informer* and Eurogamer.

What did the Xbox offer over the competition in terms of performance? What was it like to code on?

The Xbox was a dream to develop for. The PS2 was crazy powerful for the time, but you had to work so hard to get access to that power – with the Xbox, it was all abstracted, allowing our coders to get far more of the raw power with much less effort. We also had a stable development environment through Microsoft's pre-existing Windows development tools. We (Bizarre) also had direct access to the Microsoft guys and gals who were 100 per cent responsible for the hardware and software, so this support was amazing.

How did your exclusivity deal on *Project Gotham Racing* come about?

The deal for *PGR* came about as a result of Sarah (my other half) and Brian (Woodhouse – our Development Director) doing a pitch to Microsoft for an 'F1-style game in cities', as way of a follow up to *Metropolis Street Racer*. We 'knew' at that point that Dreamcast was effectively dead and that Sega would be going to become a multiplatform publisher, but they refused to acknowledge this to us. Ideally, we would have taken *MSR* to both PS2 and Xbox with Sega, but they just couldn't admit their situation to us in time for us to recoup some of our losses. Upon doing the 'F1-ish' pitch, the chaps at Microsoft saw a near-complete demo version of *MSR* and simply said, 'Why not give us *that*?'

Upon examining our contract with Sega it transpired that we (Bizarre) owned all the code and data, whereas Sega just owned the IP – essentially just the name *Metropolis Street Racer*. This meant that we could do a 'homage' game, using all of the cities and any new cars that Microsoft would license, just as long as we didn't call it *Metropolis Street Racer*!

Was there much stress getting the game ready for launch?

Oh yeah – it was mega stressful for the entire production. We basically had well under 12 months from start to finish. Our original plans for development started at the tail end of 2000, targeting console release of November 2001. This was a stupidly tight schedule given that we were doing a complete code rewrite, remodel of all the cars, had to hire new staff, working with a brand-new set of production people and to cap it all had multiple revisions of (usually underpowered) preproduction hardware and libraries to aim at.

» We're hoping that *PGR* will be announced as a supported title on the Xbox One's backward compatibility list.

How did you end up choosing the four city locations you went with?

The original locations (San Francisco, London and Tokyo) were chosen in conjunction with Sega as they were absolutely iconic, fit the key console territories and were all visually (and layout-wise) unique. New York was, again, chosen for its worldwide recognisability and also it was relatively easy for us to perform the research trips. In fact the cover art of the game was to feature the Ferrari F50 in front of the Twin Towers, but due to the catastrophic events of 9/11 we had long discussions with Microsoft about whether to keep (as a tribute) or remove the towers from the game (which we eventually did).

What improvements did *Project Gotham Racing* make over *Metropolis Street Racer*?

As far as I can remember, the biggest improvements over *MSR* included the addition of New York, and higher 'perceived value' cars – Ferrarri, TVR etc. Ultimately, the game was a complete rewrite from the Dreamcast code – everything, not just the engine. Physics, gameplay, UI, you name it. From a technical perspective Xbox gave us an order of magnitude more polygons (in the cars at least, the cities were just upscaled where it made most sense given our time pressures), shader effects (mainly reflections in both car rendering and circuit, and improved weather) and a doubling of the framerate to 60fps. I think we also made a conscious effort to make the game more 'mainstream' than what we perceived as a pretty hardcore *MSR* experience.

Why do you think Microsoft have never created a fifth game?

I'm guessing that basically Microsoft felt they could cover all bases with both the *Forza* and *Forza Horizon* brands – they didn't need a *PGR* hanging around in between, not quite a simulator, not quite an arcade experience. I think that if we had stayed with Microsoft (and not been acquired by Activision) then a *PGR5* could have happened, but alas it was not to be…

Finally, on a personal note I'd like to add that *PGR* couldn't have happened without our coder Edmund Clay, who sadly passed away in 2013. Edmund joined us to work on *PGR*, and I don't think there was an area of the game that he didn't touch – physics, rendering, AI, shaders - you name it, he was a massive influence.

"I think the improved environment for developers is what made the most difference"

Seamus Blackley

▶ the naysayers and doom merchants who have ignorantly dismissed Xbox out-of-hand," opined *Edge* after taking delivery of the finished product. "It's expensive, corpulent and the joypads aren't entirely ergonomic – but by the gods is it powerful." What's more, the software accompanying the machine delivered. In particular, *Halo* was hailed as "the most important launch game for any console, ever" by *Edge* and received the magazine's fourth 10/10 score. Other reviewers were similarly impressed, as evidenced by its score of 97 on review aggregator Metacritic.

The first territory to receive the system was North America, on 15 November 2001. Propelled by the popularity of Bungie's *Halo* and demand generated as a natural result of the holiday season, the Xbox sold an impressive 1.5 million units in the region before the end of the year. It was an encouraging start for a system that had faced so much scepticism, and North America would remain the console's stronghold for the duration of its lifetime – for every Xbox sold in the rest of the world, Microsoft sold two on its home continent.

However, things weren't nearly so rosy in Japan. Microsoft brought 250,000 consoles into the country for launch, and attracted some very high profile Japanese developers. Tecmo jumped in with both feet and provided some great exclusive

» People still love this alluring Xbox prototype – possibly because the production machine is no looker.

games, and Sega did the same while also building its Chihiro arcade platform around the console. However, others were more cautious. The likes of Capcom, Namco and Konami all jumped aboard, but didn't necessarily bring their big hitters with them – *Resident Evil* and *Tekken* didn't appear at all, for example. Companies like Square, Enix and Atlus stayed away completely. The Xbox never shed the perception that it was a product built by a foreign company for foreign audiences, and never gained a foothold in Japan as a result, selling a miserable 450,000 consoles over its entire lifetime.

Trading also proved difficult in Europe. The Xbox launched to great fanfare on 11 March 2002, but sales quickly dropped off and after just five weeks Microsoft announced that it would slash the price of the console by a third, cutting it from £299 to match the PlayStation 2's £199 price tag. The move understandably upset early adopters, who were offered two free games and an extra controller to make up for the unprecedented price drop, but it did serve to stabilise the system – during the week of the cut, Xbox sales were neck and neck with PS2 sales. The move also sparked a price war. Nintendo cut its GameCube price before even launching, and two subsequent price cuts brought the Xbox down to just £129 by April 2003. Cutting the price of the console by over 50 per cent in a little over a year did eventually convince European consumers to pick up the machine, but also ensured that Microsoft took heavy losses on every piece of hardware sold.

» The ease of porting from PC to Xbox ensured that the machine received versions of high-profile games, like *Doom 3*.

» Great Japanese games like *Panzer Dragoon Orta* failed to sell the Xbox to the Japanese public.

Microsoft also took other measures to ensure the success of the Xbox. A major one was the purchase of Rare, long considered to be one of Nintendo's key studios – a shock to players at the time, but something that had been brewing behind the scenes for some time. "I was equally shocked when they approached me and there was an opportunity to work with them," Ed reveals, surprisingly. "They had an interesting deal with Nintendo. Nintendo owned 50 per cent of Rare, and when they put that deal together, it was done well. They didn't want to sell half of their company and never be able to sell the other half. So they had a deal where [Nintendo] buys half, and then has the option to buy the other half within a number of years – and if you do not buy the other half, then [Rare] has the right to buy back your half at fair market value." The deal had already expired by 2000, but Nintendo paid for a two year extension and then declined to buy the company when the opportunity came around again.

Microsoft's $375 million purchase of Rare was made public on 24 September 2002, the day after Rare's only GameCube game was released. "I'd known there was a decision to be made between Activision and Microsoft," recalls Chris, who didn't perceive any shift in focus after the deal. "Rare wanted to carry on making the kinds of games it had been making and that would have been the wish of Microsoft too!" Ironically, though, Rare actually produced more games for Nintendo's Game Boy Advance than it did the Xbox during this time – only *Grabbed By The Ghoulies* and *Conker: Live & Reloaded* appeared on Microsoft's console, though it wasn't the only project Rare was working on. "*Kameo* was being built on the original Xbox, but it was brought over with a visual overhaul to the Xbox 360 as a launch title," explains Chris.

» The *XSN Sports* range of games was key in the early years of the Xbox, before EA built Xbox Live support into its own sports games.

In November 2002 Microsoft launched its online gaming service, Xbox Live. The high-end service relied on broadband internet connections and required an annual subscription, but was far in advance of the decentralised online experience on PS2 and the near-total lack of online games on GameCube. Players enjoyed relatively lag-free and stable sessions, had a single username across all games, as well as systems for adding friends, sending messages and even voice chat. In

XBOX

November 2004, the service was extended to include downloadable game distribution via the new Xbox Live Arcade service, which allowed players to buy small, download-exclusive games such as *Bejeweled* and *Ms Pac-Man* for relatively low prices. As it arrived late in the life of the Xbox, this was a relatively short-lived service that hosted less than 30 games in total.

While players looking for online console gaming were undoubtedly best served by Microsoft, it's worth remembering that those customers were still a relatively small market – Xbox Live picked up a million subscribers by July 2004 and doubled that to 2 million by July 2005, but take-up of the service was never beyond ten per cent of the total Xbox user base at any given time. "I think Xbox Live truly took off with the 360," says Stephen, who points to the technical limitations of the era. "Having a wired internet connection to whatever room you had your gaming system setup in was a big ask for a lot of people, while Wi-Fi is ubiquitous now."

> **"If I had really known how powerful Sony and Nintendo were, I would have probably given up and there wouldn't be an Xbox"**
> Seamus Blackley

» *Dead Or Alive 3* looked absolutely astonishing in 2001, and holds up well today.

By 2004, the Xbox had gone from office punchline to legitimate knockout artist. The enormously popular *Grand Theft Auto* games made their way to the platform, as did Konami's *Pro Evolution Soccer*. EA launched its first Xbox Live compatible sports games, and in November, *Halo 2* became the biggest entertainment launch of all time. But despite its successes, the Xbox was not a tremendously long-lived console. On 12 May 2005, just three-and a-half years after the Xbox had initially gone on sale, Microsoft unveiled the next-generation Xbox 360 for release later that year. On the same day, Nvidia announced that Microsoft had ceased orders for the Xbox GPU and wouldn't be taking any more after 1 August – effectively shutting down production of the original console for good. Xbox owners would still enjoy a full slate of games into 2006 thanks to third party publishers, but releases dropped off following that year's holiday season, with just a handful of licensed games and annual sports updates arriving in 2007. The last Xbox game to be released was *Madden NFL 09*, in August 2008, and original Xbox Live shut down on 10 May 2010 (some weeks after its original 15 April termination date, thanks to some dedicated *Halo 2* players).

For all of Microsoft's clout as a company, and its considerable financial expenditure, the Xbox could only manage second place in its generation. "If I had really known how powerful Sony and Nintendo were, I would have probably given up and there wouldn't be an Xbox," admits Seamus. 24 million Xbox consoles were sold, scraping ahead of Nintendo's GameCube by just over 2 million units but falling massively short of the 155 million PlayStation 2 consoles that Sony sold. However, Microsoft gained many positive things from the original Xbox. It successfully established itself as a major player in the console market, building consumer recognition and developer relationships that would pay dividends for the Xbox 360. What's more, the Xbox allowed Microsoft to influence the wider console market, as the console shaped the future development of games consoles on a technical level. Every major console released since the Xbox has included some form of mass storage, built-in broadband internet support and support for downloadable software.

If you missed out on the system first time around, now is a great time to catch up as the Xbox is possibly the best value platform in retro gaming right now. Very few games are anywhere near their original price, and most are ridiculously cheap – even the very best on the platform. Original hardware isn't too hard to come by, and if you're stuck for that the Xbox 360 will run certain games (be sure to check before you buy). Microsoft has also announced plans for original Xbox backwards compatibility on the Xbox One.

Looking back at the impact of the Xbox, Chris feels it comes down to the skills transferred from Microsoft's other business. "This was really Microsoft's first sizeable foray into gaming

» Big new Western gaming franchises, such as *Splinter Cell*, got their big break on Xbox.

» In 2000, Raven and her giant robot buddy danced together to introduce the Xbox to the world.

entertainment; yes, they'd had *Flight Simulator* before and had built joysticks, but creating their own console was in many ways an unexpected move for a company that was more associated with operating systems and business software," he explains. "Their experience with working with developers on those more conventional products would have helped them build a system that would also be easy to develop for by game studios." But that's far from the only factor, as Stephen reminds us. "*Halo* defined the Xbox," the coder states. "There were plenty of other good games, but *Halo* was why you bought one in that first year after launch."

However, the last word must go to Seamus, for whom all of the political battles and the frustrated car journeys home were worthwhile because of the players themselves. "There are all of these times in my life when, wandering around, I meet somebody who tells me that Xbox stopped them from killing themselves during their divorce, or was the only reason they could survive as a kid in some horrible situation, or got them interested in studying science and now they have a PhD in chemistry. Every time that happens I choke up because I see a person in front of me whose life is better, and there's really nothing like that. That's what it's about." And he's right – the Xbox made an impact on the gaming industry and on Microsoft, but the real legacy of the Xbox lies in every *Halo* LAN party, your moral choices in *Fable*, and all those times you stayed up a little *too* late on Xbox Live. ✱

Special thanks to Seamus Blackley, Ed Fries and everyone else who contributed to this article.

» With games like *Project Gotham Racing 2*, the Xbox brought the dream of photorealism closer than ever before.

SPECS BOX

Take a look at how the guts of the Xbox compared to other machines of its era

DREAMCAST

RELEASED: 27 November 1998

CPU: 200MHz Hitachi SH-4

GPU: 100MHz VideoLogic PowerVR2

MEMORY: 16MB RAM, 8MB video RAM, 2MB audio RAM

MEDIA: 1.2GB GD-ROM

STORAGE: Up to two Visual Memory Units per connected controller (128KB each, optional)

NETWORKING: 56k dial-up modem (standard) / Broadband adapter with Ethernet port (optional)

CONTROLLER PORTS: 4

PLAYSTATION 2

RELEASED: 4 March 2000

CPU: 295MHz 'Emotion Engine'

GPU: 147.5MHz 'Graphics Synthesizer'

MEMORY: 32MB RAM, 4MB video RAM, 2MB audio RAM

MEDIA: 8.5GB DVD-ROM

STORAGE: Up to two memory cards (8MB each, optional), 40GB hard disk (optional)

NETWORKING: i.LINK port for local networking (standard on pre-2003 models), Network adapter with dial-up modem and Ethernet port (optional), Ethernet port (standard on slimline models)

CONTROLLER PORTS: 2

GAMECUBE

RELEASED: 14 September 2001

CPU: 485MHz IBM 'Gekko'

GPU: 162MHz ATI 'Flipper'

MEMORY: 24MB RAM, 3MB video RAM, 16MB audio/DVD cache

MEDIA: 1.5GB miniDVD-based 8cm disc

STORAGE: Up to two memory cards (512KB – 8MB each, optional)

NETWORKING: 56k dial-up modem (standard), Broadband adapter with Ethernet port (optional)

CONTROLLER PORTS: 4

XBOX

RELEASED: 15 November 2001

CPU: 733MHz custom Intel Pentium III

GPU: 233MHz Nvidia NV2A

MEMORY: 64MB shared RAM

MEDIA: 8.5GB DVD-ROM

STORAGE: 8GB hard disk (standard), Up to two memory units per connected controller (8MB each, optional)

NETWORKING: Ethernet port (standard)

CONTROLLER PORTS: 4

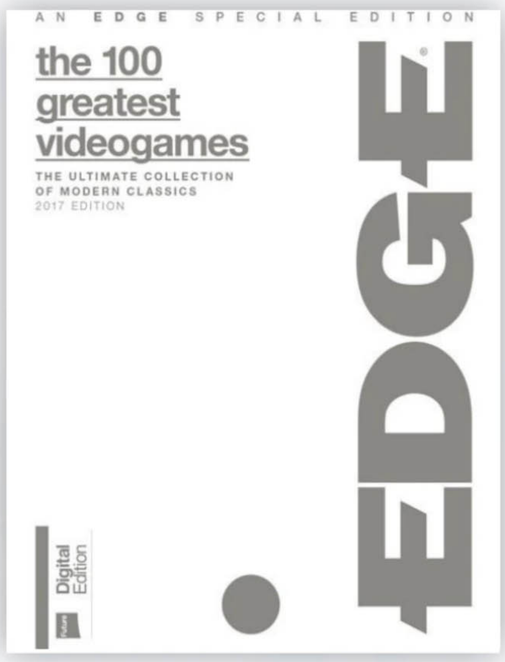
SUBSCRIBE AND SAVE UP TO 74%

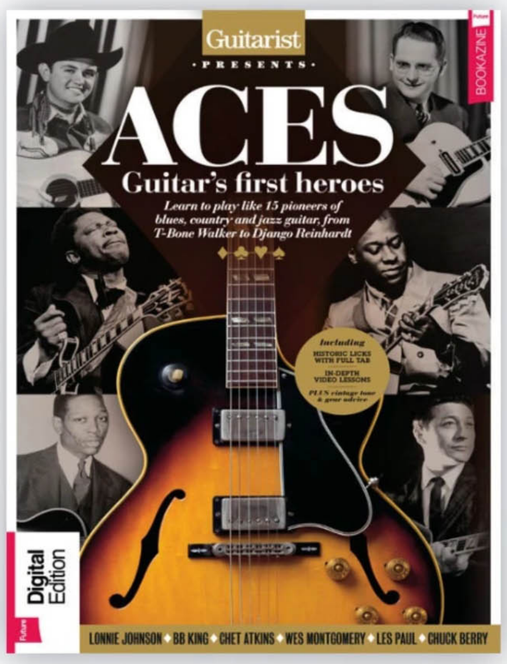
Every issue of your subscription, delivered direct to your door. Print & digital editions available.

NEAT STORAGE

Store up to 13 issues of your magazine subscription in a coordinating slip case or ring binder.

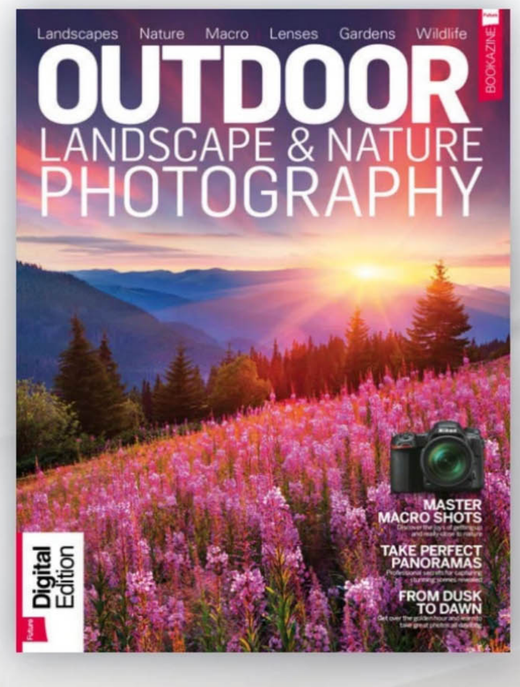
myfavouritemagazines.co.uk

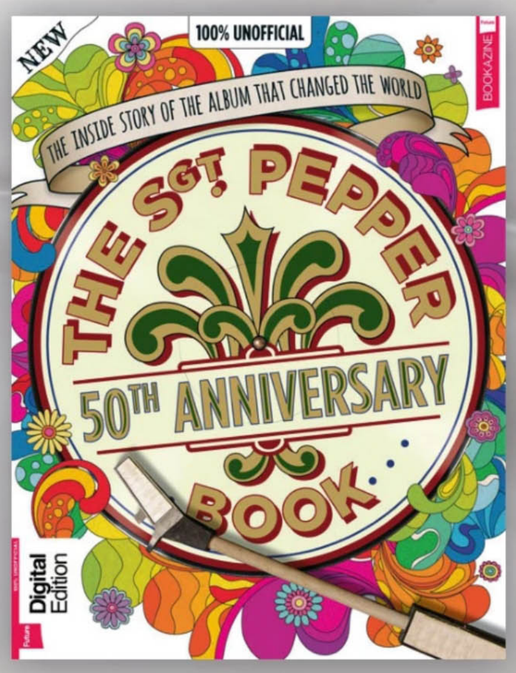


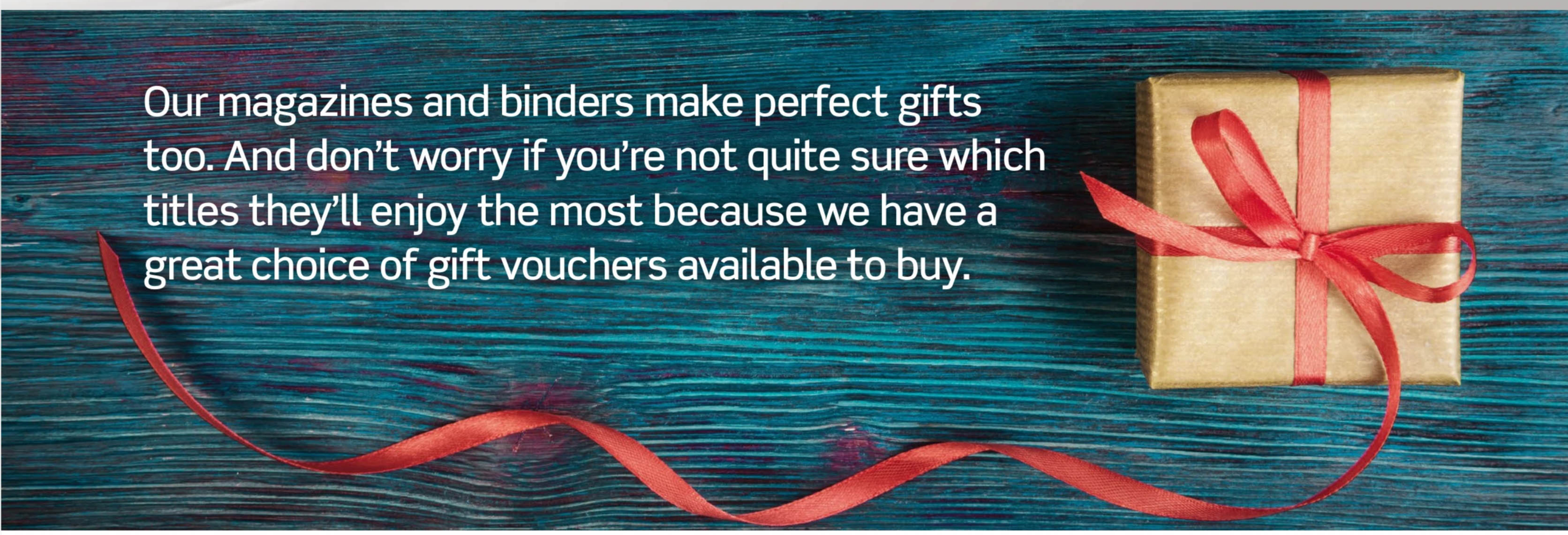


DISCOVER MORE GREAT GUIDES & SPECIALS

From photography to music and technology to field sports, there's something for everyone.





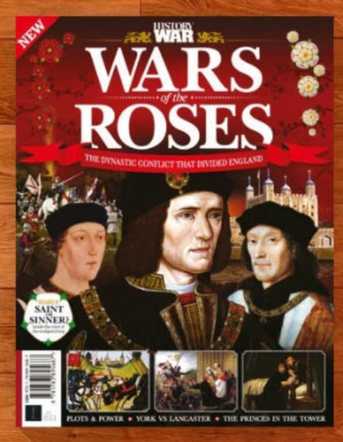


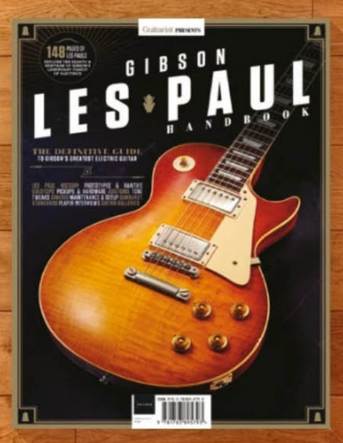
No hidden costs | Shipping included in all prices | We deliver to over 100 countries | Secure online payment

FUTURE

myfavouritemagazines
Official Magazine Subscription Store

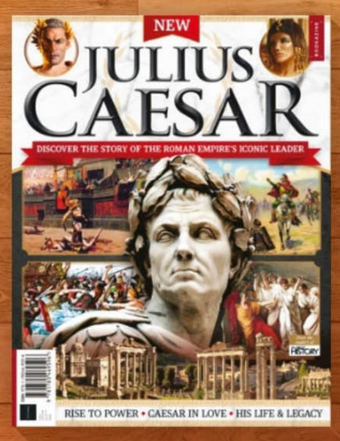
myfavouritemagazines.co.uk

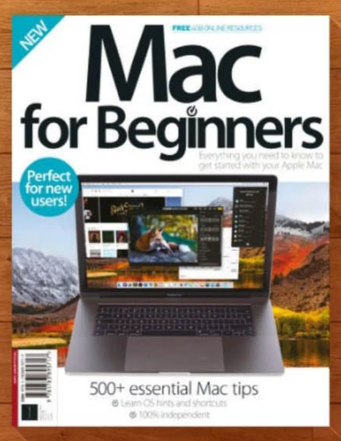


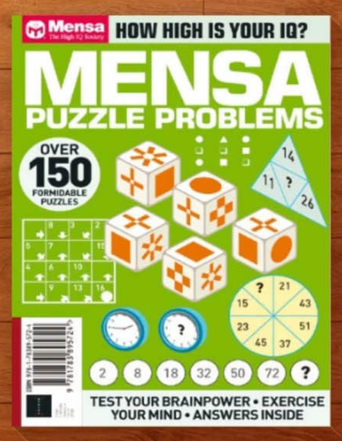


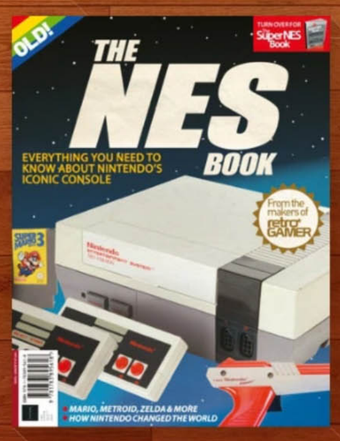
Discover another of our great bookazines

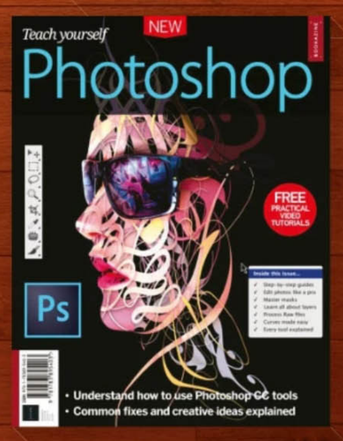
From science and history to technology and crafts, there are dozens of Future bookazines to suit all tastes











Get great savings when you buy direct from us

1000s of great titles, many not available anywhere else

Worldwide delivery and super-safe ordering

FUTURE

www.myfavouritemagazines.co.uk

Magazines, back issues & bookazines.

DISCOVER THE GOLDEN AGE OF GAMING

AMSTRAD | COMMODORE | SEGA | NINTENDO | ATARI | SINCLAIR | APPLE | SONY | COIN-OP | MOBILE

retro GAMER™

ANNUAL

CLASSIC GAMES

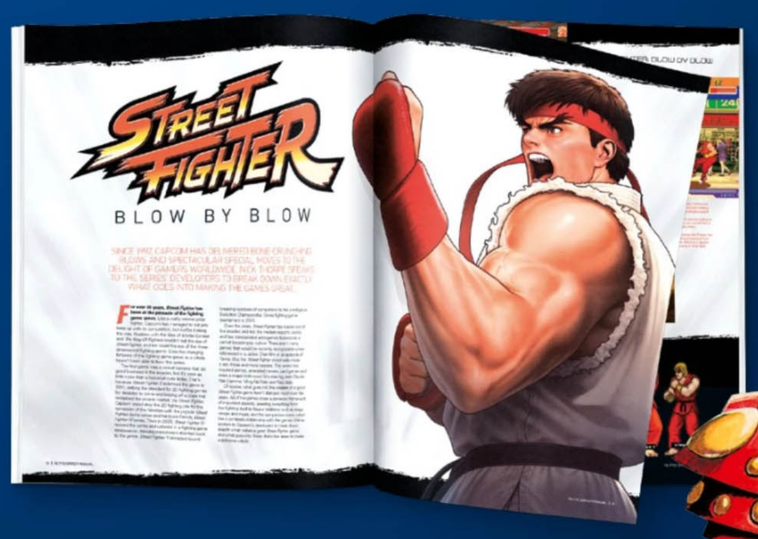
- PAC-MAN
- SUPER MARIO SUNSHINE
- LASER SQUAD

IN-DEPTH FEATURES

- GOLDENEYE 007
- DAYTONA USA
- CONTRA III & CONTRA: HARD CORPS

HARDWARE HEAVEN

- AMSTRAD COMPUTERS
- COMMODORE AMIGA
- XBOX



BIG FRANCHISES

- SPACE INVADERS
- STREET FIGHTER
- TETRIS

9020

9000

BOOKAZINE