

# The Nintendo 64 Story

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# The History of the Nintendo<sup>64</sup>

The world's most **SUCCESSFUL** video games company. The world leader in graphics workstations. 64-bit technology a **GENERATION** on from its rivals. N64 inevitably became the world's most **ANTICIPATED** video game system from the day it was **ANNOUNCED**; August 23rd, 1993.

Written by Stuart Wynne

# The Nintendo<sup>64</sup> Story

## - In the beginning...

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Now that N64s are in your local Dixons, stacked between Matsui VCRs and Goodmans hi-fis, it's difficult to realise quite how extraordinary Nintendo's 1993 announcement seemed. After years dithering about a Super NES CD-ROM upgrade, Nintendo was suddenly promising to leapfrog an entire generation of machines not yet released. Codenamed Project Reality, Nintendo's console would use 64-bit 'Reality Immersion Technology' from workstations so expensive only a handful of UK developers could afford them. Promotional screenshots showed a 3-D rendered Mario improbably dropped into a high-res

cityscape used by architects.

To many, this was pure science fiction – Project 'Unreality' joked the cynics, sniggering at a machine Nintendo insisted would cost just \$250. Two months later, the world's largest consumer electronics company – Matsushita – was to launch its 32-bit 3DO system for \$699. According to Nintendo, a machine unimaginably superior would debut in late '95, for almost a third the price.

Disbelief would surround the N64 until its launch.

### THE WILDERNESS YEARS

From the start, one of the biggest problems confronting Nintendo was

development time. In the late Eighties, Nintendo had totally dominated the 8-bit console market. But delays in launching the Super NES (1990) had allowed Sega's Mega Drive (1989) to dominate the 16-bit market in Europe and achieve parity in America. For



In 1993, SGI's UNCOMPROMISED, PERFORMANCE AT ANY COST, GRAPHIC WORKSTATIONS WERE MAINLY USED BY THE MILITARY, ARCHITECTS AND HOLLYWOOD.



AT THE TIME NINTENDO ANNOUNCED ITS 64-BIT PLANS, THIS WAS STATE-OF-THE-ART. THE 3DO COMPANY HAD ENJOYED A SPECTACULAR MAY '93 WALL STREET LAUNCH, SHARE PRICES DOUBLING IN A DAY, WHILE PROUDLY BOASTING ITS 32-BIT UNIVERSAL HARDWARE STANDARD WOULD MAKE NINTENDO AND SEGA'S LOWLY GAMEBOXES OBSOLETE.

IGNITE your mind

**OCTANE**  
POWER DESKTOP WORKSTATION

THE EXPLOSION IN PRE-RENDERED FMV INTROS HAS MADE SGI'S 'HIGH OCTANE' HARDWARE ESSENTIAL FOR MOST SOFTWARE HOUSES IN THE LATE NINETIES. HOWEVER IN 1993, 16-BIT CONSOLES AND PRIMITIVE PCs MEANT SGI MACHINES WERE ONLY PRACTICABLE FOR SOFTWARE HOUSES WITH BIG R&D BUDGETS AND FORWARD-THINKING BOSSES.

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MARIO FEATURES PROMINENTLY ON PUBLICITY FOR MIPS, WORLD-LEADING PRODUCERS OF ADVANCED RISC CPUs, WHO WERE BOUGHT BY SGI IN 1996.



SGI'S DEREK MEYER SHOWS OFF THE N64 CHIPSET. CYRUS CLAIMED SGI WOULD NEVER DELIVER SUCH A POWERFUL MACHINE AT AN AFFORDABLE PRICE.



RARE'S ACM PRODUCED BEAT-'EM-UP, KILLER INSTINCT, WAS ORIGINALLY HYPED AS THE COIN-OP TRAILBLAZER FOR NINTENDO'S 64-BIT CONSOLE.



ALTHOUGH THE NAME NINTENDO 64 WAS ALWAYS PLANNED FOR JAPAN, IN THE REST OF THE WORLD PR SHOTS HAD THE MACHINE BADGED 'ULTRA 64'.

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N64, an even bigger gap loomed. Both the Atari Jaguar and 3DO would launch in late '93, the Sega Saturn and Sony PlayStation following in '94.

Nintendo's response had two strands. Firstly, it ensured the Super NES would be fully supported by quality in-house projects. Secondly, it launched a rolling campaign of press releases and media events to ensure N64 remained constantly in gamers' minds.

These two strands blended perfectly at the Summer Consumer Electronics Show (CES), where the company showed footage of a stunning new platformer. Familiar Nintendo characters cavorted in a slick SGI-rendered world as Nintendo of America president Howard Lincoln announced Project Reality's new name: Ultra64. Only at the end of the presentation did the most dramatic revelation emerge; the stunning *Donkey Kong Country* was actually running on a Super NES.

During Project Reality game development, British developers Rare had pioneered a new technique. Advanced Computer Modelling (ACM) replaced conventional, hand-drawn sprites with graphics drawn on SGI workstations. As a result, 2-D games could look like next generation 3-D masterpieces while still running on 16-bit hardware. Over Xmas '94, *Donkey Kong Country* alone would generate more sales than the entire 32-bit market.

## SMOKE, MIRRORS & ACM

Although there were no N64 titles at the CES itself, Nintendo claimed Ultra64 hardware was running two new games at a secretive, off-site presentation for selected journalists. The August announcement had, after all, promised Project Reality hardware would be used for new coin-ops appearing in 1994. While Sega and Sony relied upon arcade conversions to promote new consoles, Ultra64 would actually provide the hardware coin-op mega-games! Arcade company Williams, producers of the *Mortal Kombat* series and keen rivals of Sega, soon signed up to market the new coin-ops.

The games spearheading Nintendo's much anticipated return to the arcade business turned out to be *Killer Instinct* and *Cruis'n USA*. Neither were actually programmed by Nintendo. *Cruis'n USA* was developed by Eugene Jarvis for Williams, while *Killer Instinct* was programmed in the UK by Rare. Under such secretive, massively hyped circumstances most journalists were impressed by the game previews. One technically-minded UK magazine raved over gameplay and assured readers *Killer Instinct* really was running on Ultra64 hardware.

In fact, both games would appear in the arcades on standard Williams hardware. With hindsight, it was an obvious con - *Killer Instinct* used precisely the same graphics technique - ACM - as Super NES *Donkey Kong Country*: next-generation looks without the need for next generation hardware.

## THE STUFF OF DREAMS

In reality, the first N64 devkit wouldn't ship until July '94 and that consisted of an SGI Onyx workstation running a microcode N64 emulation. While this allowed games programming to get underway, even 'Dream Team' developers such as LucasArts was deeply sceptical about how accurate an emulation it was. Devkits featuring real N64 hardware wouldn't go out to third-party developers until late '95 - a full year after N64 coin-ops were slated to appear.

Even more incredibly, Nintendo didn't release technical specs until January '95, at which time the RAM was a mere 2MB. This was just one of a flurry of Nintendo press releases for

workstations again ran military sims to wow the Nintendo faithful.

Four months later, the Saturn-PlayStation onslaught spread to America with the E3 show. Sony and Sega both had huge stands, the latter surprising everyone with the Saturn instantly going on sale - four months ahead of schedule, while 3DO's 64-bit M2 technology stole Nintendo's cutting-edge crown.

It had been expected Nintendo would finally unveil N64 to blunt some of its rivals' hype. Nintendo instead contented itself with the first pictures of the stylish casing, while keeping secret the design of a controller it called 'revolutionary'. To add insult to injury, Nintendo's chairman Hiroshi

## a machine which dissolve

the Las Vegas CES. Also announced was a partnership with US cable-TV giants GTE, suggesting a networkable future for N64, and the much vaunted Dream Team of software developers: Acclaim, DMA, Rare, Paradigm, Spectrum Holobyte and Williams were a distinctly odd mix. DMA had enjoyed a huge hit with *Lemmings*, but was an otherwise obscure Scottish development house. Paradigm was military sim specialists, while Spectrum Holobyte were most at home with PCs. It wasn't much to distract from the Japanese launch of Saturn and PlayStation, but neither machine was officially on show at Vegas - SGI

Yamauchi announced the worldwide, late '95 release had slipped to April '96, but hinted (misleadingly) that a Japanese launch might still happen in '95. Fortunately, the Super NES strategy was still running smoothly enough: *Donkey Kong Country 2* made its debut, as did *Killer Instinct* - ironically keeping to its promised home release date, albeit on Super NES rather than Ultra64!

## REVOLUTION DELAYED

As it turned out, Ultra64 would never be available for anyone's home. The name was dropped at the public unveiling, on the 24 of November, of



## NintendoPlayStation?!

● NINTENDO'S FIRST 'NEXT-GENERATION' SYSTEM WAS ACTUALLY A JOINT PROJECT WITH SONY. IN 1988, NINTENDO HAD SIGNED AN AGREEMENT WITH SONY FOR A SUPER NES/CD-ROM DRIVE COMBO CALLED PLAYSTATION. IT WAS OFFICIALLY ANNOUNCED AT THE 1991 JUNE CES AND, DESPITE A SPECTACULAR FALLING OUT WITH SONY, A RE-NEGOTIATED CONTRACT KEPT THE MACHINE ON TRACK. AT THE '92 SUMMER CES, NINTENDO INSISTED THE SNES CD-ROM DRIVE WOULD SHIP IN LATE '93. DEVKITS WERE IN USE, PROTOTYPE MACHINES EXISTED AND GAMES WERE DEEP IN DEVELOPMENT. THE PLAYSTATION WAS MORE THAN JUST A CD-ROM DRIVE: ITS 32-BIT RISC CPU, 16BIT DATA TRANSFER CHIP AND DOUBLE-SPEED CD-ROM DRIVE TO SOME EXTENT ANTICIPATED SONY'S LATER STANDALONE MACHINE. AT THE TIME, NINTENDO INSISTED THE SNES-BASED SYSTEM WOULD BE FAR SUPERIOR TO EXISTING 16-BIT CD SYSTEMS, SUCH AS COMMODORE'S CDTV, NEC'S TURBOGRAFX AND SEGA'S MEGA-CD, AS WELL AS THE ATARI JAGUAR AND WOULD-BE WORLD STANDARD 3DO - BOTH DUE OUT IN LATE '93. SOME TIME DURING 1993 HOWEVER, THIS CONFIDENCE EVAPORATED. NINTENDO DECIDED TO GO FOR SOMETHING FAR MORE EXCITING...



# The History of the Nintendo<sup>64</sup>



THE N64'S LONG DELAYED LAUNCH FINALLY OCCURRED AT TOKYO'S SHOSHINKAI SHOW IN LATE '95. EVEN THEN, MORE DELAYS WERE TO COME.



AN UNFEASIBLY LARGE PRE-PRODUCTION COPY OF MARIO 64 WOWED JOURNALISTS, BUT MIYAMOTO WOULD DEMAND MANY MORE CHANGES BEFORE IT WAS RELEASED.



DESPITE ALL OF THE DELAYS, ON 30 SEPTEMBER THE N64 LANDED IN AMERICA AND WAS PROMPTLY ACCLAIMED MACHINE OF THE YEAR BY TIME MAGAZINE.

the Nintendo 64 at Tokyo's Shoshinkai show. Whilst this indicated Nintendo's confidence in the hardware, there were still a few more glitches to endure. The worldwide April '96 release date was shelved, with America slipping to 30 September and Europe to late Autumn. Initial plans for ten playable titles were shelved days before the show's start and, of the two titles judged fit for media scrutiny, neither *Super Mario 64* nor *Kirby Bowl* actually used the system's most advanced features. Fortunately, *Mario* still caused a sensation with its beautifully rendered, fully 3-D environment. Nintendo president Yamauchi used *Super Mario 64* as the centrepiece of a long speech, savagely

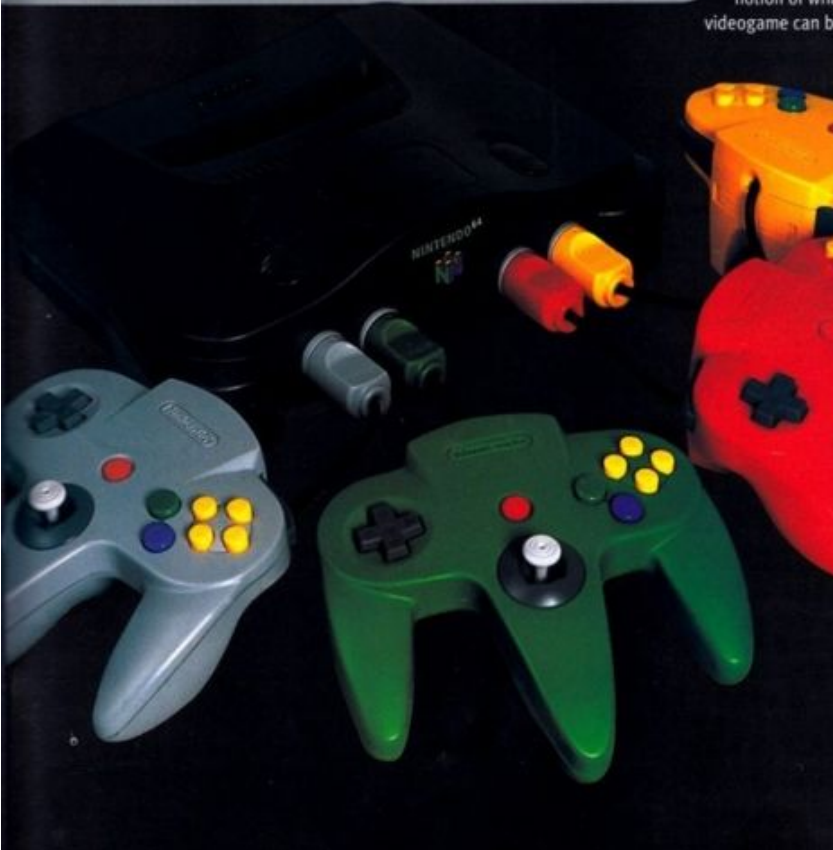
attacking the 32-bit competition for 'third-rate titles' which could herald a market crash akin to Atari's in the early Eighties. Only Nintendo's standards could save the industry... It wasn't just talk.

While the notion of a worldwide release had never been anything more than a PR chimera, the April '95 release was taken very seriously indeed by the Japanese marketplace. So when Nintendo's legendary head of software, Shigeru Miyamoto asked for more time to polish *Super Mario 64*'s gameplay any other company would've shipped regardless. After all, Sega had so rushed *Virtua Fighter* for the Saturn's 1994 launch that they had to follow it up with cut-price, glitch-free

version several months later.

Nintendo wanted to get it right first time, postponing the Japanese release by two months. Less surprisingly, the European launch slipped to Spring '97 – 18 months late. In Japan, however the wait finally ended on Sunday, 23 June, 1996. The three year PR campaign could finally take second place to the reality of plastic, steel and silicon branded N64. A little later than planned, perhaps, but for \$250 Nintendo really had delivered on Howard Lincoln's 1993 promise of a machine "which dissolves the current limits of video play, causing the world to challenge its notion of what a videogame can be."

## current limits of video play



## Nintendo 1889 – 1997

Nintendo was founded in 1889, by Fusajiro Yamauchi, its name meaning 'work hard, but in the end, it is in heaven's hands' – an appropriately superstitious name for a company making playing cards. The current chairman, Hiroshi Yamauchi, took over the company in 1949 at the age of 21. To make clear who was boss, he promptly sacked every manager who'd worked for his estranged grandfather. An iron-willed, hugely ambitious man he pushed Nintendo into all sorts of businesses, including instant rice, a taxi service, toys and coin-ops.



Nintendo withdrew from the coin-op business in the early Eighties and poured investment into the Famicom (or Family Computer). Released in 1983, its 8-bit architecture offered a bigger colour palette and more memory than its older rivals, but the key to its success was games. Yamauchi pitted teams of games programmers against other in relentless competition. Only the best games were published – the rest were scrapped.

The quality of Nintendo's games helped sell 50 million machines worldwide, bringing in £3.3 billion sales for 1992 and earning profits of £965 million – over a million pounds profit per employee. And the more Nintendo earned, the more it invested in games. *Super Mario Bros 3*, arguably the first Mario game to earn the 'world's best videogame' tag, would gross around half a billion dollars – almost as much as the movie *ET!* The NES's success. The Super NES, launched in 1990, carried on Nintendo's commitment to gaming and would outlast numerous hi-tech competitors, including the Atari Jaguar, 3DO, Mega Drive and 32X.



We say: The Nintendo 64 is here!



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Written by Stuart Wynne

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# NINTEN



## STATE-OF-THE-ART C (AND HERE'S THE PROOF)

If you are in the least bit intimidated by **MASSES** of technical information then **PLEASE** turn the page now, but if you want to know about the **NEW** Nintendo<sup>64</sup> inside and out, we present the **ULTIMATE** guide...



Just as in an SGI workstation, the heart of the N64 is a partnership between a Central Processor Unit and a custom co-processor. The N64's RISC CPU is a 64-bit R4300i [1] running at 93.75 MHz, marginally below the original 100 MHz design spec but still unbelievably powerful.

By comparison, the PlayStation's R3000i CPU processes half as much data (32-bit) per clock cycle, while running at roughly one third the speed (33Mhz).

The N64's CPU also has an Integer and FPU 64-bit execution unit built into it, dramatically supercharging 3-D maths performance. Although the R4300i only has a 32-bit system interface, to keep down costs, there are two large memory caches to store frequently accessed data.

The CPU's partner chip, a 62.5 MHz Reality Immersion Co-Processor [2], was specifically designed by SGI for N64. Nintendo claim it incorporates a Reality Display Processor (for drawing pixels), a Reality Signal Processor (which handles 3-D and audio routines) and Audio Processing Unit (sound). This is principally a marketing gimmick, emphasising that while the Saturn has lots of different custom chips, SGI's superior engineering crams all the custom processing into a single chip.

As with any console, custom hardware is what defines the system. Unlike a PC, there isn't enough memory to execute huge graphics routines in software, so these have to be engineered into the hardware. This makes for a less flexible system, but also one which is far cheaper to



# DOOM<sup>64</sup> GAMES MACHINE

manufacture, saves programmers having to develop their own low level routines and often incorporates features beyond the power of contemporary PCs.

The custom features which set the N64 apart from 32-bit rivals can be broken down into three main categories:

**Z-BUFFERING:** The z-axis sets the depth of any object in a 3-D landscape. On the N64, when a 3-D object is rendered the z-buffer automatically calculates which have to be drawn on-screen. This prevents processing time being wasted on unseen elements, and also provides

very accurate collision detection. As a result, the N64's 3-D graphics system is not only far more powerful than 32-bit rivals, but also considerably more efficient in its use of that power.

**ADVANCED TEXTURE MAPPING:** To make polygons appear more realistic, videogame artists create 'textures' which can be 'mapped' on to them, like a stone finish for a castle wall. 32-bit consoles were the first to handle this in hardware, but the N64 was a generation on. Perspective correction, for example, ensures textures accurately follow the contours of an object. While the PlayStation is notorious for distorting large texture



## MIP-MAPPING: TOMB RAIDER VS MARIO

HERE WE CAN SEE THAT WHILE THE PLAYSTATION'S TEXTURE MAPS DISSOLVE INTO A BLOCKY MESS WHEN SEEN CLOSE-UP, THE N64'S MIP-MAPPING ENSURES GRAPHICS REMAIN TOTALLY BELIEVABLE.

maps as they approach, the N64's superior design avoids these problems. It also offers environment mapping, which ensures even reflections are realistically rendered on surfaces.

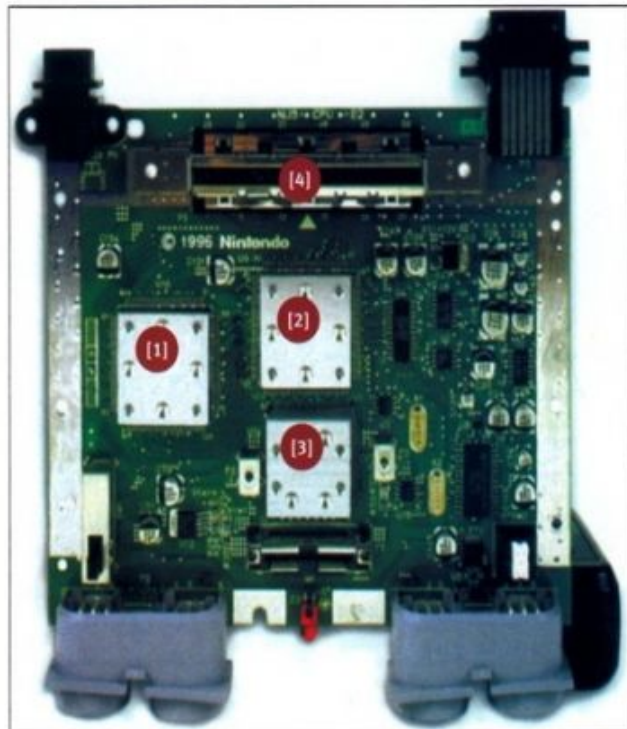
The N64's most powerful innovation, however, is something called Tri-linear Mip Mapping. On 32-bit consoles, are used to seeing texture-maps distort when seen close-up. The N64, by contrast, precomputes different levels of detail and automatically interpolates between the two most appropriate to an object's positioning. This technology also applies to sprites, so whereas the monsters on PlayStation Doom become less realistic the closer you get, on N64 they just scarier and scarier!

**ANTI-ALIASING:** Although the N64 supports a high resolution flicker-free, 640x480 interlaced screen display, for memory and processing reasons most games - for any system - run at 320x240. This can lead to 'jaggies', stair-step distortions in lines when seen on a higher resolution TV display. Anti-aliasing smoothes away these distortions by advanced transparency effects, subtly blurring away jagged lines.

It's these latter two features which

## Nintendo<sup>64</sup> Tech Specs

**PRICE:** £250 (UK)  
**AVAILABILITY:** JUNE 23RD 1996 (JAPAN), SEPTEMBER 20TH 1996 (USA), MARCH '97 (EUROPE).  
**CPU:** CUSTOM R4300I MIPS 64-BIT RISC CPU WITH A CLOCK SPEED OF 93.75 MHZ  
**CO-PROCESSOR:** CUSTOM MIPS REALITY IMMERSION CO-PROCESSOR CPU WITH A CLOCK SPEED OF 62.5 MHZ  
**MEMORY:** 4MB RAMBUS D-RAM.  
**RESOLUTION:** 256x224 - 640x480 (FLICKER-FREE, INTERLACED).  
**SPECIAL FEATURES:** Z BUFFER, ANTI-ALIASING AND REALISTIC TEXTURE MAPPING  
**MAPPING:** TRI-LINEAR MIP-MAP INTERPOLATION, ENVIRONMENT MAPPING, PERSPECTIVE CORRECTION  
**SOUND:** 100 CHANNEL STEREO SOUND.  
**SAVE SYSTEM:** JOYPAD BASED MEMORY CARDS.  
**CONTROLLER:** D-PAD, 9 BUTTONS AND ONE ANALOGUE JOYSTICK.  
**DIMENSIONS:** 26 x 19 x 7.3CM  
**WEIGHT:** 1.09KG



really create the distinctive look of N64 games. While the PlayStation and Saturn were sold on their ability to generate lots of polygons, the N64 not only offers even more polygons, but also the advanced graphics techniques previously only seen on high-end workstations. This is why Pilot Wings 64 really does look like an SGI graphics demo and not simply a 32-bit game with a few more colours or polygons.

The Nintendo 64's audio is provided by an impressive 100-channel Audio Sound Processor, built into Reality Immersion Co-Processor and capable of CD quality output. Of course, most games nowadays simply stream music off CD with soundchips only used for spot effects. While N64 carts haven't the memory to offer the latest Spice Girls single as a backing track, Nintendo doesn't regard this as a serious disadvantage. All N64 music must run through the soundchip so it can vary according to the action. It's the difference between having a composer scoring a film and simply slapping your favourite CD on in the background.

Where N64 definitely beats 32-bit consoles is memory architecture. A PlayStation has just 1MB of fast graphics memory, while slower chips are used for main memory (2MB) and

We say: it's a thing of beauty







### PILOTWINGS<sup>64</sup>

SGI'S EXPERTISE WITH HIGH-END WORKSTATION GRAPHICS ENSURES PILOTWINGS 64 LOOKS AS GOOD AS, IF NOT BETTER THAN EARLY, PR SHOTS OF MILITARY FLIGHT SIMS.

audio (0.5MB). Worse, moving data between different memory areas is very tricky during gameplay and so limits game design. The N64, by contrast, has just a single 4MB chunk of Rambus D-RAM [3] which, at 520.5MB/sec, is fast enough for anything.

The N64's highspeed chipset is perfectly exploited by game cartridges [4]. Although they might seem 'old-fashioned' they offer virtually instantaneous loading. In comparison, 32-bit CD consoles grab data at a maximum 300K/sec - which doesn't include the seek time. On N64, a game is ready to play from the moment you turn the machine on. Pauses for loading new levels are non-existent, allowing for a far more dynamic and flexible game design.

Cartridges do have some drawbacks: they're far more costly to produce than CDs and an average 12MB of memory compares poorly to 650MB of a CD. Nintendo claim advanced memory compression techniques cram in a lot more memory, but the proof is in

the games themselves. The sheer scale, range of gameplay and graphic variety of *Super Mario 64* dwarf anything yet seen on a CD. For modern arcade games, it's development time and investment which limit game size, not storage capacity.

Besides carts, the most unusual feature of N64 is its revolutionary controller. This is built around a stubby analogue joystick. With a conventional digital controller, you constantly have to tap the D-pad to simulate a fast or slow turn. On N64, the faster you move the joystick the faster you turn. Analogue sticks are available for rival systems, but these are optional extras and games rarely support them. With N64, games can be written which only work with analogue control and almost all N64 games will support it.

*Super Mario 64* fully illustrates the richness of this control system, enabling Mario to creep, walk, trot or sprint according to how fast the stubby joystick is moved. To further emphasise the importance of the stubby joystick, the N64 controller has three prongs

allowing for a variety of different ways to hold it, each appropriate to different game-styles.

There's also a slot for controller paks where game data can be stored, this is useful if a game cartridge doesn't have built-in save memory, or if you simply want to take your best times and customised settings round to a friend's house. Currently, paks have a capacity of 256K but they can be as big as 2MB.

### NINTENDO 64 64DD TECHNICAL ANALYSIS

One of the most crucial elements of the N64 is this controversial upgrade, originally known as the Bulky Drive. From early on, Nintendo appear to have recognised publishers would need an alternative to the limited memory capacity and high costs of cartridge publishing. The 64DD upgrade offers this with relatively cheap, high-density magnetic disks capable of holding 64MB of data. While the storage capacity is still only a tiny fraction of a CD's 650MB

## Nintendo<sup>64</sup> 64 - The full strip



[A] THE CARTRIDGE PORT - THE US N64 USES EASILY REMOVABLE PLASTIC PEGS TO PREVENT JAPANESE CARTRIGES BEING USED. EUROPEAN SYSTEMS WILL ALMOST CERTAINLY USE MORE ELABORATE SOFTWARE PROTECTION. [B] ON/OFF SWITCH. [C] MEMORY JUMPER PAK. [D] RESET SWITCH.



[E] EXPANSION PORT. THE 64DD ADD-ON WILL CONNECT TO THE N64 HERE. ALTHOUGH ITS ACCESS SPEED IS A LOT FASTER THAN A PLAYSTATION'S CD-ROM DRIVE, THE 64DD WILL COME WITH AN ADDITIONAL 2-4MB OF MEMORY TO BUFFER DATA TRANSFERS. THIS MEMORY REPLACES THE MEMORY JUMPER PAK [C].



[F] SINCE THE N64 HAS THE HARDWARE TO HANDLE FOUR PLAYER, SPLIT-SCREEN GAMES LIKE MARIO KART 64 NINTENDO THOUGHTFULLY ENGINEERED FOUR CONTROLLER PORTS. NO NEED FOR AN EXPENSIVE MULTI-PLAYER ADAPTOR. THE PORTS CAN ALSO BE USED TO PLUG IN OTHER EXPANSION HARDWARE.



[H] THE N64'S POWER PACK IS ACTUALLY A LARGE REMOVABLE BLOCK, SIMPLIFYING MANUFACTURING OF N64'S FOR DIFFERENT COUNTRIES. [G] NINTENDO'S PATENTED A/V OUTPUT ALLOWS FOR THE CONNECTION OF A WIDE VARIETY OF NINTENDO LEADS FROM RF CABLES TO SUPER VIDEO AND SCART.



# Nintendo<sup>64</sup> Tech Specs

capacity, the 64DD has significant advantages. The Average Seek Time spec is an impressive 150 milliseconds, which makes it extremely fast at finding data on the disk. Data is then loaded at 1MB/sec – over three times as fast as 32bit CD consoles. To further disguise this very fast loading process, the 64DD will come with either 2 or 4MB of expansion RAM which fits into a slot on top of the N64. This allows games to preload data before it's needed, imitating cart-like flexibility. According to Nintendo, once fitted the extra RAM can also be used by cart-based games.

The most impressive aspect of the 64DD, however, is its ability to save data. Whereas all of the 32-bit consoles are limited to saving scores and game positions onto carts or memory cards, the 64DD offers potential for saving huge quantities of data. Fully half of the 64DD's 64MB capacity can be made rewritable. Nintendo have talked of games which could rework themselves as you play, of 64DD upgrades for cart-based games (e.g. adding '98 season details to *FIFA '97*) but the most exciting prospect is for downloading demos and other data from the Internet. Nintendo have been in negotiations with both cable-TV giants GTE and



## Nintendo<sup>64</sup> 64DD Tech Specs

PRICE: TBA BUT LESS THAN N64.  
 AVAILABILITY: SUMMER 1997 (JAPAN).  
 FEATURES: 64MB MAGNETIC DISKS. UP TO HALF OF M/O DISK CAPACITY CAN BE REWRITABLE.  
 75MS AVERAGE SEEK TIME  
 810K/SEC DATA TRANSFER RATE  
 SUPPLIED WITH EXTRA 2 OR 4MB N64 EXPANSION MEMORY  
 DIMENSIONS: 26 x 19 x 79 CM  
 WEIGHT: 1.6KG

Netscape – the leading producer of internet web browsers.

The potential of the system shouldn't obscure the problems, however. Upgrade technologies such as the Mega-CD and 32X have proved notorious failures, while Squaresoft's break-up with Nintendo, in late '95, indicates a certain lack of confidence in a format ideal for their huge RPGs. The system was officially unveiled at the '96 Shoshinkai show with *Super Mario 64* running off an M/O disc rather than cartridge with little apparent difference.

## Nintendo<sup>64</sup> Pads – Keep dry!



THE N64 CONTROLLER'S MOST REVOLUTIONARY FEATURE IS ITS ANALOGUE JOYSTICK, ALLOWING FOR EXCEPTIONALLY ACCURATE CONTROL. AS A RESULT, THE CONVENTIONAL DIGITAL D-PAD IS RARELY USED. THE START BUTTON INVARIABLY STARTS/PAUSES GAMES. L AND R BUTTONS GENERALLY CONTROL LESS OFTEN USED OPTIONS

C-BUTTONS USUALLY CONTROL GAME VIEWS, AS IN *MARIO 64*. HOWEVER WITH THE A & B BUTTONS THEY ALSO PROVIDE AN EXCELLENT, SIX-BUTTON SFII-STYLE CONTROL SYSTEM. A & B ARE USUALLY THE MAIN CONTROL BUTTONS. THE TRIGGER-LIKE Z-BUTTON IS PERFECT FOR FIRING WEAPONS.



CONTROLLER PAKS CURRENTLY STORE 256K, BUT THE SYSTEM CAN SUPPORT MEGABYTES OF STORAGE CAPACITY.



### MARIO KART<sup>64</sup> VS TWISTED METAL

WHILE THE PLAYSTATION'S 30 MIPS (MILLION INSTRUCTIONS PER SECOND) CPU STRUGGLES WITH SPLIT SCREEN, TWO PLAYER GAMEPLAY, THE N64'S 125 MIPS CPU CAN HANDLE A HI-RES, FOUR PLAYER SPLIT-SCREEN WITH ADVANCED 3-D AND SPECIAL FILTERS.



### WAVE RACE VS JET MOTO

THE N64'S SUPERIOR POLYGON HANDLING AND LIGHTING EFFECTS MAKES POSSIBLE ENTIRELY NEW GAME TYPES SUCH AS WAVE RACE 64. BY CONTRAST, THE PLAYSTATION CAN'T EVEN GENERATE BELIEVABLE WAVES LET ALONE MAKE THEM INTERACTIVE, AS JET MOTO ILLUSTRATES.

We say: it's a thing of beauty

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