Nintendo DS

The **Nintendo DS**[a] is a handheld game console produced by Nintendo, released globally across 2004 and 2005. The DS, an initialism for "Developers' System" or "Dual Screen",[5] introduced distinctive new features to handheld games: two LCD screens working in tandem (the bottom one being a touchscreen), a built-in microphone and support for wireless connectivity.[6] Both screens are encompassed within a clamshell design similar to the Game Boy Advance SP. The Nintendo DS also features the ability for multiple DS consoles to directly interact with each other over Wi-Fi within a short range without the need to connect to an existing wireless network. Alternatively, they could interact online using the now-defunct Nintendo Wi-Fi Connection service. Its main competitor was Sony's PlayStation Portable during the seventh generation of video game consoles.

Prior to its release, the Nintendo DS was marketed as an experimental "third pillar" in Nintendo's console lineup, meant to complement the Game Boy Advance (GBA) family and GameCube. However, backward compatibility with Game Boy Advance titles and strong sales ultimately established it as the successor to the Game Boy series.[7] On March 2, 2006, Nintendo launched the Nintendo DS Lite, a slimmer and lighter redesign of the original Nintendo DS with brighter screens. On November 1, 2008, Nintendo released the Nintendo DSi, another redesign with several hardware improvements and new features, although it lost backwards compatibility for Game Boy Advance titles and a few original DS games that used the GBA slot. All Nintendo DS models combined have sold 154.02 million units,[8] making it the best selling handheld game console to date, and the second best selling video game console of all time behind Sony's PlayStation 2.[3][9] The Nintendo DS line was succeeded by the Nintendo 3DS family in 2011, which maintains backward compatibility with nearly all Nintendo DS software except for some software that requires the GBA slot for use.

Nintendo DS

A blue Nintendo DS

Also known as	iQue DS (China)
Developer	Nintendo
Manufacturer	Foxconn
Product family	Nintendo DS family
Type	Handheld game console
Generation	Seventh generation
Release date	NA: November 21, 2004 JP: December 2, 2004 AU: February 24, 2005 EU: March 11, 2005
Lifespan	2004–2013
Introductory price	US$149.99[1]
Discontinued	2013[2]
Units sold	154.02 million worldwide (as of June 30, 2016)[3] (details)
Media	Nintendo game card, ROM cartridge
CPU	Two ARM architecture processors

Contents

Memory	4 MB RAM
Storage	Cartridge save 256 KB flash memory
Display	Two TFT LCDs, 256 × 192 pixels
Connectivity	Wi-Fi (802.11b, WEP)
Online services	Nintendo Wi-Fi Connection
Best-selling game	*New Super Mario Bros.*, 30.80 million (as of September 30, 2016)[4]
Backward compatibility	Game Boy Advance
Predecessor	Game Boy Advance
Successor	Nintendo 3DS

History

Development

Development on the Nintendo DS began around mid-2002, following an original idea from former Nintendo president Hiroshi Yamauchi about a dual-screened console.[10] On November 13, 2003, Nintendo announced that it would be releasing a new game product in 2004. The company did not provide many details, but stated it would not succeed the Game Boy Advance or GameCube.[11] On January 20, 2004, the console was announced under the codename "Nintendo DS".[12] Nintendo released only a few details at that time, saying that the console would have two separate, 3-inch TFT LCD display panels, separate processors, and up to 1 gigabit (128 Megabytes) of semiconductor memory.[12][13] Current Nintendo president at the time, Satoru Iwata, said, "We have developed Nintendo DS based upon a completely different concept from existing game devices in order to provide players with a unique entertainment experience for the 21st century."[12] He also expressed optimism that the DS would help put Nintendo back at the forefront of innovation and move away from the conservative image that has been described about the company in years past.[14] In March 2004, a document containing most of the console's technical specifications was leaked, also revealing its internal development name, "Nitro".[15] In May 2004, the console was shown in prototype form at E3 2004, still under the name "Nintendo DS".[16] On July 28, 2004, Nintendo revealed a new design that was described as "sleeker and more elegant" than the one shown at E3 and announced Nintendo DS as the device's official

name.[17] Following lukewarm GameCube sales, Hiroshi Yamauchi stressed the importance of its success to the company's future, making a statement which can be translated from Japanese as, "If the DS succeeds, we will rise to heaven, but if it fails we will sink to hell."[18][19]

Launch

President Iwata referred to Nintendo DS as "Nintendo's first hardware launch in support of the basic strategy 'Gaming Population Expansion'" because the touch-based device "allows users to play intuitively".[20] On September 20, 2004, Nintendo announced that the Nintendo DS would be released in North America on November 21, 2004 for US$149.99.[21] It was set to release on December 2, 2004 in Japan (¥15000);[22] on February 24, 2005 in Australia ($199.95);[23] and on March 11, 2005 in Europe (£99.99/€149.99).[24] The console was released in North America with a midnight launch event at Universal CityWalk EB Games in Los Angeles, California. The console was launched quietly in Japan compared to the North America launch; one source cites the cold weather as the reason.[25] Regarding the European launch, Nintendo President Satoru Iwata said this:

> "Europe is an extremely important market for Nintendo, and we are pleased we can offer such a short period of time between the US and European launch. We believe that the Nintendo DS will change the way people play video games and our mission remains to expand the game play experience. Nintendo DS caters for the needs of all gamers whether for more dedicated gamers who want the real challenge they expect, or the more casual gamers who want quick, pick up and play fun".[26]

North America and Japan

The Nintendo DS was launched in North America for US$149.99 on November 21, 2004; in Japan for JP¥15,000 on December 2 in the color "Titanium". Well over three million preorders were taken in North America and Japan; preorders at online stores were launched on November 3, and ended the same day as merchants had already sold their allotment. Initially Nintendo planned to deliver one million units combined at the North American and Japanese launches; when it saw the preorder numbers, it brought another factory online to ramp up production. Nintendo originally slated 300,000 units for the U.S. debut; 550,000 were shipped, and just over 500,000 of those sold through in the first week. Later in 2005, the manufacturer suggested retail price for the Nintendo DS was dropped to US$129.99.

Both launches proved to be successful, but Nintendo chose to release the DS in North America prior to Japan, a first for a hardware launch from the Kyoto-based company. This choice was made to get the DS out for the largest shopping day of the year in the U.S. (the day after Thanksgiving, also known as "Black Friday").[27] Perhaps partly due to the release date, the DS met unexpectedly high demand in the United States, selling 1 million units by December 21, 2004. By the end of December, the total number shipped worldwide was 2.8 million, about 800,000 more than Nintendo's original forecast.[28] At least 1.2 million of them were sold in the U.S. Some industry reporters referred to it as "the Tickle Me Elmo of 2004".[29] In June 2005, Nintendo informed the press that a total of 6.65 million units had been sold worldwide.[30]

As is normal for electronics, some were reported as having problems with stuck pixels in either of the two screens. Return policies for LCD displays vary between manufacturers and regions, however in North America, Nintendo has chosen to replace a system with fixed pixels only if the owner claims that it interferes with their gaming experience. There were two exchange programs in place for North America. In the first, the owner of the defective DS in question would provide a valid credit card number and, afterwards, Nintendo would ship a new DS system to the owner with shipping supplies to return the defective system. In the second,

the owner of the defective DS in question would have shipped their system to Nintendo for inspection. After inspection, Nintendo technicians would have either shipped a replacement system or fixed the defective system. The first option allowed the owner to have a new DS in 3–5 business days.

Multiple games were released alongside the DS during its North American launch on November 21, 2004. At launch there was one pack-in demo, in addition to the built-in PictoChat program: *Metroid Prime Hunters: First Hunt* (published by Nintendo and is a demo for *Metroid Prime Hunters*, a game released in March 2006). At the time of the "Electric Blue" DS launch in June 2005, Nintendo bundled the system with *Super Mario 64 DS*.

A Nintendo DS, skinned in blue

In Japan, the games were released at the same time as the system's first release (December 2, 2004). In the launch period, *The Prince of Tennis 2005 -Crystal Drive-* (Konami) and *Puyo Puyo Fever* (Puyo Pop Fever) (Sega) were released.

Europe

The DS was released in Europe on March 11, 2005 for €149. A small supply of units were available prior to this in a package with a promotional "VIP" T-shirt, *Metroid Prime Hunters - First Hunt*, a *WarioWare: Touched!* demo, and a pre-release version of *Super Mario 64 DS*, through the Nintendo Stars Catalogue; the bundle was priced at £129.99 for the UK and €189.99 for the rest of Europe, plus 1,000 of Nintendo's "star" loyalty points (to cover postage). As of 23 January 2006, 1 million DS units had been sold in Europe, setting a sales record for a handheld console.

The European release of the DS, like the U.S., was originally packaged with a *Metroid Prime Hunters: First Hunt* demo. The European packaging for the console is noticeably more "aggressive" than that of the U.S./Japanese release. The European game cases are additionally about 1/4 inch thicker than their North American counterparts and transparent rather than solid black. Inside the case there is room for one Game Boy Advance game pak and a DS card with the instructions on the left side of the case.

Australia and New Zealand

The DS launched in Australia and New Zealand on February 24, 2005. It retailed in Australia for AU$199 and in New Zealand for NZ$249. Like the North American launch, it includes the *Metroid Prime Hunters - First Hunt* demo. The first week of sales for the system broke Australian launch sales records for a console, with 19,191 units sold by the 27th.

China

"iQue DS", the official name of the Chinese Nintendo DS, was released in China on July 23, 2005. The price of the iQue DS was 980 RMB (roughly US$130) as of April 2006. This version of the DS includes updated firmware to block out use of the PassMe device, along with the new Red DS. Chinese launch games were *Zhi Gan Yi Bi* (*Polarium*) (Nintendo/iQue) and *Momo Waliou Zhizao* (*WarioWare: Touched!*) (Nintendo/iQue). The iQue was also the name of the device that China received instead of the Nintendo 64.

Games available on launch

Title	Publisher	NA	JP	EU	AU & NZ
Asphalt Urban GT	Ubisoft	✓	✗	✓	✓
Daigasso! Band Brothers	Nintendo	✗	✓	✗	✗
Feel the Magic: XY/XX (aka *Project Rub*)	Sega	✓	✓	✓	✗
Kensyūi Dokuta Tendo (literally "Resident Doctor Tendo")	Spike Chunsoft	✗	✓	✗	✗
Madden NFL 2005	Electronic Arts	✓	✗	✗	✗
Mahjong Taikai	Koei	✗	✓	✗	✗
Metroid Prime Hunters: First Hunt	Nintendo	✓	✗	✓	✗
Mr. Driller Drill Spirits	Namco	✗	✓	✓	✗
Ping Pals	THQ	✗	✗	✓	✓
Pokémon Dash	Nintendo	✗	✓	✓	✗
Polarium	Nintendo	✗	✓	✓	✗
Rayman DS	Ubisoft	✗	✗	✓	✗
Retro Atari Classics	Atari	✗	✗	✓	✗
Robots	VU Games	✗	✗	✓	✗
Spider-Man 2	Activision	✓	✗	✓	✓
Sprung	Ubisoft	✗	✗	✓	✓
Super Mario 64 DS	Nintendo	✓	✓	✓	✓
Tiger Woods PGA Tour	Electronic Arts	✗	✗	✓	✓
The Urbz: Sims in the City	Electronic Arts	✓	✓	✓	✗
WarioWare: Touched!	Nintendo	✗	✓	✓	✓
Zoo Keeper	Success	✗	✓	✓	✓
Zunō ni Asekaku Game Series Vol.1: Cool104 Joker & Setline	Aruze	✗	✓	✗	✗

Promotion

The system's promotional slogans revolve around the word "Touch" in almost all countries, with the North American slogan being "Touching is good."[31]

The Nintendo DS was seen by many analysts to be in the same market as Sony's PlayStation Portable, although representatives from both companies have said that each system targets a different audience. *Time* magazine awarded the DS a Gadget of the Week award.[32]

At the time of its release in the United States, the Nintendo DS retailed for US$149.99. The price dropped to US$129.99 on August 21, 2005, one day before the releases of *Nintendogs* and *Advance Wars: Dual Strike*.

Nine official colors of the Nintendo DS were available through standard retailers. Titanium-colored units were available worldwide, Electric Blue was exclusive to North and Latin America. There was also a red version which was bundled with the game Mario Kart DS. Graphite Black, Pure White, Turquoise Blue, and Candy Pink were available in Japan. Mystic Pink and Cosmic Blue were available in Australia and New Zealand. Japan's Candy Pink and Australia's Cosmic Blue were also available in Europe and North America through a

Nintendogs bundle, although the colors are just referred to as pink and blue; however, these colors were available only for the original style Nintendo DS; a different and more-limited set of colors were used for the Nintendo DS Lite.

Sales

As of March 31, 2016, all Nintendo DS models combined have sold 154.02 million units, making it the best selling handheld game console to date, and the second best selling video game console of all time.[3][33]

Legacy

The success of the DS paved the way for its successor, the Nintendo 3DS, a handheld gaming console with a similar dual-screen setup which can display images on the top screen in stereoscopic 3D.[34]

On January 29, 2014, Nintendo announced that Nintendo DS games would be added to the Wii U Virtual Console, with the first game, *Brain Age: Train Your Brain in Minutes a Day!*, being released in Japan on June 3, 2014.[35][36]

Hardware

The Nintendo DS[37] design resembles that of the multi-screen games from the Game & Watch line, such as *Donkey Kong* and *Zelda*, which was also made by Nintendo.

The lower display of the Nintendo DS is overlaid with a resistive touchscreen designed to accept input from the included stylus, the user's fingers, or a curved plastic tab attached to the optional wrist strap. The touchscreen lets users interact with in-game elements more directly than by pressing buttons; for example, in the included chatting software, PictoChat, the stylus is used to write messages or draw.

Stylus for the DS Lite

The handheld features four lettered buttons (X, Y, A, B), a directional pad, and Start, Select, and Power buttons. On the top of the device are two shoulder buttons, a game card slot, a stylus holder and a power cable input. The bottom features the Game Boy Advance game card slot. The overall button layout resembles that of the Super Nintendo Entertainment System controller. When using backward compatibility mode on the DS, buttons X and Y and the touchscreen are not used as the Game Boy Advance line of systems do not feature these controls.

It also has stereo speakers providing virtual surround sound (depending on the software) located on either side of the upper display screen. This was a first for a Nintendo handheld, as the Game Boy line of systems had only supported stereo sound through the use of headphones or external speakers. A built-in microphone is located below the left side of the bottom screen. It has been used for a variety of purposes, including speech recognition, chatting online between and during gameplay sessions, and minigames that require the player to blow or shout into it.

Technical specifications

Mass	275 g (9.7 oz)
Dimensions	When closed: 148.7 mm (5.85 in) x 84.7 mm (3.33 in) x 28.9 mm (1.14 in) (width x height x depth)
Display	Two TFT LCD screens: 62 mm × 46 mm (2.4 in × 1.8 in), 77 mm (3.0 in) diagonal, 0.24 mm dot pitch, 18-bit depth (262,144 colors), 21 mm gap between screens (≈92 lines)
Resolution	256 × 192 pixels (4:3 aspect ratio) for each screen
Audio	Stereo with 16 PCM/ADPCM channels facilitated by Mitsumi MM3205B
CPU	Two ARM processors: ■ 32 bit ARM946E-S main CPU; 67 MHz clock speed. Processes gameplay mechanisms and video rendering[38] ■ 32 bit ARM7TDMI coprocessor; 33 MHz clock speed. Processes sound output, Wi-Fi support and takes on second-processor duties in Game Boy Advance mode
RAM	4 MB PSRAM (expandable via the Game Boy Advance slot, only officially used by the Nintendo DS Browser)
Input	■ Power button ■ Volume slider ■ Eight digital buttons (A, B, X, Y, L, R, Start, Select) ■ D-pad ■ Resistive touchscreen (lower screen only) ■ Microphone
Voltage	1.65 v
Battery	Rechargeable 850 mAh lithium-ion battery
Storage	256 kB of serial flash memory
Wireless connectivity	Built-in 802.11 wireless network connection (WEP encryption support only)[39]

The system's 3D hardware[37][40] consists of rendering engine and geometry engine which perform transform and lighting, Transparency Auto Sorting, Transparency Effects, Texture Matrix Effects, 2D Billboards, Texture Streaming, texture-coordinate transformation, perspective-correct texture mapping, per-pixel Alpha Test, per-primitive alpha blending, texture blending, Gouraud Shading, cel shading, z-buffering, W-Buffering, 1bit Stencil Buffer, per-vertex directional lighting and simulated point lighting, Depth Test, Stencil Test, Render to Texture, Lightmapping, Environment Mapping, Shadow Volumes, Shadow Mapping, Distance Fog, Edge Marking, Fade-In/Fade-Out, Edge-AA. Sprite special effects: scrolling, scaling, rotation, stretching, shear. However, it uses point (nearest neighbor) texture filtering, leading to some titles having a blocky appearance. Unlike most 3D hardware, it has a set limit on the number of triangles it can render as part of a single scene; the maximum amount is about 6144 vertices, or 2048 triangles per frame. The 3D hardware is designed to render to a single screen at a time, so rendering 3D to both screens is difficult and decreases performance significantly. The DS is generally more limited by its polygon budget than its pixel fill rate. There are also 512 kilobytes of texture memory, and the maximum texture size is 1024 × 1024 pixels.

The system has 656 kilobytes of video memory[41] and two 2D engines (one per screen). These are similar to (but more powerful than) the Game Boy Advance's single 2D engine.

The Nintendo DS has compatibility with Wi-Fi (IEEE 802.11 (legacy mode)). Wi-Fi is used for accessing the Nintendo Wi-Fi Connection, compete with other users playing the same Wi-Fi compatible game, PictoChat[42] or with a special cartridge and RAM extension, browse the internet.

Nintendo claims the battery lasts a maximum of 10 hours under ideal conditions on a full four-hour charge. Battery life is affected by multiple factors including speaker volume, use of one or both screens, use of wireless connectivity, and use of backlight, which can be turned on or off in selected games such as *Super Mario 64 DS*. The battery is user-replaceable using only a Phillips-head screwdriver. After about 500 charges the battery life starts dropping.[43]

Users can close the Nintendo DS system to trigger its 'sleep' mode, which pauses the game being played and saves battery life by turning off the screens, speakers, and wireless communications; however, closing the system while playing a Game Boy Advance game will not put the Nintendo DS into sleep mode, and the game will continue to run normally. Certain DS games (such as *Animal Crossing: Wild World*) also will not pause but the backlight, screens, and speakers will turn off. Additionally, when saving the game in certain games,[44] the DS will not go into sleep mode.[45] Some games, such as *The Legend of Zelda: Phantom Hourglass* even use the closing motion needed to enter sleep mode as an unorthodox way of solving puzzles. *Looney Tunes: Duck Amuck* has a game mode in which you need to close the DS to play, helping Daffy Duck hunt a monster with the shoulder buttons.

Accessories

Although the secondary port on the Nintendo DS does accept and support Game Boy Advance cartridges (but not Game Boy or Game Boy Color cartridges), Nintendo emphasized that the main intention for its inclusion was to allow a wide variety of accessories to be released for the system.

Due to the lack of a second port on the Nintendo DSi, it is not compatible with any accessory that uses it.

Rumble Pak

The Rumble Pak was the first official expansion slot accessory. In the form of a Game Boy Advance cartridge, the Rumble Pak vibrates to reflect the action in compatible games, such as when the player bumps into an obstacle or loses a life. It was released in North America and Japan in 2005 bundled with *Metroid Prime Pinball*.[46] In Europe, it was first available with the game *Actionloop*, and later *Metroid Prime Pinball*. The Rumble Pak was also released separately in those regions.

Headset

The Nintendo DS Headset is the official headset for the Nintendo DS. It plugs into the headset port (which is a combination of a standard 3.5 mm (1/8 in) headphone connector and a proprietary microphone connector) on the bottom of the system. It features one earphone and a microphone, and is compatible with all games that use the internal microphone. It was released alongside *Pokémon Diamond* and *Pearl* in Japan, North America, and Australia.

Browser

On February 15, 2006, Nintendo announced a version of the cross-platform web browser Opera for the DS system.[47] The browser can use one screen as an overview, a zoomed portion of which appears on the other screen, or both screens together to present a single tall view of the page.[48] The browser went on sale in Japan

and Europe in 2006,[49][50] and in North America on June 4, 2007.[51] Browser operation requires that an included memory expansion pak is inserted into the GBA slot. The DSi has an internet browser available for download from the Nintendo DSi shop for free.[52]

Wi-Fi USB Connector

This USB-flash-disk-sized accessory plugs into a PC's USB port and creates a miniature hotspot/wireless access point, allowing a Wii and up to five Nintendo DS units to access the Nintendo Wi-Fi Connection service through the host computer's Internet connection. When tried under Linux and Mac, it acts as a regular wireless adapter, connecting to wireless networks, an LED blinks when there is data being transferred. There is also a hacked driver for Windows XP/Vista/7/8/10 to make it function the same way. The Wi-Fi USB Connector was discontinued from retail stores.

MP3 Player

The Nintendo MP3 Player (a modified version of the device known as the Play-Yan in Japan) was released on December 8, 2006 by Nintendo of Europe at a retail price of £29.99/€30. The add-on uses removable SD cards to store MP3 audio files, and can be used in any device that features support for Game Boy Advance cartridges; however, due to this, it is limited in terms of its user-interface and functionality, as it does not support using both screens of the DS simultaneously, nor does it make use of its touch-screen capability. It is not compatible with the DSi, due to the lack of the GBA slot, but the DSi includes a music player via SD card. Although it stated on the box that it is only compatible with the Game Boy Micro, Nintendo DS and Nintendo DS Lite, it is also compatible with the Game Boy Advance SP and Game Boy Advance.

Guitar grip controller

The Guitar grip controller comes packaged with the game *Guitar Hero: On Tour* and is plugged into the GBA game slot. It features four colored buttons like the ones found on regular *Guitar Hero* guitar controllers for the stationary consoles, though it lacks the fifth orange button found on the guitar controllers. The DS Guitar Hero controller comes with a small "pick-stylus" (which is shaped like a guitar pick, as the name suggests) that can be put away into a small slot on the controller. It also features a hand strap. The game works with both the DS Lite and the original Nintendo DS as it comes with an adapter for the original DS.[53] The Guitar Grip also works with its sequels, *Guitar Hero On Tour: Decades*, *Guitar Hero On Tour: Modern Hits*, and *Band Hero*.

Later models

Nintendo DS Lite

The **Nintendo DS Lite**[b] is the first redesign of the Nintendo DS. While retaining the original model's basic characteristics, it features a sleeker appearance, larger stylus, longer lasting battery and brighter screens.[54] Nintendo considered a larger model of the Nintendo DS Lite for release, but decided against it as sales of the original redesign were still strong. It was the final DS to have backwards compatibility with Game Boy Advance games.[55] As of March 31, 2014, shipments of the DS Lite had reached 93.86 million units worldwide, according to Nintendo.[3]

Nintendo DS Lite

Nintendo DSi

The **Nintendo DSi**[c] is the second redesign of the Nintendo DS. It is based on the unreleased larger Nintendo DS Lite model. While similar to the previous DS redesign, new features include two inner and outer 0.3 megapixel digital cameras, a larger 3.25 inch display, internal and external content storage, compatibility with WPA wireless encryption, and connectivity to the Nintendo DSi Shop.

Nintendo DSi

Nintendo DSi XL

The **Nintendo DSi XL** (*DSi LL* in Japan) is a larger design of the Nintendo DSi, and the first model of the Nintendo DS family of consoles to be a size variation of a previous one.[56] It features larger screens with wider view angles, improved battery life, and a greater overall size than the original DSi.[57][58] While the original DSi was specifically designed for individual use, Nintendo president Satoru Iwata suggested that DSi XL buyers give the console a "steady place on a table in the living room", so that it might be shared by multiple household members.[56]

Nintendo DSi XL

Software and features

Nintendo Wi-Fi Connection

Nintendo Wi-Fi Connection was a free online game service run by Nintendo. Players with a compatible Nintendo DS game could connect to the service via a Wi-Fi network using a Nintendo Wi-Fi USB Connector or a wireless router. The service was launched in North America on November 14, 2005 with the release of *Mario Kart DS*.[59] Various online games and a web browser were released afterwards, with Nintendo later believing that the online platform's success directly propelled the commercial success of the entire Nintendo DS platform. The Nintendo Wi-Fi Connection served as part of the basis of what would become the Wii.[60] Most functions (for games on both the DS and Wii consoles) were discontinued worldwide on May 20, 2014.[61]

Download Play

With Download Play, it is possible for users to play multiplayer games with other Nintendo DS systems, and later Nintendo 3DS systems, using only one game card. Players must have their systems within wireless range (up to approximately 65 feet) of each other for the guest system to download the necessary data from the host system. Only certain games supported this feature and usually played with much more limited features than the full game allowed.

Download Play is also utilized to migrate Pokémon from fourth generation games into the fifth generation *Pokémon Black* and *White*, an example of a task requiring two different game cards, two handheld units, but only one player.

Some Nintendo DS retailers featured DS Download Stations that allowed users to download demos of current and upcoming DS games; however, due to memory limitations, the downloads were erased once the system was powered off. The Download Station was made up of 1 to 8 standard retail DS units, with a standard DS card containing the demo data. On May 7, 2008, Nintendo released the Nintendo Channel for download on

the Wii. The Nintendo Channel used WiiConnect24 to download Nintendo DS demos through it. From there, a user can select the demo he/she wishes to play and, similar to the Nintendo DS Download Stations at retail outlets, download it (until the user turns off the console) to their DS.

Multi-Card Play

Multi-Card Play, like Download Play, allows users to play multiplayer games with other Nintendo DS systems. In this case, each system requires a game card. This mode is accessed from an in-game menu, rather than the normal DS menu.

PictoChat

PictoChat allows users to communicate with other Nintendo DS users within local wireless range. Users can enter text (via an on screen keyboard), handwrite messages or draw pictures (via the stylus and touchscreen). There are four chatrooms (A, B, C, D) in which people can go to chat. Up to sixteen people can connect in any one room.

On Nintendo DS and Nintendo DS Lite systems, users can only write messages in black. However, in the DSi and DSi XL, there is a function that allows the user to write in any colour from the rainbow that cycles through the spectrum, meaning the user cannot choose a color.

PictoChat was not available for the subsequent Nintendo 3DS series of systems.

Firmware

Nintendo's own firmware boots the system. A health and safety warning is displayed first, then the main menu is loaded. The main menu presents the player with four main options to select: play a DS game, use PictoChat, initiate DS Download Play, or play a Game Boy Advance game. The main menu also has secondary options such as turning on or off the back light, the system settings, and an alarm.

The firmware also features a clock, several options for customization (such as boot priority for when games are inserted and GBA screen preferences), and the ability to input user information and preferences (such as name, birthday, favorite color, etc.) that can be used in games.

It supports the following languages: English, Japanese, Spanish, French, German, and Italian.

Games

Compatibility

The Nintendo DS is backward compatible with Game Boy Advance (GBA) cartridges. The smaller Nintendo DS game cards fit into a slot on the top of the system, while Game Boy Advance games fit into a slot on the bottom. The Nintendo DS, like the Game Boy Micro, is not backward compatible with games for the Game Boy Color and the original Game Boy because the Sharp Z80 compatible processor is not included and the console has physical incompatibility with Game Boy and Game Boy Color games.[62][63] The original Game Boy sound processor, however, is still included to maintain compatibility for GBA games that use the older sound hardware.

The handheld does not have a port for the Game Boy Advance Link Cable, so multiplayer and GameCube–Game Boy Advance link-up modes are not available in Game Boy Advance titles. Only single-player mode is supported on the Nintendo DS, as is the case with Game Boy Advance games played via the Virtual Console on the 3DS and Wii U.

The Nintendo DS only uses one screen when playing Game Boy Advance games. The user can configure the system to use either the top or bottom screen by default. The games are displayed within a black border on the screen, due to the slightly different screen resolution between the two systems (256 × 192 px for the Nintendo DS, and 240 × 160 px for the Game Boy Advance).

Game Boy Advance game slot on Game Boy Advance SP (below) and Nintendo DS Lite (above)

Nintendo DS games inserted into the top slot are able to detect the presence of specific Game Boy Advance games in the bottom slot. In many such games, either stated in-game during gameplay or explained in its instruction manual, extra content can be unlocked or added by starting the Nintendo DS game with the appropriate Game Boy Advance game inserted. Among those games were the popular *Pokémon Diamond* and *Pearl* or *Pokémon Platinum*, which allowed the player to find more/exclusive Pokémon in the wild if a suitable Game Boy Advance cartridge was inserted.[64] Some of the content can stay permanently, even after the GBA game has been removed.

Clockwise from left: A Game Boy Color game cartridge, a Game Boy Advance game cartridge, and a Nintendo DS game cartridge. On the far right is a United States Nickel shown for scale.

Additionally, the GBA slot can be used to house expansion paks, such as the Rumble Pak, Nintendo DS Memory Expansion Pak, and Guitar Grips for the *Guitar Hero: On Tour* series. The Nintendo DSi and the DSi XL have an SD card slot instead of a second cartridge slot and cannot play Game Boy Advance games or *Guitar Hero: On Tour*.

Regional division

The Nintendo DS is region free in the sense that any console will run a Nintendo DS game purchased anywhere in the world; however, the Chinese iQue DS games cannot be played on other versions of the original DS, whose firmware chip does not contain the required Chinese character glyph images; this restriction is removed on Nintendo DSi and 3DS systems. Although the Nintendo DS of other regions cannot play the Chinese games, the iQue DS can play games of other regions. Also, as with Game Boy games, some games that require both players to have a Nintendo DS game card for multiplayer play will not necessarily work together if the games are from different regions (e.g. a Japanese Nintendo DS game may not work with a North American copy, even though some titles, such as *Mario Kart DS* and *Pokémon Diamond* and *Pearl* versions are mutually compatible). With the addition of the Nintendo Wi-Fi Connection, certain games can be played over the Internet with users of a different region game.

Some Wi-Fi enabled games (e.g. *Mario Kart DS*) allow the selection of opponents by region. The options are "Regional" ("Continent" in Europe) and "Worldwide", as well as two non-location specific settings. This allows the player to limit competitors to only those opponents based in the same geographical area. This is based on the region code of the game in use.

The Nintendo DSi, however, has a region lock for DSiWare downloadable games, as well as DSi-specific cartridges. It still runs normal DS games of any region, however.

Media specifications

Nintendo DS games use a proprietary solid state mask ROM in their game cards.[65] The mask ROM chips are manufactured by Macronix and have an access time of 150 ns.[66] Cards range from 8–512 MiB (64 Mib to 4 Gib) in size (although data on the maximum capacity has not been released).[67][68] Larger cards have a 25% slower data transfer rate than more common smaller cards.[69] The cards usually have a small amount of flash memory or an EEPROM to save user data such as game progress or high scores. However, there are few games that have no save memory, such as *Electroplankton*. The game cards are 35 mm × 33 mm × 3.8 mm (1.38 in × 1.30 in × 0.15 in) (about half the width and depth of Game Boy Advance cartridges) and weigh around 3.5 g ($\frac{1}{8}$ oz).

Hacking and homebrew

Since the release of the Nintendo DS, a great deal of hacking has occurred involving the DS's fully rewritable firmware, Wi-Fi connection, game cards that allow SD storage, and software use. There are now many emulators for the DS, as well as the NES, SNES, Sega Master System, Sega Mega Drive, Neo-Geo Pocket, Neo-Geo MVS (arcade), and older handheld consoles like the Game Boy Color.

There are a number of cards which either have built-in flash memory, or a slot which can accept an SD, or MicroSD (like the DSTT, R4 and ez-flash V/Vi) cards. These cards typically enable DS console gamers to use their console to play MP3s and videos, and other non-gaming functions traditionally reserved for separate devices.[70]

In South Korea, many video game consumers exploit illegal copies of video games, including for the Nintendo DS. In 2007, 500,000 copies of DS games were sold, while the sales of the DS hardware units was 800,000.[71]

Another modification device called Action Replay, manufactured by the company Datel, is a device which allows the user to input cheat codes that allows it to hack games, granting the player infinite health, power-ups, access to any part of the game, infinite in game currency, the ability to walk through walls, and various other abilities depending on the game and code used.

See also

- List of Nintendo DS and 3DS flash cartridges

Notes

a. Japanese: ニンテンドーDS
b. Japanese: ニンテンドーDS Lite
c. Japanese: ニンテンドーDSi

References

1. "The Real Cost of Gaming: Inflation, Time, and Purchasing Power" (https://www.ign.com/article s/2013/10/15/the-real-cost-of-gaming-inflation-time-and-purchasing-power). October 15, 2013. Retrieved August 28, 2020.
2. Langshaw, Mark (April 21, 2013). "Nintendo: '2013 is the year of the 3DS'" (https://www.digitals py.com/videogames/nintendo-3ds/a474913/nintendo-2013-is-the-year-of-the-3ds/). *Digital Spy*. Retrieved July 30, 2019.

3. "Consolidated Sales Transition by Region" (https://www.nintendo.co.jp/ir/library/historical_data/pdf/consolidated_sales_e1603.pdf) (PDF). Nintendo. April 27, 2016. Retrieved April 27, 2016.

4. "Sales Data — Top Selling Software Sales Units — Nintendo DS Software" (https://www.nintendo.co.jp/ir/en/sales/software/ds.html). Nintendo. March 31, 2015. Retrieved May 24, 2014.

5. "Nintendo DS Frequently Asked Questions" (https://web.archive.org/web/20160117095231/http://en-americas-support.nintendo.com/app/answers/detail/a_id/3904/p/606). Nintendo. Archived from the original (http://en-americas-support.nintendo.com/app/answers/detail/a_id/3904/p/606) on January 17, 2016. Retrieved July 8, 2014.

6. Darkain (January 21, 2005). "Nintendo DS – WI-FI vs NI-FI" (https://web.archive.org/web/20050217195147/http://www.darkain.com/nintendo_ds/nifi.php). Archived from the original (http://www.darkain.com/nintendo_ds/nifi.php) on February 17, 2005. Retrieved April 2, 2006.

7. "A Pillar Too Many" (http://www.nintendojo.com/features/specials/a-pillar-too-many). Archived (https://web.archive.org/web/20150202235258/http://www.nintendojo.com/features/specials/a-pillar-too-many) from the original on February 2, 2015. Retrieved January 25, 2019.

8. As of March 31, 2016

9. "Nintendo DS Line Outsells PlayStation 2, Nintendo Says" (https://www.wired.com/gamelife/2011/01/nintendo-ds-sales/). WIRED. Retrieved October 13, 2018.

10. Yamauchi, Hiroshi (February 13, 2004). "Nintendo DS Invented by Advisor Yamauchi - Interview" (https://web.archive.org/web/20040405140350/http://gameonline.jp/news/2004/02/13013.html). Game Online citing Nikkei Shimbun. Archived from the original (http://gameonline.jp:80/news/2004/02/13013.html) on April 5, 2004. Retrieved April 19, 2020.

11. "Nintendo Going Back to the Basics. Full story about the company offering a new system in 2004" (http://ds.ign.com/articles/541/541729p1.html). IGN. November 13, 2003. Retrieved October 4, 2007.

12. "Nintendo Announces Dual-Screened Portable Game System" (https://web.archive.org/web/20040402004236/http://biz.yahoo.com/bw/040120/206239_1.html). January 20, 2004. Archived from the original (http://biz.yahoo.com/bw/040120/206239_1.html) on April 2, 2004. Retrieved July 10, 2007.

13. Billy Berghammer (January 21, 2004). "GI Online Interviews NOA's Beth Llewelyn About The Nintendo DS" (https://web.archive.org/web/20070612012800/http://www.gameinformer.com/News/Story/200401/N04.0121.1808.42530.htm). Archived from the original (http://www.gameinformer.com/News/Story/200401/N04.0121.1808.42530.htm) on June 12, 2007. Retrieved July 10, 2007.

14. Glen Bayer (March 1, 2004). "Various Satoru Iwata comments regarding the Nintendo DS" (http://www.n-sider.com/contentview.php?contentid=515). N-sider.com. Retrieved October 4, 2007.

15. Kavanagh, Rich (March 13, 2004). "More Nintendo DS (or Nitro?) specs leaked" (https://web.archive.org/web/20101106073212/http://it.vibe.co.uk/technology/2003/12/more-nintendo-ds-or-nitro-specs-leaked/). Archived from the original (http://it.vibe.co.uk/technology/2003/12/more-nintendo-ds-or-nitro-specs-leaked/) on November 6, 2010. Retrieved July 13, 2007.

16. Kent, Steve (May 5, 2004). "Nintendo unveiling new portable" (http://usatoday30.usatoday.com/life/lifestyle/2004-05-11-nintendo-ds_x.htm). USA Today. Retrieved July 13, 2007.

17. "Nintendo keeps 'DS' codename, tweaks hardware" (http://usatoday30.usatoday.com/tech/news/2004-07-28-no-really-its-ds_x.htm). USA Today. July 28, 2004. Retrieved July 13, 2007.

18. "Nikkei talks with Nintendo's Yamauchi and Iwata" (https://web.archive.org/web/20060127211555/http://game-science.com/news/000406.html). GameScience. Archived from the original (http://game-science.com/news/000406.html) on January 27, 2006. Retrieved May 27, 2014. ""If the DS succeeds, we will rise to heaven, but if it fails we will sink to hell." — Hiroshi Yamauchi"

19. Metts, Jonathan (February 13, 2004). "Iwata, Yamauchi Speak Out on Nintendo DS" (http://www.nintendoworldreport.com/news/9256/iwata-yamauchi-speak-out-on-nintendo-ds). Nintendo Worldwide Report. Retrieved May 27, 2014.

20. "Message from the President: To shareholders and investors" (https://web.archive.org/web/200 81221204655/http://www.nintendo.co.jp/ir/en/message/index.html). *Investor Relations Information*. Japan: Nintendo Co., Ltd. 2008. Archived from the original (https://www.nintendo.c o.jp/ir/en/message/index.html) on December 21, 2008. Retrieved November 25, 2015.

21. Harris, Craig (September 20, 2004). "Official Nintendo DS Launch Details" (http://ds.ign.com/art icles/549/549919p1.html). Retrieved August 13, 2007.

22. "IGN: NDS Japanese Launch Details" (http://ds.ign.com/articles/554/554890p1.html). *IGN*. Retrieved December 27, 2008.

23. "PALGN: Australian DS Launch" (https://web.archive.org/web/20090525223342/http://palgn.co m.au/nintendo-ds/1885/australian-ds-launch/). Archived from the original (http://palgn.com.au/ni ntendo-ds/1885/australian-ds-launch/) on May 25, 2009. Retrieved December 27, 2008.

24. "Nintendo claims most successful launch ever for DS in Australia" (http://www.gamesindustry.bi z/articles/nintendo-claims-most-successful-launch-ever-for-ds-in-australia). Retrieved December 27, 2008.

25. Gantayat, Anoop (December 1, 2004). "NDS Launches in Japan" (http://ds.ign.com/articles/56 9/569911p1.html). Retrieved July 16, 2007.

26. Harris, Craig (January 27, 2007). "Europe DS Launch Title Details" (http://www.ign.com/article s/2005/01/27/europe-ds-launch-title-details). IGN. Retrieved October 4, 2007.

27. "Nintendo reacts to DS demand; orders, share price on the rise" (http://www.gamespot.com/ne ws/nintendo-reacts-to-ds-demand-orders-share-price-on-the-rise-6113031). GameSpot.com. November 12, 2004. Retrieved October 11, 2012.

28. "Nintendo News, Previews, Reviews, Editorials and Interaction" (https://web.archive.org/web/2 0110604115505/http://www.nintendojo.com/archives/infocus/view_item.php?1105105971). Nintendojo.com. January 7, 2005. Archived from the original (http://www.nintendojo.com/archiv es/infocus/view_item.php?1105105971) on June 4, 2011. Retrieved October 11, 2012.

29. "Nintendo's DS player emerges as Tickle Me Elmo of 2004" (https://web.archive.org/web/20050 223235049/http://www.sacticket.com/gamers/story/11763629p-12648524c.html). February 23, 2005. Archived from the original (http://www.sacticket.com/gamers/story/11763629p-12648524 c.html) on February 23, 2005. Retrieved October 11, 2012.

30. (PDF). September 30, 2007 https://web.archive.org/web/20070930024617/http://www.nintendo.com/corp/report/FY06_1Qfin ancials.pdf (https://web.archive.org/web/20070930024617/http://www.nintendo.com/corp/report/ FY06_1Qfinancials.pdf). Archived from the original (https://www.nintendo.com/corp/report/FY06 _1Qfinancials.pdf) (PDF) on September 30, 2007. Retrieved October 11, 2012. Missing or empty |title= (help)

31. "Nintendo DS targets teens, young adults" (http://www.nbcnews.com/id/6471849/ns/technology _and_science-games/t/nintendo-ds-targets-teens-young-adults/#.V0TbC5MrLao). November 15, 2004. Retrieved May 24, 2016.

32. Rothman, Wilson (June 14, 2006). "Time Magazine: Gadget of the Week" (https://web.archive.o rg/web/20060703110018/http://www.time.com/time/business/article/0,8599,1204187,00.html). *Time*. Archived from the original (http://www.time.com/time/business/article/0,8599,1204187,00. html) on July 3, 2006. Retrieved February 1, 2007.

33. Schreier, Jason. (January 4, 2011) Nintendo DS Line Outsells PlayStation 2, Nintendo Says | Game|Life (https://www.wired.com/gamelife/2011/01/nintendo-ds-sales/). Wired.com. Retrieved on August 23, 2013.

34. Frum, Larry. "Nintendo to unveil 3-D gaming console" (http://www.cnn.com/2010/TECH/03/23/n intendo.3d/index.html). CNN.com. Retrieved September 6, 2013.

35. McWhertor, Michael (January 29, 2013). "Nintendo DS games coming to Wii U Virtual Console" (http://www.polygon.com/2014/1/29/5359746/nintendo-ds-games-coming-to-wii-u-virtual-consol e). *Polygon*. Retrieved January 30, 2014.

36. Phillips, Tom (June 4, 2014). "Nintendo's first DS title for Wii U now available in Japan" (http://www.eurogamer.net/articles/2014-06-04-nintendos-first-ds-title-for-wii-u-now-available-in-japan). Eurogamer.net. Retrieved June 4, 2014.

37. "GBATEK – GBA/NDS Technical Info" (http://problemkaputt.de/gbatek.htm#dstechnicaldata). Retrieved December 30, 2016.

38. Furber, Steve (2000). *ARM System-on-Chip Architecture*. p. 344. ISBN 0-201-67519-6.

39. "Nintendo DS and Nintendo DS Lite – Wireless Router Information" (https://web.archive.org/web/20070626043123/https://www.nintendo.com/consumer/wfc/en_na/ds/routerInfo.jsp). Nintendo – Customer Service. Archived from the original (https://www.nintendo.com/consumer/wfc/en_na/ds/routerInfo.jsp) on June 26, 2007.

40. "Take Control" (http://twvideo01.ubm-us.net/o1/vault/gdc07/slides/S3727i1.pdf) (PDF). *Twvideo01.ubm-us.net*. Retrieved September 22, 2018.

41. "A guide to homebrew development for the Nintendo DS" (http://osdl.sourceforge.net/main/documentation/misc/nintendo-DS/homebrew-guide/HomebrewForDS.html). Retrieved July 16, 2009.

42. "Nintendo DS ni-fi protocol information" (https://web.archive.org/web/20090202194241/http://masscat.afraid.org/ninds/proto_info.php). February 2, 2009. Archived from the original (http://masscat.afraid.org/ninds/proto_info.php) on February 2, 2009. Retrieved September 11, 2012.

43. "- Nintendo – Customer Service – Nintendo DS – Charging the Battery" (https://www.nintendo.com/consumer/systems/ds/battery_faq.jsp). *nintendo.com*.

44. *Pokémon Diamond* and *Pearl*, *Zoo Tycoon DS*, *SimCity DS*, *Tiger Woods PGA Tour*, *Digimon World Dawn*, *Mega Man Battle Network 5*, or *The Legendary Starfy*

45. "Nintendo DS Fitting Guides, NDSL Repair Guides" (https://web.archive.org/web/20121109090226/http://www.consolewerks.co.uk/console%20info/nintendo-ds-information.html). Consolewerks.co.uk. Archived from the original (http://www.consolewerks.co.uk/console%20info/nintendo-ds-information.html) on November 9, 2012. Retrieved September 11, 2012.

46. "Nintendo Online Store" (https://store.nintendo.com/). Retrieved April 2, 2006.

47. "Giving gamers two windows to the Web: The Opera Browser for Nintendo DS" (https://archive.is/20120909/http://www.opera.com/press/releases/2006/02/15/) (Press release). Opera Software. February 15, 2006. Archived from the original (http://www.opera.com/press/releases/2006/02/15/) on September 9, 2012. Retrieved April 2, 2006.

48. Berit Hanson (February 16, 2006). "Opera for Nintendo DS" (https://web.archive.org/web/20070518001036/http://my.opera.com/berit/blog/show.dml/146280). *Berit's Blog*. Archived from the original (http://my.opera.com/berit/blog/show.dml/146280) on May 18, 2007. Retrieved July 3, 2006.

49. "Mark your calendars: Opera announces Nintendo DS browser release date in Japan" (https://web.archive.org/web/20110806062805/http://www.opera.com/press/releases/2006/06/21/) (Press release). Opera Software ASA. June 21, 2006. Archived from the original (http://www.opera.com/press/releases/2006/06/21/) on August 6, 2011. Retrieved June 21, 2006.

50. Chris Playo. "Japan: Nintendo DS Press Conference" (https://web.archive.org/web/20090516013411/http://www.4colorrebellion.com/archives/2006/07/17/new-release-dates-for-europe/). NintendoDS Advanced. Archived from the original (http://www.4colorrebellion.com/archives/2006/07/17/new-release-dates-for-europe/) on May 16, 2009. Retrieved April 2, 2006.

51. Craig Harris (March 7, 2007). "GDC 2007: Nintendo DS Browser US Bound" (http://ds.ign.com/articles/771/771323p1.html). IGN. Retrieved September 19, 2007.

52. "Nintendo DSi Browser at Nintendo :: Games" (https://web.archive.org/web/20090409091347/https://www.nintendo.com/games/detail/JAradEBWIlZzprAROkFTgptzEmcdKPwk). Nintendo. Archived from the original (https://www.nintendo.com/games/detail/JAradEBWIlZzprAROkFTgptzEmcdKPwk) on April 9, 2009. Retrieved June 19, 2009.

53. Brian Ekberg (April 14, 2008). "Guitar Hero: On Tour First Look" (http://www.gamespot.com/guitar-hero-on-tour/previews/guitar-hero-on-tour-first-look-6189175/). GameSpot. Retrieved May 26, 2008.

54. "What Is the Difference between the Nintendo DS and the Nintendo DS Lite? | Nintendo Support" (https://en-americas-support.nintendo.com/app/answers/detail/a_id/4111/~/what-is-the-difference-between-the-nintendo-ds-and-the-nintendo-ds-lite?). en-americas-support.nintendo.com. Retrieved January 22, 2019.

55. "DSi XL Was Once DS Lite XL" (http://uk.ds.ign.com/articles/105/1054873p1.html). Retrieved January 2, 2010.

56. "Corporate Management Policy Briefing/Semi-annual Financial Results Briefing" (https://www.nintendo.co.jp/ir/en/library/events/091030/09.html). Minami-ku, Kyoto: Nintendo. October 30, 2009. pp. 9–10. Retrieved November 9, 2009.

57. Tor Thorsen (October 29, 2009). "DSi XL hits US & EU Q1 2010, DS sales top 113 million" (http://www.gamespot.com/news/dsi-xl-hits-us-and-eu-q1-2010-ds-sales-top-113-million-6238345). GameSpot. San Francisco: CBS Interactive. Retrieved October 29, 2009.

58. Christopher Dring (October 29, 2009). "Nintendo reveals DSi LL" (http://www.mcvuk.com/news/read/nintendo-reveals-dsi-ll). MCV. United Kingdom: Intent Media. Retrieved November 9, 2009.

59. "Mario Kart, Nintendo Wi-Fi Launch" (http://www.ign.com/articles/2005/11/15/mario-kart-nintendo-wi-fi-launch). IGN.com. November 15, 2005. Retrieved May 19, 2014.

60. . Translation (http://famitsu.blogspot.com/2006/03/zen-of-wi-fi.html). "The Zen of Wi-Fi" (http://www.famitsu.com/game/news/2006/03/25/103,1143298259,50588,0,0.html). Famitsu (in Japanese). March 2006. Retrieved November 13, 2015.

61. "Nintendo Wi-Fi Connection service for Nintendo DS and Wii to end in May" (https://www.nintendo.com/whatsnew/detail/vyWpoM6CBIe6FjW8NIY7bvzOrgBURhzw). Nintendo.com. February 26, 2014. Archived (https://web.archive.org/web/20140227060752/https://www.nintendo.com/whatsnew/detail/vyWpoM6CBIe6FjW8NIY7bvzOrgBURhzw) from the original on February 27, 2014. Retrieved May 20, 2014.

62. "Can the Nintendo DS or DS Lite Play Game Boy Games? | Nintendo DS Family | Nintendo Support" (http://en-americas-support.nintendo.com/app/answers/detail/a_id/3900/p/606). en-americas-support.nintendo.com. Retrieved March 17, 2018.

63. "Nintendo - Customer Service | Game Boy micro - Frequently Asked Questions" (https://www.nintendo.com/consumer/systems/micro/faq.jsp). www.nintendo.com. Retrieved March 17, 2018.

64. "Dual-slot mode" (http://bulbapedia.bulbagarden.net/wiki/Dual-Slot_Mode). Retrieved November 1, 2014.

65. Vuijk, Rafael (October 11, 2006). "First Nintendo DS cartridge information" (http://files.darkfader.net/ds/files/cartridge.txt). Dark Fader (Rafael Vuijk). Retrieved February 10, 2010.

66. "Nintendo: NDS Disassembly" (https://web.archive.org/web/20100225161503/http://blog.gaingame.com/2010/01/31/nintendo-disassembly-3/). GainGame's Blog. January 31, 2010. Archived from the original (http://blog.gaingame.com/2010/01/31/nintendo-disassembly-3/) on February 25, 2010. Retrieved February 10, 2010.

67. Ni no Kuni: The Another World was the first DS game to use a 4-gigabit card "GoNintendo: Level 5's press conference – massive info roundup (Fantasy Life announced, Ninokuni's massive DS cart, and much more!)" (http://gonintendo.com/?p=94312).

68. Adam Riley (July 15, 2007). "E3 2007 News|Archaic Sealed Heat (Nintendo DS) RPG Details" (http://www.cubed3.com/news/8133/). Cubed3.com. Retrieved November 4, 2007.

69. Sara Guinness (June 16, 2006). "MechAssault DS Developer Diary" (https://web.archive.org/web/20070509124121/http://blogs.ign.com/MechAssaultDS/2006/06/16/21863/). IGN. Archived from the original (http://blogs.ign.com/MechAssaultDS/2006/06/16/21863/) on May 9, 2007. Retrieved November 4, 2007.

70. "What Are Nintendo DS and DSi Cards?" (https://web.archive.org/web/20110203141105/http://www.nintendodscards.com/what-are-nintendo-ds-dsi-cards/). Nintendo DS Cards. June 27, 2010. Archived from the original (http://www.nintendodscards.com/what-are-nintendo-ds-dsi-cards/) on February 3, 2011. Retrieved September 23, 2010.

71. "ニンテンドーDSの違法コピーにご注意！" (https://web.archive.org/web/20100207215151/http://www.chosunonline.com/article/20071211000038) (in Japanese). The Chosun Ilbo. December 11, 2007. Archived from the original (http://www.chosunonline.com/article/20071211000038) on February 7, 2010. Retrieved September 10, 2008.

External links

- Official website (http://www.nintendo.com/ds)