PlayStation 4 technical specifications

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The **PlayStation 4 technical specifications** describe the various components of the PlayStation 4 (PS4) video game console.

Contents

Versions

The originally released 500GB HDD PS4s had manufacture serial numbers of the form CUH-10*XX*A; a minor modification with a different form of WiFi Microstrip antenna was registered in mid 2014 as part numbers CUH-11*XX*A.[1][2]

In 2015, the CUH-12 series as variants CUH-1215A and CUH-1215B with 500GB and 1TB storage respectively) were certified in the USA by the FCC. Differences between the CUH-11 and CUH-12 series included a reduction in rated power from 250W to 230W, a reduction in weight from 2.8 to 2.5kg, and physical buttons.[3][4][5] The CUH-12xx series are also referred to as the "C chassis" variant of the PS4.[6]

In late June 2015, a 1TB CUH-11 series machine was announced for European/PAL markets.[7]

The CUH-12 series was officially announced in June 2015, releasing first in Japan, then worldwide. Changes to the design included a matte black HDD cover replacing the original gloss black version.[8][9][10] Other minor changes to the design included mechanical buttons replacing electrostatic touch sensitive ones, and a shorter LED indicator on the top surface of the console.[11][12] Internally the CUH-12 series included a number of minor changes, including the change to 8 memory modules of 1 GB (from a previous 16 modules of 512 MB).[13]

Processors and memory

The PlayStation 4 uses a semi-custom Accelerated Processing Unit (APU) developed by AMD in cooperation with Sony and is manufactured by TSMC on a 28 nm process node.[15] Its APU is a single-chip that combines a central processing unit (CPU) and graphics processing unit (GPU), as well as other components such as a memory controller and video decoder/encoder.[16][17] The console also includes secondary custom chips that handle tasks associated with downloading, uploading, and social gameplay.[18][19] These tasks can be handled seamlessly in the background during gameplay or while the system is in sleep mode.[20]

> "[We] have not built an APU quite like that for anyone else in the market. It is by far the most powerful APU we have built to date".
>
> — John Taylor, AMD[14]

Though not much is publicly known of the PS4's audio capabilities, the console also contains a dedicated hardware audio module, which can support in-game chat with minimal external resources as well as "a very large number" of MP3 streams for use in in-game audio.[21]

APU

The main APU (2013 release) had a die size of 19 by 18.3 mm (0.75 by 0.72 in), with GPUs, CPUs and memory controllers on the same die.[22] 2013 release version APUs contained 20 GCN compute units on die,[23] two of which are thought to be present to provide redundancy to improve manufacturing yield.[24] CPUs plus CPU caches make up approximately 15% of the chip area, and the GPU compute units take up approximately 33% of the 348 mm^2 (0.539 sq in) die area.[24]

Device	CPU (Jaguar)				GPU (GCN)					Memory				Special features
	Cores	Frequency[25]	L2 cache	GFLOPS	Cores[1][26]	Frequency	GFLOPS	Pixel fillrate (GP/s)[2]	Texture fillrate (GT/s)[3]	Amount	Bus width (bit)	Bus type	Bandwidth (GB/s)	
Sony PS4	2 quad core modules	1.6 GHz	2 × 2 MB	102.4	1152:72:32	800 MHz	1843.2	25.6	57.6	8 GB	256	GDDR5	176	8 ACEs in the GPU and additional modules

- [1] Unified shaders : texture mapping unit : render output unit
- [2] Pixel fillrate is calculated as the number of **ROP**s multiplied by the base core clock speed.
- [3] Texture fillrate is calculated as the number of **TMU**s multiplied by the base core clock speed.

Central processing units

The central processing unit (CPU) consists of two x86-64 quad-core modules for a total of eight cores,[27] which are based on the Jaguar CPU architecture from AMD.[16] Each core has 32 kB L1 instruction and data caches, with one shared 2 MB L2 cache per four core module.[28] The CPU's base clock speed is said to be 1.6 GHz. That produces a theoretical peak performance of 102.4 GFLOPS.

Graphics processing unit

GPU specifications[29]
1152 Shaders
72 Texture mapping units
32 Raster operators
18 Compute units
8 Asynchronous compute units (64 queues)
1.84 Teraflops

The graphics processing unit (GPU) is AMD's GPGPU-capable Radeon GCN architecture, consisting of 18 compute units (CUs) for a total of 1,152 cores (64 cores per CU), that produces a theoretical peak performance of 1.84 TFLOPS.[30] This processing power can be used for graphics, physics simulation, or a combination of the two, or any other tasks suited for general purpose compute. GPU is mostly based on the Bonaire architecture using GCN 1.1 technology.[31]

Though based on AMD's GCN architecture, there are several known differentiating factors between the PS4's GPU and current-gen PC graphics cards featuring first-gen GCN architecture:

- An additional dedicated 20 GB/s bus that bypasses L1 and L2 GPU cache for direct system memory access, reducing synchronisation challenges when performing fine-grain GPGPU compute tasks.
- L2 cache support for simultaneous graphical and asynchronous compute tasks through the addition of a 'volatile' bit tag, providing control over cache invalidation, reducing the impact of simultaneous graphical and general purpose compute operations.
- An upgrade from 2 to 64 sources for compute commands, improving compute parallelism and execution priority control. This enables finer-grain control over load-balancing of compute commands including superior game-engine integration.[32]

Audio processing unit

Sharing the die with the rest of the components of the APU, is a Digital signal processing SIP block that is either identical to AMD TrueAudio or shares a certain amount of similarities with it.[33]

Memory controller

The rest of the microchip consists of the on-die memory controller, which is shared by the CPU and the GPU and some additional logic concerned with memory access. With AMD being a founding member of and Sony a contributor to the HSA Foundation the uncore of the PlayStation 4 supports several of the features promoted by the Heterogeneous System Architecture like e.g. hUMA (heterogeneous Uniform Memory Access). This means the system memory is not partitioned, so that a portion of it is exclusively available to the GPU, but unified, hence enabling hardware zero-copy.[34][35]

System memory (RAM)

The PS4 contains a total of 8 GiB (16 × 0.5 GiB (512 MiB) for CUH10XX/CUH11XX models or 8 x 1 GiB (1024 MiB) for CUH12XX models memory chips[36]) of GDDR5 unified system memory, and is capable of running at a maximum clock frequency of 2.75 GHz (5500 MT/s) with a maximum bandwidth of 176 GB/s.[30][37] This is 16 times the amount of total RAM found in the PS3 and is expected to give the console considerable longevity.[38][39] The unified memory architecture allows the CPU and GPU to access a consolidated memory, removing the need for separate, dedicated memory pools.[39]

Auxiliary processor

PS4 includes a secondary ARM processor (with separate 256 MiB of RAM) to assist with background functions and OS features.[40]

Storage

Blu-ray disc

The read-only optical drive reads Blu-ray discs at 6× constant angular velocity for a maximum read speed of 27 MB/s – a significant upgrade from the PS3's 2× speeds that were capped at 9 MB/s.[39][41] To further enhance optical drive performance, the PS4 features a hardware on-the-fly zlib decompression module (a special piece of hardware used to quickly decompress the data on the Blu-ray disc, which has been compressed to save space and bandwidth), allowing for greater effective bandwidth, whilst at the same time, the console continuously caches data onto its hard disk, even buffering unread data when a game is not actively accessing the optical drive, forming part of Sony's PlayGo strategy.[21]

A new Blu-ray disc technology was designed to support 4K resolution.[39] Although the console supports photos and videos at 4K resolution, the system is not expected to render games at 4K.[42][43]

DVD

The read-only optical drive also reads DVDs. It does not read CDs.[44]

Hard drive

The console includes a 500 GB or 1 TB hard drive,[45] which can be upgraded by the user.[46][47]

Other

An additional 256 MB chip (using a 2 Gbit DDR3 SDRAM chip in the 2013 release) is fitted, thought to be used by the auxiliary processor.[48] An additional 32 MB (256 Mbit) flash memory chip is also fitted.[49]

Input and output

The PlayStation 4 features 802.11 b/g/n WiFi connectivity, Ethernet (10BASE-T, 100BASE-TX and 1000BASE-T), Bluetooth 2.1, and two USB 3.0 ports. An auxiliary port is also included for connection to the PlayStation Camera, a motion detection digital camera device first introduced on the PS2.[30] A mono headset, which can be plugged into the DualShock 4, comes bundled with the system.[50] Audio/video output options include HDMI and optical S/PDIF.[30] The PlayStation 4 does not have an analog audio/video output.[51]

Hardware modules

Module Name	Purpose/capability	Ref.
AMD TrueAudio	This package of user-programmable audio DSPs offloads audio processing from the CPU. Possible effects include 3D audio effects, audio compression and decompression, reverberation, and voice stream processing.	[52]
Upload/download	Capable of uploading and downloading data to the hard disk	
Video compression/decompression	Capable of encoding/decoding video formats on-the-fly. These modules are AMD's UVD for hardware video decoding and AMD's VCE for hardware video encoding, used for recording SharePlay videos in the background.	
Zlib decoder	Decoding of compressed data from the Blu-ray optical drive	
WiFi module	Marvell Wireless Avastar 88W8797 Wireless communication : IEEE 802.11 b/g/n, Bluetooth 2.1 (EDR). Skyworks 2614B 315BB	[53]
HDMI module	HDMI output	[48]
Ethernet controller	Marvell Alaska 88EC060-NNB2 Ethernet 10/100/1000 support	[49]
USB controller	USB 3.0 support	[54]

Power usage

The PS4 is powered via an internal "universal" 110–240 V AC power supply.[56] The originally released version had a maximum power rating of 250 W.[57] According to tests by Eurogamer, initial consoles drew approximately 80 W when operational in menu mode, rising to around 110–120 W in gameplay, with peaks of 140 W with both gameplay and menus active,[58] tests by the Natural Resources Defense Council showed similar power consumption figures with 137 W gameplay peaks (with PS4 Camera connected); power consumption in (internet connected) standby mode was measured at 8.8 W under the same conditions, with a lower power "off" state drawing 0.5 W.[59]

The PS4 cooling system uses a single centrifugal fan, which draws air in from both sides of the console, split into flows above and below the main PCB, before entering the fan from top and bottom; the fan exhaust then cools the main APU via a heat pipe–connected heatsink, with the exhaust passing over the main power supply before being emitted from the rear of the console.[57][60][61]

Power usage[55]

Standby mode	10 W
Standby mode (with download)	70 W
Idle on menu	89–91 W
Blu-ray	93–96 W
Netflix	93 W
Game installation	108–116 W
Gaming (*Resogun*)	130–139 W
Gaming (*Killzone*)	144–151 W

The CUH-1200 model update power supply rating reduced from 250W to 230W, with gameplay, and standby download power usages reduced to around 82% of the previous version's values (148.6 to 122W running Dragon Quest Heroes, 70 to 58W in standby download mode).[62]

See also

- PlayStation technical specifications
- PlayStation 2 technical specifications
- PlayStation 3 technical specifications

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