SONY COMPUTER ENTERTAINMENT ANNOUNCES THE DEVELOPMENT OF THE WORLD'S FASTEST GRAPHICS RENDERING PROCESSOR USING EMBEDDED DRAM TECHNOLOGY

TOKYO, March 2, 1999 - Sony Computer Entertainment has developed the Graphics Synthesizer for the next generation PlayStation® incorporating a massively parallel rendering engine that contains a 2,560 bit wide data bus that is 20 times the size of leading PC-based graphics accelerators. Very high pixel fill rates and drawing performance is achieved only through the use of embedded DRAM process technology pioneered by SCE for use in advanced graphics technology.

The current PlayStation introduced the concept of the Graphics Synthesizer via the real-time calculation and rendering of a 3D object. This new GS rendering processor is the ultimate incarnation of this concept – delivering unrivalled graphics performance and capability. The rendering function was enhanced to generate image data that supports NTSC/PAL Television, High Definition Digital TV and VESA output standards. The quality of the resulting screen image is comparable to movie-quality 3D graphics in real time.

In the design of graphics systems, the rendering capability is defined by the memory bandwidth between the pixel engine and the video memory. Conventional systems use external VRAM reached via an off-chip bus that limits the total performance of the system. However in the case of the new GS, there is a 48-Gigabyte memory access bandwidth achieved via the integration of the pixel logic and the video memory on a single high performance chip. This allows orders of magnitude greater pixel fill-rate performance compared to today's best PC-based graphics accelerators.

When rendering small polygons, the peak drawing capacity is 75 Million polygons per second and the system can render 150 Million particles per second. With this large drawing capability, it is possible to render a movie-quality image. With Z-buffering, textures, lighting and alpha blending (transparency), a sustained rate of 20 Million polygons per second can be drawn continuously.

This new architecture can also execute recursive multi-pass rendering processing and filter operations at a very fast speed without the assistance of the main CPU or main bus access. In the past, this level of real-time performance was only achieved when using very expensive, high performance, dedicated graphics workstations. However, with the design of the new Graphics Synthesizer, this high quality image is now available for in-home computer entertainment applications. This will help accelerate the convergence of movies, music and computer technology into a new form of digital entertainment.

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For further information, please contact your local PR Manager.

Graphics Synthesizer – Features and General Specifications

GS Core	Parallel Rendering Processor with embedded DRAM
Clock Frequency	150 MHz
No. of Pixel Engines	16 (in Parallel)
Embedded DRAM	4 MB of multi-port DRAM (Synced at 150MHz)
Total Memory Bandwidth	48 Giga Bytes per Second
Combined Internal	
Data Bus bandwidth	2560 bit
Read	1024 bit
Write	1024 bit
Texture	512 bit
Display Colour Depth	32 bit (RGBA: 8 bits each)
Z Buffering	32 bit
Rendering Functions	Texture Mapping, Bump Mapping
	Fogging, Alpha Blending
	Bi- and Tri-Linear Filtering
	MIPMAP, Anti-aliasing
	Multi-pass Rendering

Rendering Performance

Pixel Fill Rate	2.4 Giga Pixel per Second
	(with Z buffer and Alphablend enabled)
	1.2 Giga Pixel per Second
	(with Z buffer, Alpha and Texture)
Particle Drawing Rate	150 Million /sec
Polygon Drawing Rate	75 Million /sec (small polygon)
	50 Million /sec (48 Pixel quad with Z and A)
	30 Million /sec (50 Pixel triangle with Z and A)
	25 Million /sec (48 Pixel quad with Z, A and T)
Sprite Drawing Rate	18.75 Million (8 x 8 Pixels)

Display output	NTSC/PAL
	Digital TV (DTV)
	VESA (maximum 1280 x 1024 pixels)
Silicon process technology	0.25 μ 4-level metal
Total number of transistors	43 Million
Die size	279mm^2
Package Type	384 pin BGA

<Reference Data>