

## **NVIDIA® GeForce® 8800 GTX and GeForce GTS Launch External FAQ**

### *General*

**Q: What are you announcing today?**

A: Today we are announcing the Definitive Gaming Platform which includes the new NVIDIA GeForce 8800 GTX and NVIDIA GeForce 8800 GTS graphics processing units (GPUs)—the industry's first Microsoft® DirectX® 10 unified architecture GPUs—and the new NVIDIA nForce® 680i media and communications processor (MCP).

**Q: What makes this the Definitive Gaming Platform?**

A: This platform features the ultimate gaming solution:

- Dual GeForce 8800 GTX-based graphics card running in NVIDIA® SLI™ mode
- NVIDIA nForce 680i motherboard, which is architected for maximum performance with features such as massive overclockability, SLI technology, and excessive front-side bus speeds.

**Q: Why does your new Definitive Gaming Platform feature an Intel CPU and not an AMD CPU?**

A: NVIDIA is CPU neutral. NVIDIA believes that when you are building a computer, you should select an NVIDIA nForce SLI-based motherboard first. NVIDIA nForce SLI-based motherboards are available for both Intel and AMD, so the end user can select whichever they prefer. The new Definitive Gaming Platform includes the highest performing components on the market. At the moment, these are Intel Core 2 Duo and Core 2 Quad CPUs.

**Q: How many graphics processing units are you announcing today?**

A: Today we are announcing two new GPUs based on the new GeForce 8 Series architecture. They are the NVIDIA GeForce 8800 GTX and GeForce 8800 GTS GPUs.

**Q: How much do the new GPUs cost?**

A: You will find GeForce 8800 GTX- based graphics cards selling for around \$599 and GeForce 8800 GTS- based graphics cards selling for around \$449 through e-tailers

**Q: What does your top-to-bottom GeForce product line-up look like now?**

A:

GeForce 8800 GTX - \$599

GeForce 8800 GTS - \$449

GeForce 7950 GT - \$299

GeForce 7900 GS - \$199

GeForce 7600 GT - \$159

GeForce 7600 GS - \$129

GeForce 7300 GPUs - <\$99

**Q: How do these new GPUs compare to the PlayStation 3 graphics engine?**

A: The RSX graphics processor used in PlayStation 3 is based on the award-winning NVIDIA® GeForce 7 Series architecture. The new GeForce 8800 GPUs use a completely new unified, DirectX 10-compatible architecture.

**Q: Do these new GPUs support DirectX 10?**

A: Yes. The GeForce 8 Series GPUs are not only the first shipping DirectX 10 GPUs, but they are also the reference GPUs for DirectX 10 API development and certification.

**Q: Is this a new architecture or a spin of the GeForce 7 Series architecture?**

A: This is a completely new DirectX 10-compatible, unified architecture.

**Q: Is this a hard launch with immediate availability?**

A: Yes. GeForce 8800 GTX- and GeForce 8800 GTS-based graphics cards are available today from leading e-tailers and retailers.

**Q: What kind of supply can we expect from these chips? Will it be limited or in short supply?**

A: These new GPUs are the best, most powerful graphics solutions available, so they will be in high demand. We expect to have adequate volume to meet demand.

**Q: Will there be other NVIDIA GeForce 8 Series-based dual-GPU boards soon?**

A: We cannot discuss unannounced products.

**Q: How will you enable Quad SLI technology with GeForce 8 GPUs?**

A: We cannot discuss unannounced products.

**Q: Will you have new GeForce 8 GPUs that come in a GX2 configuration?**

A: We cannot discuss unannounced products.

**Q: When can we get review units?**

A: Contact our add-in card partners for review units.

**Q: Are you making these solutions available to all board partners or just a select few?**

A: This will be available to all NVIDIA board partners.

**Q: Will you sell AICs GPUs if they want to do their own designs?**

A: We do not discuss the agreements we have with our board partners.

**Q: What are the power requirements for the GeForce 8800 GTX and GeForce 8800 GTS-based graphics cards?**

A: This is still being determined. We will have exact power requirements closer to launch and in the reviewers guide.

**Q: Are you providing add-in card partners with cards or with GPUS?**

A: All graphics cards are being built by NVIDIA's contract manufacturer.

**Q: What kind of volumes do you expect for these solutions?**

A: These new GPUs are the best, most powerful graphics solutions available, so they will be in high demand. They continue our history of graphics innovation and extend our technology leadership. Given the revolutionary performance and features of this new DirectX 10 unified architecture GPU, we expect very strong demand for the product. We expect to have adequate volume to meet demand.

**Q: Is a single GeForce 8800 GTX GPU faster than dual GeForce 7900 GTX GPUs running in SLI mode?**

A: Yes.

**Q: Is a single GeForce 8800 GTX GPU faster than a single GeForce 7950 GX2 card?**

A: Yes.

**Q: Do the new GeForce 8800 GTX and GeForce 8800 GTS GPUs support SLI technology?**

A: Yes. All GeForce 8800 GPUs support NVIDIA SLI technology.

**Q: How many slots do these boards take up?**

A: The GeForce 8800 GTX and GeForce 8800 GTS-based graphics cards occupy two slots each.

**Q: What are the key specifications of the GeForce 8800 GTX and GeForce 8800 GTS GPUs?**

	<b>GeForce 8800 GTX</b>	<b>GeForce 8800 GTS</b>
Stream Processors	128	96
Core Clock (MHz)	575	500
Shader Clock (MHz)	1350	1200
Memory Clock (MHz)	900	800
Memory Amount	768MB	640MB
Memory Interface	384-bit	320-bit
Memory Bandwidth (GB/sec)	86.4	64
Texture Fill Rate (billion/sec)	36.8	24

**Q: What kind of memory do the GeForce 8800 GTX and GeForce 8800 GTS-based graphics cards use?**

A: High-speed GDDR3 memory.

**Q: Will you offer 512MB or 256MB versions of the GeForce 8800 GTX or GeForce 8800 GTS?**

A: Not at this time.

**Q: Do these GPUs support HDCP?**

A: Yes. All NVIDIA GeForce 8800 GTX- and GeForce 8800 GTS-based graphics cards are HDCP capable.

**Q: Do the GeForce 8800 GPUs feature NVIDIA® PureVideo™ HD technology?**

A: Yes. All NVIDIA GeForce 8800 GPUs feature PureVideo HD.

**Q: How many ROPs (Raster Operations Units) do the NVIDIA GeForce 8800 GTX and GeForce 8800 GTS GPUs have?**

A: The NVIDIA GeForce 8800 GTX has a 24 pixel per clock ROP. The GeForce 8800 GTS has a 20 pixel per clock ROP.

**Q: What are the recommended power supplies for the NVIDIA GeForce 8800 GTX and GeForce 8800 GTS in single and multi-GPU configurations?**

A: GeForce 8800 GTX requires a minimum 450W or greater system power supply (with 12V current rating of 30A). GeForce 8800 GTS requires a minimum 400W or greater system power supply (with 12V current rating of 26A).

**Q: Why does the GeForce 8800 GTX require two 6-pin power connectors?**

A: The PCI Express spec allows for 75W from the edge connector plus 75W from each external 6-pin power connector. The GeForce 8800 GTX requires two 6-pin power connectors to deliver the full power requirements of the board while adhering to the PCI Express edge connector and 6-pin connector specification.

**Q: How long is the GeForce 8800 GTX graphics card? Will it fit in most chassis?**

A: The GeForce 8800 GTX graphics card is 10.5 inches long. Based on our surveys the card will fit in the vast majority of enthusiast-class chassis on the market today. Note that the power connectors are now routed off the top edge of the graphics card instead of the end of the card, so there is no extra space required at the end of the graphics card for power cabling.

**Q: Have you changed the way you approach antialiasing with GeForce 8 Series GPUs?**

A: Yes. We have added new 8x and 16x antialiasing (AA) levels that deliver outstanding image quality at lightning-fast frame rates. The NVIDIA Control Panel also now supports the following three antialiasing modes:

- a) Application Controlled – AA is completely controlled by the in-game settings.
- b) Application Override – AA is completely controlled by the NVIDIA Control Panel. In-game settings are ignored.
- c) Application Enhanced (new) – AA setting (i.e. 4x, 8x, 16x, etc) is determined by the NVIDIA Control Panel, but the application determines whether AA is on or off and what surfaces AA is applied to. This mode allows for applications to take advantage of the GeForce 8800 GPUs' new 8x and 16x AA in a more reliable, compatible manner than the Application Override mode. This is the recommended mode for all applications.

**Q: How many transistors do the NVIDIA GeForce 8 Series GPUs have?**

A: 681 million

**Q: What manufacturing process do the NVIDIA GeForce 8 Series GPU use?**

A: 90nm

**Q: Where are the NVIDIA GeForce 8 Series GPUs being manufactured?**

A: TSMC

**Q: What does unified shader core mean?**

A: Historically, GPUs have had dedicated units for different types of operations in the rendering pipeline, such as vertex processing and pixel shading. With the unified architecture of the GeForce 8 Series, NVIDIA designed a single floating point shader core with multiple independent processors. Each of these independent processors is capable of handling any type of shading operation, including pixel shading, vertex shading, geometry shading, and physics shading. GeForce 8800 GPUs can dynamically allocate processing power depending on the workload of the application, providing unprecedented performance and efficiency.

**Q: What is NVIDIA GigaThread™ technology?**

A: GigaThread is a new technology that enables thousands of independent threads to execute in parallel inside of the graphics core. This delivers extreme processing efficiency in advanced, next-generation shader programs.

**Q: What is stream processing**

A: Stream processing is a relatively new computing paradigm that enables parallel processing of a defined series of operations on multiple data streams with extreme levels of efficiency and performance. The shader core of the GeForce 8800 GPUs is comprised of 128 1.35GHz stream processors all working in parallel to deliver unmatched gaming performance. Streaming is the most efficient architecture for graphics. Streaming has evolved with graphics and the GeForce 8 Series is the next generation of a streaming architecture. The GeForce 8800 is a unified architecture where geometry, vertex, and pixel programs share common stream processing resources.

**Q: Do these GPUs support Shader Model 4.0?**

A: Yes. GeForce 8800 GPUs deliver full support for Shader Model 4.0.

**Q: What are the key difference between DirectX 9 and Direct X 10?**

A: DirectX 10 introduces a number of important new features including:

- Geometry shaders
- Stream output
- Next-generation geometry instancing
- Significantly reduced CPU overhead during CPU-to-GPU transactions

These features combine to deliver unparalleled levels of graphics realism and film-quality effects all rendered in real-time on the GPU.

**Q: What is stream output?**

A: Stream output is a new feature of DirectX 10 that allows data to be passed directly from either the vertex or geometry shader straight into frame buffer memory without having to pass through the entire rendering pipeline. The output can then be fed back through the pipeline to allow iterative processing and advanced shader effects such as particle systems and physics effects.

**Q: What are geometry shaders?**

A: Geometry shaders are a new feature of DirectX 10 that allow for dynamic creation of geometry on the GPU. Until now, graphics hardware only had the ability to manipulate existing data on the GPU. With the introduction of geometry shaders, the GPU can now create and destroy vertices output from the vertex shader. This capability allows for new features such as displacement mapping with tessellation and GPU-generated shadow volumes that deliver an even more true-to-life gaming experience.

**Q: What is the NVIDIA® Lumenex™ engine?**

A: The NVIDIA® Lumenex™ engine is a portion of the GeForce 8800 GPUs dedicated to delivering incredible image quality, including 16x full-screen antialiasing, 128-bit floating point high-dynamic range (HDR), and support for 2560x1600 resolutions at amazing frame rates.

**Q: What is NVIDIA® Quantum Effects™ technology?**

A: NVIDIA Quantum Effects is a new technology designed to enhance simulation and rendering of physics effects on the graphics processor. Through an advanced shader core architected for physics computation, GeForce 8800 GPUs are able to deliver amazing visual effects such as smoke, fire, and explosions at faster frame rates than ever before. By having this dedicated capability on the GPU, the CPU is freed up to run the game engine and AI, improving overall gameplay.

**Q: Why does the GeForce 8800 GTX graphics card have two SLI connectors?**

A: The second SLI connector on the GeForce 8800 GTX is hardware support for potential future enhancements in our SLI software functionality. With the current drivers, only one SLI connector is actually used. Users can plug the SLI connector into either the right or left set of SLI fingers.

**Q: Why did NVIDIA choose to implement a 384-bit memory interface on GeForce 8800 GPUs? Why not 512-bit or 256-bit?**

A: With GeForce 8800 GPUs, our goal was to create the highest performing GPU within a given set of design constraints including power, size, cost, design technology, and board-level requirements. Developing the highest performing GPU requires implementing an architecture that is balanced between shader, texture, ROP, and frame buffer width. Through our performance analysis across hundreds of applications and shaders, we determined that a 384-bit memory interface when combined with 128 stream processors and 64 pixels per clock of texture filtering provided the fastest, most balanced processor while meeting all the various design constraints.

**Q: What is the chip near the display connectors on the GeForce 8800-based graphics cards for?**

A: For GeForce 8800 GPUs, NVIDIA decided to put the TMDS display logic into a custom, discrete ASIC. This was done to simplify package and board routing as well as for manufacturing efficiencies.

**Q: Will future GeForce 8 Series products require this TMDS display ASIC?**

A: While we cannot discuss unannounced products, these types of design decisions are evaluated on a by-product basis and implemented where they make sense based on the market and technical requirements.

**Q: Why do GeForce 8800 GTS-based graphics cards only have 10 pieces of memory populated on the board even though the board was designed to accommodate 12 pieces of memory? Why do the two unpopulated memory slots change location from graphics card to graphics card?**

A: GeForce 8800 GTS GPUs only support 320-bit (10 pieces of 16Mx32 memory) worth of memory width. The reason the location of the two unpopulated memory slots changes from graphics card to graphics card is manufacturing efficiencies. All GeForce 8800 GTS-based graphics cards have the same performance and functionality regardless of which 10 of the 12 slots of memory are populated.

**Q: What does NVIDIA's announcement of Quantum Effects technology mean for Ageia? How does NVIDIA view Ageia's role in the industry?**

A: Earlier this year, NVIDIA demonstrated high-speed physics running on GeForce 7 Series GPUs. The new GeForce 8800 GPUs have a new, more powerful unified computing capability that increases the performance and flexibility of the GPU for physics computation. The GeForce 8800 GPUs are capable of handling complete physics computations that free the CPU from physics calculations and allow the CPU to focus on AI and game management. The GPU is now a complete solution for both graphics and physics. Consumers will benefit from the flexibility offered by GPU physics and developers welcome a hardware platform for physics acceleration with a large installed base. Ageia's hardware physics technology is a competing technology for physics acceleration.

**Q: What is GPGPU/compute?**

A: As GPUs became programmable and NVIDIA introduced the first 32-bit floating point GPU, GPGPU emerged as an active area of research. GPGPU academic researchers were attracted to the immense computational power of the GPU and have shown great results in scientific computing within the limits of what can be accomplished with graphics APIs and the graphics pipeline. NVIDIA is introducing a new architecture for processing on the GPU based on an architecture called "Compute Unified Device Architecture" or CUDA. CUDA is a unified hardware and software platform for computing on the GPU and is based on the concept of computing threads. The new GeForce 8800 GPUs contain new features for thread computing and a unique set of tools for software developers based on the industry-standard C language. By making the

power of the GPU more flexible and more accessible, NVIDIA's new CUDA expands the capability and range of applications possible on the GPU.