NVIDIA QUADRO

Revolutionary Visual Computing Solutions

Features and Benefits

Full 128-Bit Precision Graphics Pipeline
Enables mathematical computations to maintain high accuracy, resulting in unmatched visual quality.

High-Quality Full-Scene Antialiasing (FSAA)
Up to 32x FSAA dramatically reduces visual aliasing artifacts or "jaggies" at resolutions up to 2560 x 1600, resulting in highly realistic scenes. New rotated-grid FSAA algorithm (RG FSAA) delivers unprecedented quality and performance.

High Precision, High Dynamic Range Imaging (HDR)
Sets new standards for image clarity and quality through floating point capabilities in shading, filtering, texturing, and blending. Enables unprecedented quality of rendered images for visual effects processing.

Hardware-Accelerated Pixel Read-Back
Ultra-fast pixel read-back performance delivers massive host throughput, more than 10x the performance of previous generations of graphics systems.

GPU Computing
NVIDIA CUDA provides a C language environment and tool suite that unleashes new capabilities to solve complex, visualization challenges such as real-time ray tracing and interactive volume rendering.[1]

NVIDIA PureVideo Technology
NVIDIA PureVideo™ technology is the combination of high-definition video processors and software that delivers unprecedented picture clarity, smooth video, accurate color, and precise image scaling for SD and HD video content. Features include, high-quality scaling, spatial temporal de-interlacing, inverse telecine, and high quality HD video playback from DVD.

NVIDIA Unified Architecture
Industry's first unified architecture designed to dynamically allocate geometry, shading, pixel, and compute processing power to deliver optimized GPU performance.[1]

Dual Dual-Link Digital Display Connectors
Dual dual-link TMDS transmitters support ultra-high-resolution panels (up to 2560 x 1600 @ 60Hz on each panel) – which result in amazing image quality producing detailed photorealistic images.[3]

Essential for Microsoft Windows Vista
Offering an enriched 3D user interface, increased application performance, and the highest image quality, NVIDIA Quadro graphics boards and NVIDIA® OpenGL ICD drivers are optimized for 32- and 64-bit architectures to enable the best Windows® Vista™ experience.

Technical Specifications

NVIDIA QUADRO WORKSTATION GPU
> 12-bit subpixel precision
> Up to 128 textures per pass
> Eight (8) multiple render targets
> Fast 3D texture support
> Jumbo (8K) texture support
> Hardware-accelerated antialiased points and lines
> Hardware OpenGL overlay planes
> Hardware-accelerated two-sided lighting
> Hardware-accelerated clipping planes
> Third-generation occlusion culling
> OpenGL quad-buffered stereo (3-pin sync connector)
> Hardware-accelerated pixel read-back

NEXT-GENERATION SHADING ARCHITECTURE
> Full Shader Model 4.0 (OpenGL and DirectX 10)
  o Vertex Shader 4.0
  o Geometry Shader 4.0
  o Pixel Shader 4.0
> Unlimited Shader Lengths
> FP32 texture filtering and blending
> Non-power-of-two texture support

NVIDIA CUDA Software Development Tools
> C language compiler, profiler and emulation mode for debugging
> Standard numerical libraries for FFT (Fast Fourier Transform) and BLAS (Basic Linear Algegra Subroutines)

HIGH-LEVEL SHADER LANGUAGES
> Optimized compilers for Cg, OpenGLSL, and Microsoft HLSL
> OpenGL 2.1 and DirectX 10 support
> Open source compiler

HIGH-RESOLUTION ANTIALIASING
> Up to 32x full-scene antialiasing (FSAA), up to 2560 x 1600
> Rotated-grid FSAA significantly increases color accuracy and visual quality for edges, while maintaining performance

UNIFIED DRIVER ARCHITECTURE
> Single driver supports all products

SUPPORTED PLATFORMS
> Microsoft Windows® Vista, XP, 2000
> Linux—Full OpenGL implementation, complete with NVIDIA and ARB extensions (complete XFree 86 drivers)
> AMD64, Intel EM64T

PROFESSIONAL CERTIFICATIONS
Computer-Aided Design (CAD) / Computer-Aided Manufacturing (CAM) / Computer-Aided Engineering (CAE) Applications
> AutoCAD
> CATIA
> DeltaGen
> Inventor
> PDMS
> PLM
> Pro / ENGINEER
> Revit
> Solid Edge
> SolidWorks
> and many more…

Digital Content Creation (DCC) and Broadcast
> 3ds Max
> After Effects
> Houdini
> Illustrator
> Lightwave
> Maya
> Premiere Pro
> Softimage | XSI
> and many more…

Energy
> Landmark
> Paradigm GEO
> Schlumberger

Medical/Life Sciences
> Accelyris
> Tripos
> Vital Images

The NVIDIA Quadro® family of professional solutions takes the leading professional applications to a new level of interactivity by enabling unprecedented capabilities.

The industry's leading workstation applications leverage these solutions to enable hardware-accelerated features not found in any other professional graphics solution.

The Quadro professional products include a set of industry specialty solutions that have been architected to enable advanced imaging visualization and broadcast applications - from multi-system scalability and synchronization to uncompressed 12-bit HD-SDI video output.

For more information about NVIDIA Quadro, visit www.nvidia.com

1 Available on NVIDIA Quadro FX 5600, 4600, 3700, 1700, 570, 370, 3600M, 1600M, 570M, and 360M.
2 Available on NVIDIA Quadro FX 5600, 5500, 4500 X2, 4600, 4500, 3700, 3500, and 3450.
3 Available on NVIDIA Quadro FX 5600, 5500, 4600, 4500 X2, 3700, 3500, 1700, and 1500.

The **Definition** of Performance. The **Standard** for Quality.

Available NVIDIA Quadro Solutions

Ultra-High-End
NVIDIA Quadro FX 5600
NVIDIA Quadro FX 5500
NVIDIA Quadro FX 4500 X2

High-End
NVIDIA Quadro FX 4600
NVIDIA Quadro FX 3700
NVIDIA Quadro FX 3500

Mid-Range
NVIDIA Quadro FX 3450
NVIDIA Quadro FX 1700
NVIDIA Quadro FX 1500

Entry-Level
NVIDIA Quadro FX 570
NVIDIA Quadro FX 560
NVIDIA Quadro FX 550
NVIDIA Quadro FX 370

Specialty
NVIDIA Quadro Plex VCS
NVIDIA Quadro SDI
NVIDIA Quadro G-Sync

Mobile
NVIDIA Quadro FX 3600M
NVIDIA Quadro FX 1600M
NVIDIA Quadro FX 570M
NVIDIA Quadro FX 360M

Ground-breaking Unified Architecture Delivers Unprecedented Performance

The latest NVIDIA Quadro architecture takes application performance to new levels by featuring the industry's first unified architecture[1]. Designed to dynamically allocate geometry, shading, pixel, and compute processing power, the latest NVIDIA Quadro graphics boards deliver optimized Graphics Processing Unit (GPU) performance. The GPU pipeline efficiency is further multiplied by fast 3D and large texture transfers, NVIDIA's crossbar memory architecture, enabling occlusion culling, lossless depth Z-buffer, and color compression.

These elements combine to achieve unprecedented 3D performance: blazing geometry performance, lightening-fast line performance and massive fill rates powered by a dynamically configurable array of thread processors. With ultra-fast pixel read-back performance, massive host throughput gains can be achieved for professional applications. However, the true measure of power is application performance and the new NVIDIA Quadro architecture doubles the performance of the previous generation.

Advanced Programmability Empowers a New Class of Applications

The latest NVIDIA Quadro FX graphics solutions are the reference standard for

Shader Model 4.0 and next generation operating systems enabling breakthrough ultra-realistic, real-time visualization applications. Styling and production rendering are integral functions of the design workflow and NVIDIA Quadro FX provides professionals the tools to shorten the production process and enable faster time to market.

The major CAD and DCC application vendors can take full advantage of the programmable NVIDIA Quadro architecture by enabling sophisticated shaders to simulate a virtually unlimited range of physical characteristics, such as lighting effects (dispersion, reflection, refraction, BRDF models) and even physical surface properties (casting effects, porosity, molded surfaces). Real-time shaders allow

these effects to be combined and modified interactively, something that is impossible with simple 2D static texture maps.

### Full 128-bit Floating Point Precision Delivers the Industry's Highest Workstation Quality

Sophisticated real-time effects typically involve multiple mathematical operations that demand high precision to maintain image quality. The NVIDIA Quadro architecture features true 128-bit IEEE floating point precision (32-bit fp per component), resulting in the highest level of accuracy and the ultimate in visual quality.

The NVIDIA Quadro family delivers true 16-bit and 32-bit floating point formats for

accurately matching visual images. All images have a smoother, more appealing variation in color density, which increases visual realism and generates photorealistic rendered images.

Certified for the Highest Quality Experience with the Most Demanding Workstation Applications

The performance and power of the NVIDIA Quadro architecture are built on a solid foundation of quality engineering. This engineering excellence is exemplified by the NVIDIA Unified Driver Architecture (UDA), which is certified for quality by the entire spectrum of CAD and DCC applications.
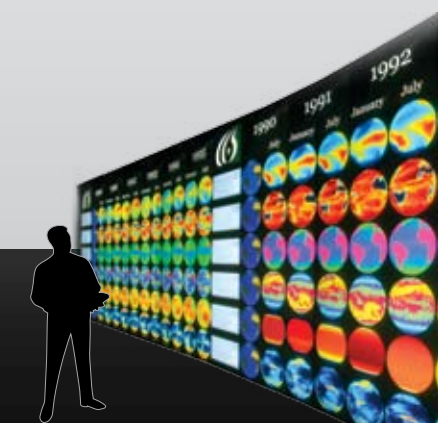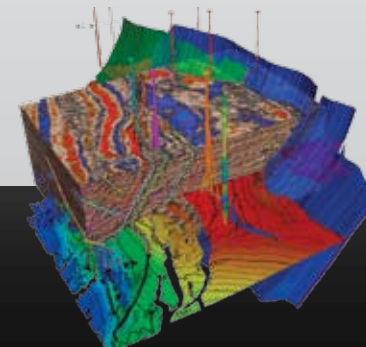
SCALABLE GRAPHICS PERFORMANCE

NVIDIA Quadro graphics solutions feature NVIDIA® SLI™ multi-GPU technology[2]. A revolutionary platform innovation, SLI technology enables professional users to dynamically scale graphics performance, enhance image quality, and expand display real estate by combining multiple NVIDIA Quadro graphics solutions in a single system.

UNCOMPROMISED PROFESSIONAL GRAPHICS TO GO

The NVIDIA Quadro FX professional solutions for mobile workstations deliver the fastest application performance and the highest quality graphics. The NVIDIA Quadro FX mobile solutions enable the leading CAD, DCC, and visualization applications to solve the most complex professional visual computing challenges in a mobile form factor.

INTEGRATED GRAPHICS TO VIDEO SOLUTION

The NVIDIA Quadro SDI solutions are ideal for on-air broadcast professionals across many applications, including virtual-set, sports, and weather news systems. The NVIDIA Quadro SDI solution is the industry's only fully integrated graphics to video out product, and will composite live video footage onto virtual backgrounds and send the result to live video for TV broadcast. The solution also allows film production and post-production professionals to preview the results of 3D compositing, editing, and color grading in real time on HD broadcast monitors.

A QUANTUM LEAP IN VISUAL COMPUTING

The NVIDIA Quadro Plex is a dedicated visual computing system (VCS) enabling breakthrough levels of capability and productivity for professionals ranging from manufacturing designers and stylists to earth scientists to digital content creators. NVIDIA Quadro Plex provides the flexibility to be deployed with any certified PCI Express® x16 platform. NVIDIA Quadro Plex achieves unmatched compute density, can be deployed in a wide range of environments, and scales to meet the most demanding professional applications requirements.

C PROGRAMMING ENVIRONMENT FOR THE GPU

The NVIDIA CUDA™ software development kit provides a C language environment and tools suite that unleashes new capabilities to solve complex, visualization challenges such as real-time ray tracing and interactive volume rendering.[1]

REVOLUTIONIZING ADVANCED VISUALIZATION

The NVIDIA Quadro G-Sync delivers frame and genlock functionality to unprecedented levels of industrial realism, visualization, and collaborative capabilities. The NVIDIA Quadro G-Sync II option can be combined with the Quadro FX 5600 or 4600, and G-Sync I can be combined with the FX 5500 to provide advanced multi-system visualization and external signal synchronization.