



FEATURES	BENEFITS
<b>Proven Workstation Graphics Architecture</b>	Parallel vertex engines, programmable pixel pipelines, and workstation specific features result in the industry's highest application performance and quality.
<b>Advanced Vertex and Pixel Programmability</b>	Enables real-time shaders to simulate a wide range of physical effects and surface properties.
<b>Full 128-bit Precision Graphics Pipeline</b>	Enables mathematical computations to maintain high accuracy, resulting in unmatched visual quality.
<b>12-bit Subpixel Precision</b>	3x that of the nearest competitive workstation graphics, 12-bit subpixel precision delivers high geometric accuracy, eliminating speckles, cracks, and other rasterization anomalies.
<b>High Quality Full-Scene Antialiasing (FSAA)</b>	Up to 16x FSAA dramatically reduces visual aliasing artifacts or "jaggies" at resolutions up to 3840x2400, resulting in highly realistic scenes. New Rotated Grid FSAA algorithm (RG FSAA) delivers unprecedented quality and performance <sup>3</sup> .
<b>High Precision Dynamic Range Imaging (HPDR) Technology<sup>3</sup></b>	Sets new standards for image clarity and quality through floating point capabilities in shading, filtering, texturing and blending. Enables unprecedented rendered image quality for visual effects processing. Support for 32-bit floating point precision per component—an industry exclusive.
<b>Hardware-Accelerated Pixel Read-Back<sup>3</sup></b>	Up to 4GB/sec. pixel read-back performance delivers massive host throughput, more than 10x the performance of previous generation graphics systems.
<b>PCI Express Support</b>	Designed specifically to take advantage of the next-generation PCI Express bus architecture. This new bus doubles the bandwidth of AGP 8X delivering over 4 GB per second in both upstream and downstream data transfers.
<b>512MB GDDR3 Support</b>	Delivers high throughput for interactive visualization of large models and high performance for real-time processing of large textures and frames, and enables the highest quality and resolution full scene antialiasing.
<b>Scalable Link Interface (SLI) Technology</b>	Enables NVIDIA Quadro FX products to be linked together via an intelligent communication protocol resulting in true graphics scaling to unprecedented levels of performance and quality <sup>1</sup> .

#### NVIDIA QUADRO FX WORKSTATION GPU

- Full 128-bit floating-point precision pipeline
- 12-bit subpixel precision
- 8 pixels per clock rendering engine
- Hardware accelerated antialiased points and lines
- Hardware OpenGL overlay planes
- Hardware accelerated two-sided lighting
- Hardware accelerated clipping planes
- 3rd-generation occlusion culling
- 16 textures per pixel
- OpenGL quad-buffered stereo (3-pin sync connector)
- Hardware-Accelerated Pixel Read-Back

#### NEXT GENERATION SHADING ARCHITECTURE

- Fully programmable GPU (OpenGL 2.0/DirectX 9.0c class)
- Long fragment and vertex programs (up to 65,536 instructions)
- Looping and subroutines (up to 256 loops per vertex program)
- Dynamic flow control
- Conditional execution

#### ARCHITECTURE

- x16 PCI Express
- 128-bit IEEE floating-point precision graphics pipeline
- 128-bit total floating point color
- 32-bit floating point per component
- 12-bit subpixel precision
- Up to 512MB high-speed GDDR3 memory
- Up to 33GB/sec. memory bandwidth
- Up to 16x FSAA
- Unlimited programmability
- 3D volumetric textures
- Single-system powerwall

#### HIGH-LEVEL SHADER LANGUAGES

- Optimized compilers for Cg, OpenGL shading language, and Microsoft HLSL
- OpenGL 2.0 and DirectX 9.0c support
- Open source compiler

#### HIGH-RESOLUTION ANTIALIASING

- Up to 16x full-scene antialiasing (FSAA) up to 2048x1536 per display or 3840x2400 for single digital display
- 12-bit subpixel sampling precision enhances AA quality
- Rotated Grid FSAA significantly increases color accuracy and visual quality for edges, while maintaining performance<sup>3</sup>

#### MEMORY

- High-speed memory (up to 512MB GDDR3)
- Advanced lossless compression algorithms (color and Z data)

#### UNIFIED DRIVER ARCHITECTURE

- Single driver supports all products

#### OPERATING SYSTEMS

- Windows® XP, 2000, NT®
- Linux—Full OpenGL implementation, complete with NVIDIA and ARB extensions (complete XFree 86 drivers)

#### NVIEW ARCHITECTURE

- Advanced multi-display desktop and application management seamlessly integrated into Microsoft Windows.
- Dual DVI output—drives two independent digital displays at 1600x1200, or one at 3840x2400<sup>4</sup>
- Dual-link TMDS—drives up to two digital displays at 3840x2400 @24Hz simultaneously<sup>5,6</sup>
- 400 MHz DACs—two analog displays up to 2048x1536 @ 85Hz each<sup>7</sup>
- OpenGL stereo support for resolutions up to 3840x2400

#### PROFESSIONAL CERTIFICATIONS: CAD

- Alias AutoStudio, DesignStudio
- Ansys
- Autodesk Architectural Desktop, AutoCAD, Inventor, Lightscape, Mechanical Desktop, VIZ
- AVEVA: PDMS
- Bentley Microstation
- Co | Create OneSpace
- Dassault CATIA
- ESRI ArcGIS
- ICEM Surf
- MSC.Nastran, MSC.Patran
- PTC Pro/ENGINEER Wildfire, 3Dpaint, CDRS
- SolidWorks
- UDS NX Series, I-deas, SolidEdge, Unigraphics, SDRC
- and many more...

#### PROFESSIONAL CERTIFICATIONS: DCC

- Adobe After Effects, Premier
- Alias Maya, StudioTools
- Apple Shake
- Avid Xpress, Xpress DV, Xpress Pro
- Discreet 3ds max, character studio, combustion
- Kaydara MOTIONBUILDER
- Maxon CINEMA 4D
- Newtek LightWave 3D
- Right Hemisphere: Deep Paint 3D
- Side Effects Houdini
- Softimage|XSI, Softimage 3D
- and many more...

<sup>1</sup> Available on NVIDIA Quadro FX 1400, 3400, 4400, and 4400G

<sup>2</sup> Bidirectional reflectance distribution function

<sup>3</sup> Available on NVIDIA Quadro FX 540, 1300, 1400, Go1400, 3400, 4000 SDI, 4400, and 4400G

<sup>4</sup> NVIDIA Quadro FX 540 includes one DVI and one analog output and NVIDIA Quadro FX Go1400 supports a combination of VGA, DVI, LVDS, and TV out

<sup>5</sup> Single Dual-link digital display available on NVIDIA Quadro FX 3400 and 4000 SDI

<sup>6</sup> Dual Dual-Link digital display support on NVIDIA Quadro 4400

<sup>7</sup> NVIDIA Quadro FX 330 includes dual 350MHz DACs



## The Definition of Performance The Standard for Quality

The NVIDIA Quadro® family of professional solutions delivers the fastest application performance and the highest quality workstation graphics.

Raw performance and quality are only the beginning—NVIDIA Quadro FX takes the leading computer aided design (CAD), digital content creation (DCC) and scientific applications to a new level of interactivity by enabling unprecedented capabilities in programmability and precision. The industry's leading OpenGL® and Microsoft® DirectX® workstation applications leverage this architecture to enable hardware accelerated features found in no other professional graphics solution.

Combining industry-leading hardware and software, NVIDIA Quadro NVS features dual- and quad-display graphics products for PCI Express systems that deliver unprecedented performance and stability. These products feature NVIDIA nView™ multi-display technology, delivering productivity and IT management tools and support to the professional desktop.



NVIDIA

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Infinity car image courtesy of EON Reality, Inc.





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

### NVIDIA QUADRO FX ARCHITECTURE ACHIEVES UNPRECEDENTED PERFORMANCE

The NVIDIA Quadro FX architecture takes application performance to new levels by featuring an array of parallel vertex engines, a radically new line engine and fully programmable pixel pipelines coupled to a high-speed graphics DRAM bus. Pipeline efficiency is further multiplied by NVIDIA's next-generation crossbar memory architecture, enabling occlusion-culling, lossless depth Z-buffer, and color compression. Featuring the industry's first top-to-bottom family of PCI Express products targeted for professional CAD, DCC and Scientific applications, NVIDIA Quadro FX ushers in a new era of unprecedented performance, programmability, precision and quality.

#### The Benefits of PCI Express

Workstations with PCI Express deliver the highest performance in video, graphics, multimedia and other professional applications.

These elements combine to achieve unprecedented 3D primitive performance: blazing geometry performance, lightening fast line performance, and massive fill rates powered by superscalar pixel pipelines. But the true measure of power is application performance—and the NVIDIA Quadro FX architecture delivers more than double the performance versus the previous generation. With a theoretical pixel readback performance of greater than 4 GB/sec., massive host throughput gains can be achieved for OpenGL applications. In addition, NVIDIA Quadro FX graphics products enable true graphics scaling to unprecedented levels of performance and scalability via an intelligent communication protocol—*NVIDIA Scalable Link Interface (SLI)* technology<sup>1</sup>.

### ADVANCED PROGRAMMABILITY EMPOWERS A NEW CLASS OF APPLICATIONS

For the first time, styling and production rendering become integral functions of the design workflow, shortening the production process and enabling faster time to market.

Leading this change in functionality are the major CAD and DCC application vendors, including: SolidWorks®, Alias®, Discreet®, Softimage®, and more. End users can take full advantage of the programmable NVIDIA Quadro FX architecture by enabling sophisticated shaders to simulate a virtually unlimited range of physical characteristics, such as lighting effects (dispersion,

reflection, refraction, BRDF<sup>2</sup> models, etc.) and even physical surface properties (casting effects, porosity, molded surfaces, etc.). Real-time shaders allow these effects to be combined and modified interactively—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 FX 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.

High sub-pixel precision is another major contributor to image quality, addressing visual anomalies that cause models to "speckle" or "crack." The NVIDIA Quadro FX architecture virtually eliminates this problem by providing 12 bits of sub-pixel precision—three times higher precision than the nearest competitive product.

NVIDIA Quadro FX delivers true 16-bit and 32-bit floating point formats for accurately matching visual images. 32-bit floating point precision format—an industry first and exclusive—meets the needs of cutting-edge applications. All images have a smoother, more appealing variation in color density thereby increasing visual realism and generating photo-realistic rendered images.

### CERTIFIED FOR THE HIGHEST QUALITY EXPERIENCE WITH THE MOST DEMANDING WORKSTATION APPLICATIONS

The performance and power of the NVIDIA Quadro FX 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.

The true power of UDA lies in the breadth of supported products and its long-term delivery of quality and performance. All NVIDIA Quadro products, including previous generations, are continually tested and certified. This rigorous testing process results in the industry's highest quality hardware and drivers, even with applications released long after an NVIDIA Quadro product may have shipped.



## The Standard for Corporate Graphics.

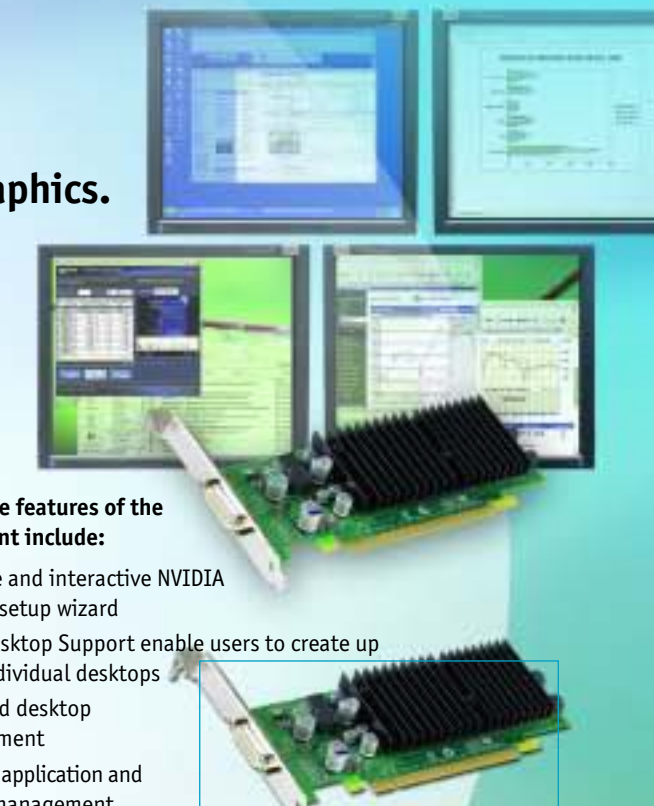
Business professionals who spend their days in front of a workstation understand the importance and value of a solution that helps them work more efficiently. Whether it's tracking securities across multiple displays or managing multiple desktop applications, corporate users are looking for the right solution to fit their business requirements. The NVIDIA Quadro NVS series of graphics boards deliver the compatibility, quality, and performance that corporate users demand. From small businesses to enterprise-level corporations, the NVIDIA Quadro NVS series features products to fit every user's needs.

#### Features and Benefits of the NVIDIA Quadro NVS Solutions include:

- Dual 350MHz RAMDACs delivers INDUSTRY'S BEST IMAGE QUALITY
- Integrated TMDS transmitters
- High-density DMS-59 connectors
- Low-profile form factor provides a cost effective and compact solution
- Passive heatsink provides a silent cooling solution

#### INCREASED PRODUCTIVITY FOR END-USERS

Seamlessly integrated within the familiar Microsoft® Windows® environment, NVIDIA nView multi-display technology offers a robust set of features to maximize productivity. For example, the Application Extensions feature allows applications such as Microsoft Internet Explorer to take full advantage of multiple displays.



#### Some of the features of the environment include:

- Intuitive and interactive NVIDIA nView™ setup wizard
- Multi-desktop Support enable users to create up to 32 individual desktops
- Improved desktop management
- superior application and profile management
- advanced window effects

NVIDIA Quadro NVS 280 PCI Express

#### IT FRIENDLY SOLUTIONS WITH INDUSTRY'S BEST SUPPORT

NVIDIA Quadro NVS solutions are built not only with the user's productivity in mind, but also to streamline and enhance deployment and maintenance. The nView Profiles feature allows IT managers to create custom desktop settings for all their users. These settings can then be globally applied to multiple systems using nView IT management tools.

### NVIDIA QUADRO FX PRODUCT SPECIFICATIONS

BOARD FEATURES	NVIDIA Quadro FX Go 1400	NVIDIA Quadro FX 330	NVIDIA Quadro FX 540	NVIDIA Quadro FX 1300	NVIDIA Quadro FX 1400	NVIDIA Quadro FX 3400	NVIDIA Quadro FX 4400	NVIDIA Quadro FX 4400G	NVIDIA Quadro FX 4000 SDI
<b>Memory Size</b>	256MB	64MB DDR	128MB DDR	128MB DDR	128MB DDR	256MB GDDR3	512MB GDDR3	512MB GDDR3	256MB GDDR3
<b>Memory interface</b>	256-bit	64-bit	128-bit	128-bit	256-bit	256-bit	256-bit	256-bit	256-bit
<b>Memory Bandwidth</b>	19.2 GB/sec.	3.2 GB/sec.	8.8 GB/sec.	17.6 GB/sec.	19.2 GB/sec.	28.8 GB/sec.	33.6 GB/sec.	33.6 GB/sec.	32 GB/sec.
<b>I/O Connectors</b>	DVI-I/VGA/TV-out	2 x DVI-I/VGA	DVI-I + VGA + HDTV	DVI-I + DVI-I + ST	DVI-I + DVI-I + ST	DVI-I + DVI-I + ST	DVI-I + DVI-I + ST	DVI-I + DVI-I + ST	DVI-I + 2xSDI
<b>Dual Link DVI</b>	-	-	-	-	-	Yes (1)	Yes (2)	Yes (2)	Yes (1)
<b>Shader Model</b>	3.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0
<b>SLI Support</b>	-	-	-	-	Yes	Yes	Yes	Yes	-
<b>Genlock/Framelock</b>	-	-	-	-	-	-	-	Yes	Genlock
<b>3D PRIMITIVE PERF</b>									
<b>Triangles/sec. (M)</b>	59	42	49	88	75	117	135	135	91
<b>Pixel/sec. Fill rate (B)</b>	2.2	1.0	1.2	2.8	2.8	4.2	6.4	6.4	5.1
<b>3D RELATIVE APPLICATION PERF</b>									
<b>SPEC SW-01</b>	3.4x	1.0x	2.7x	2.1x	3.9x	4.0x	4.5x	4.5x	4.3x
<b>SPEC UGS-04</b>	5.6x	1.0x	3.2x	3.5x	6.0x	6.8x	7.8x	7.8x	7.6x