



# Quadro™4 XGL Series **Performance Guide**

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# Quadro4 XGL Series Performance Guide

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## Introduction

This document contains essential information to assist you in the review of the Quadro 4 XGL series of professional graphics solutions. Included are important hardware optimizations, review tips, benchmark settings and other miscellaneous “gotchas” found while testing and benchmarking.

Here’s a quick list of what we’ll be reviewing:

- ❑ General Benchmark Reminders
- ❑ NVIDIA’s Unified Driver Architecture (UDA)
- ❑ Test with Windows XP
- ❑ Recommended Benchmarking Applications
- ❑ Testing NVIDIA nView Multi-display Technology
- ❑ Sample Benchmark Data

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## General Benchmark Reminders

While benchmarking, we’ve encountered a number of issues that you should be aware of. Here is a checklist of the things to look for when your numbers don’t match some of the numbers provided, or when applications will not run:

- ❑ **NVIDIA recommends testing at a minimum resolution of 1280x1024 x 32-bit with a refresh rate of 75Hz.** NVIDIA-designed the Quadro4 XGL series of graphics solutions to push the state of the art for performance and features. They are designed to drive ultra high resolutions like 1280x1024 and higher. When testing, make sure you test at high resolutions.
- ❑ **Always disable V-SYNC.** V-sync is controlled separately for different APIs. Disabling V-sync is recommended because all professional workstation applications use double buffering to deliver high-quality images during dynamic graphics. When running benchmarks built on top of these applications, synchronizing swapping display buffers to the monitor vertical retrace can easily prevent the GPU from delivering its true performance. This is likely to be the case as GPUs become increasingly more powerful.



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- **To disable V-sync in OpenGL** go to the Display Properties->Settings->Advanced-> Quadro4 \*\*\*XGL->Additional Properties->OpenGL Settings->Vertical sync panel. Make sure to set this to either “Always off” or “Off by default.”
- **To disable V-sync in D3D** the “cool bits” feature must be enabled to give you access to V-sync control in the D3D control panel of the NVIDIA display drivers. Enable this by using regedit (Start -> Run -> regedit) to add the following registry DWORD:  
[\\HKLM\Software\NVIDIACorporation\Global\NVTweak\coolbits](reg://HKLM/Software/NVIDIACorporation/Global/NVTweak/coolbits).  
Modify the value of this DWORD to be 3. Once this is enabled you can disable V-sync by entering your **Display Properties->Settings->Advanced-> Quadro4 \*\*\*XGL ->Additional Properties->D3D Settings->More D3D->Vertical Sync Mode**.
- ❑ **Uniformly set monitor refresh rate.** Refresh rate WILL effect performance regardless of V-sync being on or off.
- ❑ **Install the latest chipset drivers and IDE/SCSI drivers.** It’s crucial for you to load the latest AMD/Intel/VIA INF updates for optimal compatibility/performance. To check on current versions go to:

<http://support.intel.com/support/chipsets/driver.htm>

<http://www.amd.com/support/support.html>

<http://www.viatech.com/jsp/en/dr/driver.jsp>

After installing the chipset drivers check that the graphics card can correctly use the AGP by download and running the AGP memory utility from here:

[http://developer.nvidia.com/view.asp?IO=agp\\_memoryapp](http://developer.nvidia.com/view.asp?IO=agp_memoryapp)

Note: If zero AGP memory is available, double-check that the chipset drivers are installed. For example, when using Intel P4 chipsets the *intelinfinst\_enu* and the *intelata610\_enu* drivers may need to be loaded to ensure optimal performance.

- ❑ **Run testing from a clean disk.** Having remains of older or competitor drivers may alter performance. For best results, you’ll want to reload the OS on a freshly formatted disk.
- ❑ **Remove unnecessary startup programs.** Unload memory resident software such as anti-virus or scheduling software.
- ❑ **Restart the application before each test.** Optimal scores may not be generated if applications aren’t restarted before each test.
  - When benchmarking AutoCAD use the PowerDraft Quadro Application utility. This can be downloaded from NVIDIA’s web site at:  
[http://www.nvidia.com/view.asp?PAGE=pg\\_20010527321700](http://www.nvidia.com/view.asp?PAGE=pg_20010527321700)
  - **When benchmarking 3Dstudio Max** use the MAXtreme Quadro Application utility. This can be download from NVIDIA’s web site at:  
[http://www.nvidia.com/view.asp?PAGE=pg\\_20010527321700](http://www.nvidia.com/view.asp?PAGE=pg_20010527321700)



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- ❑ Use the correct Application specific setting within the OpenGL driver. To set the application setting within the driver go to the *Display Properties->Settings->Advanced->Quadro4 \*\*\*XGL->Additional Properties->OpenGL Settings* panel and select the appropriate application in the *Custom OpenGL Application Setting* pane. Application specific settings exist for many applications including: *3D Studio Max; AutoCAD; CATIA; Maya / Studio Tools; Pro/ENGINEER; SolidEdge; SolidWorks; Unigraphics* etc.

Note: After selecting the correct application setting **remember to disable V-sync.**

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## NVIDIA's Unified Driver Architecture (UDA)

NVIDIA's Unified Driver Architecture (UDA) allows forward-and-backward as well as top-to-bottom compatibility, greatly reducing support costs by simplifying system maintenance. With UDA, performance optimizations and bug fixes are applied to all Quadro products, providing IT managers with a strong investment protection. The patented UDA technology is found only in NVIDIA technology.

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## Test with Windows XP

Make Windows XP part of your benchmarking platform. NVIDIA has optimized the Titanium series of GPUs and Detonator XP for Windows XP. Cutting-edge graphics technology deserves a cutting-edge OS. Benchmark using Windows XP. For tips on benchmarking with Windows XP, go to:

<http://www.microsoft.com/hwdev/performance/benchmark.htm>

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## Recommended Benchmarking Applications

NVIDIA's Quadro™ and Quadro2 workstation products have been widely adopted in the industry, capturing more than 50% of the market for professional CAD and DCC users. The success of these products has been driven by the compelling price-performance and unique features offered by these products.

With the Quadro4 generation, NVIDIA has raised the bar for ultimate workstation performance by offering unbeatable features and graphics computing power for every segment of the market. The following test suites are standard workstation benchmarks, and are good tools for evaluating the industry-leading performance of Quadro4 XGL products.

- ❑ SPECviewperf<sup>sm</sup> 6.1.2
- ❑ SolidWorks - SPECapc<sup>sm</sup> for SolidWorks 2001
- ❑ Pro/ENGINEER - SPECapc<sup>sm</sup> for Pro/ENGINEER 2000i<sup>2</sup>
- ❑ Unigraphics - SPECapc<sup>sm</sup> for Unigraphics V17



- ❑ CATIA - CATbench 2001
- ❑ 3D Studio Max - MAXbench
- ❑ Alias/Wavefront Maya - MayaMarks

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## Testing NVIDIA nView Multi-display Technology

With the introduction of NVIDIA's nView multi-display technology, NVIDIA is redefining the industry standard for multi-display technologies with key new features in software and hardware. nView supports various arrangements of multiple CRTs and digital flat panel displays that can be combined to drastically increase the computer's desktop.

While using a multi-display system, users will run different applications on each monitor. It is rare that users will actually split an application across displays, as that makes the application difficult to read and use. In fact, one of the most desired multi-display features is desktop management, which prevents this basic screen splitting from occurring. nView's smart and flexible interface has built-in usability features to maximize productivity and minimize set-up. Every feature is designed to simplify setup and support, allow full customization and maximize user productivity. Features like an easy setup wizard, hot key binding, smart Window management enhancements and the ability to name and save up to 32 different desktop configurations make nView the most advanced, flexible and user-friendly multi-display management system available.

**Note:** Click [here](#) to view the Introduction to nView tutorial video.

**Note:** For detailed information on the nView control panels, please see the document "Introduction to the Quadro4 Control Panels. It is a step-by-step walk through of each button on every control panel window.

- ❑ Set-up a configuration that best suits your needs and is supported by your Quadro4 XGL graphics adapter. Examples could be:
  - Two CRTs (requires LFH to dual VGA breakout cable)
  - Two flat panels (requires LFH to dual DVI-I breakout cable)
  - One CRT and one flat panel (requires LFH to VGA + DVI-I breakout cable)
- ❑ Enable the second display. Do so from the Display Properties ► Settings control panel. The second display should appear grayed out on this page. To enable, click on display 2 and check "Extend my Windows desktop onto this monitor."



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- ❑ Set your preferences using nView Setup Wizard by either launching it from the nView Desktop Manager control or rebooting your system. Options include:
  - Windows configurations preferences on an application basis.
  - Assign pop-up window positioning preferences
  - Hot key binding of frequently used actions.
  - Setting up transparent windows.
- ❑ Save your settings.
- ❑ Repeat the process and save settings for a different user. nView Desktop Manager preferences are stored on a per Windows user basis. You can have up to 32 different users.
- ❑ Try out the different ways to manage your windows including: Desktop Manager Explorer interface, System menu pull-down interface, and nView control panel.
- ❑ Now work! Multi-desktop displays are addictive. Caution...you may not be able to go back to a single display again!



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## Sample Benchmark Data

Included below are some sample benchmarks for you to refer to while testing. If you are using a similar configuration and your scores do not match these by a significant margin, please contact NVIDIA PR. The data below was generated on the following system configuration:

CPU	Intel® Pentium4™ 2.2GHz Northwood
Motherboard	Intel i850 reference motherboard
Memory	512MB PC800 RDRAM
OS	WinXP
Misc.	All tests run with V-sync off where possible
GPU driver	NVIDIA Reference driver 27.10, MAXtreme or POWERdraft loaded where applicable
GPU	Quadro4 900 XGL





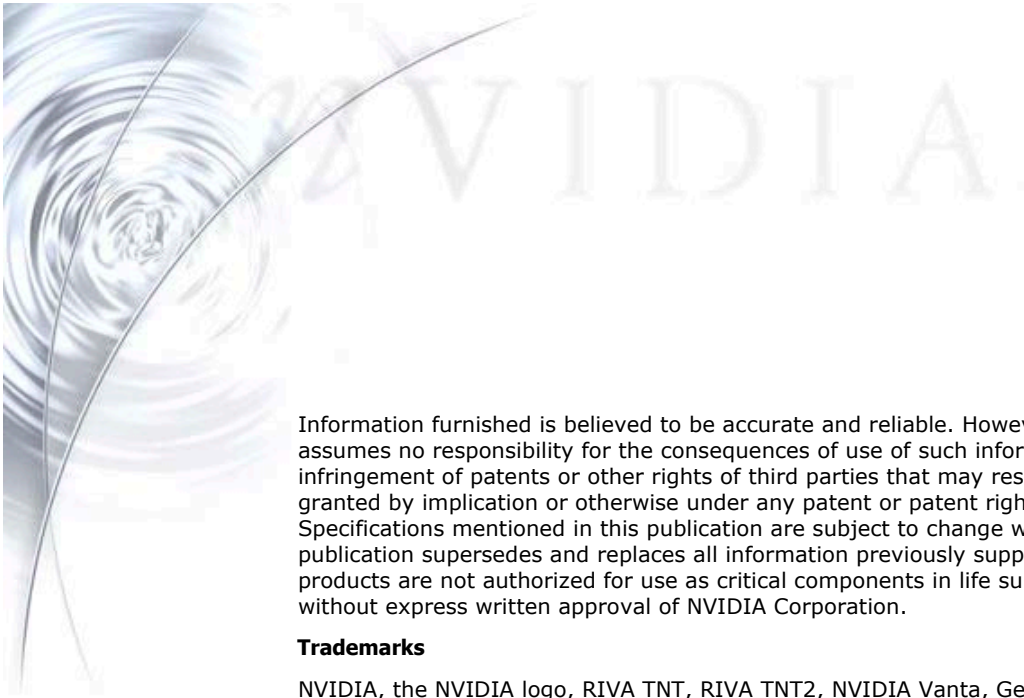
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## **NVIDIA PR Contact Information**

If you do not see similar results, or have any questions regarding the product you are reviewing, please feel free to contact either:

**Brian Burke**  
PR Manager  
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