



# NVIDIA Quadro Professional Drivers ***Release 162 Notes***

**Version 162.67**

For Windows XP / 2000

Windows XP Professional x64 Edition

Windows Server 2003 x64 Edition

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**NVIDIA Corporation**

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# Table of Contents

## 1. Introduction to Release 162

### Notes

Structure of the Document . . . . .	1
Changes in this Edition . . . . .	1

## 2. Changes in the Release 162

### Driver for Windows XP

Version 162.67 Highlights . . . . .	4
What's New in Release 162 . . . . .	4
What's New in Version 162.67 . . . . .	4
Special Instructional Notes for this Release. . . . .	7
Turning Off V-Sync to Boost Performance . . . . .	7
Changes in Version 162.67 . . . . .	8
Fixed Issues—Windows XP 32-bit . . . . .	8
Fixed Issues—Windows XP x64 . . . . .	8
Changes in Version 162.65 . . . . .	9
Fixed Issues—Windows XP 32-bit . . . . .	9
Fixed Issues—Windows XP x64 . . . . .	9
Changes in Version 162.62 . . . . .	10
Fixed Issues—Windows XP 32-bit . . . . .	10
Fixed Issues—Windows XP x64 . . . . .	12
Changes in Version 162.50 . . . . .	13
Fixed Issues—Windows XP 32-bit . . . . .	13
Fixed Issues—Windows XP x64 . . . . .	14
Open Issues in Version 162.67 . . . . .	15
NVIDIA Recommendations. . . . .	15
NVIDIA Issues—Single GPU. . . . .	16
NVIDIA Issues—SLI Mode. . . . .	18
Known Product Limitations . . . . .	19
SLI Connector Requirement on NVIDIA Quadro SLI Cards . . . . .	19
DVD Playback Issues with Dual NVIDIA Quadro NVS Cards . . . . .	20
PowerDVD 5.0 Does Not Display Correctly in nView Span Mode . . . . .	20
DirectX Fails When Detaching/Reattaching Displays in Dualview Mode. . . . .	20
OpenGL Viewport Scaling Problem in Horizontal Span Mode . . . . .	20
Driver Reports 256 MB Memory on NVIDIA Quadro FX 330 Cards . . . . .	21
Video Playback in nView Clone and Span Modes . . . . .	21
Monitor Ordering in the Windows Settings Page 21	

Applying Workstation Application Profiles . . . . .	23
No Antialiasing of 3DMark03 Image Quality Screen Captures . . . . .	23
Medal of Honor Under Windows XP / Windows 2000 . . . . .	24
Windows XP/2000 Issue with Settings Tab Monitor Positioning. . . . .	24
Antialiasing Problems With Certain Applications 24	
Poor Quality S-Video Output on Some TVs . . . . .	25
AGP and PCI-E Programs May Hang With AMD K7 and K8 Processors . . . . .	25
Desktop Manager Does Not Re-Center Logon Screen . . . . .	26
Issues with Video Mirror—Windows XP/2000	26

## 3. The Release 162 Driver for Windows XP

Hardware and Software Support . . . . .	27
Supported Operating Systems. . . . .	27
Supported NVIDIA Products. . . . .	28
Supported Languages . . . . .	29
Driver Installation . . . . .	30
System Requirements . . . . .	30
Installation Instructions . . . . .	30
NVIDIA Driver History. . . . .	33

## A. Mode Support for Windows

General Mode Support Information . . . . .	36
Default Modes Supported by GPU for Windows XP 37	
Understanding the Mode Format . . . . .	37
NVIDIA Quadro FX Family of High End GPUs . . . . .	38
NVIDIA Quadro FX Family of GPUs. . . . .	45
Modes Supported by DACs and TV Encoders . . . . .	52
External DAC Mode Support . . . . .	52
TV-Out Mode Support . . . . .	53



# **Table of Contents**



## CHAPTER

## 1

# INTRODUCTION TO *RELEASE 162 NOTES*

This edition of *Release 162 Notes* describes the Release 162 ForceWare Graphics Drivers and provides information applicable to all NVIDIA drivers. NVIDIA provides these notes to enable add-in-card (AIC) producers and original equipment manufacturers (OEMs) to monitor performance improvements and bug fixes in each documented version of the driver.

## Structure of the Document

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This document is organized in the following sections:

- [“Changes in the Release 162 Driver for Windows XP” on page 3](#) gives a summary of changes, and fixed and open issues in this version.
- [“The Release 162 Driver for Windows XP” on page 27](#) describes the NVIDIA products and languages supported by this driver, the system requirements, and how to install the driver.
- [“Mode Support for Windows” on page 35](#) lists the default resolutions supported by the driver.

## Changes in this Edition

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This edition of the *Release 162 Notes* for Windows Vista includes information about NVIDIA ForceWare graphics driver version 162.67, and lists changes made to the driver since version 160.02. These changes are discussed beginning with the chapter [“Changes in the Release 162 Driver for Windows XP” on page 3](#).



## CHAPTER

## 2

## CHANGES IN THE RELEASE 162 DRIVER FOR WINDOWS XP

This chapter describes open issues for version 162.67, and resolved issues and driver enhancements for versions of the Release 162 driver up to version 162.67. The chapter contains these sections:

- “Version 162.67 Highlights” on page 4
- “Special Instructional Notes for this Release” on page 7
- “Changes in Version 162.67” on page 8
- “Changes in Version 162.65” on page 9
- “Changes in Version 162.62” on page 10
- “Changes in Version 162.50” on page 13
- “Open Issues in Version 162.67” on page 15
- “Known Product Limitations” on page 19

## Version 162.67 Highlights

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This section provides highlights of version 162.67 of the NVIDIA Release 162 Driver.

### What's New in Release 162

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#### New Features

- Added driver support for the following NVIDIA Quadro products:
  - NVIDIA Quadro FX 370
  - NVIDIA Quadro FX 570
  - NVIDIA Quadro FX 1700
  - NVIDIA Quadro NVS 290
  - NVIDIA Quadro Plex 1000 Model S4

### What's New in Version 162.67

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#### New Features

- Enabled the **NVIDIA Application Configuration Engine (ACE)**, version 1, on Windows XP<sup>1</sup>.

This feature enables the driver to automatically detect the workstation application and configure the appropriate profile settings—the user no longer needs to manually select a profile from the NVIDIA Control Panel.

#### Auto-detected profiles:

The following applications are automatically detected. The settings appear in the Manage 3D Settings page-> Program Settings tab:

- "Adobe After Effects"
- "Altair HyperWorks"
- "ANSYS applications"
- "Autodesk 3ds Max"
- "Autodesk AutoCAD"
- "Autodesk Inventor"
- "Avid Deko"

1. ACE has been supported under Window Vista in previous driver releases.

- "Avid SOFTIMAGE|3D"
- "Avid SOFTIMAGE|XSI"
- "Bentley Systems MicroStation"
- "Cast Software WYSIWYG / Vivien"
- "Cimatron CimatronE"
- "CoCreate OneSpace"
- "Dassault Systemes CATIA"
- "Dassault Systemes SolidWorks"
- "DataSolid CADdy++"
- "Delcam applications"
- "ESRI ArcGIS / ArcView"
- "Hummingbird Exceed"
- "InnovMetric PolyWorks"
- "Intergraph SmartPlant"
- "IronCAD applications"
- "MSC Nastran / Patran"
- "Nemetschek Allplan"
- "NewTek LightWave 3D"
- "PTC CDRS" - default
- "PTC DIVISION MockUp / ProductView"
- "PTC Pro/ENGINEER Wildfire"
- "RTT DeltaGen / DeltaView"
- "Schlumberger Petrel"
- "Think3 thinkdesign / thinkiD"
- "UGS I-DEAS"
- "UGS NX"
- "UGS Solid Edge"
- "UGS Teamcenter"
- "Unisys applications"
- "Vizrt applications"
- "Yamaha ESPri"

**Not automatically detected:**

The applications listed below cannot be detected automatically and need to be manually selected through their profile in the NVIDIA Control Panel:

- "Abaqus CAE / Viewer"
- "Autodesk AliasSTUDIO"
- "Autodesk Combustion"
- "Autodesk Maya"
- "AVEVA VANTAGE PDMS / Review"
- "Brainstorm applications"
- "DENSO NADAMS"
- "ICEM Surf"
- "ISD HiCAD"
- "MAXON CINEMA 4D" B
- "MICROCADAM Helix"
- "RainStorm"
- "Overwatch Systems RemoteView"
- "PTC 3DPaint"
- "PTC Pro/ENGINEER"
- "Siemens Medical syngo"
- "Toyota TOGO"

### **Resolved Issues for Windows Vista**

See “Changes in Version 162.67” on page 8 for a list of resolved issues.

## Special Instructional Notes for this Release

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This section clarifies instructions for successfully accomplishing the following tasks:

### Turning Off V-Sync to Boost Performance

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To get the best benchmark and application performance measurements, turn V-Sync off as follows:

- 1 Open the NVIDIA Control Panel and enable Advanced View.
- 2 In the 3D Settings Category, click Manage 3D Settings.
- 3 From the Global presets pulldown menu, select **Custom** and then click **Apply**.
- 4 From the Settings listbox, select **Vertical sync** and change its value to **Force off**, then click **Apply**.
- 5 From the Global presets pulldown menu, select **3D App - Default Global Settings** (the driver's default profile) or use the application profile that matches the application you are testing, then click **Apply**.

*Be sure to close the NVIDIA Control Panel completely* —leaving it open will affect benchmark and application performance.

## Changes in Version 162.67

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The following sections list the changes made and issues resolved since driver version 162.65.

- “Fixed Issues–Windows XP 32-bit” on page 8
- “Fixed Issues–Windows XP x64” on page 8

The NVIDIA bug number is provided for reference.

### Fixed Issues–Windows XP 32-bit

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- The Windows taskbar cannot be hidden when playing a video with PowerDVD 7.3 in full-screen mode.

### Fixed Issues–Windows XP x64

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- NVIDIA Quadro FX 5600: When rotating an OpenGL application volume in a dual-display configuration, one of the displays flickers.
- NVIDIA Quadro FX 5600: Blue-screen crash occurs when running 32-bit applications.

## Changes in Version 162.65

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The following sections list the changes made and issues resolved since driver version 162.62.

- “Fixed Issues–Windows XP 32-bit” on page 9
- “Fixed Issues–Windows XP x64” on page 9

The NVIDIA bug number is provided for reference.

### Fixed Issues–Windows XP 32-bit

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- NVIDIA Quadro cards: Dassault Catia - the application crashes after using the New Drafting Creation and then exiting.
- NVIDIA Quadro cards: Cocreate - graphics disappear when alternately right-clicking/left-clicking the part.
- NVIDIA Quadro cards: CoCreate - graphics corruption occurs when creating more than 50 viewports.
- NVIDIA Quadro cards: Catia V5 - Enhanced vertex array performance is not enabled.
- NVIDIA Quadro FX 4600: When OpenGL stereo is active on the monitor, the LUT is disabled.
- NVIDIA Quadro G-Sync: The House Sync detection button is missing from the NVIDIA Control Panel Synchronize Displays page.
- NVIDIA Quadro FX 5600: ICEM Surf - shadows are not rendered correctly if soft shadow is activated.

### Fixed Issues–Windows XP x64

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- NVIDIA Quadro cards: Cocreate - graphics disappear when alternately right-clicking/left-clicking the part.
- NVIDIA Quadro NVS 290, Dual-link panels: The desktop text is blurred at 1280x800 and higher resolutions.
- NVIDIA Quadro FX SDI: SDI output disappears when using Windows Media Player.

## Changes in Version 162.62

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The following sections list the changes made and issues resolved since driver version 162.50.

- “Fixed Issues–Windows XP 32-bit” on page 10
- “Fixed Issues–Windows XP x64” on page 12

The NVIDIA bug number is provided for reference.

### Fixed Issues–Windows XP 32-bit

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- The NVIDIA Control Panel does not launch.
- RIS installation of the OS results in abnormal screen resolution.
- VC8 Softimage Project - glTexSubImage2D sources incorrectly from a PBO.
- Softimage XSI–flickering artifacts occur while windowed regions are rendered.
- SolidWorks 2008 - corrupted shadows occur in dual mode.
- CATIA V5 R14/R15 - Enhanced vertex array performance enhancements are now available.
- NVIDIA 160.xx drivers appear to be ~10% slower than previous drivers.
- NVIDIA Quadro cards: The “Avid Softimage XSI” entry is missing from the NVIDIA Control Panel Global Settings.
- NVIDIA Quadro cards: Application profiles are not being updated after driver uninstall or driver over-install.
- NVIDIA Quadro cards: Redsdk application–rendering errors occur under Dualview mode.
- NVIDIA G-Sync, Quadro Plex Model I: “View System topology” page becomes empty after setting up the server on the system.
- NVIDIA Quadro FX SDI: The maximum V-Sync delay in the NVIDIA Control Panel workstation SDI page is only 30.
- NVIDIA Quadro FX 5600: The user cannot change the flat panel scaling using the NVIDIA Control Panel.

- NVIDIA Quadro FX 5600: Motion Builder - the frame rate drops when using the Maya setting.
- NVIDIA Quadro FX 5600: Autodesk Showcase 2008 - "zebra striping" occurs.
- NVIDIA Quadro FX 4600: There is screen corruption with some OpenGL demos when 32x antialiasing is enabled.
- NVIDIA Quadro FX 4600: Changing the display resolution causes PowerDVD Blu-ray disc movie to play abnormally.
- NVIDIA Quadro FX 4600, Workstation 3D stereo: Horizontal "ripple" or tear flows from the top to the bottom of the screen while roaming.
- NVIDIA Quadro FX 4600: Alias Studio - dragging a pop-up menu to the secondary Dualview display results in corruption of the menu.
- NVIDIA Quadro FX 4600: Solid Edge V19 - there is corruption when spanning two monitors with antialiasing enabled within the application.
- NVIDIA Quadro FX 4600: PBO source rendering is incorrect.
- NVIDIA Quadro FX 4600: VC8 Softimage Project - wglMakeCurrent() fails when called across threads.
- NVIDIA Quadro FX 4600: CATIA CATGTS - performance is lower compared to the performance when run on an Quadro FX 4500.
- NVIDIA Quadro FX4500/4600: CATIA R12 crashes when using vertex arrays.
- NVIDIA Quadro FX 4500 X2: AMD Dual core CPU: The system hangs after running a stress test overnight.
- NVIDIA Quadro FX 4000: RTT DeltaGen - the application crashes inside the wglMakeCurrent() call.
- NVIDIA Quadro FX 3500: Maya - hardware rendering of images are corrupt when the tear-off window is viewed on the second Dualview monitor.
- NVIDIA Quadro FX 3400: Marquee-rendering problems with occur with GL\_SPHERE\_MAP.

- NVIDIA Quadro FX 1600M/ Quadro FX 370: CoCreate - there is corruption in the application model window after switching between full-screen and windowed DOS a few times.
- NVIDIA Quadro NVS 285: Google Earth renders incorrectly when moved across displays.

## **Fixed Issues—Windows XP x64**

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- The NVIDIA driver for the secondary nView display is not used by the OS after being installed.
- NVIDIA Quadro FX 4600: Solid Edge V19 - there is corruption when spanning two monitors with antialiasing enabled within the application.
- NVIDIA Quadro FX 3500: SolidWorks X64 hangs during the first active session after reboot while moving the mouse over task pane tabs with nView Desktop Manager enabled.

## Changes in Version 162.50

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The following sections list the changes made and issues resolved since driver version 160.02.

- “Fixed Issues–Windows XP 32-bit” on page 13
- “Fixed Issues–Windows XP x64” on page 14

The NVIDIA bug number is provided for reference.

### Fixed Issues–Windows XP 32-bit

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- OpenGL objects do not appear on the second Dualview display when moved from the first display.
- SolidWorks 2007 APC test performance drop.
- With OpenGL stereo enabled, objects shift while roaming over them.
- Memory leak occurs when rendering 3D volumes.
- Maya crashes when running specific performance tests in Dualview mode.
- NVIDIA Quadro FX 3400: Solid Edge Beta V20 aborts opening a file when the Display List option is selected.
- NVIDIA Quadro FX 4600: RTT DeltaGen–some object images are corrupt.
- NVIDIA Quadro FX 4600: SoftImage Visual Studio 2005–the application crashes (wglMakeCurrent() fails when called across threads).
- NVIDIA Quadro FX 3500/FX 5500: Maya–images are corrupt under Dualview mode.
- Dual NVIDIA Quadro FX 5600: “FBO Unsupported” error occurs when running multi-threaded code.
- NVIDIA Quadro FX SDI: nView multiple display modes are erroneously included in the nView system tray menu.
- NVIDIA Quadro FX SDI: The “Send Graphics to SDI” color setting changes are not preserved after reopening the NVIDIA Control Panel.

## **Fixed Issues—Windows XP x64**

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- Maya crashes when running specific performance tests in Dualview mode.
- Memory leak occurs when rendering 3D volumes.
- NVIDIA Quadro FX 4600: The NVIDIA Control Panel desktop Overlap feature is missing.
- NVIDIA Quadro FX 5600: The driver pauses for up to 30 seconds when running multiple processes that exceed the video memory.
- Dual NVIDIA Quadro FX 5600: “FBO Unsupported” error occurs when running multi-threaded code.

## Open Issues in Version 162.67

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As with every released driver, version 162.67 of the Release 162 driver has open issues and enhancement requests associated with it. This section includes lists of issues that are either not fixed or not implemented in this version. Some problems listed may not have been thoroughly investigated and, in fact, may not be NVIDIA issues. Others will have workaround solutions.

They are listed in the following sections:

- “NVIDIA Recommendations” on page 15
- “NVIDIA Issues—Single GPU” on page 16
- “NVIDIA Issues—SLI Mode” on page 18

### NVIDIA Recommendations

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- Single display modes such as TV only, DFP/LCD only or CRT only provide the best performance and quality from Windows Media Center Edition.

*Dual display modes such Dualview and nView Clone and Span modes are not recommended.*

- When using the trial version of WinDVD 6 from InterVideo.com, you may experience TV or DVD playback problems in Windows Media Center if you change resolutions during video playback. This is most often seen when switching from windowed to full screen mode.

*This problem does not occur with the latest full OEM versions of WinDVD or with other Windows Media Center qualified DVD decoders.*

- If you perform a clean driver installation (no previous NVIDIA drivers installed), **you must reboot your computer**. If you do not reboot, the predefined application profiles will not be activated and you may experience application stability problems.

## NVIDIA Issues—Single GPU

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This section includes issues that occur under the Windows XP or Windows 2000:

- The NVIDIA Control Panel Run Display Optimization Wizard back button does not work.
- DVI display is blurry with normal display timing settings.  
*The blurriness does not occur if "Treat as HDTV" is selected and then CMT advanced timings are used.*
- NVIDIA Control Panel->Workstation-> Frame Sync: The View Status Page does not detect which is the first and which is the second display attached to the GPU.
- There may be intermittent application compatibility issues with dual core CPUs.

*If you experience this issue, you can work around it by toggling off multi-thread optimizations using the following instructions:*

- 1 Launch **regedit** and determine the current primary display card by looking in

**HKey\_Local\_Machine\Hardware\DeviceMap\Video**

and note the GUID (global unique identifier assigned by Windows), which is the long string in brackets { } at the end of the entry

"\device\video0".

- 2 Look in

**HKey\_Local\_Machine\SYSTEM\CurrentControlSet\Control\Video\{GUID}\0000**

where {GUID} is the number derived from the previous step.

- 3 Open the "0000" directory and create a new DWORD called **OGL\_ThreadControl** and give it a value of 2.

This will disable multithreading in the driver for all OpenGL applications.

- 4 If you want to disable driver multithreading for all Direct3D applications—

In the same "0000" directory, create a new DWORD called **WTD\_EXECMODEL** and give it a value of 0.

- All GPUs: When adding Custom Resolutions, the user is not allowed to select the "monitor scaling" option.
- Video color-space range for DVI-only<sup>1</sup> outputs is erroneously set to standard mode (16-235) instead of extended mode (0-255).

*A new detection feature to apply Standard CSC mode to TV outputs (including NTSC, PAL, 480i, and 576i), included DVI-only outputs by mistake.*

**Note:** *The driver correctly applies extended mode to analog outputs, and standard mode to TV outputs (including NTSC, PAL, 480i, and 576i).*

*A future driver release will correct this and apply the extended-mode color space to DVI-only outputs.*

*You can work around this issue by forcing either standard or extended mode as follows:*

- 1 Launch **regedit** and determine the current primary display card by looking in

**HKey\_Local\_Machine\Hardware\DeviceMap\Video**

and note the GUID (global unique identifier assigned by Windows), which is the long string in brackets { } at the end of the entry

"\device\video0".

- 2 Look in

**HKey\_Local\_Machine\SYSTEM\CurrentControlSet\Control\Video\{GUID}\0000**

where {GUID} is the number derived from the previous step.

- 3 Open the "0000" directory and create a new DWORD called **VMRCCSStatus** and give it a value of

**0x3** - to force use of the standard YUV range of 16-235

**0x1** - to force use of the extended YUV range of 0-255

- Workstation 3D Stereo: After enabled 3D stereo “Force stereo stuttering” and then closing an OpenGL application, the desktop shows corruption.
- Boris FX—the application cannot render FBOs offscreen to multiple displays.
- NVIDIA Quadro SDI: When using the APIs. the dual-single-link output doesn’t match the single-link-output.
- NVIDIA Quadro FX 3500: Poser 7—performance is poor with OpenGL hardware shading enabled.
- NVIDIA Quadro 4400: OpenGL hardware acceleration is disabled after enabling three monitors.

1. “DVI-only” means only one display is connected, and it is to the DVI output.

## **NVIDIA Issues—SLI Mode**

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This section includes SLI technology related issues that occur under the Windows XP and Windows 2000:

- [SLI]: With SLI mode enabled, the NVIDIA Control Panel->Workstation->View Status page does not the correct monitor connections.

## Known Product Limitations

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This section describes problems that will not be fixed. Usually, the source of the problem is beyond the control of NVIDIA. Following is the list of problems and where they are discussed in this document:

- “SLI Connector Requirement on NVIDIA Quadro SLI Cards” on page 19
- “DVD Playback Issues with Dual NVIDIA Quadro NVS Cards” on page 20
- “PowerDVD 5.0 Does Not Display Correctly in nView Span Mode” on page 20
- “DirectX Fails When Detaching/Reattaching Displays in Dualview Mode” on page 20
- “OpenGL Viewport Scaling Problem in Horizontal Span Mode” on page 20
- “Driver Reports 256 MB Memory on NVIDIA Quadro FX 330 Cards” on page 21
- “Video Playback in nView Clone and Span Modes” on page 21
- “Monitor Ordering in the Windows Settings Page” on page 21
- “Applying Workstation Application Profiles” on page 23
- “No Antialiasing of 3DMark03 Image Quality Screen Captures” on page 23
- “Medal of Honor Under Windows XP / Windows 2000” on page 24
- “Windows XP/2000 Issue with Settings Tab Monitor Positioning” on page 24
- “Antialiasing Problems With Certain Applications” on page 24
- “Poor Quality S-Video Output on Some TVs” on page 25
- “AGP and PCI-E Programs May Hang With AMD K7 and K8 Processors” on page 25
- “Desktop Manager Does Not Re-Center Logon Screen” on page 26
- “Issues with Video Mirror–Windows XP/2000” on page 26

### SLI Connector Requirement on NVIDIA Quadro SLI Cards

---

The SLI connector that links two SLI cards is needed for proper SLI operation. However, the connector can be removed if you do not intend to enable SLI mode. If you remove the connector, then you must make sure that SLI mode is disabled from the NVIDIA control panel. Enabling SLI mode without the SLI connector installed will result in video corruption.

## DVD Playback Issues with Dual NVIDIA Quadro NVS Cards

---

With both AGP and PCI NVIDIA Quadro NVS cards installed in the system, when attempting to play DVDs in full-screen mode on the display connected to the PCI card, the screen is blank.

*This is not an NVIDIA bug, but rather a problem with older point releases of PowerDVD and WinDVD.*

## PowerDVD 5.0 Does Not Display Correctly in nView Span Mode

---

With nView Horizontal Span mode enabled, when the PowerDVD 5.0 playback window is dragged to the second display and then stretched to fill the display, the right area of the display is corrupted.

*This is not an NVIDIA bug, but a problem with PowerDVD.*

## DirectX Fails When Detaching/Reattaching Displays in Dualview Mode

---

This problem can be duplicated as follows:

- 1 Enable both displays in Dualview mode.
- 2 Detach monitor 2 and apply settings.
- 3 Reattach monitor 2 and apply settings.

DirectX runtime fails on monitor 1.

*This is not an NVIDIA bug, but a limitation in the operating system where DirectX does not enumerate the second device. DirectX can be restored to both displays by rebooting the system*

## OpenGL Viewport Scaling Problem in Horizontal Span Mode

---

With nView Horizontal Span mode enabled, when opening an OpenGL model in a viewport, the model image is scaled too large to fit in the viewport. The problem occurs with such applications as Maya 5.0 and 3D Studio MAX 4.26.

*This is not an NVIDIA bug, but a limitation in the application's ability to properly maintain the aspect ratio in Horizontal Span mode.*

## Driver Reports 256 MB Memory on NVIDIA Quadro FX 330 Cards

---

- **Problem**

When a 64 MB NVIDIA Quadro FX 330 card is installed, the driver reports that the card needs 256 MB, causing 256 MB of address space to be consumed.

- **Explanation**

*This is not a bug but a product limitation.*

The NVIDIA Quadro FX 330 GPU has some limitations that prevent the card from addressing less than 256 MB of system memory.

## Video Playback in nView Clone and Span Modes

---

- **Problem**

With nView Clone or Span mode enabled, video playback appears on only one display under the following conditions:

- Under nView Clone mode, when full-screen video mirror is not used.
- Under nView Span mode, when full-screen video mirror is not used and the video is positioned to span across both monitors.

- **Explanation**

With applications that render using the hardware overlay—such as DirectX applications—the default driver behavior is to enable the hardware overlay when nView Clone or Span mode is enabled.

*Because the driver supports only one hardware overlay, the video appears on only one display.*

## Monitor Ordering in the Windows Settings Page

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### Monitor Ordering on a Single GPU

- **Issue**

The monitor order in the Display Properties Settings page is not consistently matched with the connectors on the graphics card.

- **Explanation**

The driver does not distinguish connector positions, but instead distinguishes the display type, and consequently assigns monitor numbers according to the display type and not according to the connector.

## Monitor Ordering on a Multiple GPU System

- **Issue**

When four monitors are connected to a system with multiple PCI GPUs, such as a NVIDIA Quadro NVS 400 graphics card, and enabled in Dualview mode, many customers expect the monitor ordering in the Display Properties Settings page to conform to the following:

Connector Position	Monitor Number
Primary GPU—Output 1	1
Primary GPU—Output 2	2
Secondary GPU—Output 1	3
Secondary GPU—Output 2	4

The monitor ordering, in fact, does not conform to this scheme.

- **Explanation**

The monitor ordering is not controlled by the driver, but rather by the Windows OS method of enumerating PCI devices. The Windows enumeration results in the following monitor numbering:

Connector Position	Monitor Number
Primary GPU—Output 1	1
Secondary GPU—Output 1	2
Primary GPU—Output 2	3
Secondary GPU—Output 2	4

**Considerations for nView Span Modes:** Outputs from the same GPUs are grouped together in nView Span modes, resulting in the desktop spanning across monitors 1 and 3, or across 2 and 4.

## Applying Workstation Application Profiles

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- **Application Profiles Should be Used**

The workstation application profiles are software settings used by the NVIDIA Display Drivers to provide optimum performance when using a selected application. The profile also works around known application issues and bugs.

If there is an available setting for an application, it should be used, otherwise incorrect behavior or reduced performance is likely to occur.

- **Applying Application Profiles**

If you make a configuration change while the application is open, you must exit and then re-open the application for the change to take effect.

When an application is running it does not receive notification of configuration changes.

## No Antialiasing of 3DMark03 Image Quality Screen Captures

---

- **Problem**

After enabling antialiasing from the NVIDIA Properties page, 3DMark03 screen captures—obtained using the application’s screen capture function—might not be antialiased.

- **Explanation**

This is not an NVIDIA bug, but rather a result of different methods used to render antialiased images.

Depending on a combination of factors, the driver may take advantage of the NVIDIA hardware’s ability to bypass the front buffer while rendering an antialiased image. In this case, the front buffer does not contain antialiased data, so if an application takes data from the front buffer—as is the case with 3DMark03’s Image Quality screen captures—then the resulting image is not antialiased.

To accommodate applications that request use of the front buffer, the NVIDIA software can provide the antialiased data in a buffer to the application. Since this negates the advantages of the NVIDIA hardware capability, this support is enabled only when antialiasing is enabled within the application, and not from the NVIDIA control panel.

*In all cases when antialiasing is enabled, screen images as well as screen captures obtained using the Print Screen key are always antialiased.*

## Medal of Honor Under Windows XP / Windows 2000

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- **Problem**

The Electronic Arts game Medal of Honor uses a hard coded buffer to parse the OpenGL extension string. This can cause a system crash under Windows XP and Windows 2000.

- **Workaround**

NVIDIA has implemented Medal of Honor application detection to work around this extension string crash.

## Windows XP/2000 Issue with Settings Tab Monitor Positioning

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- **Problem**

In the Windows **Display Properties > Settings** tab, the secondary monitors cannot be positioned directly above monitor #1 without snapping horizontally to a position diagonal to monitor #1.

- **When the Problem Occurs**

The problem occurs when four monitors are connected to the graphics adapter card, but only two of them are enabled.

- **Cause and Workaround**

This is a Microsoft—not an NVIDIA—bug, and there is no workaround to correct the positioning of the monitor icons. However, the actual positioning of the displays on the desktop can be corrected using the nView Desktop Manager window as follows:

- 1 Under the Tools tab in the Desktop Manager windows, make sure Automatically Align Displays is checked.
- 2 In the Settings tab, position the appropriate monitor icon above monitor #1, then click **Apply**.

The mouse cursor movement between monitor desktops will correspond to a vertical orientation of the monitors, even though the monitor icons in the Settings tab are diagonal to each other.

**Note:** This will be the case even if the monitor icons are deliberately positioned diagonal to each other.

## Antialiasing Problems With Certain Applications

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Antialiasing in the NVIDIA Direct3D driver requires each new frame to be rendered from scratch. This requirement adversely affects applications that render only that portion of the content that has changed since the last frame. A common symptom of this problem is geometric structures that incorrectly disappear and re-appear as the scene shifts.

## Poor Quality S-Video Output on Some TVs

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NVIDIA drivers differentiate an S-video TV from a composite TV by searching for 75-Ohm loads on the chrominance and luminance lines. If the driver detects only one such load, it assumes that it has a composite TV and drives both chroma and luma onto that line. This approach allows both types of TV to display in color.

Unfortunately, some S-video TVs do not apply the correct load to both lines, causing the driver to detect an S-video TV as a composite. The driver, in turn, sends the lower quality signal to the S-video TV. To work around this problem, use the Control Panel to override the **Auto-select** feature. This can be done following these steps:

- 1 In the **Settings** tab of the **Display Properties** Control Panel, click **Advanced**.
- 2 In the **nView** tab, click **Device Settings** and click **Select Output Device**.
- 3 In the **Device Selection** tab, click the **TV** option.
- 4 Change the **Video output format** to **S-video**.

## AGP and PCI-E Programs May Hang With AMD K7 and K8 Processors

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- **Issue**

Microsoft® Windows® 2000 and Windows XP systems using AMD K7 and K8 processors can hang when an AGP or PCI-E program is used.

- **Root Cause**

There is a known problem with Microsoft® Windows® 2000 and Windows XP systems using AMD K7 and K8 CPUs that results in the Microsoft operating system allocating overlapping 4M cached pages with 4k write-combined pages. This condition results in undefined behavior and data corruption, and is explicitly disallowed by the AMD CPU manual.

This problem can affect any device driver in the system that allocates write-combined system memory, but is usually most easily reproduced with graphics drivers since graphics drivers generally make heavy use of write-combined system memory for performance reasons.

- **Resolution**

Microsoft has a knowledge base article on the issue, the text of which is unfortunately quite outdated. While the article only mentions Windows 2000, AGP, and K7, both the root cause and resolution also apply to Windows 2000 or Windows XP, AGP or PCI-E, and AMD K7 or K8. The article can be found at <http://support.microsoft.com/?id=270715>.

The issue is resolved by applying an operating system registry key as described in the referenced article that instructs the Microsoft operating system to not use the 4M pages, thus avoiding the conflict.

The registry key is automatically applied by installation of the latest NVIDIA nForce platform driver package (including 4.57 SMBUS or later). It is imperative for the package to be installed or for the registry key to be applied

before the NVIDIA graphics driver or any other device drivers are installed. The registry key takes effect only after an operating system reboot.

## **Desktop Manager Does Not Re-Center Logon Screen**

On Windows XP multi-display systems that are set to nView Span mode, the Windows logon screen is centered on the extended desktop. This usually causes it to be split across two displays, which users may find annoying. Although users can normally use the Desktop Manager to restrict a window's appearance to one display, security restrictions in the operating systems prevent this in the case of the logon screen.

## **Issues with Video Mirror—Windows XP/2000**

Table 2.1 lists current known issues with NVIDIA Video Mirror functionality.

**Table 2.1** Known Issues with Video Mirror

Video Mirror is not yet implemented for applications using Video Port Extensions (VPE).
If Video Mirror is enabled but a full-screen display does not appear, one of the following problems may have occurred:
Video Mirror can only function when overlay is being used. The video player may not be able to create an overlay if another application is using the overlay, or the desktop display resolution is too high. You can lower the desktop resolution, pixel depth, or refresh rate.
Video Mirror requires some extra memory to run. Try closing other DirectX or OpenGL applications that may be running.
You may need to close and restart your video application for Video Mirror enabling or disabling to take effect.
Some video players that cannot detect the presence of Video Mirror stop playing if they are minimized or completely obscured by another window. For example, Media Player can exhibit this problem.

## CHAPTER

## 3

# THE RELEASE 162 DRIVER FOR WINDOWS XP

This chapter covers the following main topics:

- “Hardware and Software Support” on page 27
- “Driver Installation” on page 30
- “NVIDIA Driver History” on page 33

## Hardware and Software Support

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### Supported Operating Systems

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This Release 162 driver includes drivers designed for the following Microsoft® operating systems:

- Microsoft Windows® XP
  - Windows XP Professional
  - Windows XP Home Edition
  - Windows XP Professional x64 Edition
- Microsoft Windows Server 2003 x64 Edition<sup>1</sup>
- Microsoft Windows 2000

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1. SLI mode is not supported under Microsoft Windows Server 2003 x64.

## Supported NVIDIA Products

Table 3.1 through Table 3.4 lists the NVIDIA workstation products supported by this Release 162 driver.

**Table 3.1** Supported NVIDIA Workstation Products

<b>Product</b>	<b>Windows XP 32-bit Windows 2000</b>	<b>Windows XP Professional x64</b>
NVIDIA Quadro FX 5600	X	X
NVIDIA Quadro FX 5500 SDI	X	X
NVIDIA Quadro FX 5500	X	X
NVIDIA Quadro FX 4600	X	X
NVIDIA Quadro FX 4500 X2	X	X
NVIDIA Quadro FX 4500	X	X
NVIDIA Quadro FX 4500 SDI	X	X
NVIDIA Quadro FX 4400	X	X
NVIDIA Quadro FX 4400G	X	X
NVIDIA Quadro FX 4000	X	X
NVIDIA Quadro FX 4000 SDI	X	X
NVIDIA Quadro FX 3500	X	X
NVIDIA Quadro FX 3450	X	X
NVIDIA Quadro FX 3400	X	X
NVIDIA Quadro FX 3000	X	X
NVIDIA Quadro FX 2000	X	X
NVIDIA Quadro FX 1700	X	X
NVIDIA Quadro FX 1500	X	X
NVIDIA Quadro FX 1400	X	X
NVIDIA Quadro FX 1300	X	X
NVIDIA Quadro FX 1100	X	X
NVIDIA Quadro FX 1000	X	X
NVIDIA Quadro FX 700	X	X
NVIDIA Quadro FX 500/FX 600	X	X
NVIDIA Quadro FX 570	X	X
NVIDIA Quadro FX 560	X	X
NVIDIA Quadro FX 550	X	X
NVIDIA Quadro FX 540	X	X
NVIDIA Quadro FX 370	X	X
NVIDIA Quadro FX 350	X	X
NVIDIA Quadro FX 330	X	X
NVIDIA Quadro NVS 440	X	X
NVIDIA Quadro NVS 290	X	X
NVIDIA Quadro NVS 285 PCI-E	X	X
NVIDIA Quadro NVS 280	X	X

**Table 3.2** Supported NVIDIA Quadro G-Sync Products

<b>Product</b>	<b>Windows XP 32-bit Windows 2000</b>	<b>Windows XP Professional x64</b>
NVIDIA Quadro FX 5500	X	X
NVIDIA Quadro FX 4500 X2	X	X
NVIDIA Quadro FX 4500	X	X

**Table 3.3** Supported NVIDIA Quadro G-Sync II Products

<b>Product</b>	<b>Windows XP 32-bit Windows 2000</b>	<b>Windows XP Professional x64</b>
NVIDIA Quadro FX 5600	X	X
NVIDIA Quadro FX 4600	X	X

**Table 3.4** Supported NVIDIA Quadro Plex Products

<b>Product</b>	<b>Windows XP</b>	<b>Windows XP Professional x64</b>
NVIDIA Quadro Plex 1000 Model I	X	X
NVIDIA Quadro Plex 1000 Model II	X	X
NVIDIA Quadro Plex 1000 Model III	X	X
NVIDIA Quadro Plex 1000 Model IV	X	X
NVIDIA Quadro Plex 1000 Model S4	X	X

## Supported Languages

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The Release 162 ForceWare Graphics Drivers supports the following languages in the main driver Control Panel:

English (USA)	German	Portuguese (Euro/Iberian)
English (UK)	Greek	Russian
Arabic	Hebrew	Slovak
Chinese (Simplified)	Hungarian	Slovenian
Chinese (Traditional)	Italian	Spanish
Czech	Japanese	Spanish (Latin America)
Danish	Korean	Swedish
Dutch	Norwegian	Thai
Finnish	Polish	Turkish
French	Portuguese (Brazil)	

# Driver Installation

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## System Requirements

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The hard disk space requirement is minimum 62.9 MB for English-only, and 79 MB for International.

## Installation Instructions

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### Before You Begin

- If you do not have System Administrator access privileges, it is assumed that the appropriate person with System Administrator access in your organization will set up and install the NVIDIA graphics driver software on your computer.
- The installation process copies all necessary files for operation into the appropriate directories.
- The nView system files are copied to your **Windows\System** directory.
- nView Desktop Manager Profile files (\*.tvp) are saved in the **Windows\Nview** directory.

Depending on the version of the NVIDIA driver previously installed, profiles may also be located in the **Documents and Settings\All Users\Application Data\nView\_Profiles** directory.

- As part of the install process, an uninstall is registered in your system.
- Under Windows XP, the NVIDIA driver is installed in “Dualview mode” display. However, note that the second display is not activated by default, but must be enabled.

## Preserving Settings Before Upgrading Your Software

Before uninstalling or installing software, you can preserve your nView Desktop Manager and/or NVIDIA Display settings by using the nView Desktop Manager Profiles features.

**Note:** Follow the steps below and/or refer to the *NVIDIA nView Desktop Manager User's Guide* for details. Under Windows XP/2000 and Windows NT 4.0, you must have, at least, **Power User** access privileges in order to create or save a profile. (Refer to Windows Help if you need an explanation of Power User access rights.)

Follow the steps below and/or refer to the *NVIDIA nView Desktop Manager User's Guide* for details.

- 1 Open the nView Desktop Manager Profiles page (Figure 4.1).
- 2 To preserve your current settings, you can use either the **Save** or the **New** option from the nView Desktop Manager Profiles page:
  - If you want to overwrite the currently loaded profile with your changed settings, use the **Save** option. Notice that a warning message indicates that you are about to overwrite the selected profile.
  - If you want to retain the currently loaded profile and want to save your changed settings to a new file, click the **New** option. Enter a name and description of the profile in the New Profile dialog box. For example, you can name this profile **My Settings**.
- 3 If you are an “advanced” user and want to customize certain settings in the saved profile, click **Advanced** << to expand the dialog box (Figure 4.2).
- 4 To customize the settings, you can select or clear any of the settings check boxes.
- 5 Click **Save** to return to the main Profiles page.

If you created a new profile, you will see the name of the newly created profile in the profiles list.

If you overwrote a current profile, the same profile name is retained in the list.

**Note:** nView Desktop Manager profile (.tvp) files are saved in the **Windows\nView** directory. Depending on the version of the NVIDIA driver previously installed, profiles may also be saved in the **Documents and Settings\All Users\Application Data\ nView\_Profiles** directory.

- 6 Now you can uninstall your current driver for a driver upgrade.
- 7 After you restart your computer following an NVIDIA new driver install, you can easily load the saved profile from the Profiles page of nView Desktop Manager.

## About Using Saved Profiles in Another Computer

You can easily use any saved profile (.tvp file in the **Windows\nView** directory) from one computer and use it in another computer, if you want. You'll need to copy it to the **Windows\nView** directory of a computer that has the NVIDIA ForceWare graphics display driver, etc. installed properly. Then

this profile can be loaded from another computer from the nView Desktop Manager Profiles page just as it can from your original computer.

## Uninstalling the NVIDIA Display Driver Software

*Note: It is highly recommended that you follow the steps in this section to completely uninstall the NVIDIA Display Driver software before updating to a new version of the software.*

To uninstall the nView software, follow these steps:

- 1 From the Windows taskbar, click **Start > Settings > Control Panel** to open the Control Panel window.
- 2 Double-click the **Add/Remove Programs** item.
- 3 Click the **NVIDIA Display Driver** item from the list.
- 4 Click **Change/Remove**.
- 5 Click **Yes** to continue.

A prompt appears asking whether you want to delete all of the saved nView profiles.

- If you click **Yes**, all of the nView software and all of your saved profiles will be deleted.
- If you click **No**, the nView software is removed, but the profile files are saved in the `Windows\nView` directory on your hard disk.

Your system now restarts.

## Installing the NVIDIA ForceWare Graphics Drivers

- 1 Follow the instructions on the NVIDIA .com Web site driver download page to locate the appropriate driver to download, based on your hardware and operating system.
- 2 Click the driver download link.  
The license agreement dialog box appears.
- 3 Click **Accept** if you accept the terms of the agreement, then either open the file or save the file to your PC and open it later.  
Opening the EXE file launches the NVIDIA InstallShield Wizard.
- 4 Follow the instructions in the NVIDIA InstallShield Wizard to complete the installation.

## NVIDIA Driver History

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Release 162 is the latest NVIDIA driver available. [Table 3.1](#) contains a summary of some previous driver releases and the versions associated with them. Some versions listed may not have been released outside of NVIDIA.

**Table 3.1** NVIDIA Drivers for Windows

Driver	Name	Versions	Comments
Release 162	ForceWare	162.50, 162.62, 162.65, 162.67	
Release 160	ForceWare	160.02	
Release 95	ForceWare	95.97, 96.02,97.78	
Release 90	ForceWare	91.36, 91.85,	
Release 80	ForceWare	81.67, 84.26,	
Release 75	ForceWare	77.37, 77.56	
Release 70	ForceWare	71.84, 71.89	
Release 65	ForceWare	66.77, 66.93, 67.02, 67.03, 67.66	
Release 60	ForceWare	61.76, 61.77	
Release 55	ForceWare	56.64, 56.72, 57.30	
Release 50	ForceWare	52.16, 53.04	
Release 40	Detonator FX	44.03–45.xx	
Release 40	Detonator 40	40.60–44.02	
Release 35	Detonator 35	35.60–37.80	
Release 25	Detonator 25	26.00–32.90	
Release 20	Detonator XP	21.83–23.xx	
Release 10	Detonator 3 v1x.xx	10.00–17.xx	



## APPENDIX



## MODE SUPPORT FOR WINDOWS

This chapter details the Windows modes supported by the Release 162 driver for NVIDIA products. It contains these sections:

- [“General Mode Support Information” on page 36](#)
- [“Default Modes Supported by GPU for Windows XP” on page 37](#)
- [“Modes Supported by DACs and TV Encoders” on page 52](#)

## General Mode Support Information

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The NVIDIA graphics driver includes a standard list of display modes that are supported by default. These modes are listed in the section “[Default Modes Supported by GPU for Windows XP](#)” on page 37.

The actual modes available depend on the capabilities of the display. In addition, the NVIDIA graphics driver has a “dynamic EDID detection” capability and will make available *additional* modes that are listed in the display EDID, provided the graphics hardware can support it.

The NVIDIA graphics driver also supports the high resolutions available with the displays listed in [Table A.1](#) as well as the non-standard modes listed in [Table A.2](#).

**Table A.1** Modes Supported for High Resolution Displays

Display	Maximum Resolution	Hardware Requirements
Apple 30" Cinema HD Display (Dual link DVI)	2560x1600 @ 60 Hz	<ul style="list-style-type: none"> <li>All high-end NVIDIA Quadro FX graphic solutions.</li> </ul>
Dell WFP 3007 (Dual Link DVI)	2560x1600 @ 60 Hz	<ul style="list-style-type: none"> <li>All High-end NVIDIA Quadro FX graphic solutions.</li> </ul>

**Table A.2** Non-standard Modes Supported

Resolution
1680 x 1050
1366 x 768

## Default Modes Supported by GPU for Windows XP

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This section lists the modes that are included by default in the driver INF for the following product families:

- “NVIDIA Quadro FX Family of High End GPUs” on page 38
- “NVIDIA Quadro FX Family of GPUs” on page 45

### Understanding the Mode Format

---

Figure A.1 gives an example of how to read the mode information presented in this section.

Resolution	Color Depth	Refresh Rates
1024 x 768	32	60 70 72 75 85 100 120 140 144 150 170 200

**Example entry:** 1024 x 768 32 60 70 72 75 85 100 120 140 144 150 170 200

<b>Meaning:</b>	Resolution:	1024 x 768
	Color depth:	32 bpp
	Refresh rates:	60 Hz, 70 Hz, 72 Hz, 75 Hz, 85 Hz, 100 Hz, 120 Hz, 140 Hz, 144 Hz, 150 Hz, 170 Hz, and 200 Hz

**Figure A.1** Mode Format

**Note:**

- Horizontal spanning modes of 3840x1080 and above, and vertical spanning modes of 1920x2160 and above generally require at least 32 MB of video memory at 32 bpp.
- An “i” next to the refresh rate indicates an interlaced refresh rate.

## **NVIDIA Quadro FX Family of High End GPUs**

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This sections lists the supported display resolutions, color depths, and refresh rates for the following products:

- NVIDIA Quadro FX 5600
- NVIDIA Quadro FX 4600
- NVIDIA Quadro FX 5500
- NVIDIA Quadro FX 5500 SDI
- NVIDIA Quadro FX 4500 X2
- NVIDIA Quadro FX 4500
- NVIDIA Quadro FX 4500 SDI
- NVIDIA Quadro FX 3400 / Quadro FX 4400
- NVIDIA Quadro FX 4400G
- NVIDIA Quadro FX 4000
- NVIDIA Quadro FX 4000 SDI
- NVIDIA Quadro FX 3500
- NVIDIA Quadro FX 3450 / Quadro FX 4000 SDI
- NVIDIA Quadro FX 1300/3000
- NVIDIA Quadro FX 1700
- NVIDIA Quadro FX 1500
- NVIDIA Quadro FX 1400
- NVIDIA Quadro FX 700
- NVIDIA Quadro FX 570
- NVIDIA Quadro FX 560
- NVIDIA Quadro FX 550
- NVIDIA Quadro FX 540
- NVIDIA Quadro FX 370
- NVIDIA Quadro NVS 440
- NVIDIA Quadro NVS 290
- NVIDIA Quadro NVS 285
- NVIDIA Quadro Plex 1000 Model I

- NVIDIA Quadro Plex 1000 Model II
- NVIDIA Quadro Plex 1000 Model III
- NVIDIA Quadro Plex 1000 Model IV
- NVIDIA Quadro Plex 1000 Model S4

//

### Standard Modes

320 x 200	8		60 70 72 75
320 x 240	8		60 70 72 75
400 x 300	8		60 70 72 75
480 x 360	8		60 70 72 75
512 x 384	8		60 70 72 75
640 x 400	8		60 70 72 75
640 x 480	8		60 70 72 75 85 100 120 140 144 150 170 200 240
720 x 480	8		60
720 x 576	8	50 60	
800 x 600	8		60 70 72 75 85 100 120 140 144 150 170 200 240
848 x 480	8		60 70 72 75 85 100 120 140 144 150 170 200 240
960 x 600	8		60 70 72 75 85 100 120 140 144 150 170 200 240
1024 x 768	8		60 70 72 75 85 100 120 140 144 150 170 200 240
1088 x 612	8		60 70 72 75 85 100 120 140 144 150 170 200 240
1152 x 864	8		60 70 72 75 85 100 120 140 144 150 170 200
1280 x 720	8		60 70 72 75 85 100 120 140 144 150 170
1280 x 768	8		60 70 72 75 85 100 120 140 144 150 170
1280 x 800	8		60 70 72 75 85 100 120 140 144 150 170
1280 x 960	8		60 70 72 75 85 100 120 140 144 150 170
1280 x 1024	8		60 70 72 75 85 100 120 140 144 150 170
1360 x 768	8		60 70 72 75 85 100 120 140 144 150 170
1600 x 900	8		60 70 72 75 85 100 120 140 144 150
1600 x 1024	8		60 70 72 75 85 100 120
1600 x 1200	8		60 70 72 75 85 100 120
1920 x 1080	8	30i	60 70 72 75 85 100
1920 x 1200	8		60 70 72 75 85 100
1920 x 1440	8		60 70 72 75 85
2048 x 1536	8		60 70 72 75 85

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320 x 200	16		60 70 72 75
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APPENDIX A: Mode Support for Windows Default Modes Supported by GPU for Windows

320 x 240	16		60 70 72 75
400 x 300	16		60 70 72 75
480 x 360	16		60 70 72 75
512 x 384	16		60 70 72 75
640 x 400	16		60 70 72 75
640 x 480	16		60 70 72 75 85 100 120 140 144 150 170 200 240
720 x 480	16		60
720 x 576	16	50	60
800 x 600	16		60 70 72 75 85 100 120 140 144 150 170 200 240
848 x 480	16		60 70 72 75 85 100 120 140 144 150 170 200 240
960 x 600	16		60 70 72 75 85 100 120 140 144 150 170 200 240
1024 x 768	16		60 70 72 75 85 100 120 140 144 150 170 200 240
1088 x 612	16		60 70 72 75 85 100 120 140 144 150 170 200 240
1152 x 864	16		60 70 72 75 85 100 120 140 144 150 170 200
1280 x 720	16		60 70 72 75 85 100 120 140 144 150 170
1280 x 768	16		60 70 72 75 85 100 120 140 144 150 170
1280 x 800	16		60 70 72 75 85 100 120 140 144 150 170
1280 x 960	16		60 70 72 75 85 100 120 140 144 150 170
1280 x 1024	16		60 70 72 75 85 100 120 140 144 150 170
1360 x 768	16		60 70 72 75 85 100 120 140 144 150 170
1600 x 900	16		60 70 72 75 85 100 120 140 144 150
1600 x 1024	16		60 70 72 75 85 100 120
1600 x 1200	16		60 70 72 75 85 100 120
1920 x 1080	16	30i	60 70 72 75 85 100
1920 x 1200	16		60 70 72 75 85 100
1920 x 1440	16		60 70 72 75 85
2048 x 1536	16		60 70 72 75 85

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320 x 200	32		60 70 72 75
320 x 240	32		60 70 72 75
400 x 300	32		60 70 72 75
480 x 360	32		60 70 72 75
512 x 384	32		60 70 72 75
640 x 400	32		60 70 72 75
640 x 480	32		60 70 72 75 85 100 120 140 144 150 170 200 240
720 x 480	32		60
720 x 576	32	50	60
800 x 600	32		60 70 72 75 85 100 120 140 144 150 170 200 240
848 x 480	32		60 70 72 75 85 100 120 140 144 150 170 200 240

960 x 600	32		60 70 72 75 85 100 120 140 144 150 170 200 240
1024 x 768	32		60 70 72 75 85 100 120 140 144 150 170 200
1088 x 612	32		60 70 72 75 85 100 120 140 144 150 170 200
1152 x 864	32		60 70 72 75 85 100 120 140 144 150 170
1280 x 720	32		60 70 72 75 85 100 120 140 144 150
1280 x 768	32		60 70 72 75 85 100 120 140 144 150
1280 x 800	32		60 70 72 75 85 100 120 140 144 150
1280 x 960	32		60 70 72 75 85 100 120 140 144 150
1280 x 1024	32		60 70 72 75 85 100 120 140 144 150
1360 x 768	32		60 70 72 75 85 100 120 140 144 150
1600 x 900	32		60 70 72 75 85 100 120
1600 x 1024	32		60 70 72 75 85 100
1600 x 1200	32		60 70 72 75 85 100
1920 x 1080	32	30i	60 70 72 75 85
1920 x 1200	32		60 70 72 75 85
1920 x 1440	32		60 70 72 75 85
2048 x 1536	32		60 70 72 75 85

## Horizontal Spanning Modes

1280 x 480	8		60 70 72 75 85 100 120 140 144 150 170 200 240
1600 x 600	8		60 70 72 75 85 100 120 140 144 150 170 200 240
1696 x 480	8		60 70 72 75 85 100 120 140 144 150 170 200 240
1920 x 600	8		60 70 72 75 85 100 120 140 144 150 170 200 240
2048 x 768	8		60 70 72 75 85 100 120 140 144 150 170 200 240
2176 x 612	8		60 70 72 75 85 100 120 140 144 150 170 200 240
2304 x 864	8		60 70 72 75 85 100 120 140 144 150 170 200
2560 x 720	8		60 70 72 75 85 100 120 140 144 150 170
2560 x 768	8		60 70 72 75 85 100 120 140 144 150 170
2560 x 800	8		60 70 72 75 85 100 120 140 144 150 170
2560 x 960	8		60 70 72 75 85 100 120 140 144 150 170
2560 x 1024	8		60 70 72 75 85 100 120 140 144 150 170
2720 x 768	8		60 70 72 75 85 100 120 140 144 150 170
3200 x 900	8		60 70 72 75 85 100 120 140 144 150
3200 x 1024	8		60 70 72 75 85 100 120
3200 x 1200	8		60 70 72 75 85 100 120
3840 x 1080	8	30i	60 70 72 75 85 100
3840 x 1200	8		60 70 72 75 85 100

APPENDIX A: Mode Support for Windows Default Modes Supported by GPU for Windows

3840 x 1440	8		60 70 72 75 85
4096 x 1536	8		60 70 72 75 85
-----			
1280 x 480	16		60 70 72 75 85 100 120 140 144 150 170 200 240
1600 x 600	16		60 70 72 75 85 100 120 140 144 150 170 200 240
1696 x 480	16		60 70 72 75 85 100 120 140 144 150 170 200 240
1920 x 600	16		60 70 72 75 85 100 120 140 144 150 170 200 240
2048 x 768	16		60 70 72 75 85 100 120 140 144 150 170 200 240
2176 x 612	16		60 70 72 75 85 100 120 140 144 150 170 200 240
2304 x 864	16		60 70 72 75 85 100 120 140 144 150 170 200
2560 x 720	16		60 70 72 75 85 100 120 140 144 150 170
2560 x 768	16		60 70 72 75 85 100 120 140 144 150 170
2560 x 800	16		60 70 72 75 85 100 120 140 144 150 170
2560 x 960	16		60 70 72 75 85 100 120 140 144 150 170
2560 x 1024	16		60 70 72 75 85 100 120 140 144 150 170
2720 x 768	16		60 70 72 75 85 100 120 140 144 150 170
3200 x 900	16		60 70 72 75 85 100 120 140 144 150
3200 x 1024	16		60 70 72 75 85 100 120
3200 x 1200	16		60 70 72 75 85 100 120
3840 x 1080	16	30i	60 70 72 75 85 100
3840 x 1200	16		60 70 72 75 85 100
3840 x 1440	16		60 70 72 75 85
4096 x 1536	16		60 70 72 75 85
-----			
1280 x 480	32		60 70 72 75 85 100 120 140 144 150 170 200 240
1600 x 600	32		60 70 72 75 85 100 120 140 144 150 170 200 240
1696 x 480	32		60 70 72 75 85 100 120 140 144 150 170 200 240
1920 x 600	32		60 70 72 75 85 100 120 140 144 150 170 200 240
2048 x 768	32		60 70 72 75 85 100 120 140 144 150 170 200
2176 x 612	32		60 70 72 75 85 100 120 140 144 150 170 200
2304 x 864	32		60 70 72 75 85 100 120 140 144 150 170
2560 x 720	32		60 70 72 75 85 100 120 140 144 150
2560 x 768	32		60 70 72 75 85 100 120 140 144 150
2560 x 800	32		60 70 72 75 85 100 120 140 144 150
2560 x 960	32		60 70 72 75 85 100 120 140 144 150
2560 x 1024	32		60 70 72 75 85 100 120 140 144 150
2720 x 768	32		60 70 72 75 85 100 120 140 144 150
3200 x 900	32		60 70 72 75 85 100 120
3200 x 1024	32		60 70 72 75 85 100

3200 x 1200	32		60 70 72 75 85 100
3840 x 1080	32	30i	60 70 72 75 85
3840 x 1200	32		60 70 72 75 85
3840 x 1440	32		60 70 72 75 85
4096 x 1536	32		60 70 72 75 85

## Vertical Spanning Modes

640 x 960	8		60 70 72 75 85 100 120 140 144 150 170 200 240
800 x 1200	8		60 70 72 75 85 100 120 140 144 150 170 200 240
848 x 960	8		60 70 72 75 85 100 120 140 144 150 170 200 240
960 x 1200	8		60 70 72 75 85 100 120 140 144 150 170 200 240
1024 x 1536	8		60 70 72 75 85 100 120 140 144 150 170 200 240
1088 x 1224	8		60 70 72 75 85 100 120 140 144 150 170 200 240
1152 x 1728	8		60 70 72 75 85 100 120 140 144 150 170 200
1280 x 1440	8		60 70 72 75 85 100 120 140 144 150 170
1280 x 1536	8		60 70 72 75 85 100 120 140 144 150 170
1280 x 1600	8		60 70 72 75 85 100 120 140 144 150 170
1280 x 1920	8		60 70 72 75 85 100 120 140 144 150 170
1280 x 2048	8		60 70 72 75 85 100 120 140 144 150 170
1360 x 1536	8		60 70 72 75 85 100 120 140 144 150 170
1600 x 1800	8		60 70 72 75 85 100 120 140 144 150
1600 x 2048	8		60 70 72 75 85 100 120
1600 x 2400	8		60 70 72 75 85 100 120
1920 x 2160	8	30i	60 70 72 75 85 100
1920 x 2400	8		60 70 72 75 85 100
1920 x 2880	8		60 70 72 75 85
2048 x 3072	8		60 70 72 75 85

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640 x 960	16		60 70 72 75 85 100 120 140 144 150 170 200 240
800 x 1200	16		60 70 72 75 85 100 120 140 144 150 170 200 240
848 x 960	16		60 70 72 75 85 100 120 140 144 150 170 200 240
960 x 1200	16		60 70 72 75 85 100 120 140 144 150 170 200 240
1024 x 1536	16		60 70 72 75 85 100 120 140 144 150 170 200 240
1088 x 1224	16		60 70 72 75 85 100 120 140 144 150 170 200 240
1152 x 1728	16		60 70 72 75 85 100 120 140 144 150 170 200
1280 x 1440	16		60 70 72 75 85 100 120 140 144 150 170
1280 x 1536	16		60 70 72 75 85 100 120 140 144 150 170

APPENDIX A: Mode Support for Windows Default Modes Supported by GPU for Windows

1280 x 1600	16		60 70 72 75 85 100 120 140 144 150 170
1280 x 1920	16		60 70 72 75 85 100 120 140 144 150 170
1280 x 2048	16		60 70 72 75 85 100 120 140 144 150 170
1360 x 1536	16		60 70 72 75 85 100 120 140 144 150 170
1600 x 1800	16		60 70 72 75 85 100 120 140 144 150
1600 x 2048	16		60 70 72 75 85 100 120
1600 x 2400	16		60 70 72 75 85 100 120
1920 x 2160	16	30i	60 70 72 75 85 100
1920 x 2400	16		60 70 72 75 85 100
1920 x 2880	16		60 70 72 75 85
2048 x 3072	16		60 70 72 75 85
-----			
640 x 960	32		60 70 72 75 85 100 120 140 144 150 170 200 240
800 x 1200	32		60 70 72 75 85 100 120 140 144 150 170 200 240
848 x 960	32		60 70 72 75 85 100 120 140 144 150 170 200 240
960 x 1200	32		60 70 72 75 85 100 120 140 144 150 170 200 240
1024 x 1536	32		60 70 72 75 85 100 120 140 144 150 170 200
1088 x 1224	32		60 70 72 75 85 100 120 140 144 150 170 200
1152 x 1728	32		60 70 72 75 85 100 120 140 144 150 170
1280 x 1440	32		60 70 72 75 85 100 120 140 144 150
1280 x 1536	32		60 70 72 75 85 100 120 140 144 150
1280 x 1600	32		60 70 72 75 85 100 120 140 144 150
1280 x 1920	32		60 70 72 75 85 100 120 140 144 150
1280 x 2048	32		60 70 72 75 85 100 120 140 144 150
1360 x 1536	32		60 70 72 75 85 100 120 140 144 150
1600 x 1800	32		60 70 72 75 85 100 120
1600 x 2048	32		60 70 72 75 85 100
1600 x 2400	32		60 70 72 75 85 100
1920 x 2160	32	30i	60 70 72 75 85
1920 x 2400	32		60 70 72 75 85
1920 x 2880	32		60 70 72 75 85
2048 x 3072	32		60 70 72 75 85

## NVIDIA Quadro FX Family of GPUs

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This sections lists the supported display resolutions, color depths, and refresh rates for the following products:

- NVIDIA Quadro FX 2000
- NVIDIA Quadro FX 1000
- NVIDIA Quadro NVS 280 PCI
- NVIDIA Quadro FX 500/FX 600
- NVIDIA Quadro FX 1100
- NVIDIA Quadro FX 330

### Standard Modes

320 x 200	8	60	70 72 75	
320 x 240	8	60	70 72 75	
400 x 300	8	60	70 72 75	
480 x 360	8	60	70 72 75	
512 x 384	8	60	70 72 75	
640 x 400	8	60	70 72 75	
640 x 480	8	60	70 72 75 85 100 120 140 144 150 170 200 240	
720 x 480	8	60		
720 x 576	8	50 60		
800 x 600	8	60	70 72 75 85 100 120 140 144 150 170 200 240	
848 x 480	8	60	70 72 75 85 100 120 140 144 150 170 200 240	
960 x 600	8	60	70 72 75 85 100 120 140 144 150 170 200 240	
960 x 1200	8	61		
1024 x 768	8	60	70 72 75 85 100 120 140 144 150 170 200 240	
1088 x 612	8	60	70 72 75 85 100 120 140 144 150 170 200 240	
1152 x 864	8	60	70 72 75 85 100 120 140 144 150 170 200	
1280 x 720	8	60	70 72 75 85 100 120 140 144 150 170	
1280 x 768	8	60	70 72 75 85 100 120 140 144 150 170	
1280 x 800	8	60	70 72 75 85 100 120 140 144 150 170	
1280 x 960	8	60	70 72 75 85 100 120 140 144 150 170	
1280 x 1024	8	60	70 72 75 85 100 120 140 144 150 170	
1360 x 768	8	60	70 72 75 85 100 120 140 144 150 170	
1600 x 900	8	60	70 72 75 85 100 120 140 144 150	
1600 x 1024	8	60	70 72 75 85 100 120	

APPENDIX A: Mode Support for Windows Default Modes Supported by GPU for Windows

1600 x 1200	8		60	70	72	75	85	100	120										
1920 x 1080	8	30i	60	70	72	75	85	100											
1920 x 1200	8		60	70	72	75	85	100											
1920 x 1440	8		60	70	72	75	85												
2048 x 1536	8		60	70	72	75	85												
-----																			
320 x 200	16		60	70	72	75													
320 x 240	16		60	70	72	75													
400 x 300	16		60	70	72	75													
480 x 360	16		60	70	72	75													
512 x 384	16		60	70	72	75													
640 x 400	16		60	70	72	75													
640 x 480	16		60	70	72	75	85	100	120	140	144	150	170	200	240				
720 x 480	16		60																
720 x 576	16	50	60																
800 x 600	16		60	70	72	75	85	100	120	140	144	150	170	200	240				
848 x 480	16		60	70	72	75	85	100	120	140	144	150	170	200	240				
960 x 600	16		60	70	72	75	85	100	120	140	144	150	170	200	240				
960 x 1200	16		61																
1024 x 768	16		60	70	72	75	85	100	120	140	144	150	170	200	240				
1088 x 612	16		60	70	72	75	85	100	120	140	144	150	170	200	240				
1152 x 864	16		60	70	72	75	85	100	120	140	144	150	170	200					
1280 x 720	16		60	70	72	75	85	100	120	140	144	150	170						
1280 x 768	16		60	70	72	75	85	100	120	140	144	150	170						
1280 x 800	16		60	70	72	75	85	100	120	140	144	150	170						
1280 x 960	16		60	70	72	75	85	100	120	140	144	150	170						
1280 x 1024	16		60	70	72	75	85	100	120	140	144	150	170						
1360 x 768	16		60	70	72	75	85	100	120	140	144	150	170						
1600 x 900	16		60	70	72	75	85	100	120	140	144	150							
1600 x 1024	16		60	70	72	75	85	100	120										
1600 x 1200	16		60	70	72	75	85	100	120										
1920 x 1080	16	30i	60	70	72	75	85	100											
1920 x 1200	16		60	70	72	75	85	100											
1920 x 1440	16		60	70	72	75	85												
2048 x 1536	16		60	70	72	75	85												
-----																			
320 x 200	32		60	70	72	75													
320 x 240	32		60	70	72	75													
400 x 300	32		60	70	72	75													

480 x 360	32		60	70	72	75														
512 x 384	32		60	70	72	75														
640 x 400	32		60	70	72	75														
640 x 480	32		60	70	72	75	85	100	120	140	144	150	170	200	240					
720 x 480	32		60																	
720 x 576	32	50	60																	
800 x 600	32		60	70	72	75	85	100	120	140	144	150	170	200	240					
848 x 480	32		60	70	72	75	85	100	120	140	144	150	170	200	240					
960 x 600	32		60	70	72	75	85	100	120	140	144	150	170	200	240					
960 x 1200	32			61																
1024 x 768	32		60	70	72	75	85	100	120	140	144	150	170	200						
1088 x 612	32		60	70	72	75	85	100	120	140	144	150	170	200						
1152 x 864	32		60	70	72	75	85	100	120	140	144	150	170							
1280 x 720	32		60	70	72	75	85	100	120	140	144	150								
1280 x 768	32		60	70	72	75	85	100	120	140	144	150								
1280 x 800	32		60	70	72	75	85	100	120	140	144	150								
1280 x 960	32		60	70	72	75	85	100	120	140	144	150								
1280 x 1024	32		60	70	72	75	85	100	120	140	144	150								
1360 x 768	32		60	70	72	75	85	100	120	140	144	150								
1600 x 900	32		60	70	72	75	85	100	120											
1600 x 1024	32		60	70	72	75	85	100												
1600 x 1200	32		60	70	72	75	85	100												
1920 x 1080	32	30i	60	70	72	75	85													
1920 x 1200	32		60	70	72	75	85													
1920 x 1440	32		60	70	72	75	85													
2048 x 1536	32		60	70	72	75	85													

### Horizontal Spanning Modes

1280 x 480	8		60	70	72	75	85	100	120	140	144	150	170	200	240					
1600 x 600	8		60	70	72	75	85	100	120	140	144	150	170	200	240					
1696 x 480	8		60	70	72	75	85	100	120	140	144	150	170	200	240					
1920 x 600	8		60	70	72	75	85	100	120	140	144	150	170	200	240					
1920 x 1200	8			61																
2048 x 768	8		60	70	72	75	85	100	120	140	144	150	170	200	240					
2176 x 612	8		60	70	72	75	85	100	120	140	144	150	170	200	240					
2304 x 864	8		60	70	72	75	85	100	120	140	144	150	170	200						
2560 x 720	8		60	70	72	75	85	100	120	140	144	150	170							

APPENDIX A: Mode Support for Windows Default Modes Supported by GPU for Windows

2560 x 768	8		60	70	72	75	85	100	120	140	144	150	170		
2560 x 800	8		60	70	72	75	85	100	120	140	144	150	170		
2560 x 960	8		60	70	72	75	85	100	120	140	144	150	170		
2560 x 1024	8		60	70	72	75	85	100	120	140	144	150	170		
2720 x 768	8		60	70	72	75	85	100	120	140	144	150	170		
3200 x 900	8		60	70	72	75	85	100	120	140	144	150			
3200 x 1024	8		60	70	72	75	85	100	120						
3200 x 1200	8		60	70	72	75	85	100	120						
3840 x 1080	8	30i	60	70	72	75	85	100							
3840 x 1200	8		60	70	72	75	85	100							
3840 x 1440	8		60	70	72	75	85								
4096 x 1536	8		60	70	72	75	85								
-----															
1280 x 480	16		60	70	72	75	85	100	120	140	144	150	170	200	240
1600 x 600	16		60	70	72	75	85	100	120	140	144	150	170	200	240
1696 x 480	16		60	70	72	75	85	100	120	140	144	150	170	200	240
1920 x 600	16		60	70	72	75	85	100	120	140	144	150	170	200	240
1920 x 1200	16		61												
2048 x 768	16		60	70	72	75	85	100	120	140	144	150	170	200	240
2176 x 612	16		60	70	72	75	85	100	120	140	144	150	170	200	240
2304 x 864	16		60	70	72	75	85	100	120	140	144	150	170	200	
2560 x 720	16		60	70	72	75	85	100	120	140	144	150	170		
2560 x 768	16		60	70	72	75	85	100	120	140	144	150	170		
2560 x 800	16		60	70	72	75	85	100	120	140	144	150	170		
2560 x 960	16		60	70	72	75	85	100	120	140	144	150	170		
2560 x 1024	16		60	70	72	75	85	100	120	140	144	150	170		
2720 x 768	16		60	70	72	75	85	100	120	140	144	150	170		
3200 x 900	16		60	70	72	75	85	100	120	140	144	150			
3200 x 1024	16		60	70	72	75	85	100	120						
3200 x 1200	16		60	70	72	75	85	100	120						
3840 x 1080	16	30i	60	70	72	75	85	100							
3840 x 1200	16		60	70	72	75	85	100							
3840 x 1440	16		60	70	72	75	85								
4096 x 1536	16		60	70	72	75	85								
-----															
1280 x 480	32		60	70	72	75	85	100	120	140	144	150	170	200	240
1600 x 600	32		60	70	72	75	85	100	120	140	144	150	170	200	240
1696 x 480	32		60	70	72	75	85	100	120	140	144	150	170	200	240
1920 x 600	32		60	70	72	75	85	100	120	140	144	150	170	200	240

1920 x 1200	32		61																
2048 x 768	32		60	70	72	75	85	100	120	140	144	150	170	200					
2176 x 612	32		60	70	72	75	85	100	120	140	144	150	170	200					
2304 x 864	32		60	70	72	75	85	100	120	140	144	150	170						
2560 x 720	32		60	70	72	75	85	100	120	140	144	150							
2560 x 768	32		60	70	72	75	85	100	120	140	144	150							
2560 x 800	32		60	70	72	75	85	100	120	140	144	150							
2560 x 960	32		60	70	72	75	85	100	120	140	144	150							
2560 x 1024	32		60	70	72	75	85	100	120	140	144	150							
2720 x 768	32		60	70	72	75	85	100	120	140	144	150							
3200 x 900	32		60	70	72	75	85	100	120										
3200 x 1024	32		60	70	72	75	85	100											
3200 x 1200	32		60	70	72	75	85	100											
3840 x 1080	32	30i	60	70	72	75	85												
3840 x 1200	32		60	70	72	75	85												
3840 x 1440	32		60	70	72	75	85												
4096 x 1536	32		60	70	72	75	85												

### Vertical Spanning Modes

640 x 960	8		60	70	72	75	85	100	120	140	144	150	170	200	240				
800 x 1200	8		60	70	72	75	85	100	120	140	144	150	170	200	240				
848 x 960	8		60	70	72	75	85	100	120	140	144	150	170	200	240				
960 x 1200	8		60	70	72	75	85	100	120	140	144	150	170	200	240				
1024 x 1536	8		60	70	72	75	85	100	120	140	144	150	170	200	240				
1088 x 1224	8		60	70	72	75	85	100	120	140	144	150	170	200	240				
1152 x 1728	8		60	70	72	75	85	100	120	140	144	150	170	200					
1280 x 1440	8		60	70	72	75	85	100	120	140	144	150	170						
1280 x 1536	8		60	70	72	75	85	100	120	140	144	150	170						
1280 x 1600	8		60	70	72	75	85	100	120	140	144	150	170						
1280 x 1920	8		60	70	72	75	85	100	120	140	144	150	170						
1280 x 2048	8		60	70	72	75	85	100	120	140	144	150	170						
1360 x 1536	8		60	70	72	75	85	100	120	140	144	150	170						
1600 x 1800	8		60	70	72	75	85	100	120	140	144	150							
1600 x 2048	8		60	70	72	75	85	100	120										
1600 x 2400	8		60	70	72	75	85	100	120										
1920 x 2160	8	30i	60	70	72	75	85	100											
1920 x 2400	8		60	70	72	75	85	100											

APPENDIX A: Mode Support for Windows Default Modes Supported by GPU for Windows

1920 x 2880	8		60	70	72	75	85											
2048 x 3072	8		60	70	72	75	85											
-----																		
640 x 960	16		60	70	72	75	85	100	120	140	144	150	170	200	240			
800 x 1200	16		60	70	72	75	85	100	120	140	144	150	170	200	240			
848 x 960	16		60	70	72	75	85	100	120	140	144	150	170	200	240			
960 x 1200	16		60	70	72	75	85	100	120	140	144	150	170	200	240			
1024 x 1536	16		60	70	72	75	85	100	120	140	144	150	170	200	240			
1088 x 1224	16		60	70	72	75	85	100	120	140	144	150	170	200	240			
1152 x 1728	16		60	70	72	75	85	100	120	140	144	150	170	200				
1280 x 1440	16		60	70	72	75	85	100	120	140	144	150	170					
1280 x 1536	16		60	70	72	75	85	100	120	140	144	150	170					
1280 x 1600	16		60	70	72	75	85	100	120	140	144	150	170					
1280 x 1920	16		60	70	72	75	85	100	120	140	144	150	170					
1280 x 2048	16		60	70	72	75	85	100	120	140	144	150	170					
1360 x 1536	16		60	70	72	75	85	100	120	140	144	150	170					
1600 x 1800	16		60	70	72	75	85	100	120	140	144	150						
1600 x 2048	16		60	70	72	75	85	100	120									
1600 x 2400	16		60	70	72	75	85	100	120									
1920 x 2160	16	30i	60	70	72	75	85	100										
1920 x 2400	16		60	70	72	75	85	100										
1920 x 2880	16		60	70	72	75	85											
2048 x 3072	16		60	70	72	75	85											
-----																		
640 x 960	32		60	70	72	75	85	100	120	140	144	150	170	200	240			
800 x 1200	32		60	70	72	75	85	100	120	140	144	150	170	200	240			
848 x 960	32		60	70	72	75	85	100	120	140	144	150	170	200	240			
960 x 1200	32		60	70	72	75	85	100	120	140	144	150	170	200	240			
1024 x 1536	32		60	70	72	75	85	100	120	140	144	150	170	200				
1088 x 1224	32		60	70	72	75	85	100	120	140	144	150	170	200				
1152 x 1728	32		60	70	72	75	85	100	120	140	144	150	170					
1280 x 1440	32		60	70	72	75	85	100	120	140	144	150						
1280 x 1536	32		60	70	72	75	85	100	120	140	144	150						
1280 x 1600	32		60	70	72	75	85	100	120	140	144	150						
1280 x 1920	32		60	70	72	75	85	100	120	140	144	150						
1280 x 2048	32		60	70	72	75	85	100	120	140	144	150						
1360 x 1536	32		60	70	72	75	85	100	120	140	144	150						
1600 x 1800	32		60	70	72	75	85	100	120									
1600 x 2048	32		60	70	72	75	85	100										

1600 x 2400	32		60	70	72	75	85	100
1920 x 2160	32	30i	60	70	72	75	85	
1920 x 2400	32		60	70	72	75	85	
1920 x 2880	32		60	70	72	75	85	
2048 x 3072	32		60	70	72	75	85	

## Modes Supported by DACs and TV Encoders

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This section lists the supported modes and formats for the following:

- “External DAC Mode Support” on page 52
- “TV-Out Mode Support” on page 53

### External DAC Mode Support

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#### Fairchild FMS3815 Modes Supported

Table A.3 shows the refresh rates for various resolutions of the Fairchild FMS3815 external DAC, which is commonly used on GeForce2 MX and Quadro2 MXR boards to drive a secondary CRT.

**Table A.3** External DAC Modes (Fairchild FMS3815)

Resolution	Supported Rates (Hz)
640x480	60, 70, 72, 75, 85, 100, 120, 140, 144, 150, 170
800x600	60, 70, 72, 75, 85, 100, 120, 140, 144, 150, 170
1024x768	60, 70, 72, 75, 85, 100, 120
1152x864	60, 70, 72, 75, 85
1280x720	60, 70, 72, 75, 85, 100
1280x960	60, 70, 72, 75
1280x1024	60, 70, 72, 75
1360x768	60, 70, 72, 75, 85
1600x900	60, 70
1600x1200	—

#### Analog Devices ADV-7123 Modes Supported

Table A.4 shows the refresh rates for various resolutions of the Analog Devices ADV-7123 external DAC, which is commonly used on the GeForce2 MX and the Quadro2 MXR boards to drive a secondary CRT.

**Table A.4** External DAC Modes (Analog Devices ADV-7123)

Resolution	Supported Rates (Hz)
640x480	60, 70, 72, 75, 85, 100, 120, 140, 144, 150, 170
800x600	60, 70, 72, 75, 85, 100, 120, 140, 144, 150, 170
1024x768	60, 70, 72, 75, 85, 100, 120
1152x864	60, 70, 72, 75, 85, 100
1280x720	60, 70, 72, 75, 85, 100
1280x960	60, 70, 72, 75, 85, 90

**Table A.4** External DAC Modes (Analog Devices ADV-7123) (continued)

Resolution	Supported Rates (Hz)
1280x1024	60, 70, 72, 75, 85
1360x768	60, 70, 72, 75, 85, 100
1600x900	60, 70, 75
1600x1200	—

## TV-Out Mode Support

Table A.5 and Table A.6 list the NTSC, PAL, and HDTV TV-Out modes supported by the NVIDIA driver.

**Table A.5** Mode Support for S-Video and Composite Out

Resolution	Bit depth	Comments
320x200	8, 16, 32	DirectDraw mode; not selectable as a Windows desktop
320x240	8, 16, 32	DirectDraw mode; not selectable as a Windows desktop
640x400	8, 16, 32	DirectDraw mode; not selectable as a Windows desktop
640x480	8, 16, 32	
720x480	8, 16, 32	Overscans (for video)
720x576	8, 16, 32	Overscans (for video)
800x600	8, 16, 32	
1024x768	8, 16, 32	Conexant 25871 only

**Table A.6** Mode Support for Component YPrPb Out and DVI Out

Resolution	Comments
480i (SDTV)	Supported on graphics boards with Conexant 875 or Philips 7108 TV encoders and compatible connectors, and compatible GeForce 6 Series and GeForce 7 Series GPUs.
480p (EDTV)	
720p (HDTV)	
1080i (HDTV)	
576i (PAL)	
576p (PAL)	

The driver supports manual overscan correction for component and DVI outputs. See the *ForceWare Graphics Driver User's Guide* for instructions on how to use the overscan correction features in the control panel.