NVIDIA Quadro Professional Drivers

Release 178 Notes

Version 178.46

For Windows Vista 32-bit
and Windows Vista 64-bit

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CHAPTER

1

INTRODUCTION TO *RELEASE 178 NOTES*

This edition of *Release 178 Notes* describes the Release 178 ForceWare Graphics Drivers for Microsoft® Windows® Vista. NVIDIA provides these notes to describe performance improvements and bug fixes in each documented version of the driver.

Structure of the Document

This document is organized in the following sections:

- "Release 178 Driver Changes" on page 3 gives a summary of changes, and fixed and open issues in this version.
- "The Release 178 Driver" on page 21 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 27 lists the default resolutions supported by the driver.

Changes in this Edition

This edition of the *Release 178 Notes* for Windows Vista includes information about NVIDIA ForceWare graphics driver version 178.46, and lists changes made to the driver since version 169.96. These changes are discussed beginning with the chapter "Release 178 Driver Changes" on page 3.

CHAPTER

2

RELEASE 178 DRIVER CHANGES

This chapter describes open issues for version 178.46, and resolved issues and driver enhancements for versions of the Release 178 driver up to version 178.46. The chapter contains these sections:

- "Version 178.46 Highlights" on page 4
- "Changes in Version 178.46" on page 8
- "Changes in Version 178.26" on page 9
- "Open Issues in Version 178.46" on page 11
- "Not NVIDIA Issues" on page 13
- "Known Product Limitations" on page 18

Version 178.46 Highlights

This section provides highlights of version 178.46 of the NVIDIA Release 178 Driver for Windows Vista.

- What's New in Release 178
- What's New in Version 178.46
- Limitations in This Release
- Special Instructional Notes for this Release

What's New in Release 178

- Added support for the following NVIDIA products:
  - NVIDIA Quadro FX 470
  - NVIDIA Quadro CX
  - NVIDIA Quadro FX370 Low Profile
  - NVIDIA Quadro FX4800
  - NVIDIA Quadro FX5800
  - NVIDIA Quadro VX 200
  - NVIDIA Quadro NVS 450
- Added support for hot-plug detection of VGA displays that provide EDID information.
- Added support for DDC-Ci/MCCS over the DisplayPort AUX channel.
- As of version 178.46, the NVIDIA nView Desktop Manager utility is included with the driver installation, and is accessible from the Windows Control Panel.

What's New in Version 178.46

- Added support for the following NVIDIA products:
  - NVIDIA Quadro FX 370 Low Profile
  - NVIDIA Quadro FX 4800
  - NVIDIA Quadro FX 5800
  - NVIDIA Quadro VX 200
  - NVIDIA Quadro NVS 450
- The NVIDIA nView Desktop Manager utility is included with the driver installation, and is accessible from the Windows Control Panel.
- See "Changes in Version 178.46" on page 8 for a list of resolved issues under Windows Vista.

Limitations in This Release

The following are features that are not currently supported or have limited support in this driver release:

- **NVIDIA SLI Antialiasing**

  This driver does not support NVIDIA SLI antialiasing.

- **INF Support for Restricted Timings**

  This driver version does not support the use of Restricted Timing settings (R&T strings) in the INF to control mode validation and/or mode setting for custom mode/adapter/monitor combinations. This capability is planned for a later driver release.

- **SDI**

  This driver does not support the Serial Display Interface (a standard for driving high color depth displays).

- **Genlock/Frame Lock**

  This driver does not support the ability to synchronize multiple display outputs with an external signal.

- **NVIDIA TurboCache**

  Windows Vista now controls the allocation of system memory to the GPU for TurboCache functions. The Windows Vista Display Properties pages show the shared system memory (SSM), or how much memory is allocated for NVIDIA GPUs to use for TurboCache.

  For more information on graphics memory reporting under Windows Vista, visit **http://www.microsoft.com/whdc/device/display/graphicsmemory.mspx.**

Features Not Yet Available in the NVIDIA Control Panel

Support for the following control panel features is under development and not yet available under Windows Vista:

- **Display Category**
  - The Graph tab on the Adjust Desktop Color Settings page is not available.
- **Workstation Category**

  The Workstation category page is not available with this driver version.

Special Instructional Notes for this Release

This section clarifies instructions for successfully accomplishing the following tasks:

Turning Off V-Sync to Boost Performance

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.

NVIDIA Application Configuration Engine (ACE)

This driver includes the NVIDIA Application Configuration Engine (ACE), which automatically detects the workstation application and configures the appropriate profile settings in the NVIDIA Control Panel.

See the *NVIDIA Quadro Professional Drivers: NVIDIA Control Panel Quick Start Guide* for more information about this feature.

Changes in Version 178.46

The following sections list the changes made and issues resolved since driver version 178.26.

- "Fixed Issues–Windows Vista 32-bit" on page 8
- "Fixed Issues—Windows Vista 64-bit" on page 8

The NVIDIA bug number and driver module are provided for reference.

Fixed Issues–Windows Vista 32-bit

Single-GPU Fixed Issues

- PBO buffer performance drops dramatically after some time.
- Quadro FX 3500: DDC access does not work properly.
- Quadro FX 3700: SolidMX— lines disappear while scaling objects in the application.

Fixed Issues—Windows Vista 64-bit

Single-GPU Issues

- PBO buffer performance drops dramatically after some time.
- Quadro FX 3700: Stereo Clone mode does not work.
- Quadro FX 5600/3700: Maya 2009—the application fails to start when setting the secondary display as the only display.

Changes in Version 178.26

The following sections list the changes made and issues resolved since driver version 169.96.

• "Fixed Issues–Windows Vista 32-bit" on page 9

The NVIDIA bug number and driver module are provided for reference.

Fixed Issues–Windows Vista 32-bit

Single-GPU Fixed Issues

- AutoCAD 2009–with the PowerDraft driver installed, a driver cannot recognize the graphics card and an error message appears.
- Mudbox (beta)–the application crashes on rendering using glDrawElements.
- Allplan BIM 2008–the 2008 version of the application is up to 60% slower than the older version (2006).
- Performance degradation occurs when using PBOs.
- AutoCAD VCA with a Release 169 driver runs slower than with a Release 162 driver.]
- SolidCAM 2008 – the screen freezes when running Operations ->Simulate->SolidVerify ->3D
- Quadro FX 3700: Timing is not generated for 2048x2560 or 2560x2048 resolutions.

Multi-GPU Fixed Issues

- [SLI], NVIDIA Quadro FX 4500: The NVIDIA Control Panel stops functioning properly after enabling SLI mode.

Windows Vista 64-bit Issues

Single-GPU Issues

- Performance degradation occurs when using PBOs.
- There are missing files in the driver installation, which results in errors when trying to uninstall the driver.
- AutoCAD VCA with a Release 169 driver runs slower than with a Release 162 driver.]
- Quadro FX 3700: Timing is not generated for 2048x2560 or 2560x2048 resolutions.

Multi-GPU Issues

- [SLI], NVIDIA Quadro FX 3700: With SLI-AFR mode enabled, the driver stops responding during stress tests.

Open Issues in Version 178.46

As with every released driver, version 178.46 of the Release 178 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 may have workaround solutions.

- "Windows Vista 32-bit Issues" on page 11
- "Windows Vista 64-bit Issues" on page 12

Windows Vista 32-bit Issues

Single-GPU Issues

- Gamma ramps are inconsistent between one and two-headed systems
- A random 200ms glitch occurs when using the NVIDIA DDC API to communicate with the Dome E3 Panel.
- Quadro FX 4800: Poser/Poser Pro exits with an access violation in nvoglv32.dll.
- In Dualview mode with each display running at different refresh rates, there is tearing in OpenGL windows, indicating that the driver is not sync'ing to V-blank.
- Maya 2009: driver versions and configurations need to be defined for the application in order to properly run in stereo.
- KOMPAS-3D V9 SP1 –the CAD software runs faster on a GeForce card when compared to a Quadro card.
- ArchiCAD12–OpenGL speed is half as fast on Vista than on XP.
- Quadro FX 3700: SOCET GXP–on monochromatic images, a right-click pop-up menu remains flashing over the image even after the pop-up window is invoked.
- Quadro FX 3700: SOCET GXP–menus that overlap the stereo imagery cause the stereo panel to change to mono until the menu is gone.
- Quadro FX 1700: 3ds Max 2009–the performance drops when applying a scene effect.

Multi-GPU Issues

- Dual NVIDIA Quadro FX 4500: `wglEnumGpusNV()` enumerates only one GPU.

Windows Vista 64-bit Issues

Single-GPU Issues

- Quadro FX 4800: Poser/Poser Pro exits with an access violation in nvoglv32.dll.
- MediaComposer–polygons are drawn in the wrong color after disabling shaders.
- KOMPAS-3D V9 SP1 –the CAD software runs faster on a GeForce card when compared to a Quadro card.
- Quadro FX 3700/3500: Maya 2009–there is no 3D stereo profile for the application.

Multi-GPU Issues

- Dual NVIDA Quadro FX 4500: `wglEnumGpusNV()` enumerates only one GPU.

Not NVIDIA Issues

This section lists issues that are not due to the NVIDIA driver as well as features that are not meant to be supported by the NVIDIA driver for Windows Vista.

- "Windows Vista Limitations" on page 13
- "Unsupported Features" on page 13
- "OpenGL Application Issues" on page 15
- "Application Issues" on page 16

Windows Vista Limitations

These are behaviors that may be different from Windows XP and are related directly to the Windows Vista operating system.

- World of Warcraft – there is a 60% drop in performance when running the game in windowed mode with SLI or multi-GPU mode enabled.

  This is due to a limitation of the Windows Vista operating system and affects all multi-GPU systems. NVIDIA is investigating a workaround for this performance problem.

Unsupported Features

The following are features and functionality that were available in driver releases supporting Windows XP, but are not available in driver releases for Windows Vista:

- **High resolution scaling desktop (HRSD)**
- **MultiView Display Mode** (for NVIDIA Quadro NVS graphics cards)
- **NVKeystone**
- **Unified back buffer (UBB) controls**
- **OpenGL Video Overlays**

  This is an operating system limitation.

  Vista window manager features will provide new ways of accomplishing overlays, but will require application porting.
- **Overclocking**

  GPU overclocking is no longer supported in the default GPU driver control panel. This feature is available in the NVIDIA nTune 5.05 software, which you can download from NVIDIA.com.
- **GPU Temperature Monitoring**

Temperature monitoring is no longer supported in the default GPU driver control panel. This feature is available in the NVIDIA nTune 5.05 software, which you can download from NVIDIA.com.

AGP Settings Adjustment

- **Full-screen Video Mirror**
- **Video Zoom**
- **Pan & Scan** - the process of panning across the desktop in order to display a desktop on a monitor with lower resolution
- **Per-display Desktop Color Setting Adjustments**

  For Clone mode, the desktop color setting adjustments through the NVIDIA Control Panel can only be made across all displays in a system, and not on a per-display basis.
- **Per-display Video Color Setting Adjustments**

  For Dualview mode, the video color setting adjustments through the NVIDIA Control Panel can only be made across all displays in a system, and not on a per-display basis.
- **nView Horizontal and Vertical Span Modes**

  Due to architectural changes in the new Windows Vista Window Display Driver Model (WDDM), span mode cannot be supported in NVIDIA graphics drivers. NVIDIA recommends using the built-in Windows Vista multi-display modes.
- **Edge Blending**
- **Run display optimization wizard**
- **Run multiple display wizard**
- **Run television setup wizard**
- **Display/Connection Wizard** (such as was provided with Windows Media Center Edition)
- **DVD/MPEG Extensions** (such as was provided with Windows Media Center Edition)
- **Audio Extensions** (such as was provided with Windows Media Center Edition)
- **Windowed quad-buffered stereo**

  This is an operating system limitation.

OpenGL Application Issues

The following are known compatibility issues for OpenGL applications developed under Windows XP:

- Mixed GDI and OpenGL rendering does not work.

  A number of applications use GDI to render UI components and object highlighting. This is not supported in the Windows Vista driver model.

  NVIDIA recommends converting GDI rendering to OpenGL.

  The following are some applications that are known to have this issue:

  - Maya 7.01
  - OneSpace Designer Modeling
- Applications, Tools, and Benchmarks not supported under Windows Vista
  - GLperf
  - 3ds max 8 (later releases may be supported)
  - CATIA V5R15 (V5R16 is supported)
  - PTC's CDRS 2001
- Front buffered rendering may be slow, especially when DWM is enabled.

  Flushing the rendering queue while rendering to the front buffer may cause the window manager to recomposite. Applications should therefore minimize the frequency with which they flush the rendering queue.

Application Issues

- **General Antialiasing Problem with Top Games**

  We have found that some games running under Windows Vista enable 16x coverage sampling antialiasing (CSAA) when 4xAA is selected in the game menu, resulting in deflated performance on the latest NVIDIA Quadro FX cards.

  The problem occurs with NVIDIA Vista drivers 100.54 and later.

  The same effect will occur in future "Release 100" Windows XP drivers.

  Affected applications found to date include:

  - Battlefield 2
  - Battlefield 2142
  - Sin Episodes
  - Half-Life 2
  - Half-Life 2 Lost Coast

  To set standard 4xAA in these applications, please set 4xAA in the game, and also enable “Enhance the application” antialiasing mode with a 4x antialiasing setting in the NVIDIA graphics driver control panel.

  We are working with developers to implement better in-game CSAA support. You can see CSAA menu selections in Half-Life 2: Episode One and Supreme Commander.

- City of Heroes–The mouse cursor does not display.

  This is an application issue that can be worked around in full-screen mode by adding “compatiblecursors 1” to the City of Heroes desktop shortcut.

  NVIDIA is pursuing a fix with the application developer.

- Sims 2–“Smooth Edges (AA)” option is not available with Release 100 drivers.

  This occurs because of an incorrect driver version check in the application. Using a previous Release 95 driver (xx.xx format) will allow the option to be visible.

  NVIDIA is pursuing a fix with the application developer.

- Warhammer 40k Dawn of War (all versions) does not run with Release 100 drivers.

  This occurs because of an incorrect driver version check in the application. Using a previous Release 95 driver (xx.xx format) will allow the option to be visible.

  NVIDIA is pursuing a fix with the application developer.

- Tiger Woods PGA Tour 2007–Fly-by shot before each hole blacks-out textures.

NVIDIA is working with the developer to resolve this issue.

- Need for Speed Carbon–After upgrading with patch 1.3, the game crashes when launched.

  This is an issue with the application patch under Windows Vista.

- Nascar Simracing–the game crashes when launched.

  This is an issue with the application under Windows Vista.

- Call of Duty 2–Only solid colors render during gameplay when 4xAA is enabled.

  The application is not applying antialiasing properly. Please try selecting 2x AA, disabling antialiasing, or using NVIDIA Enhanced application or Override antialiasing modes.

  NVIDIA is pursuing a fix with the application developer

- Age of Empires III–the game has rendering artifacts, such as textured squares for smoke.
- Flight Simulator X–pressing Alt+Tab to switch to the desktop does not work.
- Everquest 2– with NVIDIA driver versions 100.xx, the following error message appears:

  "You currently have a (7.15.11.120) video card installed. We recommend that you download version 7772 drivers before playing Everquest."

  This occurs because the application is not checking the driver version correctly, but this does not affect gameplay. Please select "Continue Anyway" to launch the game. The problem does not occur with a previous Release 95 driver (xx.xx format).

  NVIDIA is pursuing a fix with the application developer.

- MediaComposer video playback does not update properly.

  This is not an NVIDIA bug, but rather an issue with the application.

Known Product Limitations

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 18
- "Image Sharpening Control not Available with Quadro FX 4600 and later GPUs" on page 18
- "Driver Reports 256 MB Memory on NVIDIA Quadro FX 330 Cards" on page 19
- "Applying Workstation Application Profiles" on page 19
- "Gigabyte GA-6BX Motherboard" on page 19

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.

Image Sharpening Control not Available with Quadro FX 4600 and later GPUs

With Quadro FX 4600 and later graphics cards, the **Image sharpening** slider on the NVIDIA Control Panel-> Display->Adjust Desktop Color Settings page is grayed out.

This control is intentionally disabled because image sharpening is not supported on Quadro FX 4600 and later GPUs.

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.

Applying Workstation Application Profiles

- **Background**

  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.

- **Issues**

  Configuration changes require that you restart the application.

  Once an application is running, it does not receive notification of configuration changes, Therefore, if you change the configuration while the application is running, you must exit and restart the application for the configuration changes to take effect.

Gigabyte GA-6BX Motherboard

This motherboard uses a LinFinity regulator on the 3.3-V rail that is rated to only 5 A—less than the AGP specification, which requires 6 A. When diagnostics or applications are running, the temperature of the regulator rises, causing the voltage to the NVIDIA chip to drop as low as 2.2 V. Under these circumstances, the regulator cannot supply the current on the 3.3-V rail that the NVIDIA chip requires.

This problem does not occur when the graphics board has a switching regulator or when an external power supply is connected to the 3.3-V rail.

CHAPTER

3

THE RELEASE 178 DRIVER

This chapter covers the following main topics:

- "Hardware and Software Support" on page 21
- "Driver Installation" on page 24
- "NVIDIA Driver History" on page 25

Hardware and Software Support

Supported Operating Systems

The Release 178 driver, version 178.46, has been tested with Microsoft Windows® Vista RTM OS builds version 6000 or higher, and supports both 32-bit and 64-bit versions of Windows Vista Editions:

- Windows Vista Home Basic
- Windows Vista Home Premium
- Windows Vista Business
- Windows Vista Enterprise Edition
- Windows Vista Ultimate

Supported NVIDIA Products

Table 3.1 lists the NVIDIA products supported by the Release 178 driver.

Table 3.1 Supported NVIDIA Workstation Products

Product	Windows Vista 32-bit	Windows Vista 64-bit
NVIDIA Quadro FX 5800	X	X
NVIDIA Quadro FX 5600	X	X
NVIDIA Quadro FX 5500	X	X
NVIDIA Quadro FX 4800	X	X
NVIDIA Quadro FX 4700 X2	X	X
NVIDIA Quadro FX 4600	X	X
NVIDIA Quadro FX 4500 X2	X	X
NVIDIA Quadro FX 4500	X	X
NVIDIA Quadro FX 4400	X	X
NVIDIA Quadro FX 4400G	X	X
NVIDIA Quadro FX 4000	X	X
NVIDIA Quadro FX 3700	X	X
NVIDIA Quadro FX 3500	X	X
NVIDIA Quadro FX 3450	X	X
NVIDIA Quadro FX 3400	X	X
NVIDIA Quadro FX 1700	X	X
NVIDIA Quadro FX 1500	X	X
NVIDIA Quadro FX 1400	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 470	X	X
NVIDIA Quadro FX 370	X	X
NVIDIA Quadro FX 370 low profile	X	X
NVIDIA Quadro FX 350	X	X
NVIDIA Quadro VX 200	X	X
NVIDIA Quadro CX	X	X
NVIDIA Quadro NVS 450	X	X
NVIDIA Quadro NVS 440	X	X
NVIDIA Quadro NVS 290	X	X
NVIDIA Quadro NVS 285	X	X

Supported Languages

The Release 178 Quadro Professional Drivers supports the following languages in the main driver Control Panel:

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

Driver Installation

Minimum Hard Disk Space

The hard disk space requirement is minimum 56.4 MB for English-only, and 83.9 MB for International.

Before You Begin

If you have previously installed NVIDIA nTune, NVIDIA recommends that you uninstall nTune before installing this driver. After the driver install is complete, you can reinstall NVIDIA nTune.

Installation Instructions

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.
3. The license agreement dialog box appears.
4. 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.
5. Extract the zip files to a temporary folder on your PC.
6. Open the NVIDIA driver installation .EXE file to launch the NVIDIA InstallShield Wizard.
7. Follow the instructions in the NVIDIA InstallShield Wizard to complete the installation.

Note: After the driver installation, Windows may default to 16-bpp color and disable the Desktop Window Manager (DWM). To work around this issue, set the color to 32-bpp and then reboot the PC.

NVIDIA Driver History

Release 178 is the latest NVIDIA Quadro Professional 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 Vista

Windows Vista Build	NVIDIA ForceWare Driver
RTM OS Builds 6000 or higher	178.26, 178.46
RTM OS Builds 6000 or higher	175.51
RTM OS Builds 6000 or higher	169.61
RTM OS Builds 6000 or higher	162.50, 162.62, 162.65, 162.67
RTM OS Builds 6000 or higher	160.02
RTM OS Builds 6000 or higher	Release 100: Version 100.53, 100.54, 100.59, 100.64, 100.65, 100.75, Release 95: Version 97.46
RC2 OS Builds 5744 or higher	Release 95: Version 96.85
RC1 OS Builds 5520.RC1_16384.060812-2235 or higher	Release 95: Version 96.33
Build 5472.WinMain_idx01_5.060713-1900 or higher	Release 95: Versions 95.60–96.00
Windows Vista Beta2	NVIDIA Driver version 88.61
February 06 CTP build 5308.FebCTP_Final.060217-2200 or higher	NVIDIA Drivers 87.15, 87.45
July 05 Vista Beta1	NVIDIA Driver included ‘in the box’.
December 05 CTP build 5270.Winmain.051214-1910	NVIDIA Driver included ‘in the box’.

APPENDIX

A

MODE SUPPORT FOR WINDOWS

This chapter details the Windows modes supported by the Release 178 driver for NVIDIA products. It contains these sections:

- "General Mode Support Information" on page 28
- "Default Modes Supported by GPU" on page 29
- "TV-Out Modes Supported by TV Encoders" on page 43

General Mode Support Information

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" on page 29.

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
HP LP3065 Flat Panel Monitor (Dual-link DVI)	2560×1600 @ 60 Hz	• All high-end NVIDIA Quadro FX graphics solutions.
Apple 30" Cinema HD Display (Dual link DVI)	2560x1600 @ 60 Hz	• All high-end NVIDIA Quadro FX graphic solutions.
Dell WFP 3007 (Dual Link DVI)	2560x1600 @ 60 Hz	• All High-end NVIDIA Quadro FX graphic solutions.

Table A.2 Non-standard Modes Supported

Resolution
1680 x 1050
1366 x 768

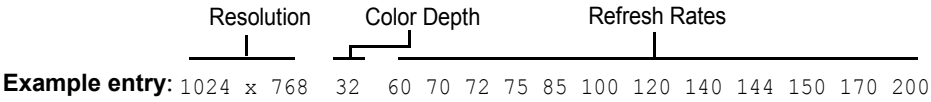
Default Modes Supported by GPU

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

- "NVIDIA Quadro FX 4400/4000/1400/550/540 and NVS 440/285 Family of GPUs" on page 30
- "NVIDIA Quadro FX 5600/4600/4700 X2/3700 Family of GPUs" on page 32
- "NVIDIA Quadro FX 1700/570/470/370 and NVS 290 Family of GPUs" on page 35
- "NVIDIA Quadro CX GPUs" on page 37
- "NVIDIA Quadro FX 5800/4800 Family of GPUs" on page 39
- "NVIDIA Quadro FX 5500/4500/3500/560/350 Family of GPUs" on page 41

Understanding the Mode Format

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



Meaning:

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 4400/4000/1400/550/540 and NVS 440/285 Family of GPUs

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

- NVIDIA Quadro FX 3400/4400
- NVIDIA Quadro FX 4000
- NVIDIA Quadro FX 3450/4000 SDI
- NVIDIA Quadro FX 1400
- NVIDIA Quadro NVS 440
- NVIDIA Quadro FX 550
- NVIDIA Quadro FX 540
- NVIDIA Quadro NVS 285
- NVIDIA Quadro NVS 210S

Standard Modes

```
 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
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 85 100 120 140 144 150 170 200 240
1280 x 1024   8         70
1440 x  900   8      60
1600 x 1200   8         70
1680 x 1050   8      60
1920 x 1440   8      60 70 72 75 85 100
2048 x 1536   8      60 70 72 75 85 100
-------------------------------------------------------------------
 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
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 85 100 120 140 144 150 170 200 240
1280 x 1024  16         70
1440 x  900  16      60
1600 x 1200  16         70
1680 x 1050  16      60
1920 x 1440  16      60 70 72 75 85 100
2048 x 1536  16      60 70 72 75 85 100
-------------------------------------------------------------------
 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         70
1152 x  864  32      60 70 72 75 85 100 120 140 144 150 170 200
1280 x  768  32      60 70 72 75 85 100 120 140 144 150 170
1280 x 1024  32         70
1440 x  900  32      60
1600 x 1200  32         70
1680 x 1050  32      60
1920 x 1440  32      60 70 72 75 85 100
2048 x 1536  32      60 70 72 75 85 100
```

NVIDIA Quadro FX 5600/4600/4700 X2/3700 Family of GPUs

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 4700 X2
- NVIDIA Quadro FX 3700

Standard Modes

```
 640 x  480   8          60    72 75 85 100
 720 x  480   8          60
 720 x  576   8       50 60
 800 x  600   8          60    72 75 85 100
1024 x  768   8          60 70 72 75 85 100
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
1280 x  768   8          60 70 72 75 85 100
1280 x  800   8          60 70 72 75 85 100
1280 x  960   8          60 70 72 75 85 100
1280 x 1024   8          60 70 72 75 85 100
1360 x  768   8          60 70 72 75 85 100
1440 x  900   8          60
1600 x 1200   8          60 70 72 75 85 100
1680 x 1050   8          60
1920 x 1080   8   30i
1920 x 1200   8          60    72 75 85 100
1920 x 1440   8          60 70 72 75 85 100
2048 x 1536   8          60 70 72 75 85 100
-------------------------------------------------------------------
 640 x  480  16          60    72 75 85 100
 720 x  480  16          60
 720 x  576  16       50 60
 800 x  600  16          60    72 75 85 100
1024 x  768  16          60 70 72 75 85 100
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
1280 x  768  16          60 70 72 75 85 100
1280 x  800  16          60 70 72 75 85 100
1280 x  960  16          60 70 72 75 85 100
1280 x 1024  16          60 70 72 75 85 100
1360 x  768  16          60 70 72 75 85 100
1440 x  900  16          60
1600 x 1200  16          60 70 72 75 85 100
1680 x 1050  16          60
1920 x 1080  16   30i
1920 x 1200  16          60    72 75 85 100
1920 x 1440  16          60 70 72 75 85 100
2048 x 1536  16          60 70 72 75 85 100
-------------------------------------------------------------------
 640 x  480  32          60    72 75 85 100
 720 x  480  32          60
 720 x  576  32       50 60
 800 x  600  32          60    72 75 85 100
1024 x  768  32          60 70 72 75 85 100
1152 x  864  32          60 70 72 75 85 100 120 140 144 150 170 200
1280 x  720  32          60 70 72 75 85 100
1280 x  768  32          60 70 72 75 85 100
1280 x  800  32          60 70 72 75 85 100
1280 x  960  32          60 70 72 75 85 100
1280 x 1024  32          60 70 72 75 85 100
1360 x  768  32          60 70 72 75 85 100
1440 x  900  32          60
1600 x 1200  32          60 70 72 75 85 100
1680 x 1050  32          60
1920 x 1080  32   30i
1920 x 1200  32          60    72 75 85
1920 x 1440  32          60 70    75 85 100
2048 x 1536  32          60 70    75 85 100
-------------------------------------------------------------------
 640 x  480  64          60    72 75 85 100
 720 x  480  64          60
 720 x  576  64       50 60
 800 x  600  64          60    72 75 85 100
1024 x  768  64          60 70 72 75 85 100
```

```
1152 x  864  64          60 70 72 75 85 100 120 140 144 150 170 200
1280 x  720  64          60 70 72 75 85 100
1280 x  768  64          60 70 72 75 85 100
1280 x  800  64          60 70 72 75 85 100
1280 x  960  64          60 70 72 75 85 100
1280 x 1024  64          60 70 72 75 85 100
1360 x  768  64          60 70 72 75 85 100
1440 x  900  64          60
1600 x 1200  64          60 70 72 75 85 100
1680 x 1050  64          60
1920 x 1080  64   30i
1920 x 1440  64                        100
2048 x 1536  64                        100

-----------------------------------------------------------------
```

NVIDIA Quadro FX 1700/570/470/370 and NVS 290 Family of GPUs

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

- NVIDIA Quadro FX 370
- NVIDIA Quadro FX 570
- NVIDIA Quadro FX 1700
- NVIDIA Quadro NVS 290
- NVIDIA Quadro FX 470

Standard Modes

```
 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
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 85 100 120 140 144 150 170 200
1280 x 1024   8         70
1440 x  900   8      60
1600 x 1200   8         70
1680 x 1050   8      60
1920 x 1440   8      60 70 72 75 85 100
2048 x 1536   8      60 70 72 75 85 100
-------------------------------------------------------------------
 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
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 85 100 120 140 144 150 170 200
1280 x 1024  16         70
1440 x  900  16      60
1600 x 1200  16         70
1680 x 1050  16      60
1920 x 1440  16      60 70 72 75 85 100
2048 x 1536  16      60 70 72 75 85 100
-------------------------------------------------------------------
 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         70
1152 x  864  32      60 70 72 75 85 100 120 140 144 150 170 200
1280 x  768  32      60 70 72 75 85 100 120 140 144 150 170 200
1280 x 1024  32         70
1440 x  900  32      60
1600 x 1200  32         70
1680 x 1050  32      60
1920 x 1440  32      60 70 72 75 85 100
2048 x 1536  32      60 70 72 75 85 100
-------------------------------------------------------------------
 640 x  480  64      60 70 72 75 85 100 120 140 144 150 170 200 240
 720 x  480  64      60
 720 x  576  64   50 60
 800 x  600  64      60 70 72 75 85 100 120 140 144 150 170 200 240
 848 x  480  64      60 70 72 75 85 100 120 140 144 150 170 200 240
 960 x  600  64      60 70 72 75 85 100 120 140 144 150 170 200 240
1024 x  768  64         70
1152 x  864  64      60 70 72 75 85 100 120 140 144 150 170 200
1280 x  768  64      60 70 72 75 85 100 120 140 144 150 170 200
1280 x 1024  64         70
1440 x  900  64      60
1600 x 1200  64         70
1680 x 1050  64      60
1920 x 1440  64                     100
2048 x 1536  64                     100
```

NVIDIA Quadro CX GPUs

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

- NVIDIA Quadro CX

Standard Modes

```
 640 x  480   8   60
 800 x  600   8   60 70 75 85 100
 848 x  480   8   60 70 75 85 100
 960 x  600   8   60 70 75 85 100
1024 x  768   8   60 70 75 85 100
1152 x  864   8   60 70 75 85 100
1280 x  768   8   60
1280 x  800   8   60
1280 x  960   8   60 70 75 85 100
1280 x 1024   8   60 70 75 85 100
1360 x  768   8   60
1600 x 1200   8   60 70 75 85 100
1680 x 1050   8   60
1920 x 1200   8   60
1920 x 1440   8   60 70 75 85 100
2048 x 1536   8   60 70 75 85 100
-------------------------------------------------------------------
 640 x  480  16   60
 800 x  600  16   60 70 75 85 100
 848 x  480  16   60 70 75 85 100
 960 x  600  16   60 70 75 85 100
1024 x  768  16   60 70 75 85 100
1152 x  864  16   60 70 75 85 100
1280 x  768  16   60
1280 x  800  16   60
1280 x  960  16   60 70 75 85 100
1280 x 1024  16   60 70 75 85 100
1360 x  768  16   60
1600 x 1200  16   60 70 75 85 100
1680 x 1050  16   60
```

```
1920 x 1200  16   60
1920 x 1440  16   60 70 75 85 100
2048 x 1536  16   60 70 75 85 100
-------------------------------------------------------------------
 640 x  480  32   60
 800 x  600  32   60 70 75 85 100
 848 x  480  32   60 70 75 85 100
 960 x  600  32   60 70 75 85 100
1024 x  768  32   60 70 75 85 100
1152 x  864  32   60 70 75 85 100
1280 x  768  32   60
1280 x  800  32   60
1280 x  960  32   60 70 75 85 100
1280 x 1024  32   60 70 75 85 100
1360 x  768  32   60
1600 x 1200  32   60 70 75 85 100
1680 x 1050  32   60
1920 x 1200  32   60
1920 x 1440  32   60 70 75 85 100
2048 x 1536  32   60 70 75 85 100
-------------------------------------------------------------------
 640 x  480  64   60
 800 x  600  64   60 70 75 85 100
 848 x  480  64   60 70 75 85 100
 960 x  600  64   60 70 75 85 100
1024 x  768  64   60 70 75 85 100
1152 x  864  64   60 70 75 85 100
1280 x  768  64   60
1280 x  800  64   60
1280 x  960  64   60 70 75 85 100
1280 x 1024  64   60 70 75 85 100
1360 x  768  64   60
1600 x 1200  64   60 70 75 85 100
1680 x 1050  64   60
1920 x 1200  64   60
1920 x 1440  64   60 70 75 85 100
2048 x 1536  64   60 70 75 85 100
```

NVIDIA Quadro FX 5800/4800 Family of GPUs

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

- NVIDIA Quadro FX 5800
- NVIDIA Quadro FX 4800

Standard Modes

```
 640 x  480   8   60
 800 x  600   8   60 70 75 85 100
 848 x  480   8   60 70 75 85 100
 960 x  600   8   60 70 75 85 100
1024 x  768   8   60 70 75 85 100
1152 x  864   8   60 70 75 85 100
1280 x  768   8   60
1280 x  800   8   60
1280 x  960   8   60 70 75 85 100
1280 x 1024   8   60 70 75 85 100
1360 x  768   8   60
1600 x 1200   8   60 70 75 85 100
1680 x 1050   8   60
1920 x 1200   8   60
1920 x 1440   8   60 70 75 85 100
2048 x 1536   8   60 70 75 85 100
-------------------------------------------------------------------
 640 x  480  16   60
 800 x  600  16   60 70 75 85 100
 848 x  480  16   60 70 75 85 100
 960 x  600  16   60 70 75 85 100
1024 x  768  16   60 70 75 85 100
1152 x  864  16   60 70 75 85 100
1280 x  768  16   60
1280 x  800  16   60
1280 x  960  16   60 70 75 85 100
1280 x 1024  16   60 70 75 85 100
1360 x  768  16   60
1600 x 1200  16   60 70 75 85 100
```

```
1680 x 1050  16   60
1920 x 1200  16   60
1920 x 1440  16   60 70 75 85 100
2048 x 1536  16   60 70 75 85 100
-------------------------------------------------------------------
 640 x  480  32   60
 800 x  600  32   60 70 75 85 100
 848 x  480  32   60 70 75 85 100
 960 x  600  32   60 70 75 85 100
1024 x  768  32   60 70 75 85 100
1152 x  864  32   60 70 75 85 100
1280 x  768  32   60
1280 x  800  32   60
1280 x  960  32   60 70 75 85 100
1280 x 1024  32   60 70 75 85 100
1360 x  768  32   60
1600 x 1200  32   60 70 75 85 100
1680 x 1050  32   60
1920 x 1200  32   60
1920 x 1440  32   60 70 75 85 100
2048 x 1536  32   60 70 75 85 100
-------------------------------------------------------------------
 640 x  480  64   60
 800 x  600  64   60 70 75 85 100
 848 x  480  64   60 70 75 85 100
 960 x  600  64   60 70 75 85 100
1024 x  768  64   60 70 75 85 100
1152 x  864  64   60 70 75 85 100
1280 x  768  64   60
1280 x  800  64   60
1280 x  960  64   60 70 75 85 100
1280 x 1024  64   60 70 75 85 100
1360 x  768  64   60
1600 x 1200  64   60 70 75 85 100
1680 x 1050  64   60
1920 x 1200  64   60
1920 x 1440  64   60 70 75 85 100
2048 x 1536  64   60 70 75 85 100
```

NVIDIA Quadro FX 5500/4500/3500/560/350 Family of GPUs

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

- NVIDIA Quadro FX 4500
- NVIDIA Quadro FX 350
- NVIDIA Quadro FX 5500
- NVIDIA Quadro FX 3500
- NVIDIA Quadro FX 1500
- NVIDIA Quadro FX 4500 X2
- NVIDIA Quadro FX 560

Standard Modes

```
 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
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 1024   8         70
1440 x  900   8      60
1600 x 1200   8         70
1680 x 1050   8      60
1920 x 1200   8      60 70 72 75 85 100
1920 x 1440   8      60 70 72 75 85 100
2048 x 1536   8      60 70 72 75 85 100
-------------------------------------------------------------------
 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
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 1024  16         70
1440 x  900  16      60
1600 x 1200  16         70
1680 x 1050  16      60
1920 x 1200  16      60 70 72 75 85 100
1920 x 1440  16      60 70 72 75 85 100
2048 x 1536  16      60 70 72 75 85 100
-------------------------------------------------------------------
 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         70
1152 x  864  32      60 70 72 75 85 100 120 140 144 150 170 200
1280 x  768  32      60 70 72 75 85 100 120 140 144 150 170
1280 x 1024  32         70
1440 x  900  32      60
1600 x 1200  32         70
1680 x 1050  32      60
1920 x 1200  32      60 70 72 75 85 100
1920 x 1440  32      60 70 72 75 85 100
2048 x 1536  32      60 70 72 75 85 100
```

TV-Out Modes Supported by TV Encoders

Table A.3 and Table A.4 list the NTSC, PAL, and HDTV TV-Out modes supported by the NVIDIA driver.

Table A.3 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.4 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, GeForce 7 Series, and GeForce 8 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.