



Release 319 Quadro, NVS, Tesla, & GRID Drivers for Windows - Version 320.86

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Windows XP

Release Notes



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01 INTRODUCTION TO RELEASE NOTES

This edition of *Release Notes* describes the Release 319 family of Tesla, Quadro, & NVS Professional Drivers for Microsoft® Windows® XP. 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:

- ▶ “Changes in the Release 319 Driver for Windows XP” on page 2 gives a summary of changes, and fixed and open issues in this version.
- ▶ “The Release 319 Driver for Windows XP” on page 25 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

This edition of the *Release Notes* for Windows XP includes information about NVIDIA graphics driver version 320.86, and lists changes made to the driver since version 306.79. These changes are discussed beginning with the chapter “Changes in the Release 319 Driver for Windows XP” on page 2.

02 CHANGES IN THE RELEASE 319 DRIVER FOR WINDOWS XP

This chapter describes open issues for version 320.86, and resolved issues and driver enhancements for versions of the Release 319 driver up to version 320.86. The chapter contains these sections:

- ▶ “Version 320.86 Highlights” on page 3
- ▶ “Advanced Instructions for This Release” on page 7
- ▶ “Open Windows XP Issues in Version 320.86” on page 9
- ▶ “Not NVIDIA Issues” on page 11
- ▶ “Known Product Limitations” on page 13

Version 320.86 Highlights

This section provides highlights of version 320.86 of the NVIDIA Release 319 Driver.

- ▶ Existing Support
- ▶ What's New in Release 319
- ▶ What's New in Version 320.86
- ▶ Discontinued Features and Support in this Release

Existing Support

This release supports the following APIs:

- ▶ Open Computing Language (OpenCL) 1.0 in Quadro FX Series x700 and newer as well as the FX4600 and FX5600.
- ▶ OpenGL 4.3
- ▶ DirectX 11
- ▶ CUDA 5.5

What's New in Release 319

The section summarizes the following driver changes in Release 319:

ODE Driver

The R319 drivers are the fifth 'Optimal Drivers for Enterprise', a release dedicated to relatively long term stability for ISV certification, OEMs, and Enterprise customers.

Enterprise Management Tools

nView Desktop Manager Version 140.75

- ▶ Revised the UI to incorporate a navigation tree instead of tabs.
- ▶ New Bird's Eye View starting page
- ▶ New Grid Line Editor controls

APIs

NvAPI

Added APIs to configure sync delay (skew and start delay) in lines and pixels.

What's New in Version 320.86

- ▶ This driver offers performance improvements over previous driver versions, including workstation compatibility fixes.

Discontinued and Unsupported Features in this Release

Unsupported Features Under Windows XP

The following are either features that are not supported under Windows XP, or feature limitations that exist under Windows XP:

Kepler GPU Limitations

- ▶ Multi-display support

The 4-display support of Kepler GPUs¹ is not available under Windows XP. Multi-display support is limited to two displays per Kepler GPU.

- ▶ SLI Support

- There is no support for SLI frame rendering (AFR/SFR) or SLI FSAA.
- SLI Mosaic (Premium Mosaic) *is* supported, but is subject to the 2-display per GPU limitation.

Unsupported Features

- ▶ NVIDIA® Maximus™ technology
- ▶ NVWMI - Enterprise management tool
- ▶ Developer APIs and Support
 - Workstation industry standard per-pixel black level adjustment
 - DirectX stereoscopic 3D within G-Sync/FrameLock configurations
- ▶ DisplayPort 1.2 functionality support, including increased bandwidth (HBR2 mode) and multi-display streaming
- ▶ NVIDIA Control Panel Access Control
- ▶ Premium Mosaic Control Display
- ▶ Multiple Mosaic Groups
- ▶ Pan and Scan Clone Mode
- ▶ GPUDirect for Video

1. Examples of Kepler GPU products include the NVIDIA Quadro K5000 and the NVS 510.

Limitations in This Release

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

► Video Memory Support

For Windows XP 64-bit, this driver recognizes up to the total available video memory on Quadro cards for Direct3D and OpenGL applications.

For Windows XP 32-bit, this driver recognizes only up to 4 GB of video memory on Quadro cards for DirectX, OpenGL, and CUDA applications.

Discontinued Features and Support in this Release

- NVIDIA® AutoCAD Performance driver is no longer integrated in the graphics driver.

Standalone versions or version updates can still be downloaded from the NVIDIA driver download page.

- Removed the following from the NVIDIA Control Panel:

- Views option

You no longer need to select between Standard and Advanced views for many NVIDIA Control Panel controls.

- Profiles menu.

- The following products are no longer supported:

- NVIDIA Quadro FX 4400
- NVIDIA Quadro FX 3400

- Legacy Support for Curie generation of Workstation products

Beginning with Release 310, the NVIDIA professional drivers no longer support the Curie generation of Workstation products.

NVIDIA Quadro FX 5500
NVIDIA Quadro FX 4500 X2
NVIDIA Quadro FX 4500
NVIDIA Quadro FX 4400
NVIDIA Quadro FX 4400G
NVIDIA Quadro FX 4000
NVIDIA Quadro FX 470
NVIDIA Quadro FX 350
NVIDIA Quadro VX 200
NVIDIA Quadro NVS 440
NVIDIA Quadro NVS 285

Release 304 drivers continue to support Curie generation Workstation products, and NVIDIA will continue to address driver issues for these products in driver branches up to and including Release 304. However, future driver enhancements and optimizations in driver releases after Release 304 will not support Curie generation products.

Advanced Instructions for This Release

This section clarifies instructions for successfully accomplishing the following tasks:

- ▶ Turning Off V-Sync to Boost Performance
- ▶ NVIDIA Application Configuration Engine (ACE)
- ▶ NVIDIA Multi-OS – GPU Assignment in System Virtualization

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 make sure that *Advanced Settings* is selected from the control panel tool bar.
- 2 From the *Select a Task* pane, under 3D Settings, click **Manage 3D Settings**, then click the Global Settings tab.
- 3 From the Global presets pull-down menu, select **Base profile**.
- 4 From the Settings list box, select **Vertical sync** and change its value to **Force off**, then click **Apply**.
- 5 From the Global presets pull-down 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.

NVIDIA Multi-OS - GPU Assignment in System Virtualization

On systems with two supported graphics cards installed, this driver supports a system virtualization tool's ability to directly assign a GPU to a guest virtual machine (VM). This direct assignment allows the host and guest VM to each run on their own operating system and with their own GPU and driver.

► **Supported Virtualization Software:** Parallels Workstation Extreme and Citrix XenServer 6

► **Supported Graphics Cards²**

Up to two different models can be used in a system, from among the following:

- Quadro 6000
- Quadro 5000
- Quadro 4000
- Quadro 2000
- Quadro FX 5800
- Quadro FX 4800
- Quadro FX 3800

► **Video BIOS Requirement**

- The graphics card assigned to the guest VM needs video BIOS version 62.00.39.00.00 or later.

For a list of NVIDIA Multi-OS certified workstations, virtualization software, and OS combinations, please see http://www.nvidia.com/object/sli_multi_os.html.

2. The Quadro K5000 is not listed as it does not support NVIDIA Multi-OS.

Open Windows XP Issues in Version 320.86

As with every released driver, version 320.86 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.

- ▶ “NVIDIA Recommendations” on page 9
- ▶ “Windows XP 32-bit Issues” on page 9
- ▶ “Windows XP 64-bit Issues” on page 10

NVIDIA Recommendations

- ▶ 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 as Dualview and nView Clone and Span modes are not recommended when using the Windows Media Center.

- ▶ 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.

Windows XP 32-bit Issues

- ▶ nView Desktop Manager: Minimized applications cannot be restored when the application taskbar icon is clicked.

You can work around this bug using either of the following methods:

- *Right-click the application taskbar icon and then click Restore, or*
- *Disable all title bar buttons from the nView Desktop Manager User Interface tab.*

- ▶ 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.

- ▶ Video color-space range for DVI-only¹ 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. “DVI-only” means only one display is connected, and it is to the DVI output.

- a 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"**.
 - b Look in **HKey_Local_Machine\SYSTEM\CurrentControlSet\Control\Video\{GUID}\0000** where {GUID} is the number derived from the previous step.
 - c Open the "0000" directory and create a new DWORD called **VMRCCCSStatus** 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
- ▶ Cinema 4D—performance improvements are requested.
 - ▶ Quadro FX 3700: SOCET GXP/SOCET Set—3D stereo effect is lost when panning or zooming.

Windows XP 64-bit Issues

- ▶ Cinema 4D—performance improvements are requested.
- ▶ Quadro FX 3700: SOCET GXP/SOCET Set—3D stereo effect is lost when panning or zooming.

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 XP.

Application Issues

- ▶ AutoCAD 2009 SP2/SP3—the application crashes with recent OpenGL drivers.
- ▶ Linear interpolation on a 3D texture with format `GL_RGBA32F_ARB` produces banding.
This is not an NVIDIA driver bug, but a normal result of the filtering methods used by the hardware.
- ▶ CATIA V5R18—there are no "Enable OpenGL Shader" options.
This is not an NVIDIA bug, but rather an issue with Windows XP SP2.
- ▶ Windows Vista 64-bit: XSI - the application viewport doesn't refresh properly.
This is not an NVIDIA bug, but rather an issue with the application.
 - CATIAV5R18– Draft Analysis images are displayed incorrectly.
This is not an NVIDIA bug, but rather an issue with the application.
- ▶ CATIA V5R17/18—the text in the Tool tree is not visible.
This is a limitation in the application with some systems.
- ▶ CATIA V5R20—not all drawing elements appear if the drawing is created using Approximate mode.
- ▶ Quadro FX 1800: DDC communications does not work when using a DisplayPort-to-DVI dual-link active adapter.
This is not an NVIDIA bug, but an issue with the adapter.
- ▶ Quadro FX 5600: Vega Prime 2.2–fog is not rendered properly where it intersects the terrain.
Floating point 32-bit depth buffers are not supported on pre-OpenGL 3.0 supported GPUs.
- ▶ NVIDIA Quadro FX 570/1700: Catnap corrupts the projection matrix for the Reflect OpenGL Demo.
*This is not an NVIDIA bug, but an issue with the OS—see [Microsoft KB 934198](#).
To work around this problem, do not put the computer into standby when it is running a program that performs intense floating-point calculations.*
- ▶ SolidEdge (32-bit)—the application cannot determine the driver version under a non-administrator account.
- ▶ Solidworks 2009—Application profile is not shown in the NVIDIA Control Panel when SolidWorks 2009 is installed.
This is an issue with the application shortcut.
- ▶ Quadro 4000/FX 4700/FX 3700: ShowCase 2011—Model “right-click” drop-down menu flickers when moving the mouse.

- ▶ Quadro 4000/FX 4800: CATIA V5R19—the product structure tree does not respond properly when the application is viewed on the secondary Dualview monitor.
- ▶ Dual Quadro FX 3700: MicroStation—when both cards are set up in Spanning mode, an application runtime error occurs.
- ▶ Quadro FX 5600/1700: System crashes or hangs when running Catia application.
- ▶ Quadro FX 4800: SPEC UG NX4—performance degradation is seen.
The variation is within expected range.
- ▶ Quadro FX 3700/1700/570: The graphics cards do not work as the secondary GPUs.
- ▶ Quadro FX 880/380: Softimage CER—the application crashes when selecting the gizmo of a specific scene.
- ▶ Quadro Plex D2: Opticore Studio 2010—the lighting surface blinks occasionally when using SLI Mosaic mode.

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:

- ▶ “System Should not Enter Sleep/Hibernate Mode With SDI Capture in Progress” on page 14
- ▶ “SDI Capture Driver Must be Installed Separately” on page 14
- ▶ “Driver May not Work with /3GB Windows Switch When Using ECC on 32-bit OS” on page 14
- ▶ “Professional 3D Stereo Left-Right Buffer Swap” on page 15
- ▶ “Using HDMI/DisplayPort Audio with Displays that have a High Native Resolution” on page 15
- ▶ “Using HDMI/DisplayPort Displays that do not Support Audio” on page 16
- ▶ “Using HDMI/DisplayPort Audio in Dualview or Clone Mode Configurations” on page 17
- ▶ “GPU Runs at a High Performance Level (full clock speeds) in Multi-display Modes” on page 17
- ▶ “1280x1024 @ 60 Hz not Available on BenQ FP241W Monitors” on page 17
- ▶ “Image Sharpening Control not Available with Quadro FX 4600 and Later GPUs” on page 17
- ▶ “More Monitors are Listed in the Windows Device Manager than are Actually Connected” on page 18
- ▶ “PowerDVD 5.0 Does Not Display Correctly in nView Span Mode” on page 18
- ▶ “DirectX Fails When Detaching/Reattaching Displays in Dualview Mode” on page 18
- ▶ “OpenGL Viewport Scaling Problem in Horizontal Span Mode” on page 19
- ▶ “Video Playback in nView Clone and Span Modes” on page 19
- ▶ “Monitor Ordering in the Windows Settings Page” on page 20
- ▶ “No Antialiasing of 3DMark03 Image Quality Screen Captures” on page 20
- ▶ “Windows XP/2000 Issue with Settings Tab Monitor Positioning” on page 22
- ▶ “Antialiasing Problems With Certain Applications” on page 22
- ▶ “Poor Quality S-Video Output on Some TVs” on page 23
- ▶ “AGP and PCI-E Programs May Hang With AMD K7 and K8 Processors” on page 23
- ▶ “Desktop Manager Does Not Re-Center Logon Screen” on page 24

System Should not Enter Sleep/Hibernate Mode With SDI Capture in Progress

SDI capture programs will become non-responsive upon resume from sleep or hibernate modes.

This is not a typical use case, so power management tests should not be performed when testing SDI.

SDI Capture Driver Must be Installed Separately

To use the Quadro SDI Capture card, you need to install the NVIDIA WDM driver for the Quadro SDI Capture card after installing the Quadro professional driver.

If you later install a different Quadro professional driver version— for example, when upgrading from a Release 260 driver to a Release 265 driver— make sure to reinstall the WDM driver from Release 265 as well. The WDM driver version must be from the same branch as the installed NVIDIA graphics driver.

Failure to follow this sequence can result in a faulty driver installation.

Driver May not Work with /3GB Windows Switch When Using ECC on 32-bit OS

► Problem

With ECC control enabled from the NVIDIA Control Panel, the driver may not start up properly if the /3GB switch was used in the Windows `Boot.ini` file.

This issue occurs on Windows XP 32-bit.

► Explanation and Resolution

The /3GB boot.ini startup switch grants more user virtual address space while reducing the amount of Windows kernel virtual address space. With ECC enabled, the driver's memory usage may exceed the reduced, available kernel virtual address space. This out-of-memory condition may prevent the driver from starting normally.

To resolve this issue, use Windows XP 64-bit or avoid using the /3GB switch (may be required for some workstation applications).

Professional 3D Stereo Left-Right Buffer Swap

When displaying stereoscopic 3D, NVIDIA GPUs are capable of updating left and right eye views after each field is displayed. This is advantageous with certain types of stereoscopic 3D content—such as fast moving objects—because it allows the objects to move as smoothly as possible across the screen with fewer jumps between fields.

In certain situations, however, updating the left and right views after each field may be problematic—such as when applications expect both left and right fields to be displayed as a pair. In this case, updating the left-right pair per field may cause blurriness on the displayed image since the application-generated fields get out of step with the displayed fields. This effect can be more noticeable on projectors that double pump the displayed frames.

In these situations, a suggested workaround is to use `WGL_EXT_swap_control` to set the swap interval via `wglSwapIntervalEXT(2)`. This ensures that the left-right views are not replaced at every field, but rather at every frame. This workaround, however, has the following caveats:

- ▶ The maximum effective frame rate is limited to half of the refresh rate.
- ▶ It does not guarantee that the left and right eye views are always presented in that order.

Sometimes, the fields are presented in right-left order. This happens when the left-right views are updated with the next frame after presentation of the left eye view.

NVIDIA is working to provide a solution in a future driver release that will provide the option for frames to be updated either per-field or per-frame.

Using HDMI/DisplayPort Audio with Displays that have a High Native Resolution

To use HDMI/DisplayPort audio with some displays that have a native resolution higher than 1920x1080, you must set the display to a lower HD resolution.

Some HDMI TV's have a native resolution that exceeds the maximum supported HD mode. For example, TVs with a native resolution of 1920x1200 exceed the maximum supported HD mode of 1920x1080.

Applying this native mode results in display overscan which cannot be resized using the NVIDIA Control Panel since the mode is not an HD mode.

To avoid this situation and provide a better user experience, the driver treats certain TVs—such as the Viewsonic VX2835wm and the Westinghouse LVM-37w3—as a DVI monitor when applying the native mode. Because the driver does not treat the TV as an HDMI in this case, the HDMI audio is not used.

Using HDMI/DisplayPort Displays that do not Support Audio

Some HDMI/DisplayPort displays do not support audio, or have issues with Quadro FX family and earlier NVIDIA graphics cards.

The NVIDIA driver attempts to identify such displays and automatically disables the audio. For example, the NVIDIA driver disables HDMI audio for all Philips HDMI TVs, as these have been identified as having issues with Quadro FX family and earlier NVIDIA graphics cards.

There may be cases where either the driver disables audio even though there is no problem, or does not disable the audio when in fact the audio does not work. The following sections describe these situations and provides guidance for handling them.

Corrupted video and no audio

The driver has not disabled audio and the display's audio signal is incompatible with the graphics card, causing video corruption.

With a different display connected in order to establish video, disable audio for the HDMI display using the NVIDIA Control Panel-> Change Resolution page. From the connector list, select **HDMI-HDTV (Audio Disabled)**.

Video but no audio

Check the connector list on the NVIDIA Control Panel->Change Resolution page.

- ▶ If **HDMI-HDTV (Audio Disabled)** is selected and you want to test whether your HDMI audio does, in fact, work, then select **HDMI-HDTV (Audio Enabled)** and the driver will prompt you with instructions for testing HDMI audio with the display.
- ▶ If **HDMI-HDTV (Audio Enabled)** is selected, then the driver has not successfully detected that an incompatible display is connected.

Future drive versions will properly identify such displays and disable audio.

- ▶ If there is no HDMI connector option in the NVIDIA Control Panel->Change Resolution page, the display does not support audio and has properly reported this to the NVIDIA driver.

Using HDMI/DisplayPort Audio in Dualview or Clone Mode Configurations

Two Audio-enabled Ports

In a multi-display configuration where both HDMI/DisplayPort audio ports are enabled, only the primary display will provide the audio.

One Audio-enabled Port

In a multi-display configuration where only one audio port is enabled, such as when one display is a DVI display, then the HDMI/DisplayPort display can provide the audio whether is it the primary or secondary display.

GPU Runs at a High Performance Level (full clock speeds) in Multi-display Modes

This is a hardware limitation and not a software bug. Even when no 3D programs are running, the driver will operate the GPU at a high performance level in order to efficiently drive multiple displays. In the case of SLI or multi-GPU PCs, the second GPU will always operate with full clock speeds; again, in order to efficiently drive multiple displays. Today, all hardware from all GPU vendors have this limitation.

1280x1024 @ 60 Hz not Available on BenQ FP241W Monitors

Even though the monitor EDID lists 1280x1024 @ 60 Hz, the screen turns blank when using an HDMI connection. This is an issue with the monitor and not the NVIDIA driver.

Because of this issue with the monitor, the NVIDIA driver blocks the problem mode (1280x1024 @ 60 Hz) and makes it unavailable.

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.

More Monitors are Listed in the Windows Device Manager than are Actually Connected

► Problem

Many monitors are listed in the Windows Device Manager hardware tree even when only a few are actually connected or enabled.

► Explanation

NVIDIA chooses to expose all potential monitors even though they are not yet connected. Such an implementation makes multiple device handling easier in certain situations, such as when a user unplugs a monitor and plugs another one in at a different port.

The only impact is a cosmetic in the plug-and-play manager. There is no functional impact at all and the GDI is not aware of the multiple monitor listing.

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.

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

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.

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.

Windows XP/2000 Issue with Settings Tab Monitor Positioning

► 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:

- a Under the Tools tab in the Desktop Manager windows, make sure Automatically Align Displays is checked.
- b 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

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

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

► 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.

03 THE RELEASE 319 DRIVER FOR WINDOWS XP

This chapter covers the following main topics:

- ▶ “Hardware and Software Support” on page 25
- ▶ “Driver Installation” on page 32

Hardware and Software Support

Supported Operating Systems

This Release 319 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

Supported NVIDIA Products

The following tables list the NVIDIA products supported by the Release 319 driver, version 320.86.

- ▶ Table 3.1, “Supported NVIDIA Quadro & NVS Products” on page 26
- ▶ Table 3.2, “Supported NVIDIA Quadro Sync Products” on page 28
- ▶ Table 3.3, “Supported NVIDIA Quadro G-Sync II Products” on page 28
- ▶ Table 3.4, “Supported NVIDIA Quadro SDI Products” on page 28
- ▶ Table 3.5, “Supported NVIDIA Quadro Plex Products” on page 28
- ▶ Table 3.6, “Supported NVIDIA Quadro Blade/Embedded Graphics Board Series” on page 29
- ▶ Table 3.7, “Supported NVIDIA Tesla Products” on page 30
- ▶ Table 3.8, “Supported NVIDIA GRID Products” on page 30

NVIDIA Quadro & NVS Products

Table 3.1 Supported NVIDIA Quadro & NVS Products

Product	Notes
NVIDIA Quadro K6000	
NVIDIA Quadro K5000	
NVIDIA Quadro K4000	
NVIDIA Quadro K2000	
NVIDIA Quadro K600	
NVIDIA Quadro 6000	
NVIDIA Quadro 5000	
NVIDIA Quadro 4000	
NVIDIA Quadro 2000D	
NVIDIA Quadro 2000	
NVIDIA Quadro 600	
NVIDIA Quadro 410	
NVIDIA Quadro 400	
NVIDIA Quadro FX 5800	
NVIDIA Quadro FX 5600	
NVIDIA Quadro FX 4800	
NVIDIA Quadro FX 4700 X2	
NVIDIA Quadro FX 4600	
NVIDIA Quadro FX 3800	
NVIDIA Quadro FX 3700	

Table 3.1 Supported NVIDIA Quadro & NVS Products (continued)

Product	Notes
NVIDIA Quadro FX 3450	
NVIDIA Quadro FX 1800	
NVIDIA Quadro FX 580	
NVIDIA Quadro FX 570	
NVIDIA Quadro FX 380	
NVIDIA Quadro FX 380 LP (low profile)	
NVIDIA Quadro FX 370	
NVIDIA Quadro FX 370 LP (low profile)	
NVIDIA Quadro CX	
NVIDIA NVS 510	
NVIDIA NVS 310	
NVIDIA NVS 300	
NVIDIA Quadro NVS 450	
NVIDIA Quadro NVS 420	
NVIDIA Quadro NVS 295	
NVIDIA Quadro NVS 290	

NVIDIA Quadro Sync Products

Table 3.2 Supported NVIDIA Quadro Sync Products

Product	Notes
NVIDIA Quadro K6000	
NVIDIA Quadro K5000	

NVIDIA Quadro G-Sync II Products

Table 3.3 Supported NVIDIA Quadro G-Sync II Products

Product	Notes
NVIDIA Quadro 6000	
NVIDIA Quadro 5000	
NVIDIA Quadro FX 5800	
NVIDIA Quadro FX 4800	
NVIDIA Quadro FX 5600	
NVIDIA Quadro FX 4600	

NVIDIA Quadro SDI Products

Table 3.4 Supported NVIDIA Quadro SDI Products

Product	Notes
NVIDIA Quadro 6000 SDI	
NVIDIA Quadro 5000 SDI	
NVIDIA Quadro 4000 SDI	
NVIDIA Quadro FX 5800 SDI	
NVIDIA Quadro CX SDI	
NVIDIA Quadro FX 5600 SDI	
NVIDIA Quadro FX 4800 SDI	
NVIDIA Quadro FX 4600 SDI	
NVIDIA Quadro FX 3800 SDI	

NVIDIA Quadro Plex Products

Table 3.5 Supported NVIDIA Quadro Plex Products

Product	Notes
NVIDIA Quadro Plex 7000	

Table 3.5 Supported NVIDIA Quadro Plex Products (continued)

Product	Notes
NVIDIA Quadro Plex D Series	
NVIDIA Quadro Plex Model II	
NVIDIA Quadro Plex Model IV	

NVIDIA Quadro Blade/Embedded Graphics Boards

Table 3.6 Supported NVIDIA Quadro Blade/Embedded Graphics Board Series

Product	Notes
NVIDIA Quadro K5000M	
NVIDIA Quadro K4000M	
NVIDIA Quadro K3000M	
NVIDIA Quadro 4000M	
NVIDIA Quadro 3000M	
NVIDIA Quadro 1000M	
NVIDIA Quadro 500M	
NVIDIA Quadro FX 3600M	
NVIDIA Quadro FX 2800M	
NVIDIA Quadro FX 1600M	Not supported
NVIDIA Quadro FX 880M	
NVIDIA Quadro FX 770M	
NVIDIA Quadro FX 560M	Not supported
NVIDIA Quadro FX 370M	
NVIDIA Quadro NVS 120M	Not supported

NVIDIA Tesla Products

The Tesla driver package is designed for systems that have one or more Tesla products installed.

- ▶ Only one GHIC can be connected to the server in a Tesla system.
- ▶ This release of the Tesla driver supports CUDA C/C++ applications and libraries that rely on the CUDA C Runtime and/or CUDA Driver API.

Table 3.7 Supported NVIDIA Tesla Products

Product	Notes
Tesla K-Series Products	
NVIDIA Tesla K10	
Tesla S-Class Products	
NVIDIA Tesla S2050	
NVIDIA Tesla S1070	
Tesla M-Class Products	
NVIDIA Tesla M2090	
NVIDIA Tesla M2075	
NVIDIA Tesla M2070	
NVIDIA Tesla M2070Q	
NVIDIA Tesla M2050	
NVIDIA Tesla M1060	
Tesla C-Class Products	
NVIDIA Tesla C2075	
NVIDIA Tesla C2070	
NVIDIA Tesla C2050	
NVIDIA Tesla C1060	
NVIDIA Tesla C870	

NVIDIA GRID Products

Table 3.8 Supported NVIDIA GRID Products

Product	Notes
NVIDIA GRID K2	
NVIDIA GRID K1	

Supported Languages

The Release 319 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

System Requirements

The hard disk space requirement for 32 bit is minimum 150 MB for English-only, and 230 MB for International.

The hard disk space requirement for 64 bit is minimum 207 MB for English-only, and 300 MB for International.

Installation Instructions

Before You Begin

► If NVIDIA nTune is already installed

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 nTune.

- 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.

► SLI Mosaic Mode

You must make sure SLI Mosaic mode is disabled before installing a new driver over a previously installed driver. If SLI Mosaic mode is active on your displays when you install the new driver, the driver will not install properly.

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 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.

Installing the NVIDIA 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.
- 4 Open the NVIDIA driver installation .EXE file to launch the NVIDIA InstallShield Wizard.
- 5 Follow the instructions in the NVIDIA InstallShield Wizard to complete the installation.

APPENDIX A MODE SUPPORT FOR WINDOWS

This chapter details the Windows modes supported by the Release 319 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 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 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
Apple 30" Cinema HD Display (Dual link DVI)	2560x1600 @ 60 Hz
Dell WFP 3007 (Dual Link DVI)	2560x1600 @ 60 Hz
HP LP3065 dual-link DVI flat panel	2560x1600 @ 60Hz.

Table A.2 Non-standard Modes Supported

Resolution		
1680 x 1050		
1366 x 768		

Default Modes Supported by GPU for Windows XP

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

► “NVIDIA Quadro & NVS GPUs” on page 38

Understanding the Mode Format

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

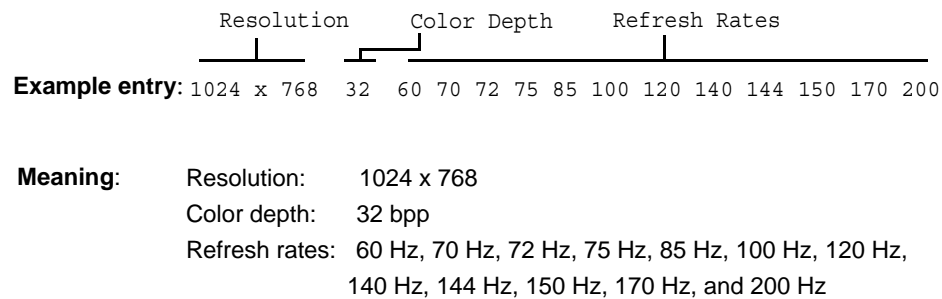


Figure A.1 Mode Format

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 & NVS GPUs

This sections lists the supported display resolutions, color depths, and refresh rates for the products listed in [“Supported NVIDIA Products”](#) on page 26.

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
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												
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						
1680 x 1050	8	60												
1920 x 1080	8	60												
1920 x 1200	8	60	70	72	75	85	100							
1920 x 1440	8	60	70	72	75	85								
2048 x 1536	8	60												

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
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												
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						
1680 x 1050	16	60												
1920 x 1080	16	60												

1920 x 1200	16	60 70 72 75 85 100
1920 x 1440	16	60 70 72 75 85
2048 x 1536	16	60

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
1024 x 768	32	60 70 72 75 85 100 120 140 144 150 170 200 240
1152 x 864	32	60 70 72 75 85 100 120 140 144 150 170 200
1280 x 720	32	60
1280 x 768	32	60 70 72 75 85 100 120 140 144 150 170
1280 x 800	32	60 70 72 75 85 100 120 140 144 150 170
1280 x 960	32	60 70 72 75 85 100 120 140 144 150 170
1280 x 1024	32	60 70 72 75 85 100 120 140 144 150 170
1360 x 768	32	60 70 72 75 85 100 120 140 144 150 170
1600 x 900	32	60 70 72 75 85 100 120 140 144 150
1600 x 1024	32	60 70 72 75 85 100 120
1600 x 1200	32	60 70 72 75 85 100 120
1680 x 1050	32	60
1920 x 1080	32	60
1920 x 1200	32	60 70 72 75 85 100
1920 x 1440	32	60 70 72 75 85
2048 x 1536	32	60

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
2048 x 768	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
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
3360 x 1050	8	60
3840 x 1080	8	60
3840 x 1200	8	60 70 72 75 85 100
3840 x 1440	8	60 70 72 75 85
4096 x 1536	8	60

```

-----
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
2048 x 768 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
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
3360 x 1050 16     60
3840 x 1080 16     60
3840 x 1200 16     60 70 72 75 85 100
3840 x 1440 16     60 70 72 75 85
4096 x 1536 16     60

```

```

-----
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
2048 x 768 32      60 70 72 75 85 100 120 140 144 150 170 200 240
2304 x 864 32      60 70 72 75 85 100 120 140 144 150 170 200
2560 x 720 32      60
2560 x 768 32      60 70 72 75 85 100 120 140 144 150 170
2560 x 800 32      60 70 72 75 85 100 120 140 144 150 170
2560 x 960 32      60 70 72 75 85 100 120 140 144 150 170
2560 x 1024 32     60 70 72 75 85 100 120 140 144 150 170
2720 x 768 32      60 70 72 75 85 100 120 140 144 150 170
3200 x 900 32      60 70 72 75 85 100 120 140 144 150
3200 x 1024 32     60 70 72 75 85 100 120
3200 x 1200 32     60 70 72 75 85 100 120
3360 x 1050 32     60
3840 x 1080 32     60
3840 x 1200 32     60 70 72 75 85 100
3840 x 1440 32     60 70 72 75 85
4096 x 1536 32     60

```

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
1024 x 1536 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

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1280 x 1440	8	60	
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	
1680 x 2100	8	60	
1920 x 2160	8	60	
1920 x 2400	8	60 70 72 75 85 100	
1920 x 2880	8	60 70 72 75 85	
2048 x 3072	8	60	

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	
1024 x 1536	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	
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	
1680 x 2100	16	60	
1920 x 2160	16	60	
1920 x 2400	16	60 70 72 75 85 100	
1920 x 2880	16	60 70 72 75 85	
2048 x 3072	16	60	

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	
1024 x 1536	32	60 70 72 75 85 100 120 140 144 150 170 200 240	
1152 x 1728	32	60 70 72 75 85 100 120 140 144 150 170 200	
1280 x 1440	32	60	
1280 x 1536	32	60 70 72 75 85 100 120 140 144 150 170	
1280 x 1600	32	60 70 72 75 85 100 120 140 144 150 170	
1280 x 1920	32	60 70 72 75 85 100 120 140 144 150 170	
1280 x 2048	32	60 70 72 75 85 100 120 140 144 150 170	
1360 x 1536	32	60 70 72 75 85 100 120 140 144 150 170	
1600 x 1800	32	60 70 72 75 85 100 120 140 144 150	
1600 x 2048	32	60 70 72 75 85 100 120	

1600 x 2400	32	60 70 72 75 85 100 120
1680 x 2100	32	60
1920 x 2160	32	60
1920 x 2400	32	60 70 72 75 85 100
1920 x 2880	32	60 70 72 75 85
2048 x 3072	32	60

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 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.

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