Release 319 Quadro & NVS Notebook Drivers for Windows - Version 320.86

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Windows 7, Windows 8

Release Notes

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01 INTRODUCTION TO RELEASE NOTES

This edition of *Release Notes* describes the Release 319 family of NVIDIA Quadro and NVS Notebook Drivers for Microsoft® Windows® Vista/7/Windows 8. 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 319 Driver Changes" on page 2 gives a summary of changes, and fixed and open issues in this version.
- "The Release 319 Driver" on page 27 describes the NVIDIA products and languages supported by this driver, the system requirements, and how to install the driver.
- "Mode Support for Windows" on page 33 lists the default resolutions supported by the driver.

Changes in this Edition

This edition of the *Release Notes* for Windows 7/Windows 8 includes information about NVIDIA graphics driver version 320.86, and lists changes made to the driver since version 314.07. These changes are discussed beginning with the chapter "Release 319 Driver Changes" on page 2.

02 RELEASE 319 DRIVER CHANGES

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

This section provides highlights of version 320.86 of the NVIDIA Release 319 Driver for Windows 7/Windows 8.

Existing Support

This release supports the following APIs:

- Open Computing Language (OpenCL) 1.1 in Quadro FX Series x700 .
- OpenGL 4.3
- DirectX 11
- CUDA 5.5

What's New in Release 319

The section summarizes the following driver changes in Release 319 since Release 313:

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.

Workstation Features

- **NVIDIA Control Panel - Display Category - Set Up Multiple Displays Page**

  Pan and Scan Clone Mode - Pan and Scan Clone was introduced in R300 drivers. It is similar to regular Clone mode except that the two displays are different resolutions. The display with the larger resolution is the source clone display. The display with the smaller resolution shows a cropped section of the cloned source display.

  Pan and Scan Clone is available only with NVIDIA Quadro 600 and later products (including corresponding K series), NVS 310 and later NVS products, and Windows 7 and later Windows operating systems.

Lock Clone Region control - new control lets you specify a section of a "pan and scan clone" source display to be cloned and locked. Once locked, you cannot dynamically pan the area.

Lock Clone Region is available only with NVIDIA Quadro 2000(D) and later products (including corresponding K-series). Unlike pan and scan clone mode, the Lock Clone Region feature is not supported on Quadro 600/K600 or NVS products.

- **NVIDIA Control Panel->Workstation Category->Set Up Mosaic Page**

  Control Display - You can now set up a control display that is separate from the Mosaic configuration.

- **Mosaic/Premium Mosaic**

  - **Multiple Mosaic Groups** - Provides multiple Mosaic/Premium Mosaic topologies to be active on a single system. Configurable using the ConfigureMosaic tool.
  - **GPUDirect for Video** - improved GPUDirect for Video performance on Premium Mosaic configurations.

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

NvWMI 2.12

NvWMI is a WMI-based interface for configuring enterprise systems.

- Added support for Quadro Sync.
- Added support for GPU Power Management
- Added method to query the serial number of a board

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.
- See "Changes in Version 320.86" on page 11 for a list of changes and resolved issues in this driver version.

Discontinued and Unsupported Features in this Release

Discontinued Features

- The 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.
- The following features are removed from the NVIDIA Control Panel
  - The Views option

    You no longer need to select between Standard and Advanced views for many NVIDIA Control Panel controls.
  - The Profiles menu
- Support for Quadro SDI products is discontinued for Windows 8 and later operating systems.
- 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 3500M
NVIDIA Quadro FX 2500M
NVIDIA Quadro FX 1500M
NVIDIA Quadro FX 560M
NVIDIA Quadro FX 560M
NVIDIA Quadro FX 350M
NVIDIA Quadro NVS 120M

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.

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

  For Windows 7 and Windows Vista 32-bit, this driver recognizes only up to 4 GB of video memory on Quadro cards for DirectX, OpenGL, and CUDA applications.

- **NVIDIA Control Panel Display Category**

  - The Graph tab on the Adjust Desktop Color Settings page is not available.

Advanced Instructions for this Release

This section clarifies instructions for successfully accomplishing the following tasks:

- -Docking/Undocking Notebooks with Mosaic
- Turning Off V-Sync to Boost Performance
- NVIDIA Application Configuration Engine (ACE)

-Docking/Undocking Notebooks with Mosaic

When using a docked Quadro notebook that is configured for NVIDIA Mosaic, you must disable Mosaic before undocking the notebook.

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.

On systems with two or more graphics cards installed, this driver supports a hypervisor's ability to directly assign GPUs to guest virtual machines (VMs). This direct assignment allows each guest VM to run on their own operating system with their own GPU and driver. The assignment allows full GPU performance and functionality in the guest VM.

Hardware Platform Requirements

To make use of GPU passthrough with virtual machines running Windows and Linux, the hardware platform must support the following features:

- A CPU with hardware-assisted instruction set virtualization: Intel VT-x or AMD-V.
- Platform support for I/O DMA remapping.

  On Intel platforms the DMA remapper technology is called Intel VT-d.

  On AMD platforms it is called AMD IOMMU.

Support for these feature varies by processor family, product, and system, and should be verified at the manufacturer's website.

Supported Hypervisors

The following hypervisors are supported:

Hypervisor	Notes
Citrix XenServer	Version 6.0 and later.
VMware vSphere (ESX / ESXi)	Version 5.1 and later.
Parallels Workstation Extreme	Version 4 and later

Supported Graphics Cards

The following GPUs are supported for device passthrough:

GPU Family	Boards supported
Kepler	GRID: K1, K2, K520, K340 Quadro: K2000, K4000, K5000, K6000 Tesla: K10, K20
Fermi	Quadro: 2000, 4000, 5000, 6000 Quadro-MXM: 1000M, 3000M Tesla: C2050, C2075, M2050, M2070, M2070Q
Tesla	Quadro FX1800, 3800, 4800, 5800 Quadro-MXM: FX880M, FX2800M Tesla: M1060, C1060

Notes and Known Issues

VMware

- PCI I/O hole may need to be changed for Windows 64-bit VMs.

  Windows 64-bit VMs may require that you edit the VM configuration file to configure a larger PCI I/O hole for the GPU.

- Access Control Services is required on some switches.

  Starting with ESX 5.0 Update 1, Access Control Services (ACS) is required on any switches in the PCIe hierarchy above a PCIe device that is to be used for passthrough. If ACS is not present, ESX will not allow the device to be assigned directly to a VM.

  To allow assignment of devices below switches that do not support ACS, you can disable the ACS check as follows:

esxcfg-advcfg -k true disableACSCheck

- Configuring passthrough to a Windows Server 2008R2 VM.

  The VMware WDDM driver must be manually installed on Windows Server 2008 R2.

  Follow the steps provided at http://communities.vmware.com/message/1423263#1425288 .

- MSI translation must be disabled.

  Blue-screen crashes may occur on VMs with assigned GPUs if MSI is initially enabled for passthrough devices.

  To avoid this issue, disable MSI translation by setting *pciPassthru0.msiEnabled = "FALSE"* in the VM's VMX file.

Citrix Xenserver

- XenServer 6.1 workaround for 64-bit MMIO failures on PCI passthrough.

  Dom0 kernel may relocate GPU BARs to an invalid location immediately beyond the end of physical RAM. There are two workaround options to address this condition:

  Workaround option #1: Add 'pci=use_crs' to the kernel parameters by running the following command in Dom0:

  /opt/xensource/libexec/xen-cmdline --set-dom0 pci=use_crs

  Workaround option #2: Install the hotfix provided by Citrix at http://support.citrix.com/article/CTX137645):

Multi-Monitor Support on GRID

Multi-monitor support on GRID boards K1 and K2 requires the following VBIOS versions:

- GRID K1: ***80.07.AF.00.00*** *or later*

GRID K2: ***80:04:BA:00.00*** *or later*

Changes in Version 320.86

The following sections list the important changes and the most common issues resolved since driver version 320.78.

Windows Vista/Windows 7 Fixed Issues

- [Quadro K2000M][Optimus notebook][Inventor]: The application crashes when NVIDIA "Optimus" technology is enabled.
- [Vegas Pro 12]: The driver crashes in nvoglv64.DLL ("NVIDIA Compatible OpenGL ICD").
- [Quadro 6000][DeltaGen]: The application OpenGL performance drops when switching from windowed to full-screen mode.
- [Quadro 600]: The primary display automatically switches to a second DVI display once the new display is connected.

Windows 8 Fixed Issues

- [Tesla M Series]: The system may crash after installing the driver.

Changes in Version 320.78

The following sections list the important changes and the most common issues resolved since driver version 320.49.

Windows Vista/Windows 7 Fixed Issues

- [Adobe Premier Pro CS 7 Lumetri]: Inadequate performance is experienced with the application.
- [AVID Motion Graphics]: The application performance has dropped since driver version 307.32.
- [NVIDIA Nsight]: The application crashes when launched.
- [Inventor]: The application crashes or locks up when using Base Profile.
- [Quadro 1000M][AECOsim Building Designer]: TDRs occur when running the application.

Changes in Version 320.49

The following sections list the important changes and the most common issues resolved since driver version 320.00.

Windows Vista/Windows 7 Fixed Issues

- [Catia]: Poor performance is experienced with new Catia render engine.
- [Catia]: The application occasionally crashes after attaching a debugger.
- [AVID Motion Graphics/Brainstorm]: Frame rate stutter occurs when a highly tessellated sphere goes off screen and then comes back on screen.
- [Avid Motion Graphics]: The application shows additional CPU activity and reduced performance when GPUD4V is utilized to transfer frames/fields to the AJA video I/O device.
- [Avid Motion Graphics]: Higher CPU usage occurs when running the application with GPUD4V transfers when compared to PBO transfers.
- [Avid Motion Graphics]: The application profile does not get applied.
- [Avid Motion Graphics]: There is a decrease in application performance when the material editor is displayed.
- [Cinema 4D]: Threaded optimization causes the application to respond slowly.
-

Changes in Version 320.00

The following sections list the important changes and the most common issues resolved since driver version 319.92.

Windows Vista/Windows 7 Fixed Issues

- Quadro 4000: Graphics performance is inconsistent when performing FBO upload and PBO readback operations on a multi-GPU system.
- [Quadro FX 3600M]: Crash in glDrawElements occurs when GL_TEXTURE_CUBE_MAP_SEAMLESS is enabled. [1039864]
- [Quadro 6000]: glGetIntegerv(GL_POLYGON_MODE) returns 2 values.
- [Kepler-class GPUs][Vega Prime]: The driver crashes when using the OpenGL function TextureGrad() with sampler2DArrayShadow.
- Compiler error occurs when concatenating certain #define macros in OpenGL ES.
- [Visi]: wglMakeCurrent crashes when previewing a file.
- [Multi-GPU][Quadro 4000]: Upload and Readback Bandwidth is inconsistent.

Changes in Version 319.92

The following sections list the important changes and the most common issues resolved since driver version 314.07.

Windows Vista/Windows 7 Fixed Issues

- Femap: VBO memory leak occurs.
- Quadro FX 3600M: Applications crash during calls to glDrawElements when GL_TEXTURE_CUBE_MAP_SEAMLESS is enabled.
- [SLI], Quadro FX 4800: “Link lost” error occurs when playing Blu-ray disk using Cyberlink PowerDVD on a DP2DVI (dual) connected display.

Windows 8 Fixed Issues

- [Quadro K5000][Houdini 12.1]: The application hangs after multiple middle mouse button clicks in the parameter window.

Open Issues in Version 320.86

As with every released driver, version 320.86 of the Release 319 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/Windows 7 32-bit Issues" on page 16
- "Windows Vista/Windows 7 64-bit Issues" on page 16

Windows Vista/Windows 7 32-bit Issues

- Cinema 4D–performance improvements are requested.
- NVIDIA Control Panel: Pro E Wildfire 5–the application doesn't appear in the NVIDIA Control Panel->Manage 3D Settings page 'show only programs found on this computer' list.
- [Quadro FX 1800M]: clCreateFromGLTexture2D fails with Mipmaps.

Windows Vista/Windows 7 64-bit Issues

- NVIDIA Control Panel: Pro E Wildfire 5–the application doesn't appear in the NVIDIA Control Panel->Manage 3D Settings page 'show only programs found on this computer' list.
- Cinema 4D–performance improvements are requested.
- [Kepler-class GPUs][Mudbox 2014]: Shadows are not visible.

Windows 8 64-bit Issues

- [Kepler-class GPUs][Mudbox 2014]: Shadows are not visible.

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 7.

Windows Vista Considerations

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

- **Gamma ramps are inconsistent between single and two-headed systems.**
- **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.

Windows 7 Considerations

Windows DWM Disabled for SLI Mosaic Mode

Due to compatibility issues, when using SLI Mosaic mode the driver turns off the Windows 7 Desktop Window Manager (DWM). As a result, DWM-managed desktop features such as Windows Aero or Windows Flip 3D will not be available.

Hotplug Action

Unlike the hotplug activity under Windows Vista, the default settings are not applied when a new display is hotplugged, and there is no message balloon alert stating that a new display was detected. Under Windows 7, all display connection and detection events are handled through the Windows 7 Connecting and Configuring Displays (CCD) mechanism.

NVIDIA Control Panel Rotate Display Page

The rotation radio button labels are changed slightly under Windows 7 to be consistent with the Microsoft panel

Table 2.1 NVIDIA Control Panel Rotation Page Radio Buttons

Clockwise Rotation	Windows 7 Label	Windows Vista Label
0 degrees	Landscape	No rotation (Landscape)
90 degrees	Portrait	90 degrees to the right (Inverted Portrait)
180 degrees	Landscape (flipped)	180 degree rotation (Inverted landscape)
270 degrees	Portrait (flipped)	90 degrees to the left (Portrait)

Limitation

- When switching the refresh rate from 59 Hz to 60Hz, the refresh rate remains at 59 Hz.

  See the Microsoft KB article KB2006076 at http://support.microsoft.com/kb/2006076.

Unsupported Features

The following are features and functionality that were available in driver releases supporting Windows XP, but are not–and will not be–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.
- **Overclocking**

  GPU overclocking is no longer supported in the default GPU driver control panel. This feature is available in the NVIDIA System Tools 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 System Tools software, which you can download from NVIDIA.com.
- **AGP Settings Adjustment**

- **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.
- **Edge Blending**
- **Run display optimization wizard**
- **Run multiple display wizard**
- **Run television setup wizard**
- **nView Horizontal and Vertical Span Modes**

  Due to architectural changes in the new Windows Vista Window Display Driver Model (WDDM), span mode is available only with NVIDIA Mosaic Technology.
- **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)

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
- 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

- Softimage–The application crashes when thumbing the CgFX scene model while in wireframe display mode.
- 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.
- ArchiCAD–the driver crashes when navigating 3D shadows.
- ArchiCAD12–OpenGL speed is half as fast on Windows Vista than on Windows XP.
- CATIA V5R20–not all drawing elements appear if the drawing is created using Approximate mode.

Other Issues

- All older drivers from other vendors must be uninstalled first.
- The Windows Vista display mode switches from Aeroglass to Basic when a quad-buffer for stereo is created.
- Quad-buffered windowed stereo is only supported with Aeroglass turned off.

- The NVIDIA Control Panel->Set Up Multiple Displays page does not provide the capability of setting the dual monitor order under WIndows Vista as it does under Windows XP.

  This capability is provided through the Windows Vista Display Properties Settings page.

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:

Some APIs do not Report Total Available Graphics Memory Correctly

Background–TAG Memory

In the Windows Display Driver Model (WDDM), Total Available Graphics (TAG) memory is reported as the sum of

- Dedicated Video Memory (video memory dedicated for graphics use)
- Dedicated System Memory (system memory dedicated for graphics use), and
- Shared System Memory (system memory shared between the graphics subsystem and the CPU).

The values for each of these components are computed according to WDDM guidelines when the NVIDIA Display Driver is loaded.

Issue

NVIDIA has found that some TAG-reporting APIs represent video memory using 32-bits instead of 64-bits, and consequently do not properly report available graphics memory when the TAG would otherwise exceed 4 gigabytes (GB). This results in under reporting

of available memory and potentially undesirable behavior of applications that rely on these APIs to report available memory.

The reported memory can be severely reduced. For example, 6 GB might be reported as 454 MB, and 8 GB might be reported as 1259 MB.

NVIDIA Action for Some GeForce-based Systems

For GeForce GPUs with 2.75 GB or less of video memory, the NVIDIA display driver constrains TAG memory to just below 4 GB[1]. In this scenario, the Shared System Memory component of TAG is limited first, before limiting Dedicated Video Memory.

This is a policy decision within the driver, and results in reliable reporting of sub-4 GB TAG memory.

When TAG Reporting Would Not Be Limited

For GeForce-based GPUs with more than 2.75 GB of video memory, as well as all Quadro and Tesla GPUs, the NVIDIA display driver does not constrain TAG memory reporting.

The disadvantage of constraining TAG on systems with larger amounts of video and system memory is that memory which otherwise would be available for graphics use is no longer available. Since shared system memory is limited first, driver components and algorithms utilizing shared system memory may suffer performance degradation when TAG is constrained.

Since these and similar scenarios are prevalent in many Workstation applications, the NVIDIA driver avoids constraining TAG on all Quadro and Tesla-based systems. Likewise, the driver does not constrain TAG for GeForce-based systems with more than 2.75 GB of video memory.

1. The WDDM guidelines dictate minimum and maximum values for the components, but the display driver may further constrain the values that are reported (within the allowed minimum and maximum).

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 HMDI 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.

Aero Must be Enabled for Windowed SLI AFR Mode Under Vista

Windows 7 Aero must be enabled in order to achieve SLI acceleration using windowed AFR mode.

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.

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.

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.

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.

03 THE RELEASE 319 DRIVER

The notebook driver is part of the NVIDIA Verde Notebook Driver Program, and can be installed on supported NVIDIA notebook GPUs. However, please note that your notebook original equipment manufacturer (OEM) provides certified drivers for your specific notebook on their website. NVIDIA recommends that you check with your notebook OEM about recommended software updates for your notebook. OEMs may not provide technical support for issues that arise from the use of this driver.

This chapter covers the following main topics:

Hardware and Software Support

Supported Operating Systems

The Release 319 driver, version 320.86, has been tested with

- Microsoft Windows® 8, and supports both 32-bit and 64-bit versions.
- Microsoft Windows® 7, and supports both 32-bit and 64-bit versions.

Supported NVIDIA Notebook Products

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

Note:

Hybrid Power technology is not supported by this release.

The following Sony VAIO notebooks are supported: Sony VAIO F Series with NVIDIA GeForce 310M, GeForce 315M (All-in-One system), GeForce GT 330M, GeForce GT 425M, GeForce GT 520M, or GeForce GT 540M (All-in-One system). Other Sony VAIO notebooks are not supported at this time (please contact Sony for driver support).

Fujitsu notebooks are not supported by this release (Fujitsu Siemens notebooks are supported).

Table 3.1 Supported NVIDIA NVS and Quadro NVS Notebook GPUs

Quadro Notebook Products
NVS 5400M NVS 5200M NVS 5100M NVS 4200M NVS 3100M NVS 2100M
Quadro NVS 320M
Quadro NVS 160M
Quadro NVS 150M
Quadro NVS 140M
Quadro NVS 135M
Quadro NVS 130M

Table 3.2 Supported NVIDIA Quadro M and Quadro FX M GPUs

Consumer Products
Quadro K5000M
Quadro K4000M
Quadro K3000M
Quadro K2000M
Quadro K1000M
Quadro 5010M
Quadro 5000M
Quadro 4000M
Quadro 3000M
Quadro 2000M
Quadro 1000M
Quadro FX 3800M
Quadro FX 3700M
Quadro FX 3600M
Quadro FX 2800M
Quadro FX 2700M
Quadro FX 1800M
Quadro FX 1700M
Quadro FX 1600M
Quadro FX 880M
Quadro FX 770M
Quadro FX 570M
Quadro FX 380M
Quadro FX 370M
Quadro FX 360M

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

Minimum Hard Disk Space

The hard disk space requirement for 32-bit is minimum 200 MB for English-only, and 275 MB for International.

The hard disk space requirement for 64-bit is minimum 270 MB for English-only, and 365 MB for International.

Before You Begin

nTune

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.

Notebooks

- Check to make sure that your notebook has a supported GPU (see "Supported NVIDIA Notebook Products" on page 28).
- It is recommended that you back up your current system configuration.
- If you own a Dell Inspiron 1420, Dell XPS M1330, or Dell XPS M1530, or Dell LatitudeD630 or D630c, it is highly recommended that you first install this Dell software update.

Premium Mosaic Mode

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

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.

   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.

Note: If you are overinstalling the driver (installing over a previous driver without first removing the previous driver), then you must reboot your computer in order 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

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 35.

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		

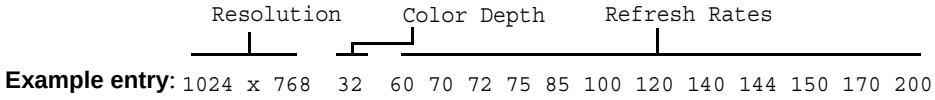
Default Modes Supported by GPU

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

▶ "Quadro Notebook GPUs" on page 36

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.

Quadro Notebook GPUs

This sections lists the supported display resolutions, color depths, and refresh rates for the products listed in "Supported NVIDIA Notebook Products" on page 28.

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
 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
 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
 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

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

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 8 Series and later GPUs.
480p (EDTV)	
720p (HDTV)	
1080i (HDTV)	
576i (PAL)	
576p (PAL)	

The driver supports manual overscan correction for component and DVI outputs. See the online NVIDIA Control Panel Help for instructions on how to use the overscan correction features.

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