



# Release 340 Graphics Drivers for Windows - Version 341.96

RN-W34196-01v01 | August 17, 2016  
Windows 10 / Windows 8.1 / Windows 8 / Windows 7 / Windows Vista

## Release Notes



# TABLE OF CONTENTS

<b>1 Introduction to Release Notes</b> .....	<b>1</b>
Structure of the Document .....	1
Changes in this Edition .....	1
<b>1 Release 340 Driver Changes</b> .....	<b>2</b>
Version 341.96 Highlights .....	2
What's New in Version 341.96 .....	3
What's New in Release 340 .....	3
Limitations Under Windows 10 .....	4
Limitations in This Release .....	5
Advanced Driver Information .....	6
Changes and Fixed Issues in Version 341.96 .....	10
Known Product Limitations .....	11
GPU Temperature Reported Incorrectly on Optimus Systems .....	12
Damaged or Missing WMI Service Will Prevent NVIDIA Driver Installation .....	12
Screen Turns Black When Performing Clean Overinstall of NVIDIA Drivers on Windows 8.1 Optimus Notebook .....	13
Flickering Black Screen Occurs After Installing the NVIDIA Drivers on Windows 8 .....	13
Total Available Graphics Memory Reported Incorrectly .....	15
Increasing 4-way SLI/Multi-GPU Performance .....	16
3D Vision USB Driver Does Not Get Installed .....	16
No PhysX Acceleration Using the GPU .....	17
NVIDIA PhysX System Software Cannot be Installed or Uninstalled in Windows Safe Mode .....	17
3DMark 11 Does not Run in Stereoscopic 3D Mode .....	17
Do not Use Windows Rollback for Graphics Drivers .....	18
Uninstalling Drivers Using Device Manager is not Supported .....	18
Changing the Primary Display Across SLI GPUs Takes Longer than Expected .....	18
Understanding the DirectX Version Shown in the NVIDIA System Information Window .....	19
Using HDMI Audio with Displays that have a High Native Resolution ...	19
Using HDMI Displays that do not Support Audio .....	20
Using HDMI/DisplayPort Audio in Dualview or Clone Mode Configurations .....	21

# TABLE OF CONTENTS

Flat Panel Scaling Controls are Non-functional for Some TV Modes for Some Displays.....	21
GPU Runs at a High Performance Level (full clock speeds) in Multi-display Modes .....	22
GeForce GTX 295 Fan Control Does not Function With NVIDIA Control Panel Performance Group version 6.03.06.00 .....	22
1280x1024 @ 60 Hz not Available on BenQ FP241W Monitors .....	22
Image Sharpening Control not Available with GeForce 8 Series and later GPUs .....	22
Gigabyte GA-6BX Motherboard .....	23
<b>2 The Release 340 Driver .....</b>	<b>24</b>
About the Release 340 Driver .....	24
Hardware and Software Support.....	25
Supported Operating Systems.....	25
Supported NVIDIA Desktop Products .....	25
Supported NVIDIA Notebook Products .....	28
Supported Languages.....	31
Driver Installation .....	31
Minimum Hard Disk Space .....	31
Before You Begin.....	32
Installation Instructions.....	32
<b>Appendix A: Mode Support for Windows .....</b>	<b>34</b>
General Mode Support Information.....	35
Understanding the Mode Format .....	36
GeForce GPUs .....	37
GeForce, Quadro NVS, and Quadro FX Notebook GPUs .....	39
Modes Supported by TV Encoders .....	41

## LIST OF TABLES

Table 2.1 Supported NVIDIA Desktop GPUs .....	25
Table 2.2 Supported NVIDIA Notebook GPUs .....	28
Table 2.3 Supported NVIDIA NVS and Quadro NVS M GPUs.....	30
Table 2.4 Supported NVIDIA Quadro M and Quadro FX M GPUs.....	30
Table A.1 Modes Supported for High Resolution Displays .....	35
Table A.2 Non-standard Modes Supported .....	35
Table A.3 Mode Support for S-Video and Composite Out .....	41
Table A.4 Mode Support for Component YPrPb Out and DVI Out.....	41

# 01 INTRODUCTION TO RELEASE NOTES

This edition of *Release Notes* describes the Release 340 family of graphics drivers (versions 340.xx to 341.xx) for Microsoft® Windows® Vista and later<sup>1</sup>. 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 340 Driver Changes](#)” on page 2 gives a summary of changes, and fixed and open issues in this version.
- ▶ “[The Release 340 Driver](#)” on page 24 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 34 lists the default resolutions supported by the driver.

## Changes in this Edition

This edition of the *Release Notes* includes information about NVIDIA graphics driver version 341.96, and lists changes made to the driver since the Release 340 driver version 341.95. These changes are discussed beginning with the chapter “[Release 340 Driver Changes](#)” on page 2.

1. Includes Windows Vista, Windows 7, Windows 8, Windows 8.1, and Windows 10

# 01 RELEASE 340 DRIVER CHANGES

This chapter describes open issues for version 341.96, and resolved issues and driver enhancements for versions of the Release 340 driver up to version 341.96.

The chapter contains these sections:

- ▶ “Version 341.96 Highlights” on page 2’
- ▶ “Changes and Fixed Issues in Version 341.96” on page 10
- ▶ “Known Product Limitations” on page 11

## Version 341.96 Highlights

This section provides highlights of version Version 341.96 of the NVIDIA Release 340 Driver for Windows Vista, Windows 7, Windows 8, Windows 8.1, and Windows 10.

- ▶ What’s New in Version 341.96
- ▶ What’s New in Release 340
- ▶ Limitations in This Release
- ▶ Advanced Driver Information

## What's New in Version 341.96

- ▶ This driver adds security updates for driver components of Tesla architecture class GPUs.

### Fixed Issues

- ▶ See [“Changes and Fixed Issues in Version 341.96”](#) on page 10 for a list of other changes and resolved issues in this driver version.

## What's New in Release 340

The section summarizes the driver changes in Release 340, including previous Release 340 drivers:

### Performance Boost

Introduces key DirectX optimizations which result in reduced game-loading times and significant performance increases across a wide variety of games. Results will vary depending on your GPU and system configuration.

### 4K Display Support

- ▶ Added support for single-tile 4K×2K @ 60 Hz displays using bridgeless SLI cards.  
*This feature was introduced in the Release 337 driver version 337.88.*

### Application Profiles

Added or updated the following profiles:

- **3DMark SkyDiver subtest** - *added EXE into original 3DMark profile*
- **Battlefield: Hardline** - *SLI profile added*
- **Dark Souls II** - *SLI profile updated, AO profile added*
- **Elder Scrolls: Online** - *SLI profile added*
- **Enemy Front** - *added Direct 9 SLI profile*
- **LuDaShi Benchmark** - *SLI profile added*
- **Music Man** - *updated profile*
- **Plants vs Zombies Garden Warfare** - *added additional EXE*
- **Qiang Shen Ji** - *updated profile*
- **Watch Dogs** - *updated profile*
- **Wildstar** - *added EXE for 32-bit version*

## 3D Vision Profiles

- **Blackguards** - *rated as "Fair"*
- **Enemy Front** - *rated as "Not Recommended"*
- **Eterium** - *rated as "Excellent"*
- **Heldric - The legend of the shoemaker** - *rated as "Good"*
- **LEGO The Hobbit** - *rated as "Fair"*
- **Murdered Soul Suspect** - *rated as "Fair"*
- **Port Royale 3** - *rated as "Good"* - *rated as "Good"*
- **Project Root** - *rated as "Excellent"*

## 3D Compatibility Mode Support

Support for 3D Compatibility Mode has been added for the following games:

- **Banished** - *rated as "Good"*
- **Bioshock Infinite: Burial at Sea** - *rated as "Good"*
- **Krater** - *rated as "Excellent"*
- **Enemy Front** - *rated as "Not Recommended"*
- **Murdered Soul Suspect** - *rated as "Excellent"*

These games must be run in DirectX 10/11 mode to see improvements. Not compatible with 3D Vision Surround mode. See ["3D Compatibility Mode" on page 6](#) for more information.

## Limitations Under Windows 10

### Cross-adapter Clone Mode

Under Windows 10, clone mode across graphics processors is handled by the Windows OS, and not by the NVIDIA driver. Consequently, there are no controls for cross-adapter clone mode in the NVIDIA Control Panel under Windows 10.

### Optimus Systems

Because cross-adapter clone mode is handled by the Windows 10 OS, there are no display controls in the NVIDIA Control Panel if no display is connected to the NVIDIA GPU.



## Limitations in This Release

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

▶ **Surround Gaming with 3-way SLI**

Surround gaming is not supported on a 3-way SLI system using GeForce GTX 200 series GPUs. [681228/683943]

▶ **NVIDIA Control Panel Display Category**

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

▶ **Negative LOD Bias Clamp**

Negative LOD bias clamp for DirectX applications is not supported on Fermi-based GPUs and later.

▶ **Hybrid Power**

Support for Hybrid Power, a Hybrid SLI technology, is discontinued and not available with this driver.

▶ **Legacy Support for GeForce 6-series and GeForce 7-series GPUs**

GeForce 6-series and GeForce 7-series GPUs have moved to legacy support with the GeForce Release 304 drivers. These products are no longer supported beginning with the GeForce Release 310 drivers.

▶ **3D Vision Legacy Support Notification for Windows Vista**

Support for 3D Vision under Windows Vista is discontinued beginning with the Release 313 drivers. 3D Vision and 3DTV Play functionality will not be available with these drivers.

NVIDIA will continue to support basic 3D Vision and 3DTV Play functionality for Windows Vista with Release 310 or earlier drivers. Basic functionality includes full-screen viewing of 3D games, pictures, and movies on 3D Vision monitors, notebooks, and 3D TVs (with 3DTV Play software installed).

## Advanced Driver Information

This section contains the following additional information about the driver:

- ▶ 3D Compatibility Mode
- ▶ Help for Resizing Your HDTV Desktop
- ▶ Dynamic GPU Performance Mode
- ▶ Power Efficiency Optimizations
- ▶ Understanding the DirectX Information Shown in the NVIDIA System Information Window

### 3D Compatibility Mode

3D Compatibility Mode is an NVIDIA proprietary rendering mode for 3D Vision that improves the 3D experience for many key DirectX 10 and 11 games. NVIDIA continues to add game support with new driver versions.

#### Requirements and Compatibility

- ▶ Games must be run in DirectX 10 or DirectX 11 mode.
- ▶ Not compatible with 3D Vision Surround.

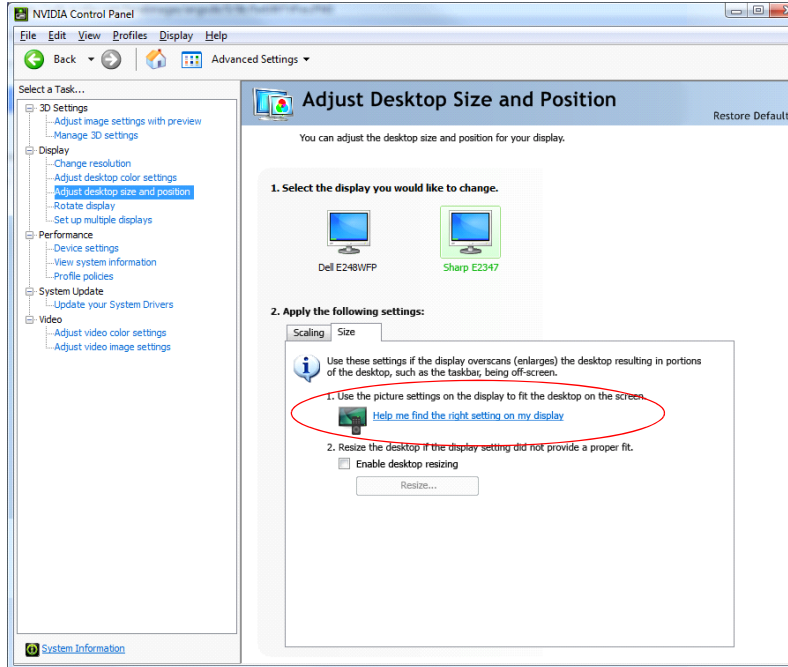
#### Switching Compatibility Modes

Games with 3D Compatibility Mode will launch in this mode by default. You can switch between 3D Compatibility mode and standard 3D Vision mode as follows:

- 1 Before starting the game, enable Advanced In-game Settings in the NVIDIA Control Panel:
  - a Open the NVIDIA Control Panel and navigate to the *Stereoscopic 3D->Set up stereoscopic 3D* page and click **Set Keyboard Shortcuts**.
  - b Click the *Show advanced in-game settings* arrow if the section is not expanded, then select **Enable advanced in-game settings**.
  - c Click **OK**.
- 2 Press Ctrl+Alt+F11 during the game to toggle between 3D Compatibility mode and standard 3D Vision mode.

## Help for Resizing Your HDTV Desktop

The best way to resize the screen in order to view the entire content is to use the controls provided by the display hardware. Click the link on the Size tab to view a guide to changing the settings on your display hardware.

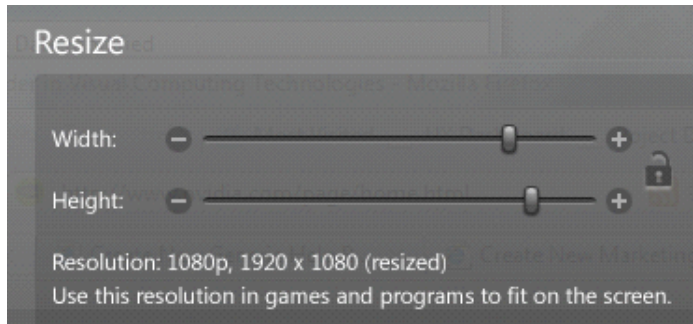


The resize controls on the NVIDIA Control Panel are provided in case satisfactory results cannot be achieved using the controls on the display.

After resizing the HDTV desktop using the NVIDIA Control Panel Resize controls, the new custom resolution created is now added to the list of available resolutions for that display, and also added to the resolution list within the game or application.

In Release 190 and later drivers, the method for resizing the HDTV desktop has changed to provide better image quality when applying underscan. This method results in a new custom resolution being created which needs to be selected from games or applications to apply the resizing. In the example displayed in the following screen shot, the underscan has created a new resolution (1216x682). Although this resolution looks

different, it is still in HD format. Remember to select this resolution in your game or other application in order to take advantage of it.



**Note:** Some games or applications may not support the new resolution.

## Dynamic GPU Performance Mode

With the Release 280 drivers, NVIDIA GPU clock speeds will increase more quickly in response to increased graphics demands. Conversely, with lower graphics use the GPU clock speed slows down more quickly, conserving as much power as possible.

In the Release 280 drivers, some users reported a noticeable fluctuation in clock speeds while engaging in various tasks on the PC. With the Release 285 and later drivers, adjustments have been made to reduce the sensitivity to levels similar to the R275 driver.

## Power Efficiency Optimizations

Release 310 drivers introduced power-optimizing enhancements. As a result of these enhancements, you may notice that GPU core clock speeds are different with this driver. For example, the GPU core clock might be faster when the GPU is in idle mode than in previous drivers. Or you may notice higher GPU core clock speeds after closing or opening certain games than in previous drivers.

This is because the reported GPU core clock frequency is no longer correlated to GPU power-saving states. Instead of lowering the GPU core clock frequency, the hardware and software use other methods to put the GPU into a low power state when the GPU is idle or in response to changing application requirements. This ensures optimum power use while continuing to provide high graphics performance.

## Understanding the DirectX Information Shown in the NVIDIA System Information Window

The System Information window—accessed by clicking **System Information** at the bottom left corner of the NVIDIA Control Panel—provides technical information about the NVIDIA graphics cards and driver installed in the system.

It also provides the following system information:

- ▶ **Operating system:** For example, “Windows 7 Enterprise, 64-bit”
- ▶ **DirectX runtime version:** For example, “11.0”

*In order to use the version of DirectX reported in the System Information window, the NVIDIA GPU and graphics driver must also support that DirectX version.*

This information is provided in the *Graphics card information* section of the System Information window as follows:

- ▶ **DirectX support**

(Provided in previous driver versions)

This is the DirectX version that is supported by the NVIDIA graphics hardware and driver.

- ▶ **Direct3D API version**

(Provided in later driver versions, for Windows 7 and later)

This is the Direct3D version that is supported by the NVIDIA graphics hardware and driver. The API version is expressed in terms of Direct3D – the graphics subsystem component of DirectX.

- ▶ **Direct3D feature level**

(Provided in later driver versions, for Windows 7 and later)

Direct3D feature levels describe a subset of features within the Direct3D API version that are supported by the NVIDIA graphics hardware and driver.

## Changes and Fixed Issues in Version 341.96

The following sections list the important changes and the most common issues resolved since version 341.95. This list is only a subset of the total number of changes made in this driver version. The NVIDIA bug number is provided for reference.

### Windows 10 Fixed Issues

There were no issues to report for this version.

### Windows Vista / Windows 7 / Windows 8 / Windows 8.1 Fixed Issues

There were no issues to report for this version.

# 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:

- ▶ “GPU Temperature Reported Incorrectly on Optimus Systems” on page 12
- ▶ “Damaged or Missing WMI Service Will Prevent NVIDIA Driver Installation” on page 12
- ▶ “Screen Turns Black When Performing Clean Overinstall of NVIDIA Drivers on Windows 8.1 Optimus Notebook” on page 13
- ▶ “Flickering Black Screen Occurs After Installing the NVIDIA Drivers on Windows 8” on page 13
- ▶ “Total Available Graphics Memory Reported Incorrectly” on page 15
- ▶ “Increasing 4-way SLI/Multi-GPU Performance” on page 16
- ▶ “3D Vision USB Driver Does Not Get Installed” on page 16
- ▶ “No PhysX Acceleration Using the GPU” on page 17
- ▶ “NVIDIA PhysX System Software Cannot be Installed or Uninstalled in Windows Safe Mode” on page 17
- ▶ “3DMark 11 Does not Run in Stereoscopic 3D Mode” on page 17
- ▶ “Do not Use Windows Rollback for Graphics Drivers” on page 18
- ▶ “Uninstalling Drivers Using Device Manager is not Supported” on page 18
- ▶ “Changing the Primary Display Across SLI GPUs Takes Longer than Expected” on page 18
- ▶ “Understanding the DirectX Version Shown in the NVIDIA System Information Window” on page 19
- ▶ “Using HDMI Audio with Displays that have a High Native Resolution” on page 19
- ▶ “Using HDMI Displays that do not Support Audio” on page 20
- ▶ “Using HDMI/DisplayPort Audio in Dualview or Clone Mode Configurations” on page 21
- ▶ “Flat Panel Scaling Controls are Non-functional for Some TV Modes for Some Displays” on page 21
- ▶ “GPU Runs at a High Performance Level (full clock speeds) in Multi-display Modes” on page 22
- ▶ “GeForce GTX 295 Fan Control Does not Function With NVIDIA Control Panel Performance Group version 6.03.06.00” on page 22
- ▶ “1280x1024 @ 60 Hz not Available on BenQ FP241W Monitors” on page 22
- ▶ “Image Sharpening Control not Available with GeForce 8 Series and later GPUs” on page 22

► [“Gigabyte GA-6BX Motherboard”](#) on page 23

## GPU Temperature Reported Incorrectly on Optimus Systems

### Issue

On Optimus systems, temperature-reporting tools such as Speccy or GPU-Z report that the NVIDIA GPU temperature is zero when no applications are running.

### Explanation

On Optimus systems, when the NVIDIA GPU is not being used then it is put into a low-power state. This causes temperature-reporting tools to return incorrect values.

Waking up the GPU to query the temperature would result in meaningless measurements because the GPU temperature change as a result.

These tools will report accurate temperatures only when the GPU is awake and running.

## Damaged or Missing WMI Service Will Prevent NVIDIA Driver Installation

### Issue

“Install failed” or “Install Failed, could not find compatible graphics hardware” message may appear during installation, even if the system has a compatible graphics card. This can occur when installing the NVIDIA driver or GeForce Experience software.

### Cause

This issue could be the result of a corrupt WMI service on your system. The NVIDIA Installer requires the WMI service to properly install the driver or other NVIDIA software.

### Resolution

You must repair the WMI service on your system in order to successfully install NVIDIA drivers. A future driver release will alert the user during installation that there is a problem with the WMI service on the system.



## Screen Turns Black When Performing Clean Overinstall of NVIDIA Drivers on Windows 8.1 Optimus Notebook

### Issue

After installing a Release 325 driver earlier than version 326.09 on an Optimus notebook running Windows 8.1, a subsequent clean overinstall of a later driver results in a black screen. The screen turns black when the driver uninstalls the older driver.

Typically, you may encounter this when attempting to upgrade the NVIDIA driver after installing Windows 8.1. While installing Windows 8.1, Windows Update installs NVIDIA driver version 326.01, then during the clean overinstall the black screen occurs as the older driver is uninstalled.

### Workaround - Prevention

To avoid the issue during the initial installation of Windows 8.1, do not reboot the system after Windows Update installs the NVIDIA driver. Then perform the custom clean overinstall of the newer driver.

### Resolution

This issue does not occur after installing an NVIDIA driver version 326.09 or later for Windows 8.1. When driver version 326.09 or later is installed, performing a clean overinstall with a newer driver will not result in a black screen.

## Flickering Black Screen Occurs After Installing the NVIDIA Drivers on Windows 8

### Issue

After installing the NVIDIA drivers on Windows 8, the subsequent reboot results in a black or flickering screen.

### Root Cause

This occurs because Windows Update performed a background installation of a Release 304 driver, which requires a reboot to complete the installation. After installing the Release 313 driver and then rebooting the system, installation of both the Release 304 as well as the Release 313 is completed, resulting in conflicting driver binaries and the black/flickering screen.

## Workaround - Prevention

To avoid the issue, reboot the system before installing the Release 313 driver.

Alternately, you can check the driver status under the Device Manager and perform the reboot if the Device Manager indicates that a restart is needed. Then install the driver.

## Workaround - Recovery

If you did not perform the necessary reboot prior to installing the driver and now encounter the black screen, do the following:

- 1 Reboot in Safe Mode.
- 2 Uninstall the driver.
- 3 Disconnect from the internet and then restart the system.
- 4 In normal mode, install the new driver.

## Total Available Graphics Memory Reported Incorrectly

### 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

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 under reporting can be extreme. For example, 6 GB might be reported as 454 MB, and 8 GB might be reported as 1259 MB.

### Driver Action for GeForce-based Graphics Systems

On graphics systems with less than 2.75 GB of advertized physical memory, the NVIDIA display driver typically limits the Shared System Memory to maintain a TAG memory value of less than 4 GB<sup>1</sup>.

- ▶ This results in reliable reporting of sub-4 GB TAG memory on systems with less than 2.75 GB of advertized physical memory.
- ▶ On systems with 2.75 GB or more of advertized physical memory, you may see different reported TAG memory values between the NVIDIA Control Panel and other reporting APIs.

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).

## Increasing 4-way SLI/Multi-GPU Performance

### Issue

With some games and applications, you may experience little to no performance gain or even a performance drop with 4-way SLI or multi-GPU configurations.

### Resolution

- 1 Open the NVIDIA Control Panel, then click **Manage 3D Settings** from the navigation pane.
- 2 Click the *Global Settings* tab, then scroll to the *Power management mode* feature, click the corresponding list arrow and select **Prefer maximum performance**, then click **Apply**.

## 3D Vision USB Driver Does Not Get Installed

### Issue

After installing the NVIDIA graphics driver, if the 3D Vision USB emitter was not plugged in, the 3D Vision USB Controller driver does not get installed. If you plug in the emitter after installing the driver, the indicator light on the emitter will flash red and will not turn green.

### Resolution

To fix this issue, NVIDIA recommends performing a driver re-install with the 3D Vision USB emitter connected. Please download the latest drivers and follow these steps:

- 1 Plug in the 3D Vision USB emitter.
- 2 Re-install the NVIDIA driver.  
Select **Custom (Advanced)** and then select **Perform a clean Installation** during the driver installation.
- 3 Reboot.

## No PhysX Acceleration Using the GPU

If after installing the PhysX System Software you find that there is no PhysX acceleration on supported applications, repeat the PhysX setup as follows:

- 1 Reboot the PC.
- 2 Open the NVIDIA Control Panel and then, under 3D Settings, click **Set PhysX configuration** to open that page.
- 3 Under **Select a PhysX processor**, verify that either **auto-select** or a specific NVIDIA GPU is selected.
- 4 Click **Apply**.

## NVIDIA PhysX System Software Cannot be Installed or Uninstalled in Windows Safe Mode

### Issue

Beginning with Release 280, the NVIDIA PhysX System Software is not included in the NVIDIA driver installation/uninstallation under safe mode.

### Explanation

The NVIDIA PhysX System Software installer is not compatible with Microsoft's policy for Windows safe Mode. Consequently, installation or uninstallation of the PhysX System Software under safe mode would fail. To allow installation or uninstallation of the graphics driver under safe mode, the NVIDIA PhysX System Software is blocked from the process.

## 3DMark 11 Does not Run in Stereoscopic 3D Mode

### Issue

When attempting to run 3DMark 11 with NVIDIA 3D Vision enabled, the benchmark may hang, present a black screen, or in other ways not appear correctly.

### Explanation

3DMark 11 is not compatible with running in stereoscopic 3D. To facilitate running the benchmark, recent drivers will run it in monoscopic mode, even with 3D Vision enabled.

## Do not Use Windows Rollback for Graphics Drivers

To reinstall a previous or older NVIDIA graphics driver, do not use the Windows rollback feature. This method will not reliably restore all the previous driver files.

Instead, use the Windows Add and Remove programs to remove the current driver, and then install the older driver using setup.exe.

## Uninstalling Drivers Using Device Manager is not Supported

### Issue

On all supported versions of Microsoft Windows, uninstalling the NVIDIA driver using the Windows Device Manager may not remove associated files or applications.

### Explanation

Microsoft has confirmed that this behavior is by design. If you wish to uninstall the NVIDIA driver, it is recommended that you do so using Add and Remove programs.

See the [Microsoft KB article 2278714](#).

## Changing the Primary Display Across SLI GPUs Takes Longer than Expected

### Issue

On an SLI system, switching the primary (or SLI focus) display when each display in the SLI group is connected to a different GPU takes longer than expected.

### Explanation

On an SLI system with each SLI GPU driving a display, the display connected to the slave GPU is the primary display (also the SLI focus display). In order to switch the primary display to the one connected to the other GPU, the master and slave GPU configuration must also switch. In order to reassign which GPU is the master and which is the slave, the driver must be reloaded. It the process of reloading the driver that takes the additional time.

## Understanding the DirectX Version Shown in the NVIDIA System Information Window

The System Information window—accessed by clicking **System Information** at the bottom left corner of the NVIDIA Control Panel—provides technical information about the NVIDIA graphics cards and driver installed in the system.

It also provides information about the Windows version as well as the DirectX version that is installed.

*However, in order to use the version of DirectX reported in the System Information window, the NVIDIA GPU and graphics driver must also support that DirectX version.*

For example, driver version 197.45 and Windows Vista (with available patch) support DirectX 11. But only NVIDIA graphics cards based on the Fermi architecture released in 2010 support DirectX 11. So your system must have one of these cards installed in order to take advantage of DirectX 11 performance.

## Using HDMI Audio with Displays that have a High Native Resolution

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

Some HDMI displays have a native resolution that exceeds the maximum supported HD mode. For example, displays 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 Displays that do not Support Audio

*Some HDMI displays do not support audio, or have issues with GeForce 9 series and earlier, and GeForce GTX 200-series 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 GeForce 9 series and earlier, and GeForce GTX 200-series 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-> Set Up Digital Audio page. Click the arrow for the problem display and then click **Turn off audio**.

### Video but no audio

- ▶ Check the display list for the problem connection on the NVIDIA Control Panel->Set Up Digital Audio page.
- ▶ If **Turn off audio** is selected and you want to test whether your HDMI audio does, in fact, work, then click the list arrow and select the name of the display.

The driver will prompt you with instructions for testing HDMI audio with that display.

- ▶ If the display name is selected, then the driver has not successfully detected that an incompatible display is connected.

*Future driver versions will properly identify such displays and disable audio.*



## 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.

## Flat Panel Scaling Controls are Non-functional for Some TV Modes for Some Displays

The NVIDIA Control Panel flat panel scaling controls on the “Adjust Size & Position” page are not intended to be used for TV modes, and normally the controls are not available for TV or HDTV displays.

However, Microsoft requires that certain TV/HDTV modes be available for all digital displays, including DVI and HDMI, even if they are not HDTV.

While the NVIDIA flat panel scaling controls are available for those displays, they will not be functional for the TV modes that appear in compliance with the Microsoft requirements. The affected modes are as follows:

- ▶ 1920x1080i @50/59.94/60 Hz
- ▶ 1280x720p @50/59.94/60 Hz
- ▶ 720x480p @ 59.94/60 Hz
- ▶ 720x576p @ 50 Hz

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

This is a hardware limitation with desktop and older notebook GPUs, and not a software bug. When multiple displays are connected and active, the GPU will always operate with full clock speeds in order to efficiently drive multiple displays—even when no 3D programs are running.



**Note:** NVIDIA notebook GeForce 5xxM series and later GPUs do not have this limitation. For those GPUs the driver can adjust the performance level, depending on demand, even when driving multiple displays.

## GeForce GTX 295 Fan Control Does not Function With NVIDIA Control Panel Performance Group version 6.03.06.00

The GeForce GTX 295 fan control does not function properly when using the NVIDIA Control Panel Performance Group version 6.03.06.00. For proper fan control, use version 6.03.12.00 or later.

## 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 GeForce 8 Series and later GPUs

With GeForce 8 Series 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 GeForce 8 series and later GPUs.

## 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.

## 02 THE RELEASE 340 DRIVER

This chapter covers the following main topics:

- ▶ “About the Release 340 Driver” on page 24
- ▶ “Hardware and Software Support” on page 25
- ▶ “Driver Installation” on page 31

### About the Release 340 Driver

This driver release is from the Release 340 family of drivers (versions 340.xx to 341.xx). This driver package supports GeForce products based on the Tesla GPU architecture as well as ION desktop GPUs. See “[Supported NVIDIA Desktop Products](#)” on page 25 for the list of specific products supported in this release.

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.

## Hardware and Software Support

- ▶ “Supported Operating Systems” on page 25
- ▶ “Supported NVIDIA Desktop Products” on page 25
- ▶ “Supported NVIDIA Notebook Products” on page 28
- ▶ “Supported Languages” on page 31

## Supported Operating Systems

This Release 340 driver includes drivers designed for the following Microsoft® operating systems:

- ▶ Microsoft Windows® 10, and supports both 32-bit and 64-bit versions.
- ▶ Microsoft Windows® 8.1, and supports both 32-bit and 64-bit versions.
- ▶ Microsoft Windows® 8, and supports both 32-bit and 64-bit versions.
- ▶ Microsoft Windows® 7, and supports both 32-bit and 64-bit versions.
- ▶ Microsoft Windows® Vista, and supports both 32-bit and 64-bit versions.

## Supported NVIDIA Desktop Products

The following table lists the NVIDIA products supported by the Release 340 driver, version 341.96:

Table 2.1 Supported NVIDIA Desktop GPUs

Consumer Products
GeForce GTX 295
GeForce GTX 285
GeForce GTX 280
GeForce GTX 275
GeForce GTX 260
GeForce GTS 250
GeForce GTS 240
GeForce GTS 150
GeForce GT 340
GeForce GT 330
GeForce GT 320
GeForce GT 240
GeForce GT 220
GeForce G210

Table 2.1 Supported NVIDIA Desktop GPUs (continued)

Consumer Products
GeForce 405
GeForce 210
GeForce 205
GeForce GTS 150
GeForce GT 130
GeForce GT 120
GeForce G100
GeForce 9800 GX2
GeForce 9800 GTX+
GeForce 9800 GTX
GeForce 9800 GT
GeForce 9600 GT
GeForce 9600 GS
GeForce 9600 GSO
GeForce 9500 GT
GeForce 9500 GS
GeForce 9400 GT
GeForce 9400
GeForce 9300 GS
GeForce 9300 GE
GeForce 9300
GeForce 9200
GeForce 8800 Ultra
GeForce 8800 GTX
GeForce 8800 GTS 512
GeForce 8800 GTS
GeForce 8800 GT
GeForce 8800 GS
GeForce 8600 GTS
GeForce 8600 GT
GeForce 8600 GS
GeForce 8500 GT
GeForce 8400 GS
GeForce 8400 SE
GeForce 8400

Table 2.1 Supported NVIDIA Desktop GPUs (continued)

Consumer Products
GeForce 8300 GS
GeForce 8300
GeForce 8200
GeForce 8100 / nForce 720a

## Supported NVIDIA Notebook Products

The following tables list the NVIDIA notebook products supported by the Release 340 driver, version 341.96:



### Note:

Hybrid Power technology is no longer supported.

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 2.2 Supported NVIDIA Notebook GPUs

Consumer Products
ION
ION LE
GeForce GTS 360M
GeForce GTS 350M
GeForce GTS 250M
GeForce GT 335M
GeForce GT 330M
GeForce GT 325M
GeForce GT 320M
GeForce 320M
GeForce 315M
GeForce 310M
GeForce 305M
GeForce GTX 285M
GeForce GTX 280M
GeForce GTX 260M
GeForce GT 240M
GeForce GT 230M
GeForce GT 220M



Table 2.2 Supported NVIDIA Notebook GPUs (continued)

Consumer Products
GeForce GTS 160M
GeForce GT 130M
GeForce GT 120M
GeForce G 210M
GeForce G 110M
GeForce G 105M
GeForce G 103M
GeForce G 102M
GeForce 9800M GTX
GeForce 9800M GTS
GeForce 9800M GT
GeForce 9800M GS
GeForce 9700M GTS
GeForce 9700M GT
GeForce 9650M GT
GeForce 9650M GS
GeForce 9600M GT
GeForce 9600M GS
GeForce 9500M GS
GeForce 9500M G
GeForce 9400M G
GeForce 9400M
GeForce 9300M GS
GeForce 9300M G
GeForce 9200M GS
GeForce 9200M GE
GeForce 9100M G
GeForce 8800M GTX
GeForce 8800M GTS
GeForce 8800M GS
GeForce 8700M GT
GeForce 8600M GT
GeForce 8600M GS
GeForce 8400M GT
GeForce 8400M GS

Table 2.2 Supported NVIDIA Notebook GPUs (continued)

Consumer Products
GeForce 8400M G
GeForce 8200M G
GeForce 8200M

Table 2.3 Supported NVIDIA NVS and Quadro NVS M GPUs

Consumer Products
NVS 5100M
NVS 3100M
NVS 2100M
Quadro NVS 320M
Quadro NVS 160M
Quadro NVS 150M
Quadro NVS 140M
Quadro NVS 135M
Quadro NVS 130M

Table 2.4 Supported NVIDIA Quadro M and Quadro FX M GPUs

Consumer Products
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 340 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

#### Desktop

The hard disk space requirement for 32-bit is minimum 220 MB for English-only, and 300 MB for International.

The hard disk space requirement for 64-bit is minimum 320 MB for English-only, and 400 MB for International.

#### Notebook

The hard disk space requirement for 32-bit is minimum 300 MB.

The hard disk space requirement for 64-bit is minimum 400 MB.

## 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](#).

## 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 From the driver download page, click the **Download** button.  
The *Download Confirmation* page appears.
- 3 If you agree to the “License For Customer Use of NVIDIA Software”, click the **Agree & Download** button to begin the download.  
The *File Download* dialog appears.
- 4 Either click **Save** to save the file and then run it from your PC, or click **Run**.  
An extraction path dialog appears prompting you to specify where on your PC you want the driver files to be installed.
- 5 Click **OK** to use the default location, or click the folder icon and specify an alternate location to install the driver files.  
The files are extracted and then the NVIDIA Installer is launched automatically.
- 6 At the *License Agreement* page of the Installer, click **Agree and Continue**.

## 7 Follow the instructions in the NVIDIA Installer to complete the installation.



**Note:** The driver presents game screenshots while the driver is installing. If you are not connected to the internet during the installation, you may see a “Navigation to the webpage was cancelled” message instead. The message can be ignored and does not affect the installation. The message won’t appear if the browser cache is cleared.



**Note:** The NVIDIA PhysX System Software will not be included in the installation if the same version or a later version is already installed.



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

See also the installation/uninstallation considerations explained in [“Known Product Limitations”](#) on page 11.

# APPENDIX A MODE SUPPORT FOR WINDOWS

This chapter details the Windows modes supported by the Release 340 driver for NVIDIA products. It contains these sections:

- ▶ “General Mode Support Information” on page 35
- ▶ “Default Modes Supported by GPU” on page 36
- ▶ “Modes Supported by TV Encoders” on page 41

## 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 36.

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)	2560 x 1600 @ 60 Hz
Dell WFP 3007 (Dual Link DVI)	2560 x 1600 @ 60 Hz
HP LP3065 dual-link DVI flat panel	2560 x 1600 @ 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:

- ▶ “GeForce GPUs” on page 37
- ▶ “GeForce, Quadro NVS, and Quadro FX Notebook GPUs” on page 39

## Understanding the Mode Format

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

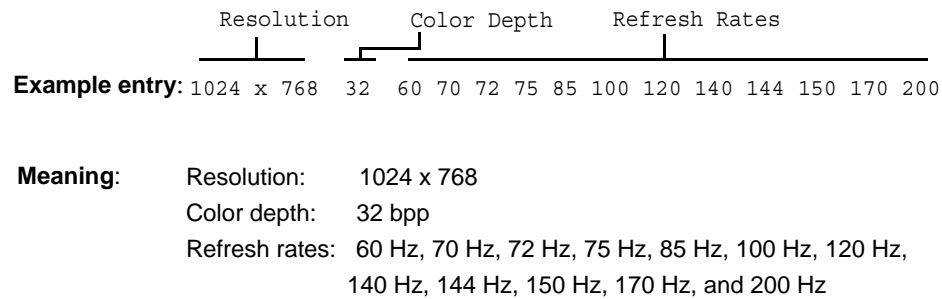


Figure A.1 Mode Format

### 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.



## GeForce GPUs

This sections lists the supported display resolutions, color depths, and refresh rates for the products listed in [“Supported NVIDIA Desktop Products”](#) on page 25.

### 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

## GeForce, Quadro NVS, and Quadro FX 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
-----
 640 x  480 64      60 70 72 75 85 100 120 140 144 150 170 200 240
 720 x  480 64      60
 720 x  576 64      50
 800 x  600 64      60 70 72 75 85 100 120 140 144 150 170 200 240
1024 x  768 64      60 70 72 75 85 100 120 140 144 150 170 200 240
1152 x  864 64      60 70 72 75 85 100 120 140 144 150 170 200
1280 x  720 64      60
1280 x  768 64      60 70 72 75 85 100 120 140 144 150 170
1280 x  800 64      60 70 72 75 85 100 120 140 144 150 170
1280 x  960 64      60 70 72 75 85 100 120 140 144 150 170
1280 x 1024 64      60 70 72 75 85 100 120 140 144 150 170
1360 x  768 64      60 70 72 75 85 100 120 140 144 150 170
1600 x  900 64      60 70 72 75 85 100 120 140 144 150
1600 x 1024 64      60 70 72 75 85 100 120
1600 x 1200 64      60 70 72 75 85 100 120
1680 x 1050 64      60
1920 x 1080 64      60
1920 x 1200 64      60 70 72 75 85 100
1920 x 1440 64      60 70 72 75 85
2048 x 1536 64      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.

## Notice

ALL NVIDIA DESIGN SPECIFICATIONS, REFERENCE BOARDS, FILES, DRAWINGS, DIAGNOSTICS, LISTS, AND OTHER DOCUMENTS (TOGETHER AND SEPARATELY, "MATERIALS") ARE BEING PROVIDED "AS IS." NVIDIA MAKES NO WARRANTIES, EXPRESSED, IMPLIED, STATUTORY, OR OTHERWISE WITH RESPECT TO THE MATERIALS, AND EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES OF NONINFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE.

Information furnished is believed to be accurate and reliable. However, NVIDIA Corporation assumes no responsibility for the consequences of use of such information or for any infringement of patents or other rights of third parties that may result from its use. No license is granted by implication of otherwise under any patent rights of NVIDIA Corporation. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all other information previously supplied. NVIDIA Corporation products are not authorized as critical components in life support devices or systems without express written approval of NVIDIA Corporation.

## HDMI

HDMI, the HDMI logo, and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC.

## Macrovision Compliance Statement

NVIDIA Products that are Macrovision enabled can only be sold or distributed to buyers with a valid and existing authorization from Macrovision to purchase and incorporate the device into buyer's products.

Macrovision copy protection technology is protected by U.S. patent numbers 5,583,936; 6,516,132; 6,836,549; and 7,050,698 and other intellectual property rights. The use of Macrovision's copy protection technology in the device must be authorized by Macrovision and is intended for home and other limited pay-per-view uses only, unless otherwise authorized in writing by Macrovision. Reverse engineering or disassembly is prohibited.

## OpenCL Notice

Portions of the NVIDIA system software contain components licensed from third parties under the following terms:

Clang & LLVM:

Copyright (c) 2003-2008 University of Illinois at Urbana-Champaign.

All rights reserved.

Portions of LLVM's System library:

Copyright (C) 2004 eXtensible Systems, Inc.

Developed by:

LLVM Team

University of Illinois at Urbana-Champaign

<http://llvm.org>

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal with the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimers.

Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimers in the documentation and/or other materials provided with the distribution.

Neither the names of the LLVM Team, University of Illinois at Urbana-Champaign, nor the names of its contributors may be used to endorse or promote products derived from this Software without specific prior written permission.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE CONTRIBUTORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS WITH THE SOFTWARE.

### **Trademarks**

NVIDIA, the NVIDIA logo, NVIDIA nForce, GeForce, NVIDIA Quadro, NVDDVD, NVIDIA Personal Cinema, NVIDIA Soundstorm, Vanta, TNT2, TNT, RIVA, RIVA TNT, VODOO, VODOO GRAPHICS, WAVEBAY, Accuvision, Antialiasing, Detonator, Digital Vibrance Control, ForceWare, NVRotate, NVSensor, NVSync, PowerMizer, Quincunx Antialiasing, Sceneshare, See What You've Been Missing, StreamThru, SuperStability, T-BUFFER, The Way It's Meant to be Played Logo, TwinBank, TwinView and the Video & Nth Superscript Design Logo are registered trademarks or trademarks of NVIDIA Corporation in the United States and/or other countries. Other company and product names may be trademarks or registered trademarks of the respective owners with which they are associated.

### **Copyright**

© 2013-2016 NVIDIA Corporation. All rights reserved.