



**NVIDIA®**

# ForceWare Graphics Drivers ***Release Notes***

**Version 56.64**

**Windows XP / 2000**

**Windows NT 4.0**

**Windows 95 / 98 / ME**

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## CHAPTER

## 1

# INTRODUCTION TO *RELEASE NOTES*

This edition of *Release Notes* describes the Release 55 Drivers for Microsoft® Windows® and provides information applicable to all NVIDIA® drivers. NVIDIA provides these notes to describe performance improvements and bug fixes in each documented version of the driver.

## Structure of the Document

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This document is organized in the following sections:

- “[Release 55 Driver Issues](#)” on page 3 gives a summary of
  - Issues that are open in this version
  - Issues that have been resolved in this version.
  - Known limitations of the driver
- “[The Release 55 Driver](#)” on page 17 describes the new features in this driver release, the NVIDIA products and languages supported by this driver, and the system requirements.
- “[NVIDIA Driver History](#)” on page 27
- “[Mode Support for Windows](#)” on page 37

## Changes in this Edition

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This edition of *Release Notes* includes information about version 56.64 of the Release 55 driver. It discusses changes made to the driver since version 53.03. These changes are discussed beginning with the chapter “[Release 55 Driver Issues](#)” on page 3.





## RELEASE 55 DRIVER ISSUES

This chapter describes open issues for version 56.64, and resolved issues and driver enhancements for versions of the Release 55 driver up to version 56.64. The chapter contains these sections:

- “Open Issues in Version 56.64” on page 3
- “Issues Resolved in Version 56.64” on page 5
- “Known Product Limitations” on page 6

### Open Issues in Version 56.64

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As with every released driver, version 56.64 of the Release 55 driver has open issues and enhancement requests associated with it. What follows is a list of issues that are either not fixed or not implemented in this version. Some problems listed may not have been thoroughly investigated and, in fact, may not be NVIDIA issues. Others will have workaround solutions.

- Windows XP/2000: Clone mode may be set for the GeForce FX 5600 although only one display is connected.

*This setting causes a drop in the performance of 3D applications. The workaround is to use the NVIDIA control panel to reset the system to standard mode from clone mode.*

- Windows XP, GeForce FX 5950 Ultra: Homeworld2 antialiased performance is slow.

*This is not an NVIDIA bug, but is a known issue with the application. A game patch 1.1 is available at [ftp://ftp.sierra.com/pub/sierra/homeworld2/updates/homeworld2\\_update\\_en\\_10\\_11.exe](ftp://ftp.sierra.com/pub/sierra/homeworld2/updates/homeworld2_update_en_10_11.exe).*

- Quadro NVS, Windows NT 4.0: NV settings on taskbar should not include nView Display Mode > Single/Clone/Span if in Multiview.  
*A fix for this issue will be included in a future driver release.*
- Windows XP: Performance and Quality page does not update correctly.  
*A fix for this issue will be included in a future driver release.*
- Windows XP, GeForce FX 5600: Enter key does not perform the intended actions in the NVIDIA control panel.  
*A fix for this issue will be included in a future driver release.*
- Quadro FX 1100, Windows XP: Mouse pointer is blurry when moved to the right side of the LCD  
*A fix for this issue will be included in a future driver release.*
- Windows XP, Quadro FX 3000, T221 Display: Windows MediaPlayer becomes pink/green with two T221 monitors rotated.  
*A fix for this issue will be included in a future driver release.*
- Windows XP: Double-clicked Outlook messages sometimes end up underneath other windows.  
*A fix for this issue will be included in a future driver release.*
- Quadro4 980XGL/Quadro FX1000, Windows 2000: Altair Engineering HyperMesh6.0 has problems with model contour color and rubber band operation.  
*A fix for this issue will be included in a future driver release.*
- GeForce FX 5700, Windows XP: Various textures in Far Cry are not rendering at 640x480.  
*A fix for this issue will be included in the next driver release.*
- GeForce FX 5950 Ultra, Windows XP: Fog does not display correctly in the game Xpand Rally.  
*A fix for this issue will be included in the next driver release.*
- GeForce FX 5950 Ultra, Windows XP: Lighting does not display correctly in the game Xpand Rally.  
*A fix for this issue will be included in the next driver release.*
- GeForce FX 5950 Ultra, Windows XP: Fogging effect is not applied to distant trees in the game Far Cry.  
*A fix for this issue will be included in the next driver release.*

- GeForce FX, Windows ME/Windows XP: With 4x (or greater) antialiasing enabled, the Options menu text in the game Spellforce appears only when the mouse cursor hovers over it.  
*A fix for this issue will be included in the next driver release.*
- Windows ME: CodeCult benchmark does not run properly.  
*This is not an NVIDIA bug.*
- GeForce FX, Windows ME: Gunmetal Demo intro movie does not display properly.  
*This is not an NVIDIA bug.*

## 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:

- “No Antialiasing of 3DMark03 Image Quality Screen Captures” on page 7
- “Medal of Honor Under Windows XP and Windows 2000” on page 7
- “Hide Modes Check Box Cannot be Cleared” on page 8
- “Windows 2000 Issue with Settings Tab Monitor Positioning” on page 8
- “Gigabyte GA-6BX Motherboard” on page 9
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- “Desktop Manager Does Not Re-Center Logon Screen” on page 12
- “Issues with Video Mirror” on page 13

## No Antialiasing of 3DMark03 Image Quality Screen Captures

---

- **Problem**

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

- **Explanation**

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

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

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

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

## Medal of Honor Under Windows XP and Windows 2000

---

- **Problem**

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

- **Workaround**

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

## Hide Modes Check Box Cannot be Cleared

---

- **Background**

One of the NVIDIA display property page dialog boxes contains the check box labelled “Hide modes that this monitor cannot display”. It is checked by default, indicating that only the refresh rates supported by the monitor are listed in the refresh rate drop down list.

The check box appears in the Device Adjustments->Monitor Settings page.

- **Problem**

If you clear the check box, click **Apply**, and then close the dialog box, the check box is still checked when the page is re-opened.

- **Explanation**

This function is no longer controlled by the NVIDIA driver, but has not been removed from the control panel in order to maintain consistency with driver designs that are currently being shipped to OEMs.

## Windows 2000 Issue with Settings Tab Monitor Positioning

---

- **Problem**

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

- **When the Problem Occurs**

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

- **Cause and Workaround**

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

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

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

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

## 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.

## Controlling Windows 9x TV Tuner Scaling Artifacts

---

Bus-mastering TV tuners that do not flip leave artifacts when they are scaled. On Windows 9x, this problem is addressed by setting the local DirectDraw™ registry value `VideoBusMasterMode` to 1. This setting causes the DirectDraw driver to look for flips occurring within half-second intervals. If none are found, an overlay automatically starts flipping at 30 fps. This setting works with only Windows 9x.

## Quake III Arena `malloc()` Error on TNT2

---

- **Problem**

Running the application Quake III Arena in a continuous loop results in an application failure after several hours.

Typical failure modes include either a `malloc()` error (such as `Z_malloc: failed on allocation of xxxxxxxx bytes`) or the Microsoft error dialog stating that “the application has experienced a problem and must now be closed”.

- **Explanation**

The problem is not an NVIDIA bug, but is caused by a memory leak in Quake III Arena. The extent of the problem depends on the method used for looping the application:

- **Using a .CFG File**

Using a `.cfg` file actually performs an infinite recursion, which causes a memory leak in Quake III Arena, leading to the failure.

- **Running Quake III as a Local Server**

Another method for using Quake III Arena as an OpenGL stress test is to run Quake III as a local server and then either follow or spectate a bot server. The failure can also occur using this method, depending on the Quake III Arena version. For example, the problem has been seen with point release 1.15c but not with point release 1.17.

## Windows Media Player Hangs Playing MPEG Files

---

On systems using the InterVideo WinDVD player (including ones that don't contain NVIDIA components), Windows Media Player 6.4 halts if the slider is adjusted while an MPEG clip is playing. The problem also occurs if Active Movie or the Movie Player on the Windows 98 CD is used instead of Media Player 6.4.

There are two ways to work around this problem:

- **Under Display Properties > Settings > Advanced... > Performance, set Graphics Hardware acceleration to None.**
- **Uninstall the WinDVD player.**

This is not an NVIDIA bug.

## AVI Playback Problems With Older Intel Indeo Codecs

---

Some Intel Indeo<sup>®</sup> video codecs prior to 5.x (notably 3.2) do not correctly play AVI files that contain IF09 (YUV9) data. Symptoms include distorted images and the failure of the Overlay Color Control function. These codecs come installed on many Windows 9x and Windows NT 4.0 systems.

The problem can be resolved by downloading a release 5.x or later Indeo codec from the Intel Web site.

## Antialiasing Problems With Certain Applications

---

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

## VIA KX133 and 694X Chipsets With AGP 2X

---

On Athlon motherboards with the VIA KX133 or 694X chipset, such as the ASUS K7V motherboard, NVIDIA drivers default to AGP 2X mode to work around insufficient drive strength on one of the signals.

- **On Windows 9x systems, the registry key**

```
HKEY_LOCAL_MACHINE\Software\NVIDIA Corporation\Global\System\
EnableVia4X
```

can be created to force NVIDIA drivers to use AGP 4X transfers.

- **On Windows NT 4.0 and Windows 2000 systems, the registry key is**

```
HKLM\System\CurrentControlSet\Services\nv4\DeviceN\ EnableVia4X
```

where the N in DeviceN is the system-determined number indicating the current NVIDIA device. This number is normally 0.

These registry keys should only be used if there is reason to believe that the motherboard has the appropriate drive strength.



## **Irongate Chipsets With AGP 1X**

---

AGP 1X transfers are used on Athlon motherboards with the Irongate chipset to work around a problem with the signal integrity of the chipset.

## **Poor Quality S-Video Output on Some TVs**

---

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

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

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

## **GLQuake Crash and Version 5.16 (or Later) Drivers**

---

GLQUAKE.EXE crashes when it is run with the `-condebug` command-line option on a GeForce 256 or a GeForce2 GTS that uses NVIDIA driver version 5.16 or later.

GLQuake uses `glGetString(GL_EXTENSIONS)` to find the NVIDIA OpenGL extensions string and tries to dump the result into a fixed-length, 1024-byte buffer. With the advent of NVIDIA driver version 5.16 and its additional OpenGL capabilities, the extensions string now exceeds 1024 bytes. GLQuake does not truncate the OpenGL extensions string to the length of the buffer, thereby writing past the end of the buffer. The data lost in this process eventually causes the application to crash.

## **Additional Properties Button Not Working in Windows 95**

---

The Additional Properties button found under the NVIDIA product tab in the Display Properties Control Panel may not function in certain Windows 95 systems. The problem occurs because these systems have an outdated version of the 32-bit common controls library (`COMCTL32.DLL`) from Microsoft.

Starting with the RIVA TNT, the Control Panel interface for NVIDIA processors requires version 4.70 or later of `COMCTL32.DLL`. Appropriate versions of `COMCTL32.DLL` are in Windows 98 or later and Internet Explorer 4.0 or later. The library can also be obtained from the Microsoft Web site.

## **Windows 98 and Windows Me MultiMon Support**

---

When running in MultiMon configuration, the Windows 98 and Windows Me operating systems force resolutions to be multiples of eight; for example, a resolution of 1600x900 pixels is changed to 1600x896.

Prior to setting a mode on the secondary display under MultiMon, these operating systems first validate the mode on the primary display and change the resolution of the primary display to 1600x896. Because the 1600x896 resolution is not in the NVIDIA master mode list, the NVIDIA driver would normally reject this resolution, which would prevent the operating systems from validating it and would prevent them from setting the secondary display's mode.

To work around this problem, the driver silently accepts the 1600x896 resolution, allowing this resolution to be validated by the operating systems in MultiMon configuration.

## **AGP Programs May Hang With Athlon Processor**

---

Windows 2000 systems using AMD Athlon processors can hang when an AGP program such as 3D WinBench 2000 is used. The problem can occur whether or not an NVIDIA video adaptor is installed.

The solution is to edit the registry to prevent the Memory Manager from using the processor's Page Size Extension feature. For a more complete explanation see <http://support.microsoft.com/support/kb/articles/Q270/7/15.ASP>

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

---

On Windows NT 4.0, Windows 2000, and Windows XP multi-display systems that are set to nView Span mode, the Windows logon screen is centered on the extended desktop. This usually causes it to be split across two displays, which users may find annoying. Although users can normally use the Desktop Manager to restrict a window's appearance to one display, security restrictions in the operating systems prevent this in the case of the logon screen.

## Issues with Video Mirror

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

**Table 2.1** Known Issues with Video Mirror

Issues	Windows XP/2000	Windows NT 4.0	Windows 9x
Video Mirror is not yet implemented for applications using Video Port Extensions (VPE).	x		x
If Video Mirror is enabled but a full-screen display does not appear, one of the following problems may have occurred:			
Video Mirror can only function when overlay is being used. The video player may not be able to create an overlay if another application is using the overlay, or the desktop display resolution is too high. You can lower the desktop resolution, pixel depth, or refresh rate.	x		x
Video Mirror requires some extra memory to run. Try closing other DirectX or OpenGL applications that may be running.	x		x
You may need to close and restart your video application for Video Mirror enabling or disabling to take effect.	x		x
Some video players that cannot detect the presence of Video Mirror stop playing if they are minimized or completely obscured by another window. For example, Media Player can exhibit this problem.	x		x



## Issues Resolved in Version 56.64

---

Significant issues resolved in driver version 56.64 are listed below:

- GeForce FX 5700/5700 Ultra/5950 Ultra, Windows XP: Rendering problems in Splinter Cell buffer shadow mode.
- Image Sharpening is being applied by default, causing text to appear thinner on some CRTs.
- GeForce FX 5700/5700 Ultra, Ravenshield: Corruption occurs in the game after a party member death.
- All GeForce FX, Windows XP: Intermittently, Warcraft III videos are not displayed properly on some systems.
- GeForce FX 5950 Ultra, Windows XP: nView Setup Wizard lacks 16-bit color choice.
- Quadro NVS, Windows XP: After turning off Span-over-Span, the display properties panel stops responding when selecting the Quadro NVS page.
- Quadro NVS, Windows XP: Flight.exe OpenGL has stripes of bad rendering on dual Quadro NVS cards.
- Quadro NVS 280 AGP + Quadro NVS 280 PCI, Windows 2000: Driver does not install with SETUP.EXE.
- Windows XP: Black horizontal lines in Need for Speed Hot Pursuit 2.
- Quadro NVS, Windows XP: Driver causes blue-screen crash.
- Geforce2, Windows XP: Command and Conquer - Generals game back screen is black
- Geforce4 MX, Windows XP: Rendering problems with Armies of eXigo
- GeForce FX 5950 Ultra, Windows XP: 8xAA isn't working in Flight Simulator 2004.
- GeForce3 Ti, Windows XP/2000: VBO alt-tab crash
- Windows XP: PAL-M is incorrectly outputting 50 Hz instead of 60 Hz.
- nView Setup Wizard, Windows NT 4.0: Display mode, resolution and bit depth are not set properly when Span or Clone mode are selected in wizard
- GeForce FX 5700, Windows Me: WinDVD/PowerDVD hangs in nView Clone mode with video mirror enabled.

- GeForce FX 5700, Windows Me: Scaling loses overlay with PowerDVD.
- GeForce FX 5700, Windows 98/Me: Macrovision DVD test program fails.

## CHAPTER

## 3

# THE RELEASE 55 DRIVER

This chapter covers the following main topics:

- “Features and Enhancements in the Release 55 Driver” on page 17
- “Hardware and Software Support” on page 19
- “Driver Installation” on page 22

## Features and Enhancements in the Release 55 Driver

---

The Release 55 driver offers new features not found in previous releases of the NVIDIA Driver for Windows. The following highlights the new features in Release 55:

### PCI Express Support

---

2D and 3D graphics drivers support the PCI Express I/O.

### PAE Support

---

2D and 3D graphics driver support systems that utilize physical address extensions (PAE)<sup>1</sup>.

---

1. PAE is an extension that enables Intel compatible computers to address more than 4 GB of physical memory.

## **nView Desktop Manager Enhancements**

---

- Seamless nView support between 32-bit and 64-bit processes on Windows 64-bit Edition
- Dual NVKeystone support for independent keystone trapezoids under nView Span modes.
- Per-display Desktop Management

## **User Interface Enhancements**

---

- New application profiles capability lets you associate a collection of driver settings—such as antialiasing and display quality settings—with an application.
- Easy access standalone panel, independent of the Microsoft Display Properties window.
- Improved multi-adapter support.
- Improved TV and HDTV Controls

## **Video Support Enhancements**

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- Advanced de-interlacing and inverse 3:2 pull-down capability
- Enhanced HDTV and Media Center support

## **3D Graphics API Enhancements**

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### **Direct3D**

- Improved antialiasing performance
- Improved shaders

### **OpenGL**

New extension: `GL_NV_pixel_buffer_object`



# Hardware and Software Support

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## Supported Operating Systems

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This Release 55 driver includes drivers designed for the following Microsoft® operating systems:

- Microsoft Windows® XP
  - Windows XP Media Center Edition 2004
  - Windows XP Professional
  - Windows XP Home Edition
- Microsoft Windows 2000 and Windows NT® 4.0
- Microsoft Windows 95, Windows 98, and Windows Millennium Edition (Me), collectively called Windows 9x in this document

## Supported NVIDIA Products

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Table 3.1 lists the NVIDIA products supported by the Release 55 driver. The products are listed in the approximate order of their performance.

**Table 3.1** Supported NVIDIA GPU-Based Products

NVIDIA Desktop Products	NVIDIA Workstation Products	Number of Displays Supported Per Card
nForce™2 S nForce2 ST nForce2 G nForce2		2 — applies to all GPUs in this category.
nForce 420/420D nForce 220/220D		1 — applies to all GPUs in this category.
GeForce FX 5950 Ultra		2 — applies to all GPUs in this category.
GeForce FX 5700 Ultra GeForce FX 5700	Quadro FX 1100	2 — applies to all GPUs in this category.
GeForce FX 5900 GeForce FX 5900 Ultra GeForce FX 5900 XT	Quadro FX 3000	2 — applies to all GPUs in this category.
GeForce FX 5200 Ultra GeForce FX 5200	Quadro FX 500 Quadro NVS 280 PCI	2 — applies to all GPUs in this category.
GeForce FX 5600 Ultra GeForce FX 5600		2 — applies to all GPUs in this category.
GeForce FX 5800 Ultra GeForce FX 5800	Quadro FX 2000 Quadro FX 1000	2 — applies to all GPUs in this category.

**Table 3.1** Supported NVIDIA GPU-Based Products (continued)

<b>NVIDIA Desktop Products</b>	<b>NVIDIA Workstation Products</b>	<b>Number of Displays Supported Per Card</b>
GeForce4 Ti 4800 GeForce4 Ti 4800 SE GeForce4 Ti 4200 w/AGP 8x	Quadro4 980 XGL Quadro4 780 XGL	2 — applies to all GPUs in this category.
GeForce4 Ti 4600 GeForce4 Ti 4400 GeForce4 Ti 4200	Quadro4 900 XGL Quadro4 750 XGL Quadro4 700 XGL	2 — applies to all GPUs in this category.
GeForce3 GeForce3 Ti 500 GeForce3 Ti 200	Quadro DCC	1 — applies to all GPUs in this category.
GeForce4 MX 440 w/AGP 8x GeForce4 MX 440 SE w/AGP 8x	Quadro4 580 XGL Quadro NVS 280 Quadro4 380 XGL	2 — applies to all GPUs in this category.
GeForce4 MX 460 GeForce4 MX 440 GeForce4 MX 440-SE GeForce4 MX 420	Quadro4 550 XGL Quadro NVS 200	2 — applies to all GPUs in this category.
	Quadro NVS 400	4 — applies to all GPUs in this category.
GeForce2 Ti GeForce2 Ultra GeForce2 Pro GeForce2 GTS	Quadro2 Pro	1 — applies to all GPUs in this category.
GeForce2 MX GeForce2 MX400 GeForce2 MX200 GeForce2 MX100	Quadro2 MXR Quadro2 EX	2 — applies to all GPUs in this category.
GeForce 256	Quadro	1 — applies to all GPUs in this category.
RIVA TNT2™ Ultra RIVA TNT2 Pro RIVA TNT2 RIVA TNT2 M64 NVIDIA Vanta NVIDIA Vanta LT		1 — applies to all GPUs in this category.

## Supported Languages

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The Release 55 Drivers for Windows supports the following languages in the main driver Control Panel:

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

# Driver Installation

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## System Requirements

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- “Minimum Hard Disk Space” on page 22
- “Additional Operating System Requirements” on page 23

## Minimum Hard Disk Space

The minimum hard disk space requirement for each operating system are listed in Table 3.2, Table 3.3, and Table 3.4:

**Table 3.2** Hard Disk Space Requirements—English

Operating System	Minimum Hard Disk Space
Windows XP (all editions)	21.1 MB
Windows 2000	19.2 MB
Windows NT 4.0	15.0 MB
Windows Me	18.7 MB
Windows 98	19.3 MB
Windows 95	19.3 MB

**Table 3.3** Hard Disk Space Requirements—Non-English Languages

Operating System	Minimum Hard Disk Space
Windows XP (all editions)	24.9 MB
Windows 2000	24.9 MB
Windows NT 4.0	24.8 MB
Windows Me	24.8 MB
Windows 98	24.8 MB
Windows 95	24.8 MB

**Table 3.4** Hard Disk Space Requirements—Full International Package

Operating System	Minimum Hard Disk Space
Windows XP (all editions)	34.2 MB
Windows 2000	44.1 MB
Windows NT 4.0	29.4 MB
Windows Me	33.0 MB
Windows 98	44.1 MB
Windows 95	44.1 MB

## Additional Operating System Requirements

The operating systems in [Table 3.5](#) require the additional packages listed in order to be supported by NVIDIA.

**Table 3.5** Additional Operating System Requirements

Operating System	Additional Requirements
Windows NT 4.0	Service Pack 4
Windows 98	Microsoft DirectX™ 5
Windows 95	OSR2 (OEM Service Release 2) with USB supplement for AGP Microsoft OPENGL32.DLL Microsoft DirectX 5

## Installation Instructions

### Before You Begin

- If you do not have System Administrator access privileges, it is assumed that the appropriate person with System Administrator access in your organization will set up and install the NVIDIA Display Driver software on your computer.
- The installation process copies all necessary files for operation into the appropriate directories.
- The nView system files are copied to your `Windows\System` directory.
- Profile files are saved in the `Windows\Nview` directory.
- As part of the install process, an uninstall is registered in your system.
- Under Windows Me and Windows XP, the NVIDIA driver is installed in “Dualview mode” display. However, note that the second display is not activated by default, but must be enabled.
- Under Windows 2000, the NVIDIA Display Driver is installed in Span mode.

## Preserving Desktop Manager Settings Before Upgrading Your Software

You can preserve your Desktop Manager settings by using profiles when you upgrade your software.

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

- 1** Before uninstalling or installing software, save your current nView Desktop Manager settings to a new profile.  
For example, name this profile "My Settings".
- 2** Open the `Windows\nView` directory.  
You should see your new profile `.tvp` file in this directory; for example, `My Settings.tvp`.
- 3** You can copy this file to a disk in your A: drive *or* to a different directory on your hard drive.
- 4** Uninstall the currently installed NVIDIA Display Driver software on your system. See "Uninstalling the NVIDIA Display Driver Software" on page 25.
- 5** Install the new version of the NVIDIA Display Driver software.
- 6** Copy your profile `.tvp` file back into the `Windows\nView` directory.
- 7** Start nView Desktop Manager and load your profile.  
When you load this profile, all your nView Desktop Manager settings, including Application Position Memory (APM) and/or Individual Application Settings (IAS) you may have set up for an application, will be restored.

## Uninstalling the NVIDIA Display Driver Software

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

To uninstall the nView software, follow these steps:

- 1 From the Windows desktop, click **Start > Settings > Control Panel > Add/Remove Programs**.
- 2 Click the “NVIDIA Display Drivers” choice from the list that appears.
- 3 Click **Change/Remove**.
- 4 Click **Yes** to continue.
- 5 A prompt appears asking whether you want to delete all of the saved nView profiles.  
*Note: If you click **Yes**, all of the nView software and all of your saved profiles will be deleted. If you click **No**, the nView software is removed, but the profile files are saved in the `Windows\nView` directory on your hard disk.*
- 6 Your system now restarts.

## Installing the NVIDIA ForceWare Graphics Drivers

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





## CHAPTER

## 4

# NVIDIA DRIVER HISTORY

This chapter provides the driver release history and summarizes the features and enhancements that have been introduced in each release. It contains these sections:

- “Driver Release History” on page 28
- “Release 50 Enhancements” on page 28
- “Release 40 Enhancements” on page 32
- “Release 35 Enhancements” on page 34
- “Release 25 Enhancements” on page 35
- “Release 20 Enhancements” on page 36
- “Release 10 Enhancements” on page 36

## Driver Release History

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Release 55 is the latest NVIDIA driver available. [Table 4.1](#) contains a summary of some previous driver releases and the versions associated with them. Some versions listed may not have been released outside of NVIDIA.

**Table 4.1** NVIDIA Drivers for Windows

Driver	Name	Versions	Comments
Release 50	ForceWare	50.01–54.xx	Releases ongoing
Release 40	Detonator FX	44.03–45.xx	Releases ongoing
Release 40	Detonator 40	40.60–44.02	
Release 35	Detonator 35	35.60–37.80	
Release 25	Detonator 25	26.00–32.90	
Release 20	Detonator XP	21.83–23.xx	
Release 10	Detonator 3 v1x.xx	10.00–17.xx	

## Release 50 Enhancements

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The Release 50 driver offers new features not found in previous releases of the NVIDIA Driver for Windows.

### 64-Bit Support

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Driver Release 50 offers AMD64 and IA64 OS support.

### Dynamic Memory Mapping

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Dynamic memory mapping adds support for 256 MB graphics cards for video, display, and OpenGL drivers.

### NVIDIA Unified Compiler

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As today's GPUs become more and more programmable they are entering a similar era to that of the CPU. For CPUs, it is common for developers to implement code paths specifically optimized for AMD or Intel (e.g MMX and 3DNow!). Programmable GPUs are no different. Because architectures vary, it makes sense that one common assembly language can't cover all the nuances of specific GPU micro-architectures. In fact, different code paths make different GPUs go faster. As a result with the GeForce FX architecture, NVIDIA has implemented a GPU-specific compiler that can be used to optimize application performance.

## Display Driver Changes and New Features

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- **Rotation support**

Added to Windows Me/9x.

- **Custom resolutions**

Provides the user with the ability to construct new modes via the NVIDIA control panel.

- **Screen editing**

Allows removing infrequently used screens by dragging them from the NVIDIA screen menu to a list. Screens can be restored by simply clicking the **Restore Defaults** option or by dragging them back to the menu.

- **Dynamic EDIDs**

Updates the master mode list with new modes contained in the connected device's EDID.

- **Support for special panels and devices**

- Large panels
- Wide panels
- Seamless Span modes in the mode list to support T221 style large panels
- Interlaced modes for HDTV
- DVI device hot plugging

- **Frame Lock functionality**

Enables synchronizing applications across multiple displays for Quadro FX series of GPUs.

- **Edge Blend functionality**

Enables blending the adjacent edges of overlapped displays on projection systems for Quadro FX series of GPUs.

## Video—New Features

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### Video Mixing Renderer (VMR) support

VMR support is provided for full-screen video and Microsoft's DirectX Video Acceleration (DXVA).

## PowerMizer—New Features

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- **Dynamic peak power control**
- **Thermal Protection version 2.0**

## User Interface Changes

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### New Features

- **Dualview**

This feature is available and supported as a single-step process from the nView Display Modes panel and APIs. Switching in and out of all driver modes is possible with several choices for display device pairs:

- Analog display + digital display
  - Digital display + analog display
  - TV + digital display
  - Other combinations
- **Change Resolution panel**
  - **Improved Color Correction panel with enhanced Gamma**
  - **HDTV support**

### Improvements

- **Menus for NVIDIA user components**
- **Easy access to nView Display Mode or Windows Display Properties Settings through the NVIDIA Settings taskbar utility**
- **Panel access for non-administrator users**
- **Tool tips for the scroll bar on the NVIDIA menu**
- **Improved Performance and Quality Settings panel**
- **Improved TV-Out settings panel**
- **Improved device selection (display pairs)**
- **Separate Overlay Controls panel**
- **Separate Full Screen Video settings panel**

### nView

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- **Action Toolbar**
- **Kinematic mouse actions**
- **Resolution per Desktop support**
- **Application monitor exclusions and inclusions**

- **Internet Explorer pop-up prevention**
- **Monitor grids**
- **Keystone luma compensation**
- **Multiview support**
- **nViewCmd**
- **NVManagement**
- **Faster Desktop switching**
- **Integrated control panels**
- **New Setup Wizard**
- **Driver independence**

## **DirectX Graphics**

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- **Floating point render targets**
- **Multi-element textures**
- **Improved antialiasing compatibility**
- **Improved shader handling and stability**
- **Improved render-to-texture performance**

## **OpenGL**

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- **Windows 9x Rotation support**
- **New supported extension:** `GL_ARB_occlusion_query`
- **Faster Vertex Processing Pipeline**  
Improved geometry processing and display list support provided.
- **Faster vertex and fragment program compilers**
- **Improved support for** `ARB_vertex_buffer_object` **extension (vbo)**
- **Improved stability during mode switches, antialiasing, and UBB**
- **Faster texture downloads**

## Release 40 Enhancements

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The Release 40 driver offers new features not found in previous releases of the NVIDIA Driver for Windows.

### Enhanced Display Driver, DirectX, and Video Capabilities

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- **Windows XP SP1**

- Release 40 supports Windows XP SP1, Windows Media Center edition, and Windows XP Tablet PC.
- Release 40 provides support for bugcheck EA callbacks, enabling OCA EA failures to be resolved more quickly while assisting to identify failure causes—such as due to chip instability or overclocking.

- **Rotation support**

Release 40 supports the NVRotate™ desktop rotation<sup>1</sup> feature, which allows the user to rotate the desktop by 90, 180, or 270 degrees.

- **DirectX 9 support**

With Microsoft's release of DirectX 9 runtime, Release 40 version 42.51 and later provides support for DirectX 9, which includes the new vertex shaders, antialiasing modes, and multi-display device support.

- **Video enhancements**

- Flip Sync functionality support
- Support for multiple Macrovision clients
- Simplified Video Mirror controls

- **TV Overscan support**

Depending on the TV encoder used, Release 40 supports TV overscan—allowing the user to eliminate the black borders around the TV display screen. This option is accessible through the NVIDIA display properties control panel.

---

1. Rotation is not supported on graphics cards based on the TNT, TNT2 or Vanta product families.

## New Graphical User Interface

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- **Media Center Tray application**

The Media Center Tray is a new application that replaces QuickTweak, and contains menu items that provide access to all NVIDIA user interface software applications.

- **New Display Properties panel**

The NVIDIA control panel has been redesigned to make navigating easier and to improve control over the display adapter settings.

## Enhanced nView Desktop Manager Features

---

- **Additional OS support**

NVIDIA nView supports Windows NT 4.0, Windows 9x/Me, and Windows 2000/XP.

- **Zoom support**

New fixed-frame zoom and bi-directional zoom editing capability added.

- **NV-Switcher**

Improved ALT+TAB switcher which also supports Desktop switching and is expandable to other NVIDIA features.

- **Color-keyed windows**

Allows the user to color key windows for easy identification when activating them on the desktop.

- **Taskbar and menu transparency**

- **New window actions and application settings.**

- **Keystone support<sup>2</sup>**

---

2. Keystone is not supported on graphics cards based on the TNT, TNT2 or Vanta product families.

## OpenGL Enhancements

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- **OpenGL 1.4 ICD with NVIDIA extensions**

New extension includes ARB\_vertex\_program, which co-exists with NV\_vertex\_program.

- **Enhancements for workstation applications**

- NV1x line stipple enhancements, and NV2x 2-sided lighting optimizations
- Immediate mode optimizations for Solid Edge, and display list tuning for UGv17.

- **Multi-monitor improvements**

New accelerated spanning mode is enabled by default.

- **Reduced power consumption**

Release 40 utilizes CPU cycles more efficiently, resulting in reduced power consumption without sacrificing performance.

- **Dynamic AGP/Video memory management**

## Release 35 Enhancements

---

The Release 35 driver offers new features not found in previous releases of the NVIDIA Driver for Windows.

- **NVRotate™**

The NVRotate feature lets you view your Windows desktop in Landscape or Portrait mode. You can rotate desktop by 90, 180 and 270 degrees.

- **Improved and expanded NVIDIA nView Desktop Manager application**

nView Desktop Manager has now been redesigned with a convenient user interface and many new features and utilities designed to solve specific problems for users. Utilities such as anti-keystoning support and flat panel monitor calibration screens and utilities have been designed to improve windows multi-display usability.

For example, NVKeystone can be set to compensate for keystoning effects on your windows display, allowing you to fix distorted projection images. This feature is primarily for laptop (mobile) computers.

**Note:** For further details on NVKeystone and many new nView Desktop Manager features, see the *NVIDIA nView Desktop Manager User's Guide*.



## Release 25 Enhancements

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The Release 25 driver offers new features not found in previous releases of the NVIDIA Driver for Windows.

- **nView**

The latest multi-monitor technology encompassing driver support, multi-monitor GPU architecture, and desktop management support. nView consists of two main modules:

- nView Display Manager

New support for multi-monitor functionality, including Clone modes, and Horizontal and Vertical spanning modes.

- nView Desktop Manager

A control panel and desktop management engine for application window management and extension of functions, and support for multiple desktops.

- **Dualview support for Windows 2000**

- **Improved DirectX Video Acceleration (DXVA)**

- **Special support for NVIDIA NV25 capabilities**

- IDCT support for DirectX VA
- Improved antialiasing compatibility and performance
- Support for NV25 hardware overlays under OpenGL

- **Enhanced 3D stereo functionality**

- Support for lenticular lenses on LCDs
- Stereo DIN connector support
- VSYNC Off with 3D Stereo
- Stereo API for developers

- **OpenGL enhancement**

- New `render_to_texture` extension

## Release 20 Enhancements

---

The Release 20 driver offers new features not found in previous releases of the NVIDIA Driver for Windows.

- **OpenGL 1.3 ICD with NVIDIA extensions**
- **OpenGL performance optimizations**
- **Optimized DirectX pipeline with NVIDIA pixel and vertex shaders**
- **Full support for Windows XP, including**
  - Full hardware acceleration for Windows XP GUI features
  - Accelerated Windows XP 3D performance through the NVIDIA XPress Link technology

## Release 10 Enhancements

---

The Release 10 driver offers new features not found in previous releases of the NVIDIA Driver for Windows.

- **Support for Microsoft DirectX 8**
- **Support for Microsoft DirectX VA 1.0**
- **NVIDIA 3D Stereo (requires installation of the optional Stereoscopic driver)**

The driver provides stereoscopic viewing capabilities for games and still images.

- **Special support for NVIDIA GeForce3 capabilities:**
  - Pixel and Vertex Shader support for DirectX 8 and OpenGL<sup>®</sup>
  - Quincunx antialiasing option for enhanced image quality and performance
- **AMD<sup>®</sup> Athlon<sup>™</sup> Processor and Intel Pentium<sup>®</sup> 4 Processor optimizations**
- **Improved TwinView<sup>™</sup> interfaceStereo Support**

## APPENDIX



## MODE SUPPORT FOR WINDOWS

This chapter details the Windows modes supported by the Release 55 driver for NVIDIA products. It contains these sections:

- “Modes Supported by GPU” on page 38
- “Modes Supported by DACs and TV Encoders” on page 78

## Modes Supported by GPU

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This section lists the supported modes for the following product families:

- “TNT2 Products” on page 39
- “Vanta Products” on page 41
- “GeForce, GeForce2, GeForce3, and Quadro Products” on page 43
- “GeForce2 MX, GeForce4 MX, Quadro4 FX, GeForce4 Ti Product, and GeForce4 Integrated Families” on page 46
- “Integrated GeForce2 Product” on page 52
- “Quadro4 9xx / 7xx XGL Products” on page 54
- “GeForce FX Family” on page 60
- “Quadro FX / Quadro NVS Products” on page 66
- “Quadro FX 3000 Products” on page 72

The product family mode details in this section are given in table format as follows:

Resolution	Color Depth	Refresh Rates
------------	-------------	---------------

For example,

the following entry:

```
1024 x 768 32 60 70 72 75 85 100 120 140 144 150 170 200
indicates
```

- Resolution of 1024 x 768
- Color depth of 32 bpp
- Refresh rates of 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

**Note:**

- Horizontal spanning modes of 3840x108 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.

## TNT2 Products

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

- NVIDIA RIVA TNT2/TNT2 Pro
- NVIDIA RIVA TNT2 Ultra
- NVIDIA RIVA TNT2 Model 64/Model 64 Pro

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

---

320 x 200	16	60 70 72 75
320 x 240	16	60 70 72 75
400 x 300	16	60 70 72 75
480 x 360	16	60 70 72 75
512 x 384	16	60 70 72 75
640 x 400	16	60 70 72 75
640 x 480	16	60 70 72 75 85 100 120 140 144 150 170 200 240

720 x 480	16		60
720 x 576	16		60
800 x 600	16		60 70 72 75 85 100 120 140 144 170 200 240
1024 x 768	16		60 70 72 75 85 100 120 140 144 150 170 200
1152 x 864	16		60 70 72 75 85 100 120 140 144 150 170
1280 x 720	16		60 70 72 75 85 100 120 140 144 150
1280 x 768	16		60 70 72 75 85 100 120 140 144 150
1280 x 960	16		60 70 72 75 85 100 120 140 144 150
1280 x 1024	16		60 70 72 75 85 100 120 140 144 150
1600 x 900	16		60 70 72 75 85 100 120
1600 x 1024	16		60 70 72 75 85 100
1600 x 1200	16		60 70 72 75 85 100
1920 x 1080	16	30i	60 70 72 75 85 100
1920 x 1200	16		60 70 72 75 85
1920 x 1440	16		60 70 72 75
2048 x 1536	16		60

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320 x 200	32		60 70 72 75
320 x 240	32		60 70 72 75
400 x 300	32		60 70 72 75
480 x 360	32		60 70 72 75
512 x 384	32		60 70 72 75
640 x 400	32		60 70 72 75
640 x 480	32		60 70 72 75 85 100 120 140 144 150 170 200 240
720 x 480	32		60
720 x 576	32		60
800 x 600	32		60 70 72 75 85 100 120 140 144 170 200 240
1024 x 768	32		60 70 72 75 85 100 120 140 144 150 170
1152 x 864	32		60 70 72 75 85 100 120 140 150
1280 x 720	32		60 70 72 75 85 100 120
1280 x 768	32		60 70 72 75 85 100 120
1280 x 960	32		60 70 72 75 85 100 120
1280 x 1024	32		60 70 72 75 85 100 120
1600 x 900	32		60 70 72 75 85
1600 x 1024	32		60 70 72 75 85
1600 x 1200	32		60 70 72 75 85
1920 x 1080	32	30i	60 70 72 75
1920 x 1200	32		60 70
1920 x 1440	32		60

## Vanta Products

---

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

- NVIDIA Vanta/Vanta LT

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320 x 200	8		60 70 72 75
320 x 240	8		60 70 72 75
400 x 300	8		60 70 72 75
480 x 360	8		60 70 72 75
512 x 384	8		60 70 72 75
640 x 400	8		60 70 72 75
640 x 480	8		60 70 72 75 85 100 120 140 144 150 170 200 240
720 x 480	8		60
720 x 576	8		60
800 x 600	8		60 70 72 75 85 100 120 140 144 170 200 240
1024 x 768	8		60 70 72 75 85 100 120 140 144 150 170
1152 x 864	8		60 70 72 75 85 100 120 140 144 150
1280 x 1024	8		60 70 72 75 85 100 120
1600 x 1024	8		60 70 72 75 85
1600 x 1200	8		60 70 72 75 85
1920 x 1080	8	30i	60 70 72 75 85
1920 x 1200	8		60 70 72 75

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320 x 200	16		60 70 72 75
320 x 240	16		60 70 72 75
400 x 300	16		60 70 72 75
480 x 360	16		60 70 72 75
512 x 384	16		60 70 72 75
640 x 400	16		60 70 72 75
640 x 480	16		60 70 72 75 85 100 120 140 144 150 170 200 240
720 x 480	16		60
720 x 576	16		60
800 x 600	16		60 70 72 75 85 100 120 140 144 170 200 240
1024 x 768	16		60 70 72 75 85 100 120 140 144 150 170
1152 x 864	16		60 70 72 75 85 100 120 140 144 150
1280 x 1024	16		60 70 72 75 85 100 120
1600 x 1024	16		60 70 72 75 85
1600 x 1200	16		60 70 72 75 85

1920 x 1080	16	30i	60 70 72 75 85
1920 x 1200	16		60 70 72 75
-----			
320 x 200	32		60 70 72 75
320 x 240	32		60 70 72 75
400 x 300	32		60 70 72 75
480 x 360	32		60 70 72 75
512 x 384	32		60 70 72 75
640 x 400	32		60 70 72 75
640 x 480	32		60 70 72 75 85 100 120 140 144 150 170 200 240
720 x 480	32		60
720 x 576	32		60
800 x 600	32		60 70 72 75 85 100 120 140 144 170 200 240
1024 x 768	32		60 70 72 75 85 100 120 140 144 150 170
1152 x 864	32		60 70 72 75 85 100 120 140
1280 x 1024	32		60 70 72 75 85 100
1600 x 1024	32		60 70 72 75
1600 x 1200	32		60 70 72 75
1920 x 1080	32	30i	60 70 72
1920 x 1200	32		60



## **GeForce, GeForce2, GeForce3, and Quadro Products**

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

- NVIDIA GeForce 256
- NVIDIA GeForce DDR
- NVIDIA Quadro
- NVIDIA GeForce2 GTS/GeForce2 Pro
- NVIDIA GeForce2 Ti
- NVIDIA GeForce2 Ultra
- NVIDIA Quadro2 Pro
- NVIDIA GeForce3
- NVIDIA GeForce3 Ti 200
- NVIDIA GeForce3 Ti 500
- NVIDIA Quadro DCC

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

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

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

## **GeForce2 MX, GeForce4 MX, Quadro4 FX, GeForce4 Ti Product, and GeForce4 Integrated Families**

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

- NVIDIA GeForce2 MX/MX 400
- NVIDIA GeForce2 MX 100/200
- NVIDIA GeForce4 MX 460
- NVIDIA GeForce4 MX 440
- NVIDIA GeForce4 MX 420
- NVIDIA GeForce4 MX 440-SE
- NVIDIA GeForce MX 4000
- NVIDIA GeForce4 MX Integrated GPU
- NVIDIA GeForce4 Ti 4800
- NVIDIA GeForce4 Ti 4800 SE
- NVIDIA GeForce4 Ti 4600
- NVIDIA GeForce4 Ti 4400
- NVIDIA GeForce4 Ti 4200
- NVIDIA GeForce4 Ti 4200 with AGP8X
- NVIDIA Quadro4 550 XGL
- NVIDIA Quadro2 MXR/EX
- NVIDIA Quadro NVS
- NVIDIA Quadro4 580 XGL
- NVIDIA Quadro4 380 XGL

## Standard Modes

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

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

## Horizontal Spanning Modes

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

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

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

## Vertical Spanning Modes

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

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

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

## Integrated GeForce2 Product

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

- NVIDIA GeForce2 Integrated GPU

### Standard Modes

320 x 200	8	60 70 72 75
320 x 240	8	60 70 72 75
400 x 300	8	60 70 72 75
480 x 360	8	60 70 72 75
512 x 384	8	60 70 72 75
640 x 400	8	60 70 72 75
640 x 480	8	60 72 75 85 100
720 x 480	8	60
720 x 576	8	60
800 x 480	8	60 72 75 85 100
800 x 600	8	60 72 75 85 100
1024 x 768	8	60 72 75 85 100
1280 x 768	8	60 72 75 85 100
1280 x 1024	8	60 72 75 85 100
1600 x 900	8	60 72 75 85 100
1600 x 1200	8	60 72 75 85 100
1920 x 1080	8 30i	
1920 x 1200	8	60 72 75 85 100
1920 x 1440	8	60 72 75 85 100
2048 x 1536	8	60 72 75 85 100

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320 x 200	16	60 70 72 75
320 x 240	16	60 70 72 75
400 x 300	16	60 70 72 75
480 x 360	16	60 70 72 75
512 x 384	16	60 70 72 75
640 x 400	16	60 70 72 75
640 x 480	16	60 72 75 85 100
720 x 480	16	60
720 x 576	16	60

800 x 480	16	60	72 75 85 100
800 x 600	16	60	72 75 85 100
1024 x 768	16	60	72 75 85 100
1280 x 768	16	60	72 75 85 100
1280 x 1024	16	60	72 75 85 100
1600 x 900	16	60	72 75 85 100
1600 x 1200	16	60	72 75 85 100
1920 x 1080	16	30i	
1920 x 1200	16	60	72 75 85 100
1920 x 1440	16	60	72 75 85 100
2048 x 1536	16	60	72 75 85 100

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320 x 200	32	60 70 72 75
320 x 240	32	60 70 72 75
400 x 300	32	60 70 72 75
480 x 360	32	60 70 72 75
512 x 384	32	60 70 72 75
640 x 400	32	60 70 72 75
640 x 480	32	60 72 75 85 100
720 x 480	32	60
720 x 576	32	60
800 x 480	32	60 72 75 85 100
800 x 600	32	60 72 75 85 100
1024 x 768	32	60 72 75 85 100
1280 x 768	32	60 72 75 85 100
1280 x 1024	32	60 72 75 85 100
1600 x 900	32	60 72 75 85 100
1600 x 1200	32	60 72 75 85 100
1920 x 1080	32	30i
1920 x 1200	32	60 72 75 85 100
1920 x 1440	32	60 72 75
2048 x 1536	32	60 72

## Quadro4 9xx / 7xx XGL Products

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

- NVIDIA Quadro4 900 XGL
- NVIDIA Quadro4 750 XGL
- NVIDIA Quadro4 700 XGL
- NVIDIA Quadro4 980 XGL
- NVIDIA Quadro4 780 XGL

### Standard Modes

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

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

## Horizontal Spanning Modes

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

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

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

## Vertical Spanning Modes

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

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

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

## GeForce FX Family

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

- NVIDIA GeForce FX 5950 Ultra
- NVIDIA GeForce FX 5900 Ultra
- NVIDIA GeForce FX 5900
- NVIDIA GeForce FX 5900XT
- NVIDIA GeForce FX 5800 Ultra
- NVIDIA GeForce FX 5800
- NVIDIA GeForce FX 5700 Ultra
- NVIDIA GeForce FX 5700
- NVIDIA GeForce FX 5600 Ultra
- NVIDIA GeForce FX 5600
- NVIDIA GeForce FX 5200 Ultra
- NVIDIA GeForce FX 5200

## Standard Modes

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

1280 x 1024	8		60 70 72 75 85 100 120 140 144 150 170
1360 x 768	8		60 70 72 75 85 100 120 140 144 150 170
1600 x 900	8		60 70 72 75 85 100 120 140 144 150
1600 x 1024	8		60 70 72 75 85 100 120
1600 x 1200	8		60 70 72 75 85 100 120
1920 x 1080	8	30i	60 70 72 75 85 100
1920 x 1200	8		60 70 72 75 85 100
1920 x 1440	8		60 70 72 75 85
2048 x 1536	8		60 70 72 75 85

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

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

## Horizontal Spanning Modes

1280 x 480	8		60 70 72 75 85 100 120 140 144 150 170 200 240
1600 x 600	8		60 70 72 75 85 100 120 140 144 150 170 200 240
1696 x 480	8		60 70 72 75 85 100 120 140 144 150 170 200 240
2048 x 768	8		60 70 72 75 85 100 120 140 144 150 170 200 240
2176 x 612	8		60 70 72 75 85 100 120 140 144 150 170 200 240
2304 x 864	8		60 70 72 75 85 100 120 140 144 150 170 200
2560 x 720	8		60 70 72 75 85 100 120 140 144 150 170
2560 x 768	8		60 70 72 75 85 100 120 140 144 150 170
2560 x 960	8		60 70 72 75 85 100 120 140 144 150 170
2560 x 1024	8		60 70 72 75 85 100 120 140 144 150 170

2720 x 768	8		60 70 72 75 85 100 120 140 144 150 170
3200 x 900	8		60 70 72 75 85 100 120 140 144 150
3200 x 1024	8		60 70 72 75 85 100 120
3200 x 1200	8		60 70 72 75 85 100 120
3840 x 1080	8	30i	60 70 72 75 85 100
3840 x 1200	8		60 70 72 75 85 100
3840 x 1440	8		60 70 72 75 85
4096 x 1536	8		60 70 72 75 85

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

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1280 x 480	32		60 70 72 75 85 100 120 140 144 150 170 200 240
1600 x 600	32		60 70 72 75 85 100 120 140 144 150 170 200 240
1696 x 480	32		60 70 72 75 85 100 120 140 144 150 170 200 240
2048 x 768	32		60 70 72 75 85 100 120 140 144 150 170 200
2176 x 612	32		60 70 72 75 85 100 120 140 144 150 170 200
2304 x 864	32		60 70 72 75 85 100 120 140 144 150 170
2560 x 720	32		60 70 72 75 85 100 120 140 144 150
2560 x 768	32		60 70 72 75 85 100 120 140 144 150
2560 x 960	32		60 70 72 75 85 100 120 140 144 150

2560 x 1024	32		60 70 72 75 85 100 120 140 144 150
2720 x 768	32		60 70 72 75 85 100 120 140 144 150
3200 x 900	32		60 70 72 75 85 100 120
3200 x 1024	32		60 70 72 75 85 100
3200 x 1200	32		60 70 72 75 85 100
3840 x 1080	32	30i	60 70 72 75 85
3840 x 1200	32		60 70 72 75 85
3840 x 1440	32		60 70 72 75 85
4096 x 1536	32		60 70 72 75 85

## Vertical Spanning Modes

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

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

1280 x 1920	16		60 70 72 75 85 100 120 140 144 150 170
1280 x 2048	16		60 70 72 75 85 100 120 140 144 150 170
1360 x 1536	16		60 70 72 75 85 100 120 140 144 150 170
1600 x 1800	16		60 70 72 75 85 100 120 140 144 150
1600 x 2048	16		60 70 72 75 85 100 120
1600 x 2400	16		60 70 72 75 85 100 120
1920 x 2160	16	30i	60 70 72 75 85 100
1920 x 2400	16		60 70 72 75 85 100
1920 x 2880	16		60 70 72 75 85
2048 x 3072	16		60 70 72 75 85

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

## Quadro FX / Quadro NVS Products

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

- NVIDIA Quadro FX 2000
- NVIDIA Quadro FX 1000
- NVIDIA Quadro NVS 280 PCI
- NVIDIA Quadro FX 500
- NVIDIA Quadro FX 1100

### Standard Modes

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



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

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

### Horizontal Spanning Modes

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

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

3840 x 1440	32	60	70 72 75 85
4096 x 1536	32	60	70 72 75 85

### Vertical Spanning Modes

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

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

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

## Quadro FX 3000 Products

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

- NVIDIA Quadro FX 3000

### Standard Modes

320 x 200	8	60	70 72 75	
320 x 240	8	60	70 72 75	
400 x 300	8	60	70 72 75	
480 x 360	8	60	70 72 75	
512 x 384	8	60	70 72 75	
640 x 400	8	60	70 72 75	
640 x 480	8	60	70 72 75 85 100 120 140 144 150 170 200 240	
720 x 480	8	60		
720 x 576	8	60		
800 x 600	8	50 60	70 72 75 85 100 120 140 144 150 170 200 240	
848 x 480	8	60	70 72 75 85 100 120 140 144 150 170 200 240	
960 x 1200	8		61	
1024 x 768	8	50 60	70 72 75 85 100 120 140 144 150 170 200 240	
1088 x 612	8	60	70 72 75 85 100 120 140 144 150 170 200 240	
1152 x 864	8	60	70 72 75 85 100 120 140 144 150 170 200	
1280 x 720	8	60	70 72 75 85 100 120 140 144 150 170	
1280 x 768	8	60	70 72 75 85 100 120 140 144 150 170	
1280 x 960	8	60	70 72 75 85 100 120 140 144 150 170	
1280 x 1024	8	50 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	50 60	70 72 75 85 100 120	
1920 x 1080	8	30i 60	70 72 75 85 100	
1920 x 1154	8	50		
1920 x 1200	8	50 60	70 72 75 85 100	
1920 x 1440	8	60	70 72 75 85	
2048 x 1536	8	60	70 72 75 85	

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320 x 200 16 60 70 72 75

320 x 240	16	60	70 72 75
400 x 300	16	60	70 72 75
480 x 360	16	60	70 72 75
512 x 384	16	60	70 72 75
640 x 400	16	60	70 72 75
640 x 480	16	60	70 72 75 85 100 120 140 144 150 170 200 240
720 x 480	16	60	
720 x 576	16	60	
800 x 600	16	50 60	70 72 75 85 100 120 140 144 150 170 200 240
848 x 480	16	60	70 72 75 85 100 120 140 144 150 170 200 240
960 x 1200	16	61	
1024 x 768	16	50 60	70 72 75 85 100 120 140 144 150 170 200 240
1088 x 612	16	60	70 72 75 85 100 120 140 144 150 170 200 240
1152 x 864	16	60	70 72 75 85 100 120 140 144 150 170 200
1280 x 720	16	60	70 72 75 85 100 120 140 144 150 170
1280 x 768	16	60	70 72 75 85 100 120 140 144 150 170
1280 x 960	16	60	70 72 75 85 100 120 140 144 150 170
1280 x 1024	16	50 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	50 60	70 72 75 85 100 120
1920 x 1080	16	30i 60	70 72 75 85 100
1920 x 1154	16	50	
1920 x 1200	16	50 60	70 72 75 85 100
1920 x 1440	16	60	70 72 75 85
2048 x 1536	16	60	70 72 75 85

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

960 x 1200	32		61																	
1024 x 768	32		50 60		70 72 75 85 100 120 140 144 150 170 200															
1088 x 612	32		60		70 72 75 85 100 120 140 144 150 170 200															
1152 x 864	32		60		70 72 75 85 100 120 140 144 150 170															
1280 x 720	32		60		70 72 75 85 100 120 140 144 150															
1280 x 768	32		60		70 72 75 85 100 120 140 144 150															
1280 x 960	32		60		70 72 75 85 100 120 140 144 150															
1280 x 1024	32		50 60		70 72 75 85 100 120 140 144 150															
1360 x 768	32		60		70 72 75 85 100 120 140 144 150															
1600 x 900	32		60		70 72 75 85 100 120															
1600 x 1024	32		60		70 72 75 85 100															
1600 x 1200	32		50 60		70 72 75 85 100															
1920 x 1080	32	30i	60		70 72 75 85															
1920 x 1154	32		50																	
1920 x 1200	32		50 60		70 72 75 85															
1920 x 1440	32		60		70 72 75 85															
2048 x 1536	32		60		70 72 75 85															

### Horizontal Spanning Modes

1280 x 480	8		60		70 72 75 85 100 120 140 144 150 170 200 240															
1600 x 600	8		50 60		70 72 75 85 100 120 140 144 150 170 200 240															
1696 x 480	8		60		70 72 75 85 100 120 140 144 150 170 200 240															
1920 x 1200	8			61																
2048 x 768	8		50 60		70 72 75 85 100 120 140 144 150 170 200 240															
2176 x 612	8		60		70 72 75 85 100 120 140 144 150 170 200 240															
2304 x 864	8		60		70 72 75 85 100 120 140 144 150 170 200															
2560 x 720	8		60		70 72 75 85 100 120 140 144 150 170															
2560 x 768	8		60		70 72 75 85 100 120 140 144 150 170															
2560 x 960	8		60		70 72 75 85 100 120 140 144 150 170															
2560 x 1024	8		50 60		70 72 75 85 100 120 140 144 150 170															
2720 x 768	8		60		70 72 75 85 100 120 140 144 150 170															
3200 x 900	8		60		70 72 75 85 100 120 140 144 150															
3200 x 1024	8		60		70 72 75 85 100 120															
3200 x 1200	8		50 60		70 72 75 85 100 120															
3840 x 1080	8	30i	60		70 72 75 85 100															
3840 x 1154	8		50																	
3840 x 1200	8		50 60		70 72 75 85 100															
3840 x 1440	8		60		70 72 75 85															
4096 x 1536	8		60		70 72 75 85															



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1280 x 480 16          60   70 72 75 85 100 120 140 144 150 170 200 240
1600 x 600 16        50 60   70 72 75 85 100 120 140 144 150 170 200 240
1696 x 480 16          60   70 72 75 85 100 120 140 144 150 170 200 240
1920 x 1200 16              61
2048 x 768 16        50 60   70 72 75 85 100 120 140 144 150 170 200 240
2176 x 612 16          60   70 72 75 85 100 120 140 144 150 170 200 240
2304 x 864 16          60   70 72 75 85 100 120 140 144 150 170 200
2560 x 720 16          60   70 72 75 85 100 120 140 144 150 170
2560 x 768 16          60   70 72 75 85 100 120 140 144 150 170
2560 x 960 16          60   70 72 75 85 100 120 140 144 150 170
2560 x 1024 16        50 60   70 72 75 85 100 120 140 144 150 170
2720 x 768 16          60   70 72 75 85 100 120 140 144 150 170
3200 x 900 16          60   70 72 75 85 100 120 140 144 150
3200 x 1024 16         60   70 72 75 85 100 120
3200 x 1200 16        50 60   70 72 75 85 100 120
3840 x 1080 16    30i   60   70 72 75 85 100
3840 x 1154 16        50
3840 x 1200 16        50 60   70 72 75 85 100
3840 x 1440 16          60   70 72 75 85
4096 x 1536 16         60   70 72 75 85
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1280 x 480 32          60   70 72 75 85 100 120 140 144 150 170 200 240
1600 x 600 32        50 60   70 72 75 85 100 120 140 144 150 170 200 240
1696 x 480 32          60   70 72 75 85 100 120 140 144 150 170 200 240
1920 x 1200 32              61
2048 x 768 32        50 60   70 72 75 85 100 120 140 144 150 170 200
2176 x 612 32          60   70 72 75 85 100 120 140 144 150 170 200
2304 x 864 32          60   70 72 75 85 100 120 140 144 150 170
2560 x 720 32          60   70 72 75 85 100 120 140 144 150
2560 x 768 32          60   70 72 75 85 100 120 140 144 150
2560 x 960 32          60   70 72 75 85 100 120 140 144 150
2560 x 1024 32        50 60   70 72 75 85 100 120 140 144 150
2720 x 768 32          60   70 72 75 85 100 120 140 144 150
3200 x 900 32          60   70 72 75 85 100 120
3200 x 1024 32         60   70 72 75 85 100
3200 x 1200 32        50 60   70 72 75 85 100
3840 x 1080 32    30i   60   70 72 75 85
3840 x 1154 32        50
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3840 x 1200	32	50 60	70 72 75 85
3840 x 1440	32	60	70 72 75 85
4096 x 1536	32	60	70 72 75 85

### Vertical Spanning Modes

640 x 960	8	60	70 72 75 85 100 120 140 144 150 170 200 240
800 x 1200	8	50 60	70 72 75 85 100 120 140 144 150 170 200 240
848 x 960	8	60	70 72 75 85 100 120 140 144 150 170 200 240
1024 x 1536	8	50 60	70 72 75 85 100 120 140 144 150 170 200 240
1088 x 1224	8	60	70 72 75 85 100 120 140 144 150 170 200 240
1152 x 1728	8	60	70 72 75 85 100 120 140 144 150 170 200
1280 x 1440	8	60	70 72 75 85 100 120 140 144 150 170
1280 x 1536	8	60	70 72 75 85 100 120 140 144 150 170
1280 x 1920	8	60	70 72 75 85 100 120 140 144 150 170
1280 x 2048	8	50 60	70 72 75 85 100 120 140 144 150 170
1360 x 1536	8	60	70 72 75 85 100 120 140 144 150 170
1600 x 1800	8	60	70 72 75 85 100 120 140 144 150
1600 x 2048	8	60	70 72 75 85 100 120
1600 x 2400	8	50 60	70 72 75 85 100 120
1920 x 2160	8	30i 60	70 72 75 85 100
1920 x 2308	8	50	
1920 x 2400	8	50 60	70 72 75 85 100
1920 x 2880	8	60	70 72 75 85
2048 x 3072	8	60	70 72 75 85

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640 x 960	16	60	70 72 75 85 100 120 140 144 150 170 200 240
800 x 1200	16	50 60	70 72 75 85 100 120 140 144 150 170 200 240
848 x 960	16	60	70 72 75 85 100 120 140 144 150 170 200 240
1024 x 1536	16	50 60	70 72 75 85 100 120 140 144 150 170 200 240
1088 x 1224	16	60	70 72 75 85 100 120 140 144 150 170 200 240
1152 x 1728	16	60	70 72 75 85 100 120 140 144 150 170 200
1280 x 1440	16	60	70 72 75 85 100 120 140 144 150 170
1280 x 1536	16	60	70 72 75 85 100 120 140 144 150 170
1280 x 1920	16	60	70 72 75 85 100 120 140 144 150 170
1280 x 2048	16	50 60	70 72 75 85 100 120 140 144 150 170
1360 x 1536	16	60	70 72 75 85 100 120 140 144 150 170
1600 x 1800	16	60	70 72 75 85 100 120 140 144 150
1600 x 2048	16	60	70 72 75 85 100 120

1600 x 2400	16		50 60	70 72 75 85 100 120
1920 x 2160	16	30i	60	70 72 75 85 100
1920 x 2308	16		50	
1920 x 2400	16		50 60	70 72 75 85 100
1920 x 2880	16		60	70 72 75 85
2048 x 3072	16		60	70 72 75 85
-----				
640 x 960	32		60	70 72 75 85 100 120 140 144 150 170 200 240
800 x 1200	32		50 60	70 72 75 85 100 120 140 144 150 170 200 240
848 x 960	32		60	70 72 75 85 100 120 140 144 150 170 200 240
1024 x 1536	32		50 60	70 72 75 85 100 120 140 144 150 170 200
1088 x 1224	32		60	70 72 75 85 100 120 140 144 150 170 200
1152 x 1728	32		60	70 72 75 85 100 120 140 144 150 170
1280 x 1440	32		60	70 72 75 85 100 120 140 144 150
1280 x 1536	32		60	70 72 75 85 100 120 140 144 150
1280 x 1920	32		60	70 72 75 85 100 120 140 144 150
1280 x 2048	32		50 60	70 72 75 85 100 120 140 144 150
1360 x 1536	32		60	70 72 75 85 100 120 140 144 150
1600 x 1800	32		60	70 72 75 85 100 120
1600 x 2048	32		60	70 72 75 85 100
1600 x 2400	32		50 60	70 72 75 85 100
1920 x 2160	32	30i	60	70 72 75 85
1920 x 2308	32		50	
1920 x 2400	32		50 60	70 72 75 85
1920 x 2880	32		60	70 72 75 85
2048 x 3072	32		60	70 72 75 85

## Modes Supported by DACs and TV Encoders

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

- “External DAC Mode Support” on page 78
- “TV-Out Mode Support” on page 79

### External DAC Mode Support

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#### Fairchild FMS3815 Modes Supported

Table A.1 shows the refresh rates for various resolutions of the Fairchild FMS3815 external DAC, which is commonly used on GeForce2 MX and Quadro2 MXR boards to drive a secondary CRT.

**Table A.1** External DAC Modes (Fairchild FMS3815)

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

#### Analog Devices ADV-7123 Modes Supported

Table A.2 shows the refresh rates for various resolutions of the Analog Devices ADV-7123 external DAC, which is commonly used on the GeForce2 MX and the Quadro2 MXR boards to drive a secondary CRT.

**Table A.2** External DAC Modes (Analog Devices ADV-7123)

Resolution	Supported Rates (Hz)
640x480	60, 70, 72, 75, 85, 100, 120, 140, 144, 150, 170
800x600	60, 70, 72, 75, 85, 100, 120, 140, 144, 150, 170
1024x768	60, 70, 72, 75, 85, 100, 120
1152x864	60, 70, 72, 75, 85, 100
1280x720	60, 70, 72, 75, 85, 100
1280x960	60, 70, 72, 75, 85, 90
1280x1024	60, 70, 72, 75, 85

**Table A.2** External DAC Modes (Analog Devices ADV-7123) (continued)

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

## TV-Out Mode Support

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

**Table A.3** Mode Support for TV-Out

Resolution	Bitdepth	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
480i (SDTV)	N/A	Supported on graphics boards with Conexant 875 or Philips 7108 TV encoders and compatible connectors.
480p (EDTV)	N/A	Supported on graphics boards with Conexant 875 or Philips 7108 TV encoders and compatible connectors.
720p (HDTV)	N/A	Supported on graphics boards with Conexant 875 or Philips 7108 TV encoders and compatible connectors.
1080i (HDTV)	N/A	Supported on graphics boards with Conexant 875 or Philips 7108 TV encoders and compatible connectors.