



ForceWare Graphics Drivers ***Release 65 Notes***

Version 67.66

For Windows XP / 2000

Windows XP Media Center Edition

Windows 98 / ME

Windows NT 4.0

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CHAPTER

1

INTRODUCTION TO *RELEASE 65 NOTES*

This edition of *Release 65 Notes* describes the Release 65 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

This document is organized in the following sections:

- [“Release 65 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 65 Driver” on page 25](#) describes the NVIDIA products and languages supported by this driver, the system requirements, and how to install the driver.
- [“NVIDIA Driver History” on page 136](#) describes the new features included in the Release 65 driver as well as information on previous driver releases.
- [“Mode Support for Windows” on page 49](#)

Changes in this Edition

This edition of *Release 65 Notes* includes information about version 67.66 of the Release 65 driver. It discusses changes made to the driver since version 61.76. These changes are discussed beginning with the chapter [“Release 65 Driver Issues” on page 3](#).

CHAPTER

2

RELEASE 65 DRIVER ISSUES

This chapter describes open issues for version 67.66, and resolved issues and driver enhancements for versions of the Release 65 driver up to version 67.66. The chapter contains these sections:

- “Open Issues in Version 67.66” on page 3
- “Issues Resolved in Version 67.66” on page 6
- “Issues Resolved in Version 67.03” on page 7
- “Issues Resolved in Version 67.02” on page 8
- “Issues Resolved in Version 66.93” on page 9
- “Known Product Limitations” on page 11

Open Issues in Version 67.66

As with every released driver, version 67.66 of the Release 65 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.

- GeForce 6 Series: When performing 4:3 PanScan of VMR7 or VMR9 DVD playback, the screen does not pan nor is the screen centered.
A fix for this will be included in the next driver release.
- SLI Cards: The game Lock On Modern Air Combat has rendering issues with SLI mode enabled.
A fix for this will be included in the next driver release.

- GeForce 6600/6800 128MB: 3D Mark 2003 demo mode results in an out of memory error at 1600x1200x32 with 4x antialiasing enabled.

This is not a bug. The problem occurs because there is not enough memory to run 3D Mark03 in this mode with a 128MB board.

- Single display modes such as TV only, DFP/LCD only or CRT only provide the best performance and quality from Windows Media Center Edition.

Dual display modes such Dualview and nView Clone and Span modes are not recommended.

- When using the trial version of WinDVD 6 from InterVideo.com, you may experience TV or DVD playback problems in Windows Media Center if you change resolutions during video playback. This is most often seen when switching from windowed to full screen mode.

This problem does not occur with the latest full OEM versions of WinDVD or with other Windows Media Center qualified DVD decoders.

- GeForce 6800: Code Creatures Benchmark shows screen corruption at 1600x1200x32 with 8x antialiasing enabled.

A fix for this will be included in the next driver release.

- GeForce 6600: Artifacts appear in the intro videos and during game play in Tomb Raider: Angel of Darkness at 1600x1200 and with 4x antialiasing enabled.

A fix for this will be included in the next driver release.

- GeForce 6600: Minor flickering in Return of Wolfenstein: Enemy Territory when antialiasing is enabled at high resolutions.

A fix for this will be included in the next driver release.

- GeForce4 Ti/GeForce 6800: Command and Conquer: Generals has corruption when both antialiasing is enabled in the NVIDIA control panel and in-game image quality is set to "High".

A fix for this will be included in the next driver release.

- GeForce 6800: Aspect ratio is incorrect when movie transitions from 4:3 to 16:9 playback using PowerDVD5 Trail (download from the Cyberlink Web site).

This is an application issue. The problem does not occur with other DVD players.

- If you perform a clean driver installation (no previous NVIDIA drivers installed), **you must reboot your computer.** If you do not

reboot, the predefined application profiles will not be activated and you may experience application stability problems.

- Windows XP/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.

- 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.

Issues Resolved in Version 67.66

The following are changes made and issues resolved since driver version 67.03:

- SLI cards: Half Life 2 performance drops on "canals" demo with SLI enabled.
- GeForce 6800 Ultra, SLI: No performance difference with the game Lock On Modern Air Combat when SLI mode is enabled.
- GeForce 6800: Incorrect fog for underwater objects in Half Life 2.
- SLI cards: Shadows flicker with Source engine games like Half-Life 2 and Counter-Strike when SLI mode is enabled.
- Windows XP Media Center Edition, GeForce 6600: Graphical distortion appears intermittently when cycling through the Media Center menus.
- Windows XP Media Center Edition, GeForce 6600: From HDTV component-out, changing the resolution from 1080i or 720p to 480p results in 480i being set instead.
- GeForce 6600 GT: NVIDIA Color Correction does not work when playing video using VMR.
- GeForce 6800 LE, PCI-Express: With an HDTV as the secondary display in Clone mode, the TV loses sync when changing the resolution to 1080i with Keep Native HDTV resolution selected.
- Windows Media Center Edition, GeForce PCX 5300: When using HDTV over DVI, 1080i mode does not sync correctly in native and underscan modes.
- GeForce2, GeForce4 MX, Windows XP: City of Heroes crashes to the desktop intermittently.

Issues Resolved in Version 67.03

The following are changes made and issues resolved since driver version 67.02:

- GeForce 6600 GT AGP: Fixed a 3D corruption problem that appears when this card is used with certain motherboards, such as SIS motherboards.

Issues Resolved in Version 67.02

The following are changes made and issues resolved since driver version 66.93:

- Added new Performance and Quality option—**Negative LOD bias**

This control lets the user manually set negative LOD bias to “clamp” for applications that automatically enable anisotropic filtering.

Applications sometimes use negative LOD bias to sharpen texture filtering. This sharpens the stationary image but introduces aliasing when the scene is in motion. Because anisotropic filtering provides texture sharpening without unwanted aliasing, it is desirable to clamp LOD bias when anisotropic filtering is enabled.

When the user enables anisotropic filtering through the control panel, the control is automatically set to “Clamp”.

- GeForce FX 5950 Ultra: Operating system failure with the game Flat Out.
- GeForce FX 5950 Ultra, Windows XP: Shadows in the game Angel of Darkness render incorrectly in a room with two light sources.
- GeForce 6600, Windows XP Media Center: HDTV 1080i display corruption occurs when underscan mode is enabled.
- GeForce FX 5200, Windows XP: Character model shading in the game Tomb Raider: The Angel of Darkness is rendered red instead of gray.
- GeForce 6 series, Windows XP Media Center 2005: Live TV audio stutters when viewed in Clone mode using the NTVU Tuner card.
- GeForce 6800, Windows XP: Video smears once you toggle WMP10 to fullscreen mode while playing a WMV HD clip.

Issues Resolved in Version 66.93

Significant issues resolved in driver version 66.93 are listed below:

- Windows XP, Quadro FX 3400: CATIA - Extra lines displayed on Structural Anlysis.
- Windows XP, Quadro FX 3000, IBM T221 panel, DG5: Desktop appears elongated when HRSD is selected.
- Windows XP, Quadro FX 4000: Main grid is corrupted when starting Lightwave 8.0/7.5.
- Windows XP, GeForce FX 5700 Ultra, GeForce 6800: Corruption with vehicles and clouds in Sim City 4.
- Windows XP, GeForce PCX 5750: Command and Conquer Generals back screen is white (or green).
- Windows Media Center Edition: Live TV or DVD playback may stall or stutter when using the "Smart" deinterlacing setting in the NVIDIA DVD Decoder.
- GeForce FX 5200, Windows NT 4.0: Crash in Quake3 ver. 1.32 with Multiview.
- GeForce 6800, Windows XP: Corruption in the Far Cry loading screen before the map loads at 1600x1200x32 or greater resolutions with antialiasing enabled.
- Quadro FX 4000, Windows XP, Lightwave 8.0/7.5: Main grid is corrupted on startup.
- GeForce FX 5950 Ultra, Windows XP: Deus Ex 2 door button shader disappears.
- GeForce 6800, Windows XP: Corruption after screen shot attempted with antialiasing enabled in Far Cry.
- GeForce 6800: Cannot set refresh rate of 48 Hz for 3840x2400.
- Quadro FX 1100, Windows XP, Autodesk Inventor 8: Mipmapping is broken.
- Windows XP, Quadro 400 NVS: Non-admin accounts can enable multiview, but an error message appears after rebooting the system.
- Modo application crashes with GeForce Products.
- Windows XP, GeForce 6800: Microsoft Rallisport Challenge performace drops with antialiasing and lens flares enabled.
- Windows XP, Quadro NVS 200/280: Roaming profiles cannot be read or written.

- Windows XP, GeForce4 Ti: Kohan 2 has missing geometry.
- Windows XP: Manual downclocking does not work but locks to the defaults.
- Windows XP, GeForce FX 5700 Ultra, GeForce 6800: Corruption with vehicles and clouds in Sim City 4.
- Windows XP, GeForce4 Series, GeForce 6800: Fog problems with Men of Valor.
- Windows XP, Windows 2000, GeForce FX 5950: When the digital display is the primary in Clone mode, both TV and DFP are black upon resume from standby.
- This driver now supports PCI Express under the Windows NT 4.0 operating system.

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:

- “DVD Playback Issues with Dual Quadro NVS Cards” on page 12
- “PowerDVD 5.0 Does Not Display Correctly in nView Span Mode” on page 12
- “DirectX Fails When Detaching/Reattaching Displays in Dualview Mode” on page 12
- “OpenGL Viewport Scaling Problem in Horizontal Span Mode” on page 13
- “Driver Reports 256 MB Memory on Quadro FX 330 Cards” on page 13
- “Video Playback in nView Clone and Span Modes” on page 13
- “Monitor Ordering in the Windows Settings Page” on page 14
- “DirectX Applications Run Only on Single Display Even in Multiview Mode” on page 15
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- “Advanced Timing Adjustment Limitations” on page 17
- “No Antialiasing of 3DMark03 Image Quality Screen Captures” on page 17
- “Medal of Honor Under Windows XP / Windows 2000” on page 18
- “Hide Modes Check Box Cannot be Cleared” on page 18
- “Windows 2000 Issue with Settings Tab Monitor Positioning” on page 19
- “Gigabyte GA-6BX Motherboard” on page 19
- “Controlling Windows 9x TV Tuner Scaling Artifacts” on page 19
- “Quake III Arena malloc() Error on TNT2” on page 20
- “Windows Media Player Hangs Playing MPEG Files” on page 20
- “AVI Playback Problems With Older Intel Indeo Codecs” on page 21
- “Antialiasing Problems With Certain Applications” on page 21
- “VIA KX133 and 694X Chipsets With AGP 2X” on page 21
- “Irongate Chipsets With AGP 1X” on page 21

- “Poor Quality S-Video Output on Some TVs” on page 22
- “GLQuake Crash and Version 5.16 (or Later) Drivers” on page 22
- “Windows 98 and Windows Me MultiMon Support” on page 22
- “AGP Programs May Hang With Athlon Processor” on page 23
- “Desktop Manager Does Not Re-Center Logon Screen” on page 23
- “Issues with Video Mirror” on page 23

DVD Playback Issues with Dual Quadro NVS Cards

With both AGP and PCI Quadro NVS cards installed in the system, when attempting to play DVDs in full-screen mode on the display connected to the PCI card, the screen is blank.

This is not an NVIDIA bug, but rather a problem with older point releases of PowerDVD and WinDVD.

PowerDVD 5.0 Does Not Display Correctly in nView Span Mode

With nView Horizontal Span mode enabled, when the PowerDVD 5.0 playback window is dragged to the second display and then stretched to fill the display, the right area of the display is corrupted.

This is not an NVIDIA bug, but a problem with PowerDVD.

DirectX Fails When Detaching/Reattaching Displays in Dualview Mode

This problem can be duplicated as follows:

- 1 Enable both displays in Dualview mode.
- 2 Detach monitor 2 and apply settings.
- 3 Reattach monitor 2 and apply settings.

DirectX runtime fails on monitor 1.

This is not an NVIDIA bug, but a limitation in the operating system where DirectX does not enumerate the second device. DirectX can be restored to both displays by rebooting the system

OpenGL Viewport Scaling Problem in Horizontal Span Mode

With nView Horizontal Span mode enabled, when opening an OpenGL model in a viewport, the model image is scaled too large to fit in the viewport. The problem occurs with such applications as Maya 5.0 and 3D Studio MAX 4.26.

This is not an NVIDIA bug, but a limitation in the application's ability to properly maintain the aspect ratio in Horizontal Span mode.

Driver Reports 256 MB Memory on Quadro FX 330 Cards

- **Problem**

When a 64 MB Quadro FX 330 card is installed, the driver reports that the card needs 256 MB, causing 256 MB of address space to be consumed.

- **Explanation**

This is not a bug but a product limitation.

The Quadro FX 330 card is hardware strap limited, and consequently causes the software to report that the card requires 256 MB of address space.

Video Playback in nView Clone and Span Modes

- **Problem**

With nView Clone or Span mode enabled, video playback appears on only one display under the following conditions:

- Under nView Clone mode, when fullscreen video mirror is not used.
- Under nView Span mode, when fullscreen video mirror is not used and the video is positioned to span across both monitors.

- **Explanation**

With applications that render using the hardware overlay—such as DirectX applications—the default driver behavior for Release 60 is to enable the hardware overlay when nView Clone or Span mode is enabled.

Because the driver supports only one hardware overlay, the video appears on only one display.

Monitor Ordering in the Windows Settings Page

Monitor Ordering on a Single GPU

- **Issue**

The monitor order in the Display Properties Settings page is not consistently matched with the connectors on the graphics card.

- **Explanation**

The driver does not distinguish connector positions, but instead distinguishes the display type, and consequently assigns monitor numbers according to the display type and not according to the connector.

Monitor Ordering on a Multiple GPU System

- **Issue**

When four monitors are connected to a system with multiple PCI GPUs, such as a Quadro NVS 400 graphics card, and enabled in Dualview or Multiview mode, many customers expect the monitor ordering in the Display Properties Settings page to conform to the following:

Connector Position	Monitor Number
Primary GPU—Output 1	1
Primary GPU—Output 2	2
Secondary GPU—Output 1	3
Secondary GPU—Output 2	4

The monitor ordering, in fact, does not conform to this scheme.

- **Explanation**

The monitor ordering is not controlled by the driver, but rather by the Windows OS method of enumerating PCI devices. The Windows enumeration results in the following monitor numbering:

Connector Position	Monitor Number
Primary GPU—Output 1	1
Secondary GPU—Output 1	2
Primary GPU—Output 2	3
Secondary GPU—Output 2	4

Considerations for nView Span Modes: Outputs from the same GPUs are grouped together in nView Span modes, resulting in the desktop spanning across monitors 1 and 3, or across 2 and 4.

DirectX Applications Run Only on Single Display Even in Multiview Mode

- **Problem**

When running DirectX applications in fullscreen mode on an NVIDIA Multiview system, the application appears on only one display instead of all the displays.

A Multiview system consists of a Quadro NVS series graphics card with multiple monitors connected and multiview mode enabled.

- **Explanation**

The problem occurs only with DirectX /Direct3D applications that use full-screen exclusive mode. In order to support these applications, the driver must switch to single display mode and blank out the other displays.

In scenarios that require multiview functionality—such as when using screen savers—NVIDIA recommends using non-DirectX/Direct3D applications.

Applying Workstation Application Profiles

- **Background**

The workstation application profiles are software settings used by the NVIDIA Display Drivers to provide optimum performance when using a selected application. The profile also works around known application issues and bugs.

If there is an available setting for an application, it should be used, otherwise incorrect behavior or reduced performance is likely to occur.

- **Issues**

Application profile changes are subject to the following conditions:

- **Configuration Changes Require Application Restart**

Running applications do not receive notification of configuration changes, Therefore, if you change the configuration while the application is running, you must exit and restart the application for the configuration changes to take effect.

- **Some Profiles Release DirectDraw**

Some profiles release DirectDraw. If you change the configuration while the application is running, the application will not continue to run. You

must exit and restart the application. See the table below for a list of application profiles that release DirectDraw.

- **Some Profiles Require System Reboot**

See the table below for a list of application profiles that require system reboot for the configuration changes to take effect.

Table 2.1 Workstation Application Profile Issues

Application Profile Name	Releases Direct Draw	Requires a Reboot to take effect
Ansys	X	
Cadcentre PDMS	X	
CATIA	X	
CDRS	X	
ESPRi	X	
Exceed	X	
I-DEAS Master Series	X	
ICEM Surf	X	
IronCAD	X	
Large Model CAD	X	X
Microstation	X	
NADAMS	X	
NASTRAN, Patran	X	
OneSpace Designer	X	
OneSpace Designer-Large Model	X	X
Plant Designer, Imagineer	X	
Pro/ENGINEER	X	
Pro/ENGINEER Wildfire	X	
PTC DIVISION Mockup	X	
OneSpace Designer Modeling	X	
Solid Edge	X	
Solidworks	X	
ThinkDesign	X	
TOGO POST	X	
Unigraphics	X	

Advanced Timing Adjustment Limitations

- **Problem**

The Advanced Timing page—accessed from the NVIDIA Display Properties Change Resolution page—is not available for some cards using the DVI connector.

- **Explanation**

DVI timing adjustment is supported for NV3x-based cards only if they have an external TMDS, such as the SiliconImage 164.

If the card uses the internal TMDS, then the page is not accessible. However, cards with an internal TMDS can support refresh rates less than 60 Hz in this driver.

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 / 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® 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 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.

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

CHAPTER

3

THE RELEASE 65 DRIVER

This chapter covers the following main topics:

- “Hardware and Software Support” on page 25
- “Driver Installation” on page 28

See the chapter “Release 65 Enhancements” on page 138 for a summary of Release 65 features and enhancements.

Hardware and Software Support

Supported Operating Systems

This Release 65 driver includes drivers designed for the following Microsoft[®] operating systems:

- Microsoft Windows[®] XP
 - Windows XP Media Center Edition 2005
 - Windows XP Media Center Edition 2004
 - Windows XP Professional
 - Windows XP Home Edition
 - Windows XP 64-bit Edition for 64-Bit Extended Systems
 - Windows Server 2003 SP1 for 64-Bit Extended Systems
- Microsoft Windows 2000 and Windows NT[®] 4.0
- Microsoft Windows 98 and Windows Millennium Edition (Me), collectively called Windows 9x in this document

Supported NVIDIA Products

Table 3.1 lists the NVIDIA products supported by the Release 65 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
GeForce 6200	Quadro FX 4400
GeForce 6600	Quadro FX 540
GeForce 6600 GT	Quadro FX 1400
GeForce 6800 Ultra	Quadro FX 4000
GeForce 6800	Quadro FX 3400
GeForce 6800 GT	Quadro FX 1300
GeForce 6800 LE	Quadro FX 1100
GeForce FX 5950 Ultra	Quadro FX 330
GeForce FX 5700 Ultra	Quadro FX 3000(G)
GeForce FX 5700	Quadro FX 600
GeForce FX 5700LE	Quadro FX 500
GeForce FX 5700VE	Quadro NVS 280 PCI
GeForce PCX 5750	Quadro FX 2000
GeForce FX 5900	Quadro FX 1000
GeForce FX 5900 Ultra	Quadro FX 700
GeForce FX 5900 XT	
GeForce FX 5900ZT	
GeForce PCX 5900	
GeForce FX 5200 Ultra	
GeForce FX 5200 LE	
GeForce FX 5200	
GeForce FX 5500	
GeForce FX 5100	
GeForce PCX 5300	
GeForce FX 5600 Ultra	
GeForce FX 5600	
GeForce FX 5600XT	
GeForce FX 5600SE	
GeForce FX 5800 Ultra	
GeForce FX 5800	
GeForce4 Ti 4800	Quadro4 980 XGL
GeForce4 Ti 4800 SE	Quadro4 900 XGL
GeForce4 Ti 4200 w/AGP 8x	Quadro4 750 XGL
GeForce4 Ti 4600	Quadro4 700 XGL
GeForce4 Ti 4400	Quadro4 500 XGL
GeForce4 Ti 4200	
GeForce3	Quadro DCC
GeForce3 Ti 500	
GeForce3 Ti 200	

Table 3.1 Supported NVIDIA GPU-Based Products (continued)

NVIDIA Desktop Products	NVIDIA Workstation Products
GeForce4 MX 440 w/AGP 8x GeForce4 MX 440 SE w/AGP 8x GeForce4 MX 460 GeForce4 MX 440 GeForce4 MX 420 GeForce PCX 4300 GeForce4 MX Integrated Graphics	Quadro4 580 XGL Quadro NVS 280 Quadro4 380 XGL Quadro4 550 XGL Quadro NVS 200 Quadro NVS 400
GeForce2 Ti GeForce2 Ultra GeForce2 Pro GeForce2 GTS	Quadro2 Pro
GeForce2 MX GeForce2 MX400 GeForce2 MX200 GeForce2 MX100 GeForce2 MX Integrated Graphics	Quadro2 MXR Quadro2 EX
GeForce 256 GeForce 256 DDR	Quadro

Supported Languages

The Release 65 ForceWare Graphics Drivers supports the following languages in the main driver Control Panel:

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

Driver Installation

System Requirements

- “Minimum Hard Disk Space” on page 28
- “Additional Operating System Requirements” on page 29

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

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

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

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

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 graphics driver software on your computer.
- The installation process copies all necessary files for operation into the appropriate directories.
- The nView system files are copied to your **Windows\System** directory.
- nView Desktop Manager Profile files (*.tvp) are saved in the **Windows\Nview** directory.
Depending on the version of the NVIDIA driver previously installed, profiles may also be located in the **Documents and Settings\All Users\Application Data\nView_Profiles** directory.
- As part of the install process, an uninstall is registered in your system.
- Under Windows 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. See the instructions in the *ForceWare Graphics Drivers User’s Guide* for instructions on how to install nView DualView mode.

Preserving Settings Before Upgrading Your Software

Before uninstalling or installing software, you can preserve your nView Desktop Manager and/or NVIDIA Display settings by using the nView Desktop Manager Profiles features.

Note: Follow the steps below and/or refer to the *NVIDIA nView Desktop Manager User's Guide* for details. Under Windows XP/2000 and Windows NT 4.0, you must have, at least, **Power User** access privileges in order to create or save a profile. (Refer to Windows Help if you need an explanation of Power User access rights.)

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

- 1 Open the nView Desktop Manager Profiles page (Figure 4.1).
- 2 To preserve your current settings, you can use either the **Save** or the **New** option from the nView Desktop Manager Profiles page:
 - If you want to overwrite the currently loaded profile with your changed settings, use the **Save** option. Notice that a warning message indicates that you are about to overwrite the selected profile.
 - If you want to retain the currently loaded profile and want to save your changed settings to a new file, click the **New** option. Enter a name and description of the profile in the New Profile dialog box. For example, you can name this profile **My Settings**.
- 3 If you are an “advanced” user and want to customize certain settings in the saved profile, click **Advanced** << to expand the dialog box (Figure 4.2).
- 4 To customize the settings, you can select or clear any of the settings check boxes.
- 5 Click **Save** to return to the main Profiles page.

If you created a new profile, you will see the name of the newly created profile in the profiles list.

If you overwrote a current profile, the same profile name is retained in the list.

Note: nView Desktop Manager profile (. **tvp**) files are saved in the **Windows\nView** directory. Depending on the version of the NVIDIA driver previously installed, profiles may also be saved in the **Documents and Settings\All Users\Application Data\ nView_Profiles** directory.
- 6 Now you can uninstall your current driver for a driver upgrade.
- 7 After you restart your computer following an NVIDIA new driver install, you can easily load the saved profile from the Profiles page of nView Desktop Manager.

About Using Saved Profiles in Another Computer

You can easily use any saved profile (.tvp file in the **Windows\nView** directory) from one computer and use it in another computer, if you want. You'll need to copy it to the **Windows\nView** directory of a computer that has the NVIDIA ForceWare graphics display driver, etc. installed properly. Then this profile can be loaded from another computer from the nView Desktop Manager Profiles page just as it can from your original computer.

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 taskbar, click **Start > Settings > Control Panel** to open the Control Panel window.
- 2** Double-click the **Add/Remove Programs** item.
- 3** Click the **NVIDIA Display Driver** item from the list.
- 4** Click **Change/Remove**.
- 5** Click **Yes** to continue.

A prompt appears asking whether you want to delete all of the saved nView profiles.

- 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.

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 34
- “Release 65 Enhancements” on page 35
- “Release 60 Enhancements” on page 37
- “Release 55 Enhancements” on page 39
- “Release 50 Enhancements” on page 40
- “Release 40 Enhancements” on page 44
- “Release 35 Enhancements” on page 46
- “Release 25 Enhancements” on page 47
- “Release 20 Enhancements” on page 48
- “Release 10 Enhancements” on page 48

Driver Release History

Release 65 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 65	ForceWare	66.77, 66.93, 67.02, 67.03, 67.66	
Release 60	ForceWare	61.76, 61.77	
Release 55	ForceWare	56.64, 56.72, 57.30	
Release 50	ForceWare	52.16, 53.04	
Release 40	Detonator FX	44.03–45.xx	
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 65 Enhancements

SLI Support

Release 65 supports the new Scalable Link Interface (SLI) technology for improved performance using dual high-end graphics cards¹ that support SLI technology.

The following combinations of PCI Express graphics cards & chipsets are supported in this release of the driver:

Chipset	PCI-Express Graphics Cards
Intel(R) E7525	GeForce 6800 Ultra + GeForce 6800 Ultra GeForce 6800 GT + GeForce 6800 GT
NVIDIA nForce4 SLI	GeForce 6800 Ultra + GeForce 6800 Ultra GeForce 6800 GT + GeForce 6800 GT GeForce 6800 + GeForce 6800 GeForce 6600 GT + GeForce 6600 GT
NVIDIA nForce Professional 2200	GeForce 6800 Ultra + GeForce 6800 Ultra GeForce 6800 GT + GeForce 6800 GT GeForce 6800 + GeForce 6800 GeForce 6600 GT + GeForce 6600 GT
NVIDIA nForce Professional 2200 + NVIDIA nForce Professional 2050	GeForce 6800 Ultra + GeForce 6800 Ultra GeForce 6800 GT + GeForce 6800 GT GeForce 6800 + GeForce 6800 GeForce 6600 GT + GeForce 6600 GT

512 MB Frame Buffer Support

ForceWare Release 65 graphics drivers provide memory management techniques for supporting 512 MB versions of the new generation of NVIDIA graphics cards, such as the GeForce 6800 or Quadro FX 4000 and later.

OS Support

Release 65 supports Windows XP SP2 and Windows XP Media Center Edition 2005.

1. Cards must be the same model number and from the same vendor.

Enhancements in Driver Performance

Improved Robustness

The ForceWare Release 65 graphics driver offers improved stability and robustness in DirectX and 2D graphics.

Video Enhancements

Video enhancements in Release 65 include

- Optimized motion compensation and video processing to take advantage of the capabilities of the newest generation of NVIDIA GPUs.
- Support for Microsoft's Certified Output Protection Protocol (COPP)
- Improved media capture interface

3D Graphics API Enhancements

- **DirectX Enhancements**
 - DirectX 9.0c Compatibility
 - Supports the capabilities of the newest generation of NVIDIA GPUs for improved DirectX shader handling and reduced CPU overhead
- **OpenGL Enhancements**
 - Improved and more efficient vertex_buffer_object (VBO) handling
 - More efficient memory management for improved performance under DualView

HDTV Support Enhancements

Release 65 offers improved HDTV over DVI underscan support, exposed through the NVIDIA control panel.

Desktop Manager and Control Panel Improvements

Release 65 includes the following improvements in the Desktop Manager and control panel:

- New Negative LOD Bias control page (effective with version 67.03)
- High Resolution Scalable Desktop Performance
- Desktop Manager Wizards
- Desktop Manager Hot Keys, Toolbars, and Gridlines
- Application Profiles
- Control Panel User Interface

Release 60 Enhancements

Latest GPU Support

The ForceWare Release 60 graphics drivers support the newest generation of NVIDIA GPUs, including

- **Improved vertex and pixel compilers**
- **Video shaders**

PCI Express Support

ForceWare Release 60 offers 2D and 3D graphics driver support for the PCI Express I/O, including

- **DirectX support**
- **Enhanced OpenGL support**
 - Improved texture memory management and bandwidth utilization

Enhancements in Driver Performance

- **Enhanced Robustness**

The ForceWare Release 60 graphics driver offers more robust stability and compatibility in DirectX support, antialiasing, and desktop rotation.
- **Reduction of OCA issues**
- **Dynamic Video Memory**

Streamlines OS system resources for large frame buffer configurations

3D Graphics API Enhancements

Direct3D

- DirectX 9.0c Support

OpenGL

- New drivers for the OpenGL ARB shading language (GLSL)
- Enhanced support for Windows XP 64-Bit Edition and IA32-E.
- New extensions
 - `GL_NV_fragment_program2`
 - `GL_EXT_blend_equation_separate`
 - `NV_vertex_program3`
 - `ATI_draw_buffers`
 - `ATI_texture_float`
 - `ATI_texture_mirror_once`
 - `GL_ARB_texture_non_power_of_two`
 - `GL_NVX_centroid_sample`
 - `GL_NVX_conditional_render`

Release 55 Enhancements

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)².

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

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

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

3D Graphics API Enhancements

Direct3D

- Improved antialiasing performance
- Improved shaders

OpenGL

New extension: `GL_NV_pixel_buffer_object`

Release 50 Enhancements

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

64-Bit Support

Driver Release 50 offers AMD64 and IA64 OS support.

Dynamic Memory Mapping

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

NVIDIA Unified Compiler

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

- **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

Video Mixing Renderer (VMR) support

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

PowerMizer—New Features

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

User Interface Changes

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

- **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

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

OpenGL

- **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

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

- **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 rotation³ 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.

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

New Graphical User Interface

- **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 support⁴**

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

OpenGL Enhancements

- **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

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[®]
 - Quincunx antialiasing option for enhanced image quality and performance
- **AMD[®] Athlon[™] Processor and Intel Pentium[®] 4 Processor optimizations**
- **Improved TwinView[™] interface**

A P P E N D I X



MODE SUPPORT FOR WINDOWS

This chapter details the Windows modes supported¹ by the Release 65 driver for NVIDIA products. It contains these sections:

- “Modes Supported by GPU” on page 50
- “Modes Supported by DACs and TV Encoders” on page 90

1. Additional resolutions may be supported based on the dynamic EDID capability of the NVIDIA graphics driver.

Modes Supported by GPU

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

- “GeForce FX Family and GeForce 6 Series” on page 51
- “Quadro FX Family of High End GPUs” on page 58
- “GeForce and Quadro GPUs, GeForce2 and GeForce3 Series of GPUs” on page 65
- “GeForce2 MX, GeForce4 MX, Quadro4, and GeForce4 Ti Series GPUs, GeForce4 MX Integrated GPU” on page 68
- “GeForce2 Integrated GPU” on page 74
- “Quadro4 9xx / 7xx XGL Products” on page 77
- “Quadro FX Family and Quadro NVS Series GPUs” on page 83

Understanding the Mode Format

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

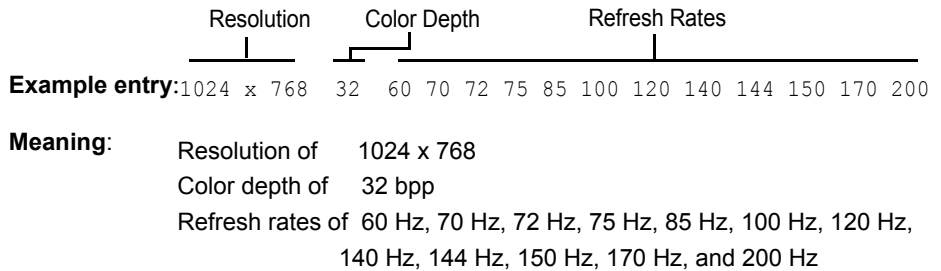


Figure A.1 Mode Format

Note:

- Horizontal spanning modes of 3840x1080 and above, and vertical spanning modes of 1920x2160 and above generally require at least 32 MB of video memory at 32 bpp.
- An “i” next to the refresh rate indicates an interlaced refresh rate.

GeForce FX Family and GeForce 6 Series

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

- NVIDIA GeForce 6800 / 6800 Ultra
- NVIDIA GeForce 6800LE
- NVIDIA GeForce 6800GT
- NVIDIA GeForce 6600 / 6600 GT
- NVIDIA GeForce 6200
- NVIDIA GeForce FX 5800 / 5800 Ultra
- NVIDIA GeForce FX 5600 / 5600 Ultra
- NVIDIA GeForce FX 5600XT
- NVIDIA GeForce FX 5200 / 5200 Ultra
- NVIDIA GeForce FX 5200/GeForce PCX 5300
- NVIDIA GeForce FX 5200LE
- NVIDIA GeForce FX 5500
- NVIDIA GeForce FX 5100
- NVIDIA GeForce FX 5900 Ultra
- NVIDIA GeForce FX 5900/GeForce PCX 5900
- NVIDIA GeForce FX 5900XT
- NVIDIA GeForce FX 5950 Ultra
- NVIDIA GeForce FX 5900ZT
- NVIDIA GeForce FX 5700 Ultra/GeForce PCX 5750
- NVIDIA GeForce FX 5700
- NVIDIA GeForce FX 5700LE
- NVIDIA GeForce FX 5700VE

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 600	8		60 70 72 75 85 100 120 140 144 150 170 200 240
1024 x 768	8		60 70 72 75 85 100 120 140 144 150 170 200 240
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 800	8		60 70 72 75 85 100 120 140 144 150 170
1280 x 960	8		60 70 72 75 85 100 120 140 144 150 170
1280 x 1024	8		60 70 72 75 85 100 120 140 144 150 170
1360 x 768	8		60 70 72 75 85 100 120 140 144 150 170
1600 x 900	8		60 70 72 75 85 100 120 140 144 150
1600 x 1024	8		60 70 72 75 85 100 120
1600 x 1200	8		60 70 72 75 85 100 120
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

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 600	16		60 70 72 75 85 100 120 140 144 150 170 200 240
1024 x 768	16		60 70 72 75 85 100 120 140 144 150 170 200 240
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 800	16		60 70 72 75 85 100 120 140 144 150 170
1280 x 960	16		60 70 72 75 85 100 120 140 144 150 170
1280 x 1024	16		60 70 72 75 85 100 120 140 144 150 170
1360 x 768	16		60 70 72 75 85 100 120 140 144 150 170
1600 x 900	16		60 70 72 75 85 100 120 140 144 150
1600 x 1024	16		60 70 72 75 85 100 120
1600 x 1200	16		60 70 72 75 85 100 120
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

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 600	32		60 70 72 75 85 100 120 140 144 150 170 200 240
1024 x 768	32		60 70 72 75 85 100 120 140 144 150 170 200
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 800	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 600	8		60	70	72	75	85	100	120	140	144	150	170	200	240
2048 x 768	8		60	70	72	75	85	100	120	140	144	150	170	200	240
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 800	8		60	70	72	75	85	100	120	140	144	150	170		
2560 x 960	8		60	70	72	75	85	100	120	140	144	150	170		
2560 x 1024	8		60	70	72	75	85	100	120	140	144	150	170		
2720 x 768	8		60	70	72	75	85	100	120	140	144	150	170		
3200 x 900	8		60	70	72	75	85	100	120	140	144	150			
3200 x 1024	8		60	70	72	75	85	100	120						
3200 x 1200	8		60	70	72	75	85	100	120						
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 600	16		60	70	72	75	85	100	120	140	144	150	170	200	240
2048 x 768	16		60	70	72	75	85	100	120	140	144	150	170	200	240
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 800	16		60	70	72	75	85	100	120	140	144	150	170		
2560 x 960	16		60	70	72	75	85	100	120	140	144	150	170		

```

2560 x 1024 16      60 70 72 75 85 100 120 140 144 150 170
2720 x  768 16      60 70 72 75 85 100 120 140 144 150 170
3200 x  900 16      60 70 72 75 85 100 120 140 144 150
3200 x 1024 16      60 70 72 75 85 100 120
3200 x 1200 16      60 70 72 75 85 100 120
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
1920 x  600 32      60 70 72 75 85 100 120 140 144 150 170 200 240
2048 x  768 32      60 70 72 75 85 100 120 140 144 150 170 200
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  800 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
960 x 1200  8      60 70 72 75 85 100 120 140 144 150 170 200 240
1024 x 1536  8     60 70 72 75 85 100 120 140 144 150 170 200 240

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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 1600	8		60 70 72 75 85 100 120 140 144 150 170
1280 x 1920	8		60 70 72 75 85 100 120 140 144 150 170
1280 x 2048	8		60 70 72 75 85 100 120 140 144 150 170
1360 x 1536	8		60 70 72 75 85 100 120 140 144 150 170
1600 x 1800	8		60 70 72 75 85 100 120 140 144 150
1600 x 2048	8		60 70 72 75 85 100 120
1600 x 2400	8		60 70 72 75 85 100 120
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

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
960 x 1200	16		60 70 72 75 85 100 120 140 144 150 170 200 240
1024 x 1536	16		60 70 72 75 85 100 120 140 144 150 170 200 240
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 1600	16		60 70 72 75 85 100 120 140 144 150 170
1280 x 1920	16		60 70 72 75 85 100 120 140 144 150 170
1280 x 2048	16		60 70 72 75 85 100 120 140 144 150 170
1360 x 1536	16		60 70 72 75 85 100 120 140 144 150 170
1600 x 1800	16		60 70 72 75 85 100 120 140 144 150
1600 x 2048	16		60 70 72 75 85 100 120
1600 x 2400	16		60 70 72 75 85 100 120
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

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
960 x 1200	32		60 70 72 75 85 100 120 140 144 150 170 200 240
1024 x 1536	32		60 70 72 75 85 100 120 140 144 150 170 200
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 1600	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 Family of High End GPUs

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

- Quadro FX 4000 / Quadro FX 3400
- Quadro FX 4400
- Quadro FX 1400
- Quadro FX 540
- Quadro FX 3000 / Quadro FX 1300
- Quadro FX 700

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 600	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 800	8	60	70 72 75 85 100 120 140 144 150 170
1280 x 960	8	60	70 72 75 85 100 120 140 144 150 170
1280 x 1024	8	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												

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 600	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 800	16			60	70	72	75	85	100	120	140	144	150	170						
1280 x 960	16			60	70	72	75	85	100	120	140	144	150	170						
1280 x 1024	16		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												

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 600	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 800	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 600	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 800	8		60	70 72 75 85 100 120 140 144 150 170
2560 x 960	8		60	70 72 75 85 100 120 140 144 150 170
2560 x 1024	8	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

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 600	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 800	16		60	70 72 75 85 100 120 140 144 150 170
2560 x 960	16		60	70 72 75 85 100 120 140 144 150 170
2560 x 1024	16	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

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	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 600	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 800	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												
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
960 x 1200	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 1600	8		60	70	72	75	85	100	120	140	144	150	170		
1280 x 1920	8		60	70	72	75	85	100	120	140	144	150	170		
1280 x 2048	8	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

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
960 x 1200	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 1600	16		60	70 72 75 85 100 120 140 144 150 170
1280 x 1920	16		60	70 72 75 85 100 120 140 144 150 170
1280 x 2048	16		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
960 x 1200	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 1600	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					

GeForce and Quadro GPUs, GeForce2 and GeForce3 Series of GPUs

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

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

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

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, and GeForce4 Ti Series GPUs, GeForce4 MX Integrated GPU

This section 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 GeForce4 MX 440SE with AGP8X
- NVIDIA GeForce4 MX 440 with AGP8x / GeForce PCX 4300
- 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
960 x 600	8		60 70 72 75 85 100 120 140 144 170 200
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 800	8		60 70 72 75 85 100 120 140 144 150 170
1280 x 960	8		60 70 72 75 85 100 120 140 144 150 170
1280 x 1024	8		60 70 72 75 85 100 120 140 144 150 170
1360 x 768	8		60 70 72 75 85 100 120 140 144 150 170
1600 x 900	8		60 70 72 75 85 100 120 140 144 150
1600 x 1024	8		60 70 72 75 85 100 120
1600 x 1200	8		60 70 72 75 85 100 120
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

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 600	16		60 70 72 75 85 100 120 140 144	170 200
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 800	16		60 70 72 75 85 100 120 140 144	150 170
1280 x 960	16		60 70 72 75 85 100 120 140 144	150 170
1280 x 1024	16		60 70 72 75 85 100 120 140 144	150 170
1360 x 768	16		60 70 72 75 85 100 120 140 144	150 170
1600 x 900	16		60 70 72 75 85 100 120 140 144	150
1600 x 1024	16		60 70 72 75 85 100 120	
1600 x 1200	16		60 70 72 75 85 100 120	
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	

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
960 x 600	32		60 70 72 75 85 100 120 140 144	170 200
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 800	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 600	8		60 70 72 75 85 100 120 140 144 170 200
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 800	8		60 70 72 75 85 100 120 140 144 150 170
2560 x 960	8		60 70 72 75 85 100 120 140 144 150 170
2560 x 1024	8		60 70 72 75 85 100 120 140 144 150 170
2720 x 768	8		60 70 72 75 85 100 120 140 144 150 170
3200 x 900	8		60 70 72 75 85 100 120 140 144 150
3200 x 1024	8		60 70 72 75 85 100 120
3200 x 1200	8		60 70 72 75 85 100 120
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

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
1920 x 600	16		60 70 72 75 85 100 120 140 144 170 200
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 800	16		60 70 72 75 85 100 120 140 144 150 170

2560 x 960	16		60 70 72 75 85 100 120 140 144 150 170
2560 x 1024	16		60 70 72 75 85 100 120 140 144 150 170
2720 x 768	16		60 70 72 75 85 100 120 140 144 150 170
3200 x 900	16		60 70 72 75 85 100 120 140 144 150
3200 x 1024	16		60 70 72 75 85 100 120
3200 x 1200	16		60 70 72 75 85 100 120
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

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 600	32		60 70 72 75 85 100 120 140 144 170 200
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 800	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
960 x 1200	8		60 70 72 75 85 100 120 140 144 170 200
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 1600	8		60 70 72 75 85 100 120 140 144 150 170
1280 x 1920	8		60 70 72 75 85 100 120 140 144 150 170
1280 x 2048	8		60 70 72 75 85 100 120 140 144 150 170
1360 x 1536	8		60 70 72 75 85 100 120 140 144 150 170
1600 x 1800	8		60 70 72 75 85 100 120 140 144 150
1600 x 2048	8		60 70 72 75 85 100 120
1600 x 2400	8		60 70 72 75 85 100 120
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

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
960 x 1200	16		60 70 72 75 85 100 120 140 144 170 200
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 1600	16		60 70 72 75 85 100 120 140 144 150 170
1280 x 1920	16		60 70 72 75 85 100 120 140 144 150 170
1280 x 2048	16		60 70 72 75 85 100 120 140 144 150 170
1360 x 1536	16		60 70 72 75 85 100 120 140 144 150 170
1600 x 1800	16		60 70 72 75 85 100 120 140 144 150
1600 x 2048	16		60 70 72 75 85 100 120
1600 x 2400	16		60 70 72 75 85 100 120
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

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
960 x 1200	32		60 70 72 75 85 100 120 140 144 170 200

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 1600	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

GeForce2 Integrated GPU

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

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

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

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 600	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 800	8	60	70 72 75	85	100	120	140	144	150	170									
1280 x 960	8	60	70 72 75	85	100	120	140	144	150	170									
1280 x 1024	8	60	70 72 75	85	100	120	140	144	150	170									
1360 x 768	8	60	70 72 75	85	100	120	140	144	150	170									
1600 x 900	8	60	70 72 75	85	100	120	140	144	150										
1600 x 1024	8	60	70 72 75	85	100	120													
1600 x 1200	8	60	70 72 75	85	100	120													
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

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 600	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 800	16	60	70 72 75 85 100 120 140 144 150 170
1280 x 960	16	60	70 72 75 85 100 120 140 144 150 170
1280 x 1024	16	60	70 72 75 85 100 120 140 144 150 170
1360 x 768	16	60	70 72 75 85 100 120 140 144 150 170
1600 x 900	16	60	70 72 75 85 100 120 140 144 150
1600 x 1024	16	60	70 72 75 85 100 120
1600 x 1200	16	60	70 72 75 85 100 120
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

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							
960 x 600	32	60	70	72	75	85	100	120	140	144	170	200	240							
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 800	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 600	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 800	8	60	70	72	75	85	100	120	140	144	150	170								
2560 x 960	8	60	70	72	75	85	100	120	140	144	150	170								
2560 x 1024	8	60	70	72	75	85	100	120	140	144	150	170								
2720 x 768	8	60	70	72	75	85	100	120	140	144	150	170								
3200 x 900	8	60	70	72	75	85	100	120	140	144	150									

3200 x 1024	8	60	70 72 75 85 100 120
3200 x 1200	8	60	70 72 75 85 100 120
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

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
1920 x 600	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 800	16	60	70 72 75 85 100 120 140 144 150 170
2560 x 960	16	60	70 72 75 85 100 120 140 144 150 170
2560 x 1024	16	60	70 72 75 85 100 120 140 144 150 170
2720 x 768	16	60	70 72 75 85 100 120 140 144 150 170
3200 x 900	16	60	70 72 75 85 100 120 140 144 150
3200 x 1024	16	60	70 72 75 85 100 120
3200 x 1200	16	60	70 72 75 85 100 120
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

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 600	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 800	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	
960 x 1200	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 1600	8	60	70 72 75 85 100 120 140 144 150 170	
1280 x 1920	8	60	70 72 75 85 100 120 140 144 150 170	
1280 x 2048	8	60	70 72 75 85 100 120 140 144 150 170	
1360 x 1536	8	60	70 72 75 85 100 120 140 144 150 170	
1600 x 1800	8	60	70 72 75 85 100 120 140 144 150	
1600 x 2048	8	60	70 72 75 85 100 120	
1600 x 2400	8	60	70 72 75 85 100 120	
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	

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	
960 x 1200	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 1600	16	60	70 72 75 85 100 120 140 144 150 170
1280 x 1920	16	60	70 72 75 85 100 120 140 144 150 170
1280 x 2048	16	60	70 72 75 85 100 120 140 144 150 170
1360 x 1536	16	60	70 72 75 85 100 120 140 144 150 170
1600 x 1800	16	60	70 72 75 85 100 120 140 144 150
1600 x 2048	16	60	70 72 75 85 100 120
1600 x 2400	16	60	70 72 75 85 100 120
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

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
960 x 1200	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 1600	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	

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													

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 600	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 800	16		60	70	72	75	85	100	120	140	144	150	170							
1280 x 960	16		60	70	72	75	85	100	120	140	144	150	170							
1280 x 1024	16		60	70	72	75	85	100	120	140	144	150	170							
1360 x 768	16		60	70	72	75	85	100	120	140	144	150	170							
1600 x 900	16		60	70	72	75	85	100	120	140	144	150								
1600 x 1024	16		60	70	72	75	85	100	120											
1600 x 1200	16		60	70	72	75	85	100	120											
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													

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 600	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 800	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 600	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 800	8		60	70	72	75	85	100	120	140	144	150	170		
2560 x 960	8		60	70	72	75	85	100	120	140	144	150	170		
2560 x 1024	8		60	70	72	75	85	100	120	140	144	150	170		
2720 x 768	8		60	70	72	75	85	100	120	140	144	150	170		
3200 x 900	8		60	70	72	75	85	100	120	140	144	150			
3200 x 1024	8		60	70	72	75	85	100	120						
3200 x 1200	8		60	70	72	75	85	100	120						
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 600	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 800	16		60	70	72	75	85	100	120	140	144	150	170		
2560 x 960	16		60	70	72	75	85	100	120	140	144	150	170		
2560 x 1024	16		60	70	72	75	85	100	120	140	144	150	170		
2720 x 768	16		60	70	72	75	85	100	120	140	144	150	170		
3200 x 900	16		60	70	72	75	85	100	120	140	144	150			
3200 x 1024	16		60	70	72	75	85	100	120						
3200 x 1200	16		60	70	72	75	85	100	120						
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 600	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 800	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
960 x 1200	8	60	70 72 75 85 100 120 140 144 150 170 200 240
1024 x 1536	8	60	70 72 75 85 100 120 140 144 150 170 200 240
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 1600	8	60	70 72 75 85 100 120 140 144 150 170
1280 x 1920	8	60	70 72 75 85 100 120 140 144 150 170
1280 x 2048	8	60	70 72 75 85 100 120 140 144 150 170
1360 x 1536	8	60	70 72 75 85 100 120 140 144 150 170
1600 x 1800	8	60	70 72 75 85 100 120 140 144 150
1600 x 2048	8	60	70 72 75 85 100 120
1600 x 2400	8	60	70 72 75 85 100 120
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										

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		
960 x 1200	16	60	70	72	75	85	100	120	140	144	150	170	200	240		
1024 x 1536	16	60	70	72	75	85	100	120	140	144	150	170	200	240		
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 1600	16	60	70	72	75	85	100	120	140	144	150	170				
1280 x 1920	16	60	70	72	75	85	100	120	140	144	150	170				
1280 x 2048	16	60	70	72	75	85	100	120	140	144	150	170				
1360 x 1536	16	60	70	72	75	85	100	120	140	144	150	170				
1600 x 1800	16	60	70	72	75	85	100	120	140	144	150					
1600 x 2048	16	60	70	72	75	85	100	120								
1600 x 2400	16	60	70	72	75	85	100	120								
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										

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		
960 x 1200	32	60	70	72	75	85	100	120	140	144	150	170	200	240		
1024 x 1536	32	60	70	72	75	85	100	120	140	144	150	170	200			
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 1600	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

Modes Supported by DACs and TV Encoders

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

- “External DAC Mode Support” on page 90
- “TV-Out Mode Support” on page 91

External DAC Mode Support

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, and compatible GeForce 6 series GPUs.
480p (EDTV)	N/A	
720p (HDTV)	N/A	
1080i (HDTV)	N/A	