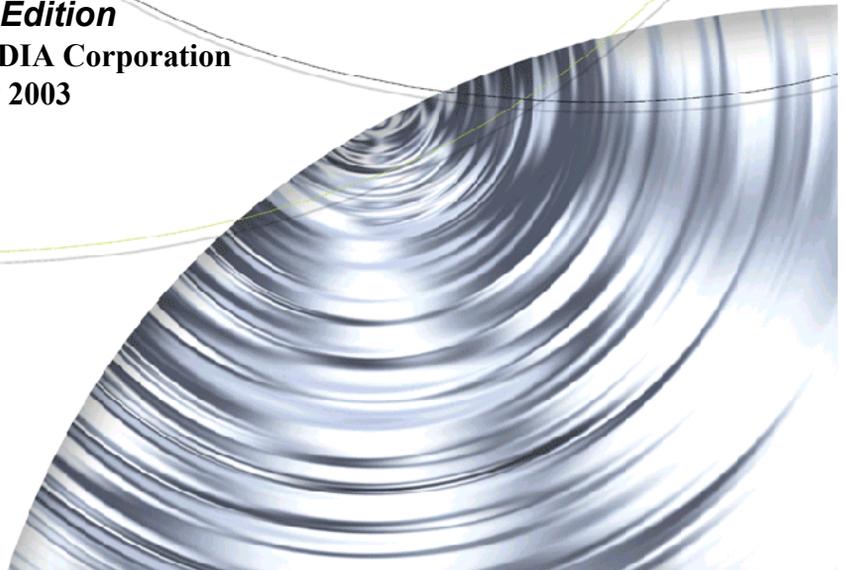Drivers for Windows

NVIDIA Display Properties Desktop User's Guide

Driver Version: Release 40

4th Edition
NVIDIA Corporation
May 2003

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INTRODUCTION

This chapter contains the following major sections:

About this Guide

This *User's Guide* is addressed to users of NVIDIA® Display Properties, which is the NVIDIA Windows Control Panel-based user interface accessible from the Windows Display Properties **Settings** > **Advanced** option.

This guide focuses on the NVIDIA desktop products, i.e, graphics cards based on NVIDIA desktop **GPUs (graphics processing units)** listed in Table 2.5, "Supported NVIDIA Products" on page 19.

For technical details on the features and benefits of the NVIDIA Display Driver, refer to the NVIDIA web page: **www.nvidia.com**.

Other Related Documentation

- If you are primarily using the NVIDIA workstation products, i.e., graphics cards based on the Quadro through Quadro4 series of processors, see the "*Quadro Workstation Display Properties User's Guide*".

- For details on using the nView™ Desktop Manager application component of the NVIDIA display drivers, see the *NVIDIA nView Desktop Manager 2.0 User's Guide*.

- The document titled "*NVIDIA Drivers for Windows: Release 40 Notes*" enables add-in-card (AIC) producers and original equipment manufacturers (OEMs) to monitor performance improvements and bug fixes in the driver.

Online Help

You can obtain context help for any of the options on the NVIDIA control-panel based user interface by using any one of these methods:

- Select or move your mouse pointer to the option for which you want help. Then press F1.

    or

- Click the "**?**" icon located on the top right corner of the NVIDIA panel (window) you have open, move the "**?**" icon over the option for which you want help, then click your mouse again to display the help.

nView vs. NVIDIA Display Properties

nView

nView represents a collection of multi-display technologies encompassing driver support, multi-display GPU architecture, and desktop management support.

nView Desktop Manager

The primary nView component is the Desktop Manager, which is a user-level application utility that focuses on making you more productive when working on your Windows desktop. Desktop Manager was originally created for multi-display graphics cards but has grown to enhance single-display user desktops as well. Desktop Manager supports both single-display and multi-display configurations running with single-display, multi-display, or multiple graphics cards based on NVIDIA GPUs.

Note: nView Desktop Manager has been further enhanced in terms of new features for the Release 40 NVIDIA drivers. For details, see "New Features in this Driver Release" on page 5 and the NVIDIA nView Desktop Manager 2.0 User's Guide.

NVIDIA Display Properties

NVIDIA Display Properties**,** the topic of this *User's Guide,* refers to the NVIDIA Windows Control Panel-based user interface, which you can access from the **Windows Display Properties** > **Settings** > **Advanced** option. Once you click the NVIDIA GPU tab name that your are using, a Media Center menu appears (Figure 1.2) from which you can configure the advanced display properties of the current release of the NVIDIA Windows Display Driver software.

Note: The NVIDIA Display Properties has a completely new and efficient user interface. For details, see "NVIDIA Display Properties: New User Interface" on page 7 later in this chapter.

Key Terms and Concepts

analog display
Analog display refers to your CRT display device, in general. The terms CRT and analog display may be used interchangeably in this guide.

application
An application (or program) can have any number of windows. Some applications have only a single window such as Calculator or Notepad. Other applications can have many windows such as Outlook where you can open several E-mail windows, have your Inbox open, open calendars, etc.

Control Panel
Refers to the Windows Control Panel group, which you can access by clicking **Start** > **Settings** > **Control Panel** from the Windows taskbar.

digital display
A digital display device can be a digital flat panel (DFP) or, for example, a mobile computer (laptop) LVDS internal panel.

desktop
Desktop is the on-screen work area on which windows, icons, menus, and dialog boxes appear.

dialog box
Dialog boxes are user-input windows that contain command button and various kinds of options through which you can carry out a particular command or task. For example, in a Windows application "Save As" dialog box, you must

indicate the folder to contain the document to be saved and the name of that document when saving it.

Also see the definition of "modal dialog box" and "modeless dialog box" on this page.

dual-card configuration

A setup where two or more display devices (such as a monitor, flat panel, or TV) are connected to two NVIDIA GPU-based graphics cards installed in the computer.

GPU

Graphics Processing Unit (GPU). NVIDIA graphics chip products are called GPUs. Supported NVIDIA GPUs are listed in "Hardware: Supported NVIDIA Products" on page 19. The graphics card you are using is based on an NVIDIA GPU.

modal dialog box

A dialog box that puts you in the state or "mode" of being able to work only in the dialog box. You cannot move a modal dialog box; it can be removed only by clicking its buttons.

modeless dialog box

A dialog box that resembles a document window without a collapse box. You can move a modeless dialog box, make it inactive and active again, and close it like a document window.

multi-card configuration

A setup where two or more display devices (such as a monitor, flat panel, TV, and so on) are connected to two (or more) NVIDIA GPU-based graphics cards installed in the computer.

multi-display configuration

A setup where two or more display devices are connected to either a

• multi-display NVIDIA GPU-based graphics card; *or*

• two (or more) NVIDIA GPU-based graphics cards.

single-display configuration

A setup where only one display device is connected to the NVIDIA GPU-based graphics card in your computer.

nView Display Mode

nView Span and Clone mode display options are available when you click the nView Display Mode option from the Media Center menu

window

A window is any independent window on your desktop. Applications such as Outlook or Explorer may have several windows which are all part of the same application. Windows can be dragged around the screen, opened and closed, and resized.

The nView Desktop Manager application (described in the *NVIDIA nView Desktop Manager 2.0 User's Guide*) allows you to do even more with windows such as make them transparent or force them always to be on top of other windows.

New Features in this Driver Release

This section provides a summary of the new features and enhancements provided with the NVIDIA Release 40 drivers for Windows. In addition to overall performance and stability improvements, the following are the specific areas that have undergone significant changes:

Enhanced Display Driver, DirectX, and Video Capabilities

Windows XP SP1

- Release 40 driver software supports Windows XP SP1, including support for Windows XP Tablet PC and eHome technology.

- Release 40 driver software provides support for bugcheck EA callbacks, enabling OCA EA failures to be resolved more quickly while assisting to identify failure causes such as those due to chip instability or overclocking.

Temperature Settings

Note: This option is available with GeForce FX and later NVIDIA GPUs *and* on certain older NVIDIA GPUs if the option has been enabled in the registry settings of your computer.

Temperature settings let you adjust the temperature of the selected NVIDIA GPU on your computer. See "Temperature Settings Panel" on page 136 for details.

Direct 3D Vertical Sync Options

Vertical Sync Mode options for Direct3D specify how Vertical Sync is handled in Direct3D application. For details, see "Other Direct3D Options" on page 118.

NVRotate

NVRotate is a desktop rotation feature that lets you rotate the desktop by 90, 180, or 270 degrees.[1]

For further details, see "Enabling NVRotate" on page 134.

- **Controls:** Desktop rotation is controlled through the NVIDIA Display Properties panel, or integrated seamlessly with Windows XP Tablet PC.

- **Graphics API Support:** NVRotate includes support for windowed and full-screen applications in all rotation modes for Direct3D and OpenGL application.

- **Hardware Platforms:** Rotation functionality is supported on desktop, mobile, and Tablet PCs.

DirectX 9 Support

When Microsoft releases DirectX 9 runtime, Release 40 will provide support for DirectX 9, which includes the new vertex shaders, antialiasing modes, and multi-display device support.

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

Video Enhancements

Changes in the video driver include:

• Flip Sync functionality support

• Support for multiple Macrovision clients

• Simplified Video Mirror feature controls

TV Screen Size Support

Depending on the TV encoder used, Release 40 supports the adjustment of the TV screen up to a DVD-optimal mode. This option is accessible through the NVIDIA display properties control panel.

For further details, see "Device Adjustments: TV Output" on page 103.

Additional Enhancements

• Improved support for wide-aspect ratio screen resolutions.

• Improved memory management support for Dualview.

• Improved memory management support for OpenGL.

NVIDIA Display Properties: New User Interface

New Display Properties Panel

The NVIDIA display properties panels (accessed through the Windows Display Properties Settings **Advanced** option) have been redesigned to improve control over the display adapter settings and make navigation easier.

Some of the new features include the following:

• A Media Center menu in the form of a "slider tray" that allows all pages to be available from the top level page. See Using the Media Center Menu below for details on using this interface.

• Dynamic tracking allows the pages to adapt to the state of the driver, and user interface controls are modified, or even created, accordingly.

• Driver configuration changes are maintained across driver installations.

Using the Media Center Menu

Once your NVIDIA display driver software is installed, you can access the NVIDIA display driver features that are available on the Media Center menu by using the procedures that are explained and illustrated in this section.

1 From your Windows desktop, right click to display the pop-up menu and click **Properties** > the **Settings** tab and then **Advanced**. You will see the name of your NVIDIA GPU on a tab (Figure 1.1).

2 Click the NVIDIA GPU tab, which displays the name of the NVIDIA GPU-based graphics card that is installed on your computer.

The NVIDIA Media Center menu appears (Figure 1.2 and Figure 1.3). From this menu, you can access all the NVIDIA properties panels where you can configure the following NVIDIA Display Driver features.

- **nView Display (Span/Clone) Mode** options are available when Dualview is disabled, as shown in Figure 1.2. In this case, you can also access the **Color Correction** and **Device Selection** panels.

- **Device Selection**. This option appears when Dualview mode is enabled, as shown in Figure 1.3. When Dualview mode is disabled (nView Span/Clone mode enabled), this option doesn't appear because it is accessible from the nView Display Mode panel.

- **Performance and Quality Settings**

- **Direct3D Settings**

- **Refresh Rate Overrides**

- **OpenGL Settings**

- **Overlay Controls**

- **Desktop Utilities**

- **NVRotate**

- **Temperature Settings** (available only with the GeForce FX GPU and only if the feature is enabled on GPUs that are older than the GeForce GX)

3 Click the green button on the Media Center menu to toggle between hiding/displaying the Media Center menu, as shown in Figure 1.4 through Figure 1.6.

Figure 1.1   NVIDIA GPU Tab

Figure 1.2   NVIDIA Display Properties: Media Center Menu (nView Display Mode)

Media Center menu with **nView Display Mode** Option

Click this button to collapse the Media Center menu.
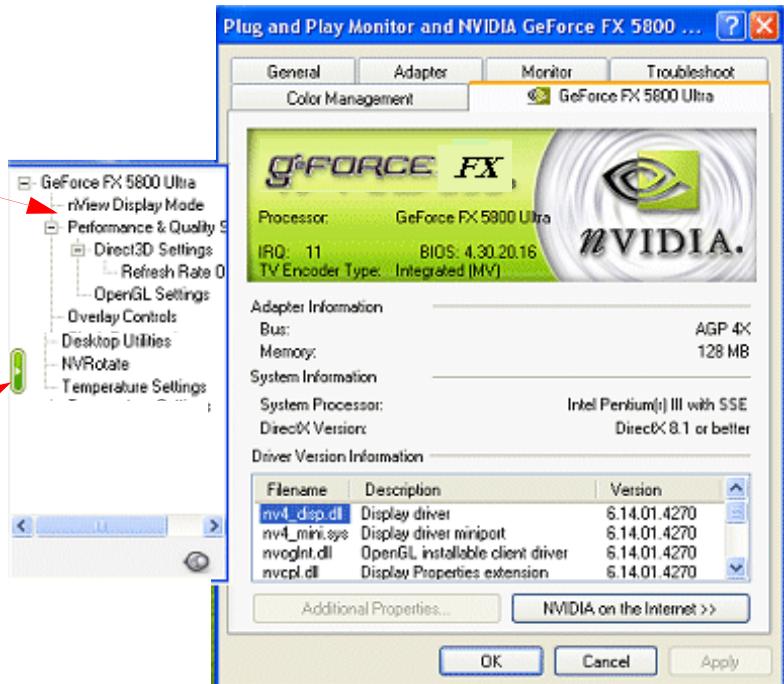
Figure 1.3 NVIDIA Display Properties: Media Center Menu (nView Dualview Mode)

Media Center
in nView
Dualview mode.

Click this
button
to collapse
the Media
Center menu.
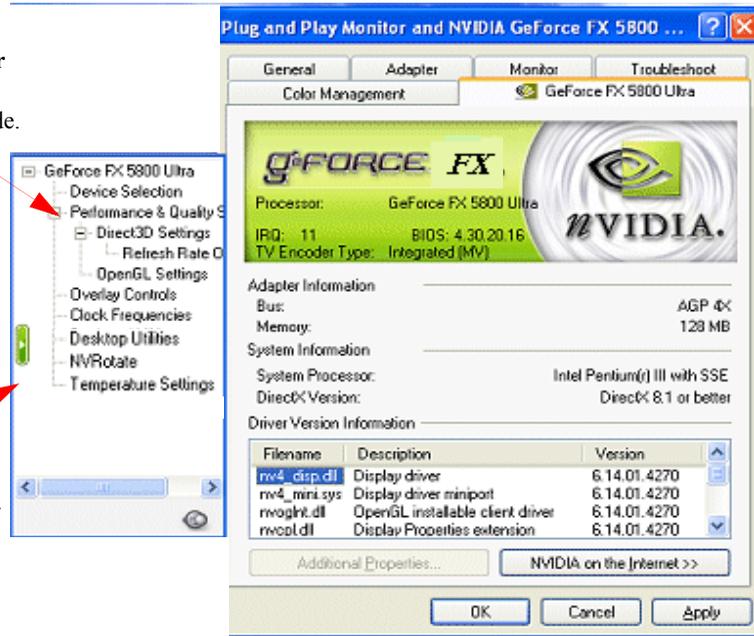
Figure 1.4 NVIDIA GPU Panel with Media Center Menu (Collapsed)

Click this button
or click **Additional
Properties** to
display the
Media Center
menu.

Figure 1.5   nView Display Mode Panel with Media Center Menu

Click this button
to collapse the
Media Center menu.
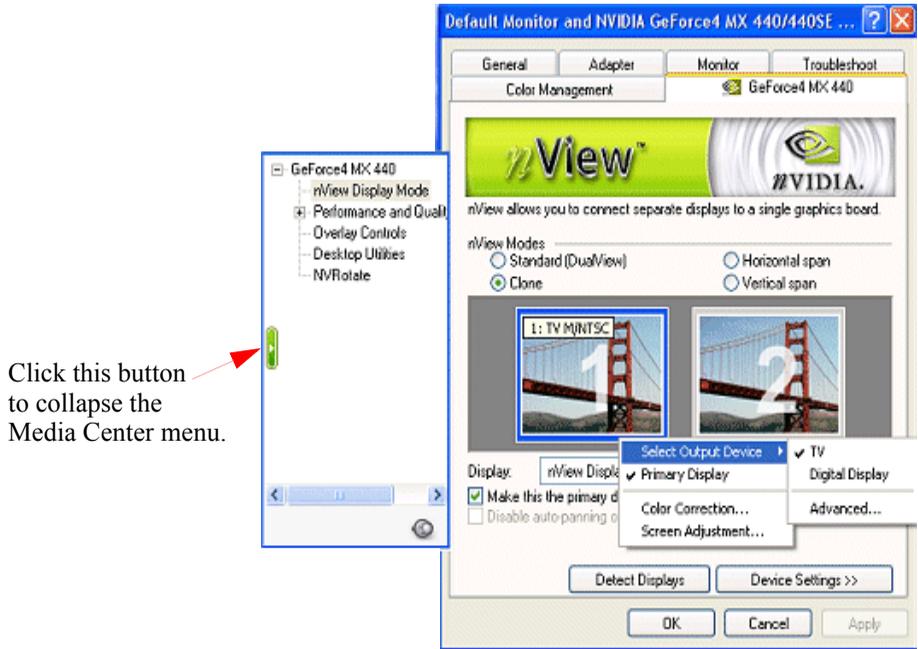
Figure 1.6   nView Display Mode Panel with Media Center Menu Collapsed

Click this button
to display the
Media Center menu.
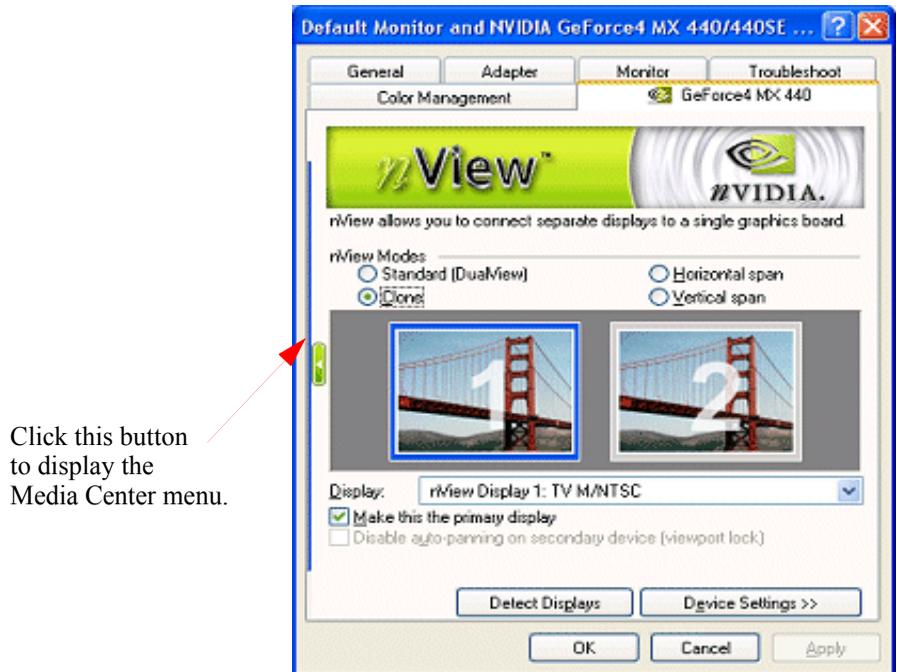
Media Center Tray Application

The Media Center Tray is a new application that can be used in place of the Media Center menu described earlier. The Media Center tray is accessible by clicking the "Media Center icon", which you can optionally add to the Windows taskbar. The Media Center tray contains menu items that provide access to the same display settings that the Media Center menu contains, in additional to direct access to certain application-specific options such as those for nView Desktop Manager, OpenGL and Direct3D customized settings, and others.

For details on enabling the Media Center icon, see "Enabling the Media Center Icon" on page 109.

nView Desktop Manager: Enhancements and New Features

Feature Enhancements

The following features have been enhanced in the new version of NVIDIA nView Desktop Manager:

- **Operating System Support** includes Windows NT 4.0, Windows 98/Me, and Windows 2000/XP.

- **Profile Feature:** Display Modes are now saved to and loaded from each profile. (This feature is not available in Windows NT 4.0.)

- **Multiple Desktop Support** additions include:

  - Support for multi-display wallpaper selection

  - Graphical display in explorer shell extension

  - Support for icons to represent desktops

  - Support for arbitrary positioning of windows on the desktops

  - Zoom Support includes new "Fixed-Frame zoom" and "Bi-Directional" zoom editing capability

New Features

The following features are new to the current version of the nView Desktop Manager:

- **Task Switcher.** When enabled, nView Desktop Manager adds a desktop switcher in addition to the standard application tab switcher. By default, this additional "switch desktop" functionality is accessed through a Alt-~ keystroke combination which you can change through options in the Desktop Manager Hot Keys panel.

- **Color Keyed Windows** allows the user to color key windows for easy identification when activating them on the desktop.

- **NVKeystone™** allows real-time image correction on portable projectors and heads-up displays.[2] 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.

- **Taskbar and Menu Transparency**

- **New window actions**, such as Collapse

- **New applications settings,** including a full set of application launch and disable settings.

OpenGL Enhancements

OpenGL 1.4 ICD with NVIDIA Extensions

- New extension includes ARB_vertex_program, which co-exists with NV_vertex_program

- Meets new conformance tests

Additional OpenGL Enhancements

- **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**

  - Accommodates multiple applications open at the same time

  - Dynamic Memory Resizing

Allowance for additional memory tuning

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

2

SYSTEM REQUIREMENTS

This chapter contains the following major sections:

System Requirements and Support

This section contains the following topics:

Operating Systems

This release of the NVIDIA Display Properties driver is designed for the Microsoft operating systems listed in Table 2.1:

Table 2.1   Operating System Requirements

Operating System	Minimum Requirements
Windows XP	Home and Professional Editions
Windows 2000	

Table 2.1   Operating System Requirements (continued)

Operating System	Minimum Requirements
Windows NT 4.0	Service Pack 4
Windows Millennium Edition (Me)	
Windows 98	Microsoft DirectX 5
Windows 95	OSR2 (OEM Service Release 2) with USB supplement for full AGP support
	Microsoft OPENGL32.DLL
	Microsoft DirectX 5

Note: Windows 95, 98, and Me are collectively called Windows 9x in this guide.

Minimum Hard Disk Space

The minimum hard disk space requirements for each operating system are listed in Table 2.2, Table 2.3, and Table 2.4.

Table 2.2   Hard Disk Space Requirements — English

Operating System	Minimum Disk Space Required
Windows XP	16.3 MB
Windows 2000	16.3 MB
Windows NT	14.0 MB
Windows Me	15.4 MB
Windows 98	15.4 MB
Windows 95	15.4 MB

Table 2.3   Hard Disk Space Requirements — Non-English Languages

Operating System	Minimum Requirements
Windows XP	16.8 MB
Windows 2000	16.8 MB
Windows NT	14.5 MB
Windows Me	16.0 MB
Windows 98	16.0 MB
Windows 95	16.0 MB

Table 2.4   Hard Disk Space Requirements — Full International Package

Operating System	Minimum Requirements
Windows XP	37.8 MB
Windows 2000	37.8 MB
Windows NT	36.6 MB
Windows Me	36.6 MB
Windows 98	36.6 MB
Windows 95	36.6 MB

Software: NVIDIA Display Driver

Make sure the current version of the NVIDIA Display Driver software for your Windows operating system has been installed on your computer.

Consult your System Administrator if you are unsure about the version that is installed.

Hardware: Supported NVIDIA Products

Table 2.5 lists the NVIDIA products supported by the NVIDIA Display Driver software and the number of displays the GPU-based card supports.

Table 2.5   Supported NVIDIA Products

NVIDIA Desktop Products	NVIDIA Workstation Products	Number of Displays Supported Per Card
nForce^{TM}2 S nForce2 ST nForce2 G nForce2		**2**— applies to all GPUs in this category.
nForce 420/420D nForce 220/220D		**1**— applies to all GPUs in this category.
GeForce^{TM} FX 5800 GeForce FX 5600 GeForce FX 5200 GeForce FX Ultra GeForce FX Mobile	Quadro$^{®}$ FX 2000 Quadro FX 1000	**2** — applies to all GPUs in this category.
GeForce 4 Ti 4200 AGP 8X	Quadro4 980 XGL Quadro4 780 XGL	**2** — applies to all GPUs in this category.
GeForce4 4200 Go	Quadro4 700 GoGL	**2** — applies to all GPUs in this category.

Table 2.5   Supported NVIDIA Products (continued)

NVIDIA Desktop Products	NVIDIA Workstation Products	Number of Displays Supported Per Card
GeForce4 Ti 4600 GeForce4 Ti 4400 GeForce4 Ti 4200	Quadro4 900 XGL Quadro4 750 XGL Quadro4 700 XGL	**2** — applies to all GPUs in this category.
GeForce3 Ti 500 GeForce3 Ti 200 GeForce3	Quadro DCC	**1** — applies to all GPUs in this category.
GeForce4 MX 460 GeForce4 MX 440 GeForce4 MX 420 SDR	Quadro4 550 XGL Quadro4 500 XGL Quadro NVS 200 (AGP) Quadro NVS 200 (PCI)	**2** — applies to all GPUs in this category.
	Quadro NVS 400 (PCI)	**4** — applies to all GPUs in this category.
GeForce4 460 Go GeForce4 440 Go GeForce4 440 Go 64M GeForce4 420 Go GeForce4 420 Go 32M GeForce4 410 Go 16M	Quadro4 500 Go GL	**2** — applies to all GPUs in this category.
GeForce2 Ultra GeForce2 Ti GeForce2 GTS/Pro	Quadro2 Pro	**1** — applies to all GPUs in this category.
GeForce2 MX 400 GeForce2 MX 200 GeForce2 MX	Quadro2 MXR	**2** — applies to all GPUs in this category.
	Quadro2 EX	**1** — applies to all GPUs in this category.
GeForce2 Go	Quadro2 Go	**2** — applies to all GPUs in this category.
GeForce DDR GeForce 256	Quadro	**1** — applies to all GPUs in this category.

RIVA TNT**™**2 family
   RIVA TNT2 Ultra
   RIVA TNT2 Pro
   RIVA TNT2
   RIVA TNT2 M64
   NVIDIA Vanta**™**
   NVIDIA Vanta LT
	---	**1** — applies to all GPUs in this category.

RIVA TNT**™**	---	**1**

Supported Languages

The following languages are supported in the NVIDIA panels that are accessible from the Windows **Display Properties** > **Settings** > **Advanced** option.

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

Notes on Feature and Configuration Support

- "Feature Support" on page 21
- "Multi-Display Setup: Tips and Requirements" on page 22

Feature Support

- To access NVIDIA nView-based features using the NVIDIA Display Properties driver, you need

  - a multi-display graphics card based on any of the NVIDIA GPUs that support multiple displays on a single card, as indicated in Table 2.1, *and*

  - at least two display devices connected to the card.

- Other non-nView features are supported by either single-display or multi-display NVIDIA GPU-based cards; i.e., you can connect only one display device, such as a monitor, and access these features, provided the NVIDIA GPU supports these features.

- The options shown in the NVIDIA properties panels may vary depending on the specific NVIDIA GPU you are using. For example, one or more options that are available for a specific GPU-based card, such as a GeForce4 Ti or GeForce4 MX, may not be available on a GeForce2 Pro or other types of products.

Multi-Display Setup: Tips and Requirements

- When using a multi-display setup under Windows 2000/XP, running Windows in "Dualview" mode is strongly recommended.

- When running Windows with multiple cards (i.e., two or more NVIDIA GPU-based graphics card are installed in your computer), note the following:

  - Using cards based on the same NVIDIA GPU is strongly recommended.

  - The same NVIDIA driver (version) must be installed for each card.
  - For a detailed discussion of using multi-display modes, see "Using nView Multi-Display Modes: Dualview vs. Span/Clone" on page 34.

Examples in this Guide

- For example purposes, most of the NVIDIA panels shown in this guide feature NVIDIA GeForce4-based and the GeForce FX-based GPUs. You may be using a different NVIDIA GPU, in which case you will see the exact name of the GPU you are using reflected in the NVIDIA GPU tab.

- The Windows 2000 and Windows XP panels shown in this document are interchangeable, unless noted otherwise.

3

NVIDIA DRIVER FEATURE HISTORY

This chapter provides release history of the NVIDIA Display Driver for Windows and summarizes the features and enhancements that have been introduced in each release. It contains these sections:

Driver Release History

Release 40 is the latest NVIDIA Display Driver software for Windows. Table 3.1 contains a summary of previous driver releases and the versions associated with them.

Note: Some versions listed may not have been released outside of NVIDIA.

Table 3.1   NVIDIA Display Drivers for Windows

Driver	Name	Versions	Comments
Release 40	Detonator™ FX	44.03 – 44.*xx*	Releases ongoing
Release 40	Detonator 40	40.*xx* – 44.02	Releases ongoing
Release 35		35.*xx* – 36.xx	Releases ongoing

Table 3.1   NVIDIA Display Drivers for Windows (continued)

Driver	Name	Versions	Comments
Release 25	Detonator XP	26.00 – 29.42	Releases ongoing
Release 20	Detonator XP v2*x.xx*	21.83 – 23.xx	
Release 10	Detonator 3 v1*x..xx*	10.00 – 17.xx	
Release 6	Detonator 3	6.09 – 8.*xx*	
Release 5	Detonator 2	5.00 – 5.*xx*	
Release 4	Detonator	3.00 – 3.*xx*	
Release 3	Detonator	1.83 – 2.42	
Release 2		1.05 – 1.31	

Release 35 Enhancements

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

• **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.

For details on using this feature, see "Enabling NVRotate" on page 134.

• 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.

Release 25 Enhancements

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

• **nView,** the next-generation of the former "TwinView" feature, is the latest multi-display technology encompassing driver support, multi-display GPU architecture, and desktop management support.

- **nView Desktop Manager** is a desktop management engine for application window management, extension of application functions, and support of multiple desktops.

    Note: Desktop Manager has been significantly redesigned from its previous TwinView version. nView Desktop Manager is now a separate item on the Windows Control Panel group. You can click this item to access the Desktop Manager configuration tabs and windows.

- **NVIDIA Display Properties** (the topic of this guide) now offers improved features for multi-display functionality, including Clone modes and Horizontal and Vertical Span modes.

- **Dualview support** for Windows 2000

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

- **Special support for NVIDIA products in the GeForce4 family**:

    - IDCT support for DirectX VA

    - Improved antialiasing compatibility and performance

- **Enhanced 3D Stereo functionality**

    - Support for lenticular lenses on LCDs (Liquid Crystal Displays)

    - 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 offered new features not found in previous releases of the NVIDIA Display 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 user interface features *and*

    - accelerated Windows XP 3D performance through the NVIDIA XPress Link technology.

Release 10 Enhancements

The Release 10 driver offered new features not found in previous releases of the NVIDIA Display 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 the following 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

Release 6 Enhancements

The Release 6 driver offered new features not found in previous releases of the NVIDIA Display Driver for Windows.

- "TwinView" on page 26
- "Digital Vibrance Control" on page 27
- "OpenGL" on page 27
- "Direct3D" on page 28
- "Cursor Trails Support" on page 28
- "Display Properties – Settings – Advanced Tabs" on page 28

TwinView

TwinView is a Release 6 *and later* feature that supports connecting dual displays using an NVIDIA GPU-based multi-display card.

TwinView includes major features such as the *Virtual Desktop*, *Video Mirror*, and *Desktop Manager*.

TwinView supports a variety of display options, such as digital flat panels, red-green-blue (RGB) monitors, TVs, and analog flat panels and display modes; i.e., Standard, Clone, and Span.

Virtual Desktop

Virtual Desktop is a TwinView feature that is useful for flat panels and monitors with limited resolution. Virtual Desktop is used to set a larger than viewable area on the second display, which supports full pan-and-scan of the entire desktop area. Currently, Virtual Desktop functionality is available under the following operating systems and modes:

• Windows NT 4.0 and Windows 2000 in TwinView Standard or Clone mode

• Windows 9*x* in TwinView Clone mode

Video Mirror

Video Mirror is a TwinView feature that allows a video or DVD application to mirror its playback in full-screen mode on any one of the connected display devices. In other words, Video Mirror allows video data that's displayed on a hardware overlay to be displayed at full-screen on a secondary display. Currently, Video Mirror functionality is available under

• Windows 2000 in TwinView Clone mode

• Windows 9*x* in TwinView Clone or Span mode

• Windows 95 in TwinView Clone mode

Desktop Manager

See description of

Digital Vibrance Control

Digital Vibrance Control™ (DVC), a mechanism for controlling color separation and intensity, boosts the color saturation of an image. DVC is supported by the GeForce2 MX family and later series of NVIDIA GPUs.

OpenGL

The NVIDIA OpenGL Settings panel contains the following changes:

• Improved full-scene antialiasing methods

• Additional options for Windows 2000 and Windows NT 4.0

    • Force 16-bit Depth Buffer

- Enable Advanced Multiple Monitors

Direct3D

The NVIDIA Direct3D Settings panel contains the following changes:

- Improved full-scene antialiasing methods not previously available

- Removed certain obsolete options

Cursor Trails Support

Release 6 for Windows provides support for cursor trails in Windows 9*x*.

Display Properties – Settings – Advanced Tabs

TwinView, Digital Vibrance Control, OpenGL, and Direct3D features have associated NVIDIA-specific tabs from which the above-mentioned features can be configured.

Release 5 Enhancements

The Release 5 driver offered new features that were not found in previous releases of the NVIDIA Display Driver for Windows.

OpenGL

Changes have been made to the core, extensions, performance, and available features of OpenGL.

OpenGL 1.2 Core
Release 5 adds all the features that constitute the OpenGL 1.2 core capabilities:

- BGRA pixel formats

- packed pixel formats (plus R5_G6_B5 formats and reversed formats)

- rescaling vertex normals

- specular highlights after texturing

- level-of-detail control for mipmapped textures (supported in software on TNT2)
- texture coordinate edge clamping
- 3D textures (performed in software on all platforms)
- vertex array subranges for optimizing vertex array processing (`glDrawRangeElements()` retains the performance of `glDrawElements()`)

OpenGL Extensions

The OpenGL extensions in Table 3.2 were added or changed in Release 5.

Table 3.2   OpenGL Extensions Modified in Release 5

Extension	Status	Comment
ARB_texture_cube_map	New	Same as EXT_texture_cube_map
ARB_texture_env_add	New	Same as EXT_texture_env_add
ARB_transpose_matrix	New	
GL_ARB_texture_compression	New (5.16)	To replace S3_s3tc
NV_blend_square	New	
S3_s3tc	New	Deprecated
EXT_clip_volume_hint	Removed	
EXT_cull_vertex	Removed	
GL_NV_light_max_exponent	Renamed	Was GL_EXT_light_max_exponent

OpenGL Performance Enhancements

A number of features are significantly improved in Release 5.

- For RIVA TNT and TNT2, polygon offset is faster.
- For GeForce 256, a number of improvements have been made:
  - `glDrawPixels()` and `glReadPixels()` have been made faster
  - Display lists use AGP memory for better performance.
  - Large texture sets are handled more efficiently by the texture manager.
  - Vertex arrays with two-sided lighting are faster.
  - Compiled vertex arrays are faster for primitives that use multi-textured TexCoord2f+Color4ub+Vertex3f.
  - Vertex array range extension is fully functional.
- Windows **Display Properties** > **Settings** > **Advanced** tabs enables accelerated full-scene antialiasing (GeForce, GeForce2)
- Multi-monitor hardware is accelerated on Windows 2000.

- `GL_WGL_swap_interval` extension can change Vsync behavior.

- Vsync is on by default. (Default behavior is selectable from the NVIDIA OpenGL properties tab.)

- Default anisotropic filtering can be triggered by checking the anisotropic filtering box on the NVIDIA OpenGL properties tab.

- Enabling `GL_POLYGON_SMOOTH` no longer forces software rendering, resulting in much better performance at some cost in visual quality.

Direct3D

Release 5 contains the following Direct3D changes:

- Accelerated full-scene antialiasing is enabled (GeForce, GeForce2).

- Limited three-stage setup is now possible.

- `D3DVTXPCAPS_MATERIALSOURCE7` capability bit is now disabled (leaving the driver with DirectX 6 material source capabilities)

The following Registry keys are useful for applications that do not blit correctly:

- `FLUSHAFTERBLITENABLE` is a new Registry key that controls the wait-after-blit condition when the `DDBLT_WAIT` flag is set.

  (Default is `DISABLED`—do not wait.)

  Note: This Registry key was formerly named `WAITAFTERBLITENABLE`.

- `FORCEBLITWAITFLAGENABLE` is a new Registry key that forces the `DDBLT_WAIT` flag to be set for all blits, which prevents applications that do not check the return value from unexpectedly losing blits.

  (Default is `DISABLED`.)

- `LIMITMAXQUEUEDFBBLITSENABLE` is a new Registry key that limits the maximum number of queued blits to the front buffer to a value set by the `PRERENDERLIMIT` Registry key, which is 3 by default.

  (Default is `DISABLED`.)

Display Properties – Settings – Advanced Tabs

NVIDIA now provides tabs (**Display Properties** >**Settings** > **Advanced**) for Windows NT 4.0 and Windows 2000.

C H A P T E R

4

ABOUT INSTALLING AND UNINSTALLING NVIDIA DRIVERS

This chapter contains the following major sections:

Before You Begin

In order to access the NVIDIA Display Properties tabs, the latest version of the NVIDIA Display Drivers software for your Windows operating system must be installed on your computer.

- If you do not have System Administrator access privileges, it is assumed that the appropriate person with System Administrator access in your organization will set up and install the NVIDIA Display Driver software on your computer.

- This chapter discusses the installation process but does not provide step-by-step instructions on how to perform an actual installation.

- For details on configuring and using the nView Desktop Manager application component of the NVIDIA Display Driver, see the *NVIDIA nView Desktop Manager 2.0 User's Guide*.

About the NVIDIA Display Driver Installation

NVIDIA Driver Installation provides both an `.inf` file-based installation method and an InstallShield Wizard-based installation method.

File Locations

- 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" (`.tvp`) files are saved in the `Windows\nView` directory.

- As part of the installation process, an uninstall is registered in your system.

- Under Windows Me and Windows XP, the NVIDIA driver is installed in "Dualview" display mode. However, note that the second display is not activated (turned on) by default. You need to enable it. For details on enabling Dualview mode, see "Using nView Multi-Display Modes: Dualview vs. Span/Clone" on page 34.

- Under Windows 2000, the NVIDIA Display Driver is installed in Span mode.

Preserving Desktop Manager Settings Before Upgrading Your Software

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

Follow the steps below and/or refer to the *NVIDIA nView Desktop Manager 2.0 User's Guide* for details.

1 Before uninstalling or installing software, save your current nView Desktop Manager settings to a new profile.

For example, name this profile "`My Settings`".

2 Open the `Windows\nView` directory.

You should see your new profile `.tvp` file in this directory; for example, `My Settings.tvp`.

3 You can copy this file to a disk in your A: drive *or* to a different directory on your hard drive.

4 Uninstall the currently installed NVIDIA Display Driver software on your system. See "Uninstalling the NVIDIA Display Driver Software" on page 33.

5 Install the new version of the NVIDIA Display Driver software.

6 Copy your profile `.tvp` file back into the `Windows\nView` directory.

7 Start nView Desktop Manager and load your profile.

When you load this profile, all your nView Desktop Manager settings, including Individual Settings you may have set up for applications, are restored.

Uninstalling the NVIDIA Display Driver Software

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

To uninstall the NVIDIA Display Driver software, follow these steps:

1 From the Windows taskbar, click **Start** > **Settings** > **Control Panel** to open the Control Panel windows.

2 Double click the **Add/Remove Programs** item.

3 Click the **NVIDIA Windows Display Drivers** item from the list.

4 Click **Change/Remove**.

5 Click **Yes** to continue.

Note: 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.

5

USING NVIEW MULTI-DISPLAY MODES: DUALVIEW VS. SPAN/CLONE

This chapter contains the following major sections:

nView Dualview vs. Span and Clone Modes

When using NVIDIA products that are multi-display capable, there are three ways to run multi-display configurations under most operating system; Dualview, Span, or Clone mode.

- **nView Dualview and Span/Clone modes are mutually exclusive**. This means that you cannot access nView Span or Clone Mode if you have Dualview mode enabled. Conversely, you cannot access Dualview mode if you have nView Span or Clone Mode enabled.

  Note: As explained in Chapter 1, the *nView Display Mode* option in the Media Center menu will always be visible when you are *not* in Dualview mode (Figure 5.1). When you are in Dualview mode, the *nView Display Mode* option is replaced by the *Device Selection* option (Figure 5.2).

Figure 5.1   NVIDIA Media Center Menu: nView Display Mode Enabled

nView Display
Mode option
appears when
Dualview is
disabled.
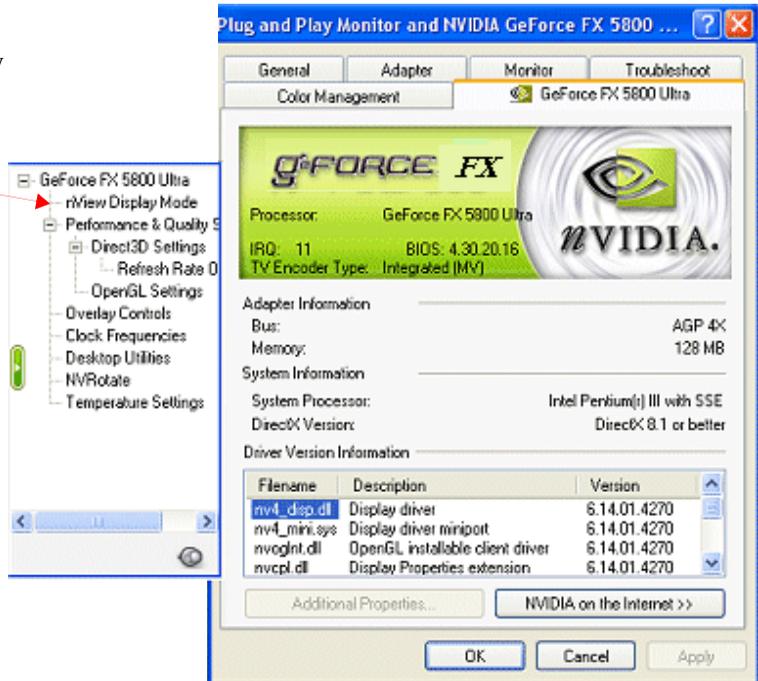
Figure 5.2   NVIDIA Media Center Menu: Dualview Mode Enabled

nView Display
Mode is
unavailable
when Dualview
mode is enabled.
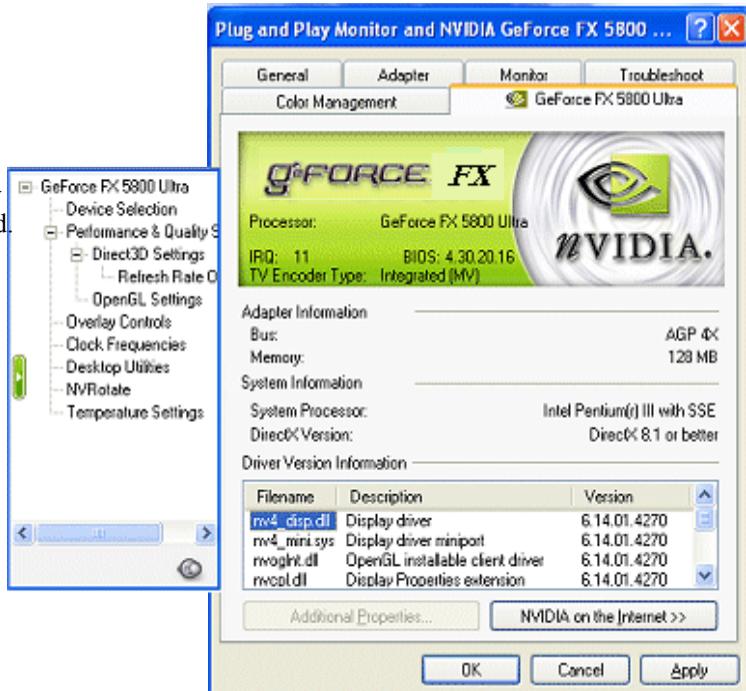
Figure 5.3 nView Span/Cone Modes Available: Windows XP (2000)
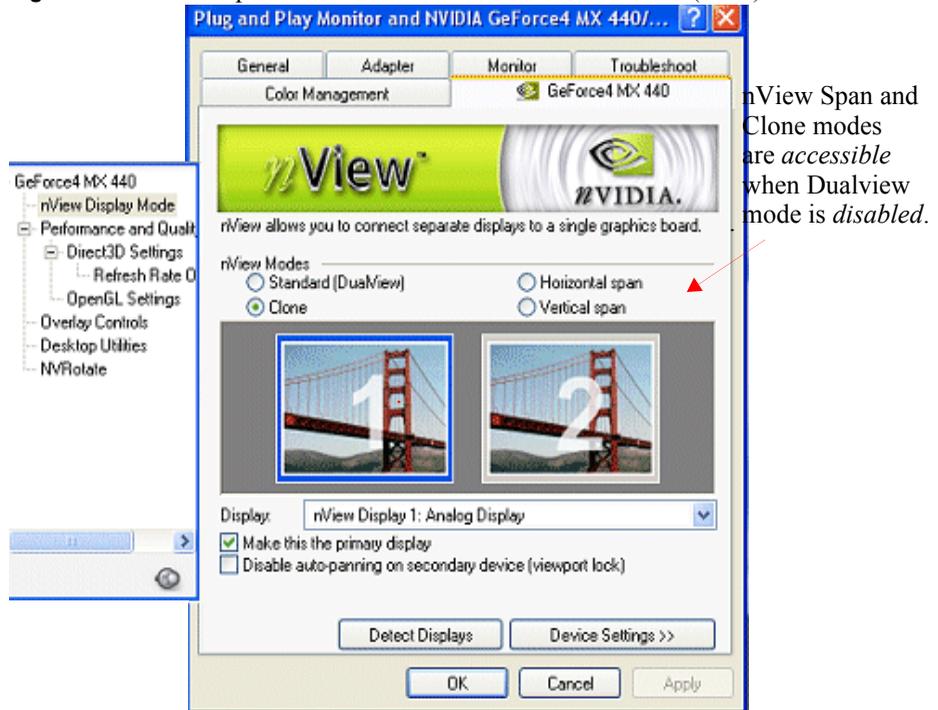
- **nView Dualview Mode** has no special "nView multi-display mode" user interface because Dualview support conforms to the standard Microsoft user interface. The "Standard" mode in the panel shown in Figure 5.2 can be thought of as Dualview in that it is *not* Span or Clone mode.

   Note: When you start **Windows 9x** or **Windows XP** using multiple displays, Windows is pre-configured for Dualview mode. This is not the case for Windows 2000. NVIDIA provides a special feature to "Enable Dualview" in Windows 2000.

   For details on using Dualview mode, see the following sections:

• **nView Span and Clone Modes:** You can access Span or Clone modes (Figure 5.3) through the **Advanced** option on the Windows Display Properties Settings panel. (Windows 9*x* offers Clone mode only.)

For details on using nView Span/Clone modes, see the following sections:

nView Dualview Mode

Key Features of nView Dualview Mode

Dualview mode is sometimes called "native mode" as it is the native mode supported by Windows multi-display configurations; i.e. it is the "Microsoft" defined multi-display mode supported by Microsoft Windows operating systems.

Figure 5.4   Multiple Display Devices in nView Dualview Mode

Display 1: (resolution = 1280 x 768)   **Display 2:** (resolution = 1024 x 768)

Taskbar is not stretched across displays.   **Background** is not stretched across displays.
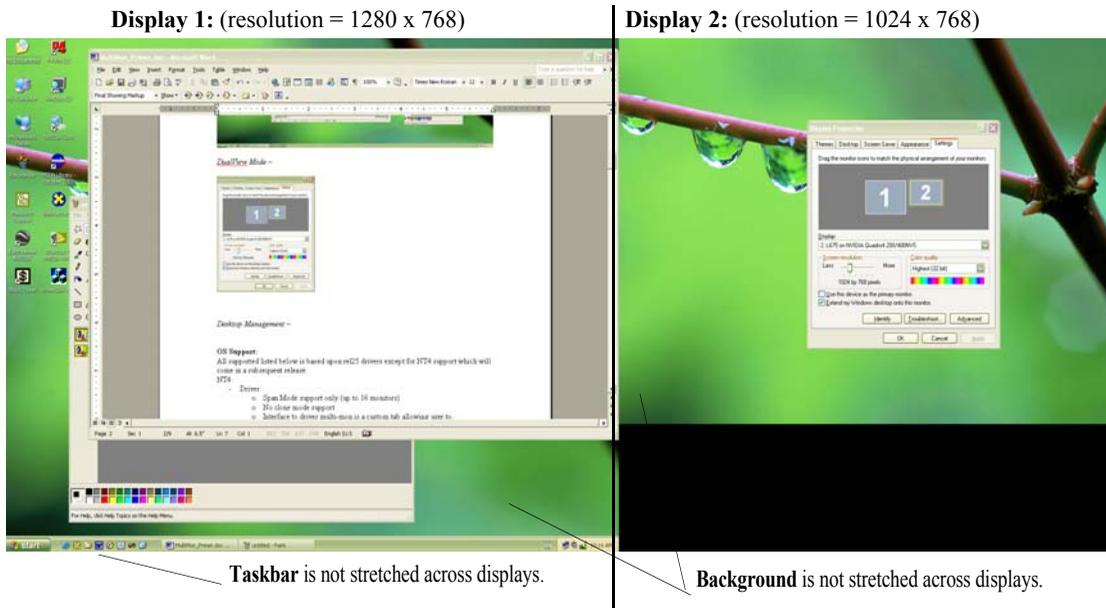
Dualview support and functionality include the following:

- nView Dualview, Span, and Clone modes support advanced NVIDIA features such as **Video Mirroring**. See "Full-Screen Video Mirroring Options" on page 130.

  Note: Windows NT 4.0 in Multiview mode does not support Video Mirroring.

- Windows places the taskbar on only a single display.

- Windows replicates (rather than stretches) the background on each display.

- When you maximize an application, it maximizes only to the single display, and so on.

  Figure 5.4 shows an example of a Dualview system where the left display is running at 1280x1024 and the right display is running at 1024x768. Notice that the background is not stretched across the displays and the taskbar appears on a single display instead of being stretched across displays.

- You can set different color depths per display.

- You can arrange your multi-display desktop to be any shape; it does not have to be limited to "rectangular" as in Span modes.

- When you run a DirectX or OpenGL application in Dualview mode, it is accelerated as long as the window does not span more than one display. If the window spans two displays, drawing is not accelerated in the window.

  Note: In Span mode, drawing is always accelerated.

- Dualview mode works for any display connected to your NVIDIA multi-display graphics card:

  - PC monitor with an analog connector
  - Flat Panel with a DVI connector
  - TV with an S-Video connector.

  For example, you can have a system with the primary display as an analog PC monitor that supports up to 1600 x 1200 at 100 Hz refresh rate, while the secondary display is connected to an NTSC TV that is limited to 800 x 600 at 60 Hz refresh rate. The TV has less resolution and refresh rate than the monitor since the TV encoder on the graphics chip has fewer capabilities than the analog PC monitor.

Enabling nView Dualview Mode for the First Time: Windows 2000

Note: When you start Windows 2000 with an NVIDIA GPU-based multi-display graphics card (or multiple NVIDIA GPU-based graphics cards), you are not yet in "Dualview" mode*. You can confirm this when you view the Windows Display Properties Settings panel and see only one monitor image in the display.

The NVIDIA Desktop Utilities settings panel contains an option that lets you enable "Dualview" mode under Windows 2000. Follow these steps to enable Dualview.

1 Make sure you have a multi-display NVIDIA GPU-based graphics card, or dual graphics cards, properly installed in your computer and securely connected to your display devices.

2 Ensure that you have more than one display device attached to your multi-display graphics card and that the display devices are turned on.

3 Confirm that the NVIDIA Display Driver software (including the nView Desktop Manager component) has been installed on your system.

4 Start up Windows.

5 From your desktop, right click to view the properties menu.

6 Click **Properties** > **Settings** (tab) > **Advanced >** the NVIDIA GPU tab > **Desktop Utilities** option from the Media Center menu to display the NVIDIA Desktop Utilities panel.

7 Click the **Enable Dualview (Treat multiple outputs . . .)** option to enable it (Figure 5.5).and click **Apply**. The prompt in Figure 5.6 appears.

Figure 5.5   NVIDIA Desktop Utilities Panel: Enabling Dualview in Windows 2000
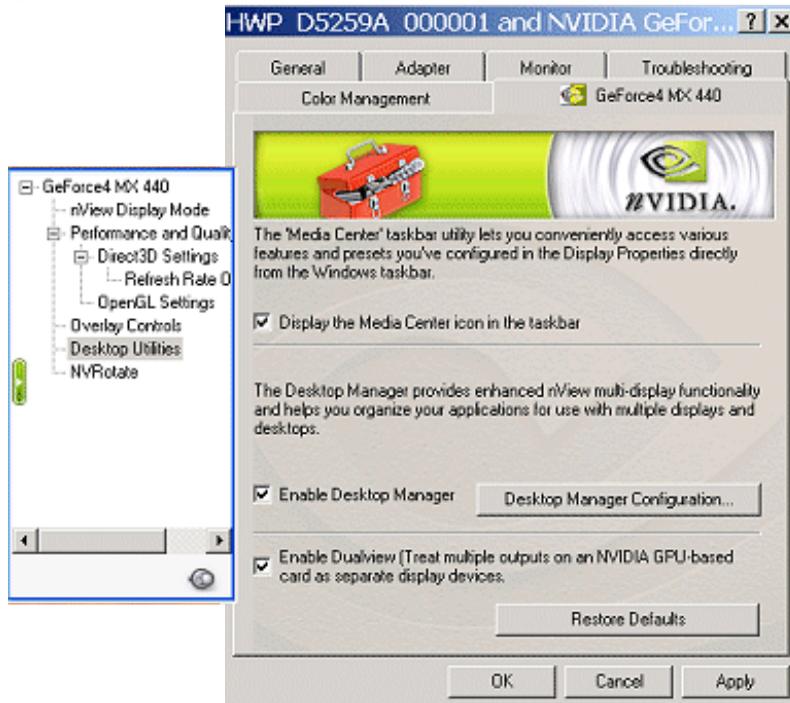
Figure 5.6   Restart Now Message: Enabling Dualview in Windows 2000
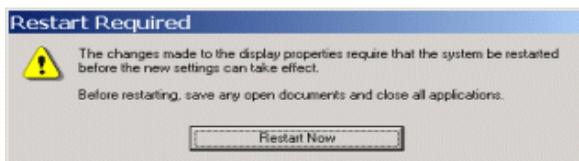
8 Click **Restart Now**. When the system starts up, you may see a series of Dualview installation prompts as shown in Figure 5.7.

Note: It may take up to one minute for the first Dualview prompt to appear.

Figure 5.7   Dualview Installation Messages: Windows 2000
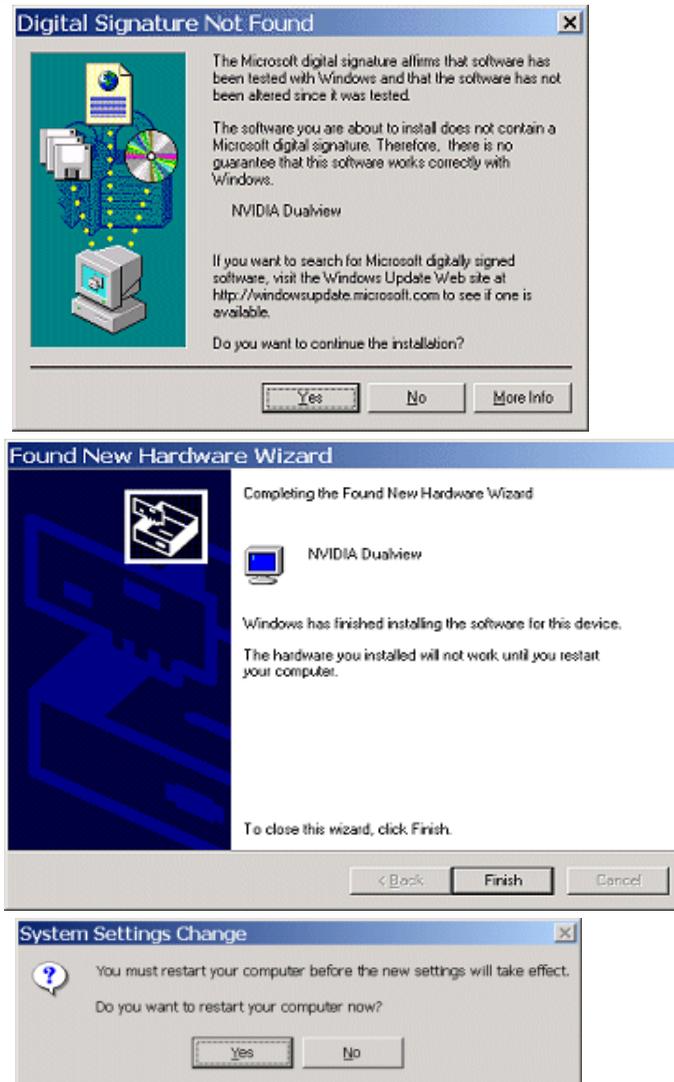
9 Click **Yes**, **Finish**, and **Yes** to follow through and then restart your computer as prompted.

After the system starts up, if the NVIDIA nView Desktop Manager Setup Wizard appears, run through the Wizard. (See the *NVIDIA nView Desktop Manager 2.0 User's Guide* for details.)

10 From your desktop, right click to view the properties menu, then click **Properties** and the **Settings** tab.

You'll notice that at least two monitor images appear on the Settings panel now, as shown in Figure 5.8. This is Dualview mode. However you will need to enable this mode, as explained in later steps.

Figure 5.8   Display Properties Settings: Dualview Mode (Windows 2000)
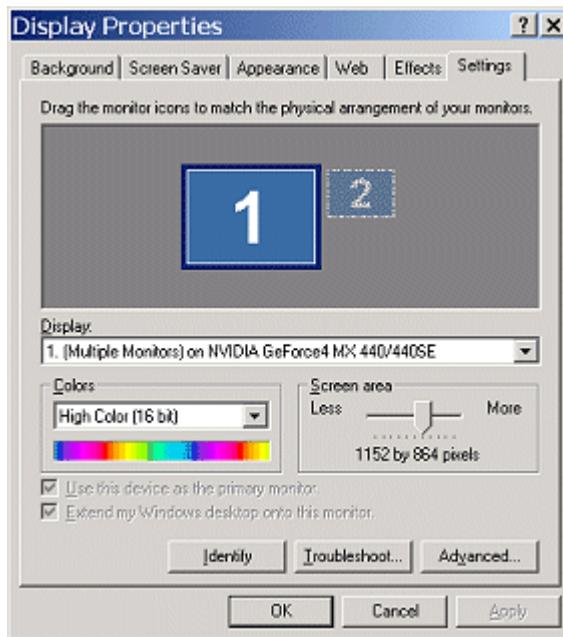
11 Be sure to click the display image **1** so that it is the selected display.

12 Click **Advanced** to display the NVIDIA GPU tab, as shown in Figure 5.9.

13 Click the NVIDIA GPU tab to display the associated panel and the Media Center menu, as shown in Figure 5.10.

Note: The *nView Display Mode* option on the Media Center menu is replaced by the *Device Selection* option because your are in Dualview mode.

14 Click **OK** to return to the Display Properties **Settings** panel.

Note: The following steps let you enable (turn on) your secondary display.

15 From the Display Properties Settings panel, right click monitor image numbered **2** to display a pop-up properties menu.

16 Click **Attached** and click **Apply**.

17 You will notice that the **Extend my Windows desktop onto this monitor . .** option becomes checked and your secondary display is enabled (Figure 5.11).

Figure 5.9 First Appearance of the NVIDIA GPU Tab: Windows 2000
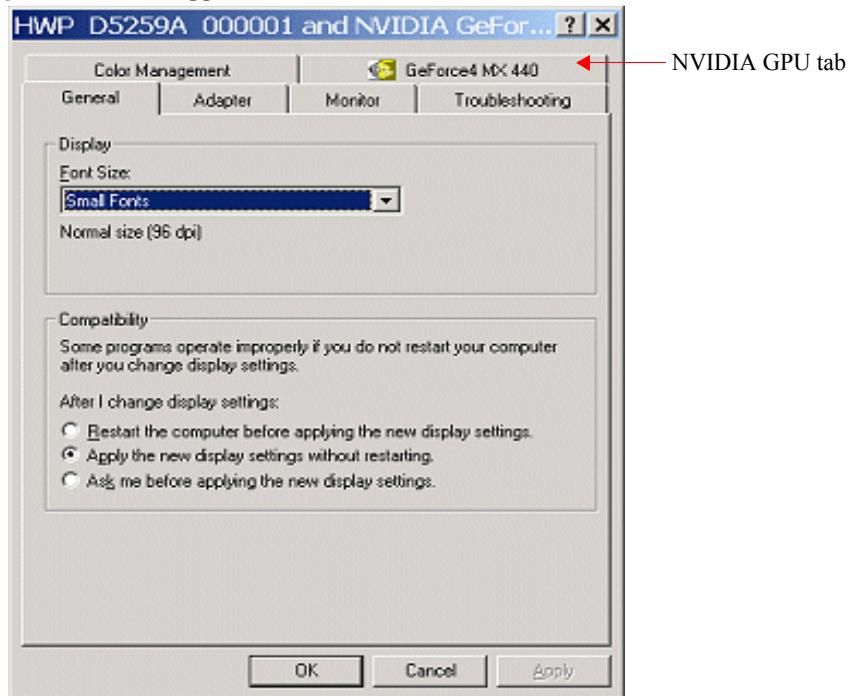
Figure 5.10 First Appearance of the Media Center Menu: Windows 2000 (Dualview)
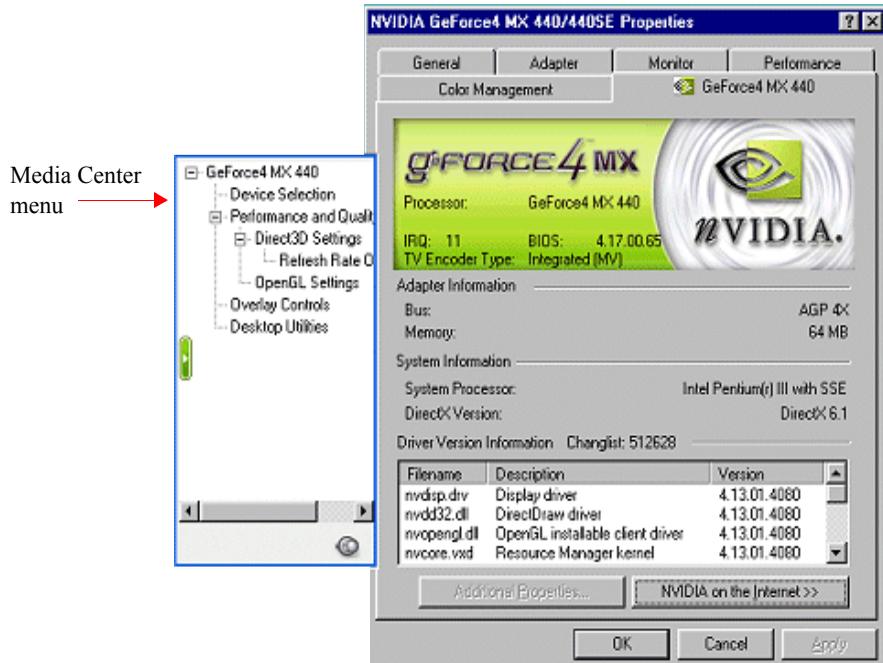
Figure 5.11 Windows 2000 Display Settings: Dualview Mode (Display 2 attached)
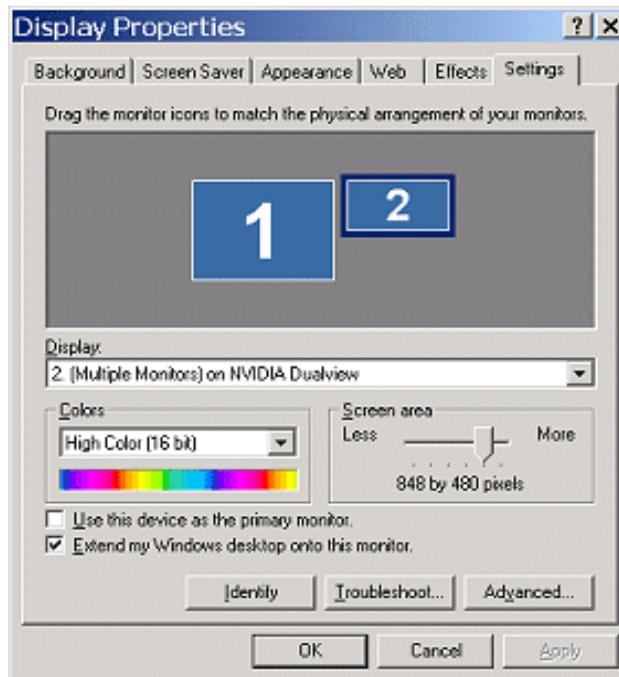
Enabling nView Dualview Mode After Initial Session: Windows 2000

Switching back and forth from Dualview to Span/Clones mode under Windows 2000 is much faster *after* the initial Dualview enable session.On subsequent Dualview enabling sessions, you can use fewer steps, as follows:

1 Follow the basic steps in "Enabling nView Dualview Mode for the First Time: Windows 2000" on page 39 through step 9.

2 After your computer restarts, Dualview enabling is complete. You will not see any further Dualview messages and do not need to follow the remaining steps.

Activating nView Dualview Mode: Windows XP

When you start Windows XP in multi-display configuration, Windows starts in "Dualview" mode. You may only need to do an "attach" procedure to enable the secondary display device. Follow these steps:

1 Make sure you have an NVIDIA GPU-based multi-display graphics card installed in your computer.

2 Confirm that all your display devices are securely connected to your computer and turned on!

3 Confirm that the NVIDIA Display Driver software (including the nView Desktop Manager component) has been installed on your system.

4 Start Windows.

5 From your desktop, right click to open the properties menu, then click **Properties** and the **Settings** (tab). You'll notice that two monitor images appear on the Settings panel, indicating that you are in Dualview mode.

Figure 5.12 Windows XP Display Settings in Dualview Mode
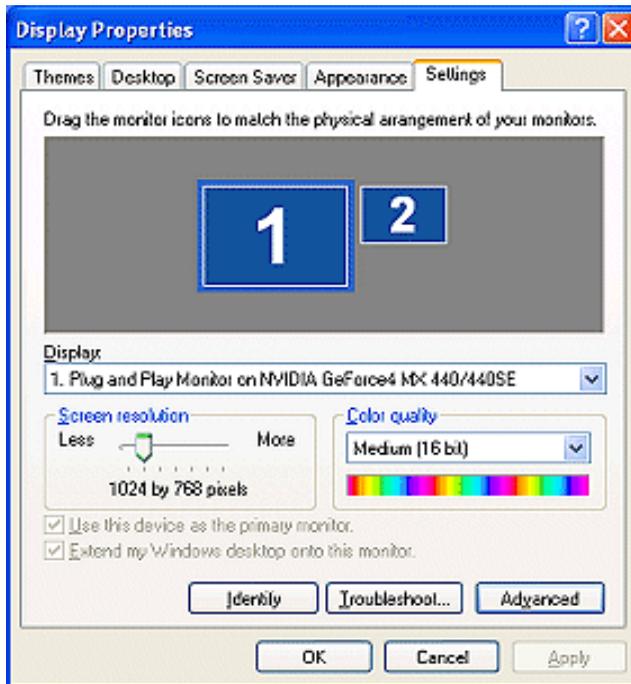
6 Now right click the monitor image that you need to attach. A pop-up properties menu appears.

Note: You may not need to do the next step if the secondary display device is already attached.

7 Click **Attached** and **Apply**.

You will notice that the **Extend my Windows desktop onto this monitor** option becomes checked and your secondary display device is enabled.

8 Click **Advanced**. The NVIDIA GPU tab appears (Figure 5.14).

9 Click the NVIDIA GPU tab. Notice that although you are in Dualview mode, you can see the **nView Display Mode** option in the Media Center menu.

Figure 5.13 Windows XP Display Settings in Dualview Mode (Display 2 attached)
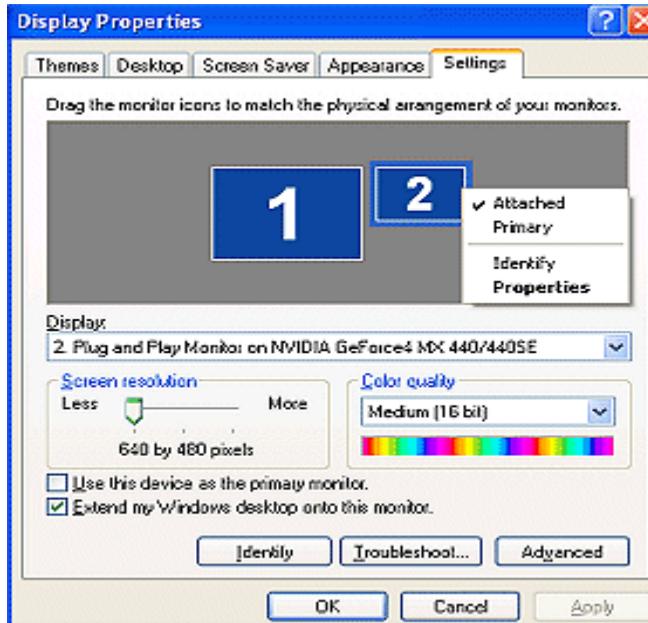
Figure 5.14 First Appearance of the NVIDIA GPU tab
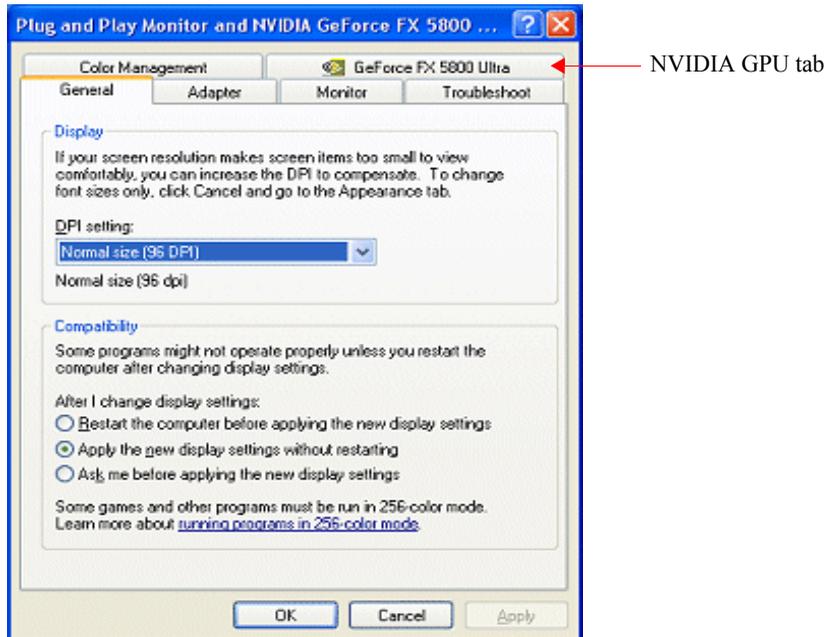
10 Click **nView Display Mode** to display the associated properties panel. Notice that the nView Span/Clone mode options are disabled because you are in nView Dualview mode. (Figure 5.15)

Figure 5.15 nView Span/Clone Options *Disabled* in Dualview Mode: Windows XP
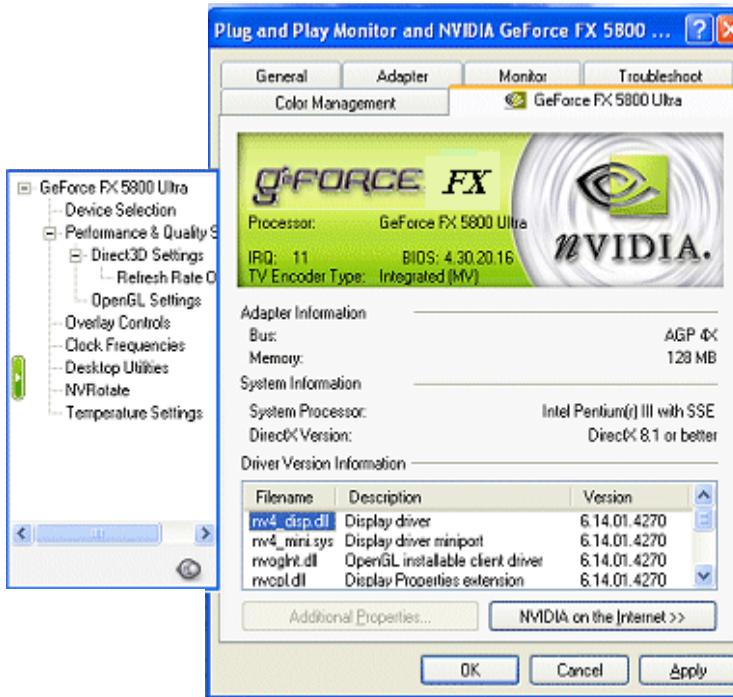
Activating nView Dualview Mode: Windows 9*x*

Notes: • Dualview mode is not supported under Windows 95.

• Under Dualview mode, when you switch to a full-screen Microsoft DOS window or boot to a DOS prompt, the display is limited to the primary display device.

• Under Dualview mode, OpenGL-based applications will only run using Microsoft's software rendering implementation of OpenGL. This is due to a design limitation within Windows.

When you start Windows 9*x* in multi-display configuration, Windows starts in "Dualview" mode. You may only need to do an "attach" procedure to enable the secondary display device. Follow these steps

1 Make sure you have an NVIDIA GPU-based multi-display graphics card installed in your computer and all your display devices are securely connected to your computer and turned on!

2 Confirm that the current version of the NVIDIA Display Driver software (including the nView Desktop Manager application) has been installed on your system.

3 Start Windows.

4 From your desktop, right click to open the properties menu, then click **Properties** and **Settings** (tab). You'll notice that (at least) two monitor images appear on the Settings panel (Figure 5.16). **This is Dualview mode.**

Figure 5.16 Display Settings: Windows 98
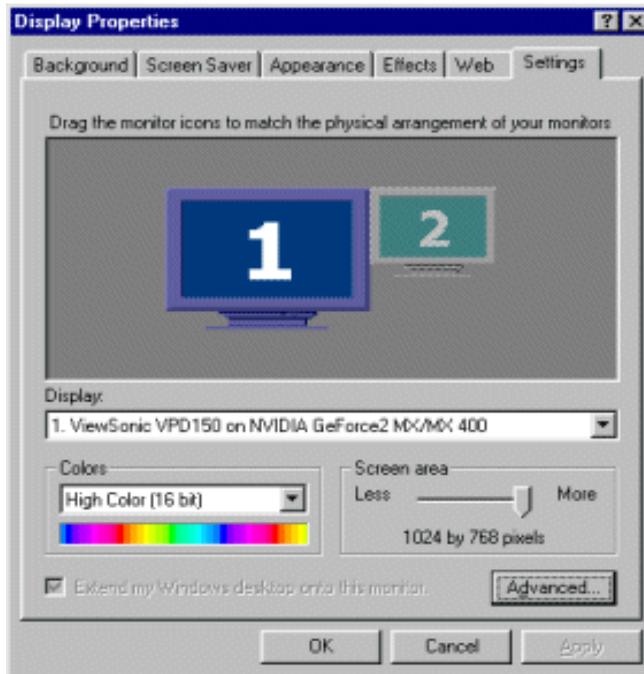
Note: If you are using an NVIDIA multi-display graphics card (such as a GeForce4 MX) but have only one display device connected (such as a CRT), you will see two monitor images on the Settings panel even though only one display device is connected. You cannot enable the second display until you physically connect a second display device to the graphics card.

5 To turn on (enable) the secondary display (monitor image **2**), go to the next step.

6 Right click monitor image **2** (Figure 5.17) and click **Enabled** to check the option. Notice that the **Extend my Windows desktop onto this monitor** option becomes checked (Figure 5.18).

> **Note:** If you get a Compatibility Warning message, read the message carefully and then click **OK**.

Figure 5.17 Enabling Dualview (1): Windows 9x
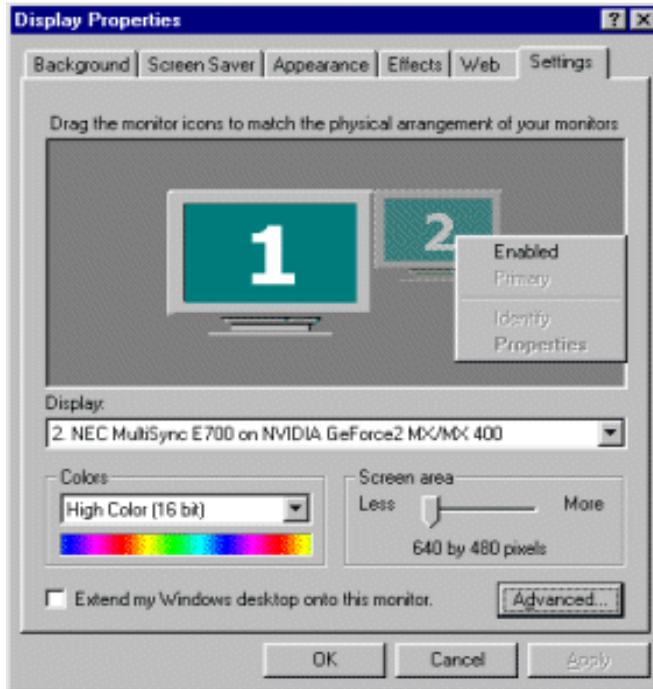
7 Click **Apply**.

8 Be sure to click the display image **1** so that it is the selected display.

9 Click **Advanced** and then click the NVIDIA GPU tab (Figure 5.19) to display the window in Figure 5.20.

Under Windows 9*x*, the **nView Display Mode** option does not appear at all in the Media Center menu because you are in Dualview mode.

Figure 5.18 Enabling Dualview (2): Windows 9x
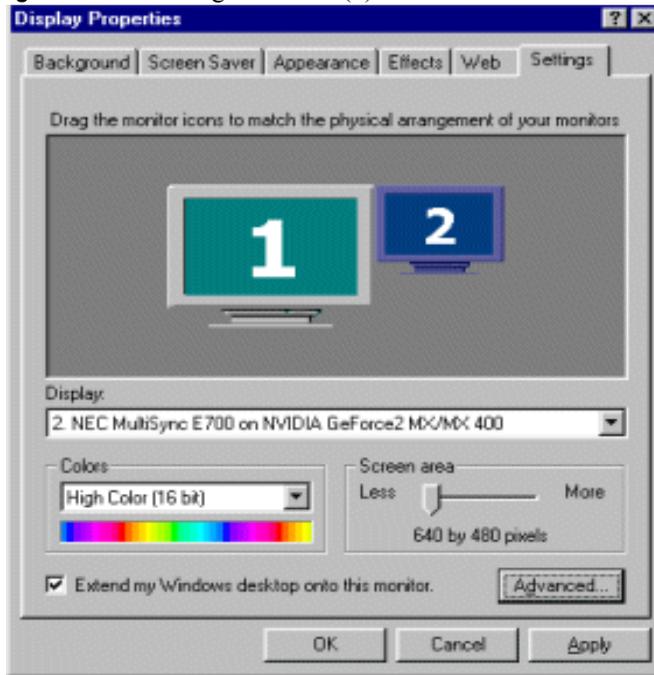
Figure 5.19 First Appearance of the NVIDIA GPU Tab: Windows 9x

NVIDIA GPU tab
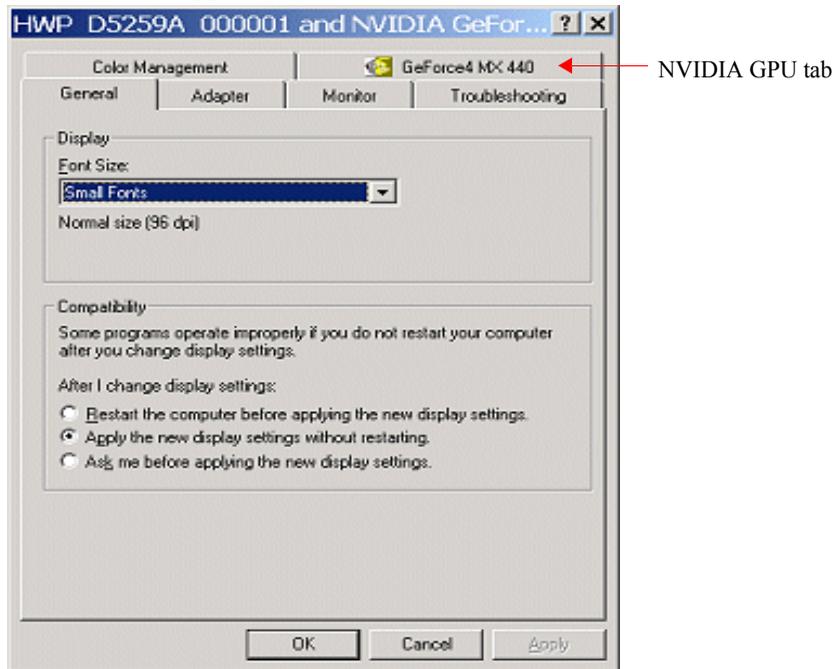
Figure 5.20 NVIDIA Media Center Menu in Dualview Mode: Windows 98

Media Center menu

nView Display Mode option is *unavailable* in Dualview mode.
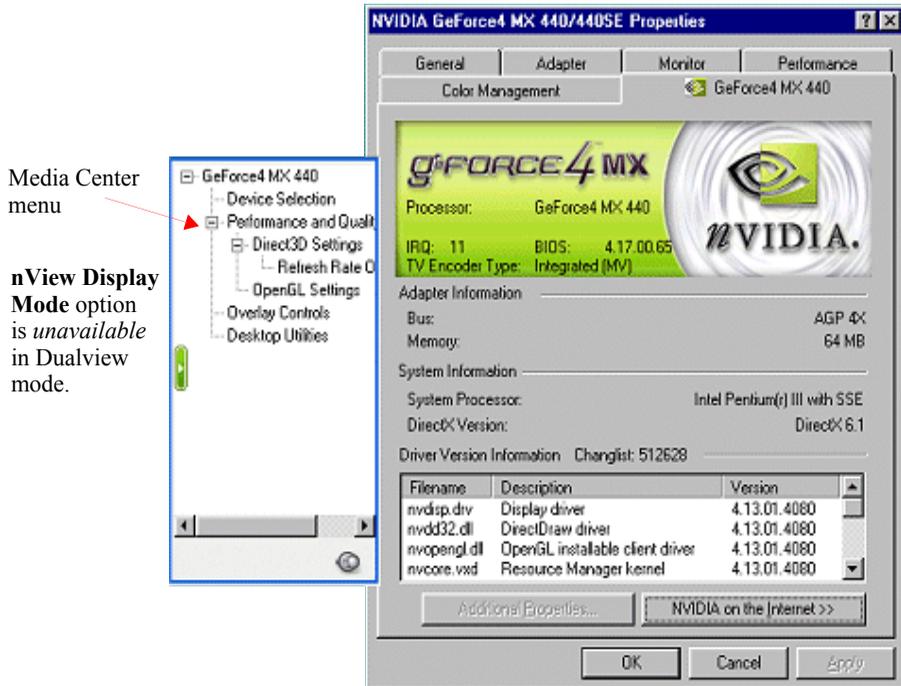
nView Span and Clone Modes

nView Span, Clone, and Dualview modes support advanced NVIDIA features such as Video Mirroring. (See "Overlay Controls Panel" on page 129.)

Note: Windows NT 4.0 Multiview mode does not support Video Mirroring.

Key Features of nView Span Mode

Span mode support and functionality include the following:

• DirectX or OpenGL applications in Span mode are fully accelerated.

• In nView Span mode, your Windows desktop is "stretched" or "spans" all of your displays. In Span mode, as far as Windows is concerned, you only have a single "logical" display device connected to your computer – the real "physical" displays are combined together to give you this "logical" display.

Figure 5.21   Multiple Displays in nView Horizontal Span Mode

Display 1   **Display 2**

Taskbar is stretched. across displays

Background is stretched across displays.
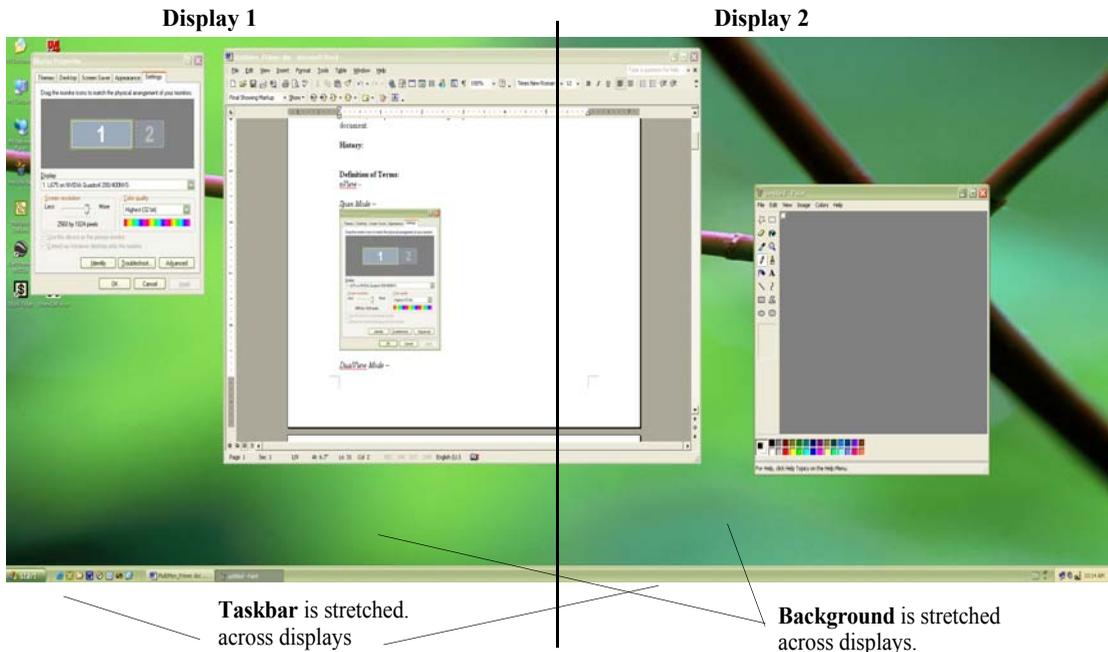
Figure 5.21 shows an example of running Span mode under Windows XP with both of the two displays set to 1280x1024 resolution. In this configuration, Windows recognizes *only* a single display running at 2x1280x1024 or 2560x1024.

- The key to remember when running nView Span mode is that Windows does not detect that you have two displays connected – as far as it is concerned, you have an oversized display. This is the reason that you cannot use different bit depths or resolutions per display.

  Note: This also results in Span mode being slightly faster than Dualview mode because Windows only has to manage one display device instead of two.

- Under nView Span mode, Windows "stretches" the background wallpaper out to cover your large "logical" display and it stretches the taskbar out to fill your large "logical" display, as shown in Figure 5.21. If you maximize an application, the application will be maximized to fill the large "logical" display screen – i.e., both displays.

- Using the current Release 40 drivers under Windows XP and Windows 2000, you can run nView Span mode with more than two displays. For example, if

are using an NVIDIA GPU-based card to which you have connected four displays, you can have two sets of two spanned displays.

Enabling nView Span/Clone Modes

Enabling nView Span/Clone Modes: Windows 2000

Note: Under Windows 2000, switching between nView Span/Clone and Dualview modes requires restarting your computer.

To disable Dualview mode and, therefore, make nView Span and Clone modes accessible, follow these steps:

1 Click **Properties** > **Settings** tab.

2 Be sure to click the display image **1** so that it is the selected display.

3 Click **Advanced** to display the NVIDIA GPU tab.

4 Click the NVIDIA GPU tab and then the **Desktop Utilities** option from the Media Center menu.

5 Click to *uncheck* the option **Enable Dualview (Treat multiple outputs . . .)**.

6 Click **Apply** and restart your computer.

After the system starts up, if the NVIDIA nView Desktop Manager Setup Wizard appears, run through the Wizard. (See the *NVIDIA nView Desktop Manager 2.0 User's Guide* for details.)

7 Right click to display the properties menu, then select **Properties** > **Settings** tab.

When you are in Windows 2000 (non-Dualview) nView Span or Clone mode, your Windows Display Properties Settings panel shows only one monitor image (Figure 5.22).

8 Click **Advanced** to display the NVIDIA GPU tab (Figure 5.23).

9 Click the NVIDIA GPU tab. The Media Center menu appears (Figure 5.24).

10 Click **nView Display Mode** to display the associated properties panel with the Span and Clone mode options available. (Figure 5.25).

Figure 5.22 Windows 2000 Display Properties Settings in nView Span/Clone Mode (Dualview disabled)
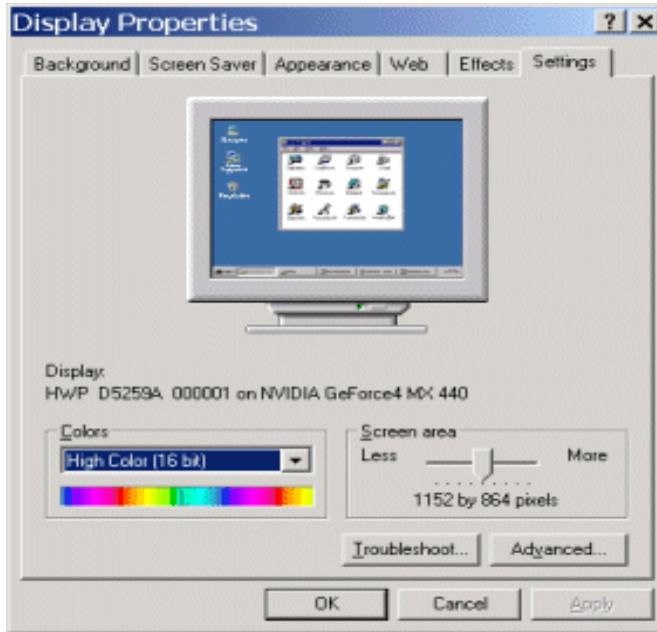
Figure 5.23 First Appearance of the NVIDIA GPU Tab: Windows 2000

NVIDIA GPU tab
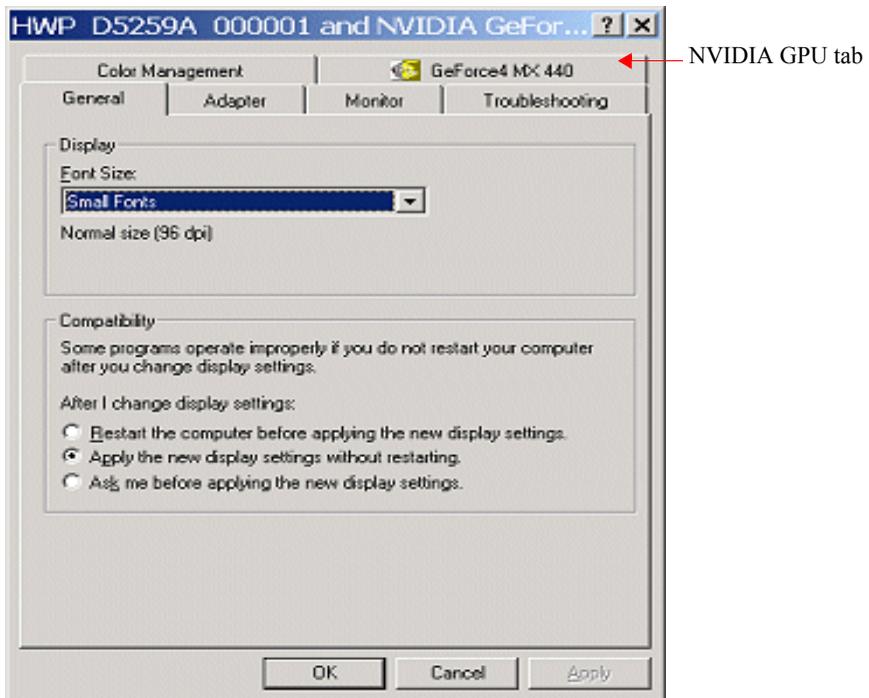
Figure 5.24 NVIDIA Media Center Menu: Windows 2000

Media Center
menu   →
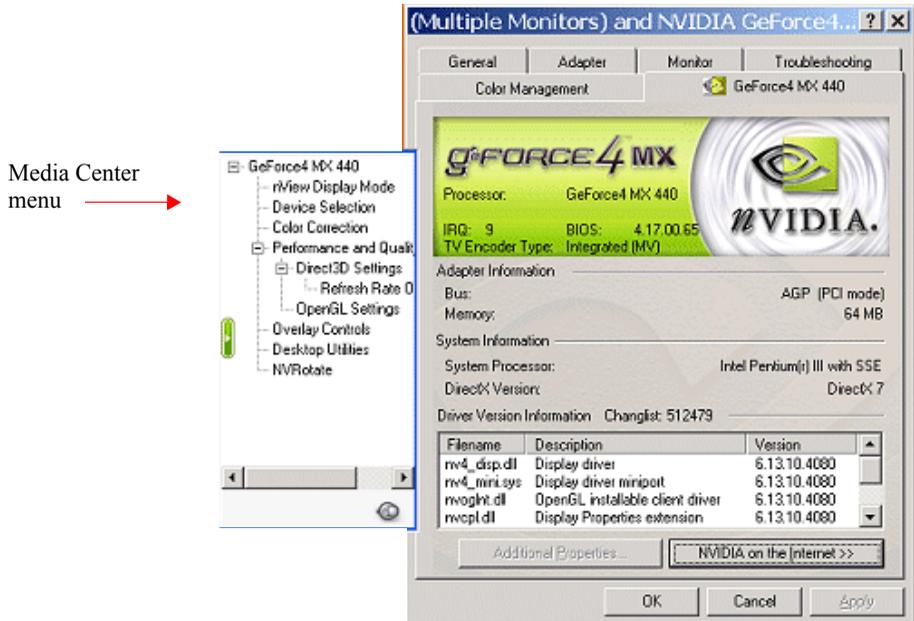
Figure 5.25 nView Clone/Span Modes Available: Windows 2000
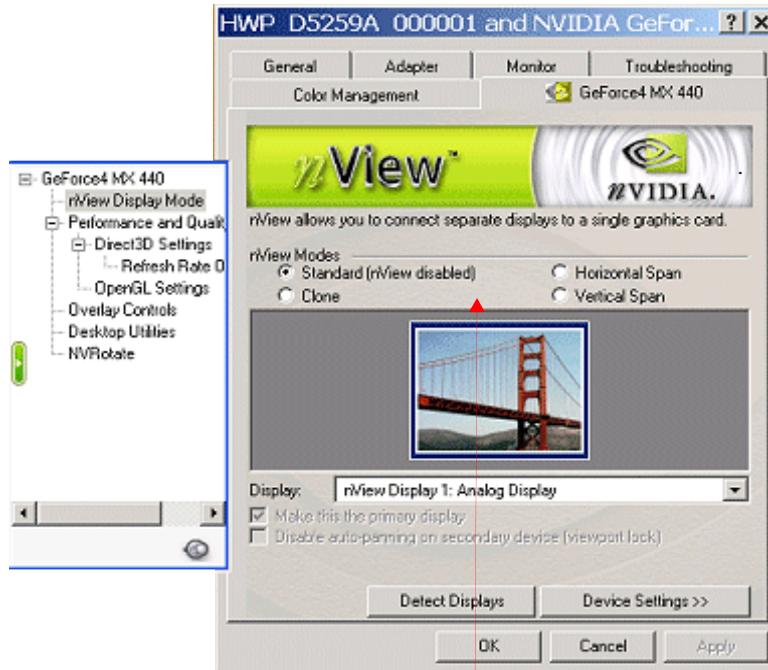
nView Span/Clone modes are *available* because
nView Standard (Dualview) mode is disabled.

Enabling nView Span/Clone Modes: Windows XP

Note: Under Windows XP, *you do not need to restart your computer* to switch between nView Span/Clone Mode and Dualview mode.

When you are in Windows XP Span or Clone mode, your Windows Display Properties Settings panel shows at least "two" monitor images, unlike Windows 2000, which shows only one monitor image.

To disable Dualview mode and, therefore, make nView Span and Clone modes accessible, follow these steps:

1 Open the Windows Display Properties Settings panel.

2 Right click the monitor image **2** and click **Attached** so that the option becomes *unchecked*.

3 Click **Apply** (Figure 5.26). This turns off your secondary display. (To access nView Span and Clone modes, only one monitor needs to be enabled on the Display Settings panel.)

4 Be sure to click the display image **1** so that it is the selected display.

Figure 5.26 Disabling Dualview Mode: Windows XP
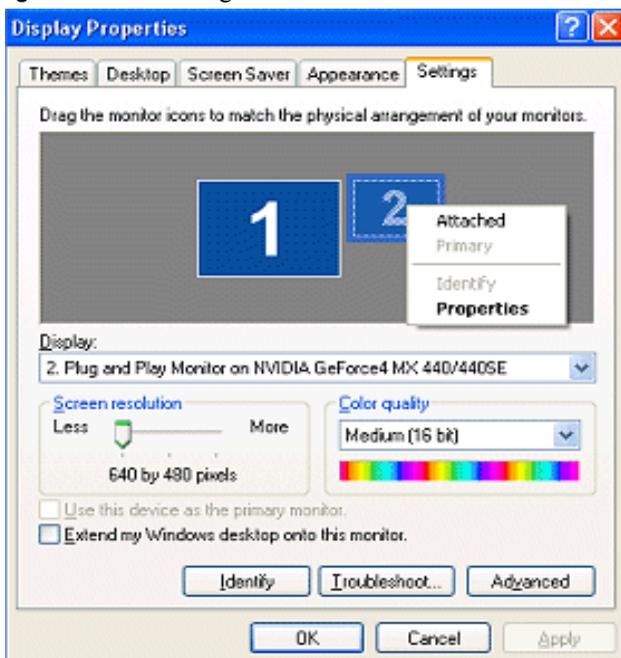
5 Click **Advanced** to display the NVIDIA GPU tab shown in Figure 5.27.

6 Click the NVIDIA GPU tab to display the **nView Display Mode** option in the Media Center menu, as shown in Figure 5.28.

7 Click **nView Display Mode** to display the associated panel with the Span/
Clone mode options available (Figure 5.29).

Figure 5.27 First Appearance of the NVIDIA GPU tab: Windows XP (2000)
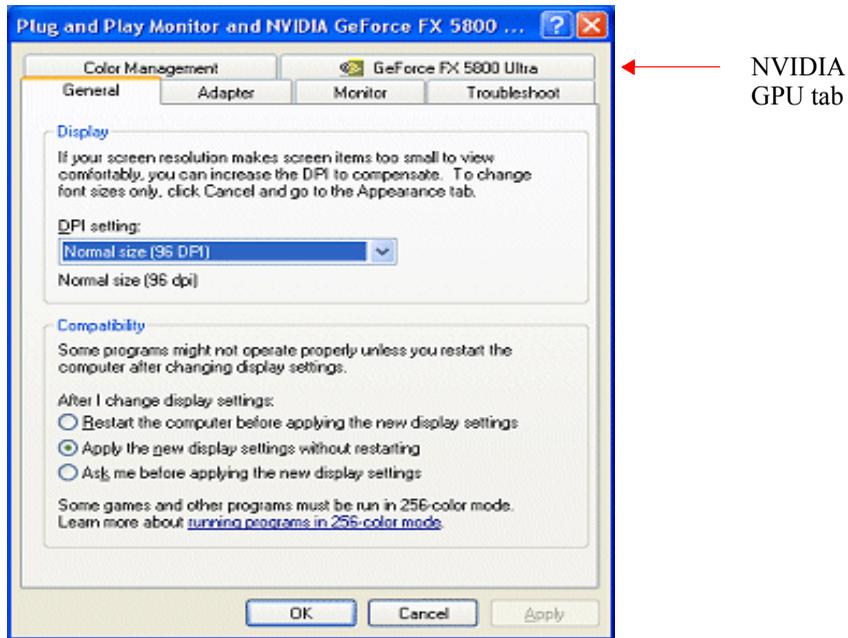
NVIDIA
GPU tab

Figure 5.28 NVIDIA Media Center Menu: Windows XP (2000)

Media Center
menu
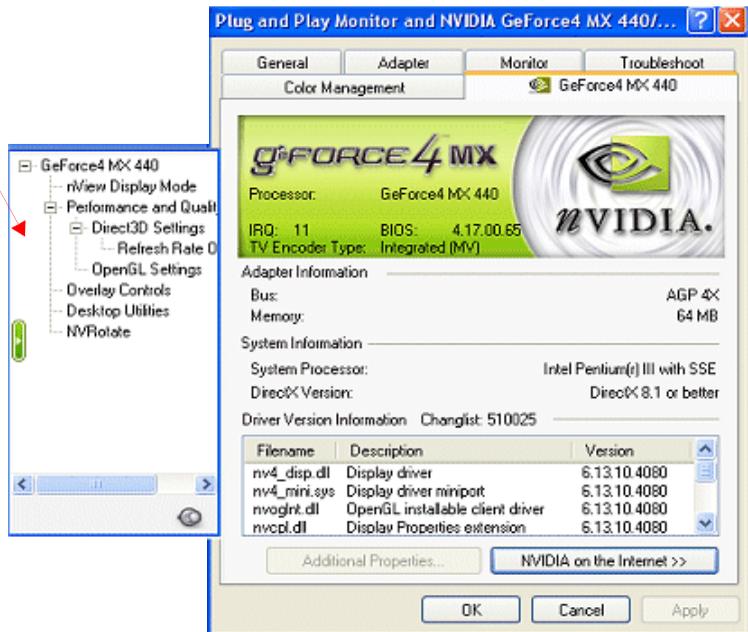
Figure 5.29 nView Clone/Span Modes Available: Windows XP (2000)
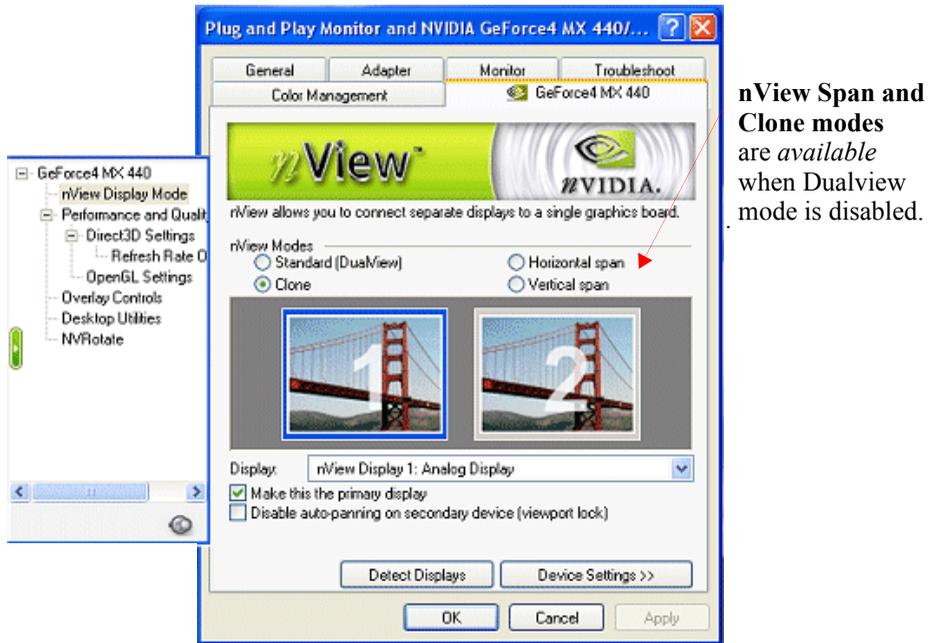
nView Span and Clone modes are *available* when Dualview mode is disabled.

Enabling nView Clone Mode: Windows 9x

Note: Under **Windows 9***x,* **Clone** mode is available. Also, *you do not need to restart your computer* to switch between nView Clone mode and Dualview mode.

When you are in Windows 9*x* Clone mode, your Windows Display Properties Settings panel shows at least "two" monitor images, which indicates that you are in Dualview mode.

To disable Dualview mode and, therefore, make nView Clone mode accessible, follow these steps:

1 Open the Windows Display Properties Settings panel.

2 Right click on the monitor image number **2** and click **Enabled** so that the option becomes *unchecked* and click **Apply** (Figure 5.30). This turns off your secondary display. (To access nView Span and Clone modes, only one monitor needs to be enabled on the Display Settings panel.)

3 Be sure to click the display image **1** so that it is the selected display.

4 Click **Advanced** to display the NVIDIA GPU tab shown in Figure 5.31.

5 Click the NVIDIA GPU tab to display the **Media Center** menu (Figure 5.32)

6 From the Media Center menu, click **nView Display Mode** to display the associated properties panel (Figure 5.33).

Figure 5.30 Disabling Dualview: Windows 9x
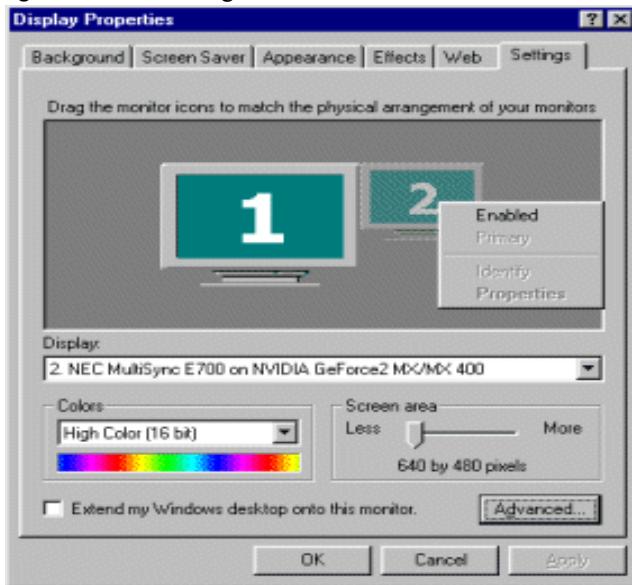
Figure 5.31 First Appearance of the NVIDIA GPU tab: Windows 9x
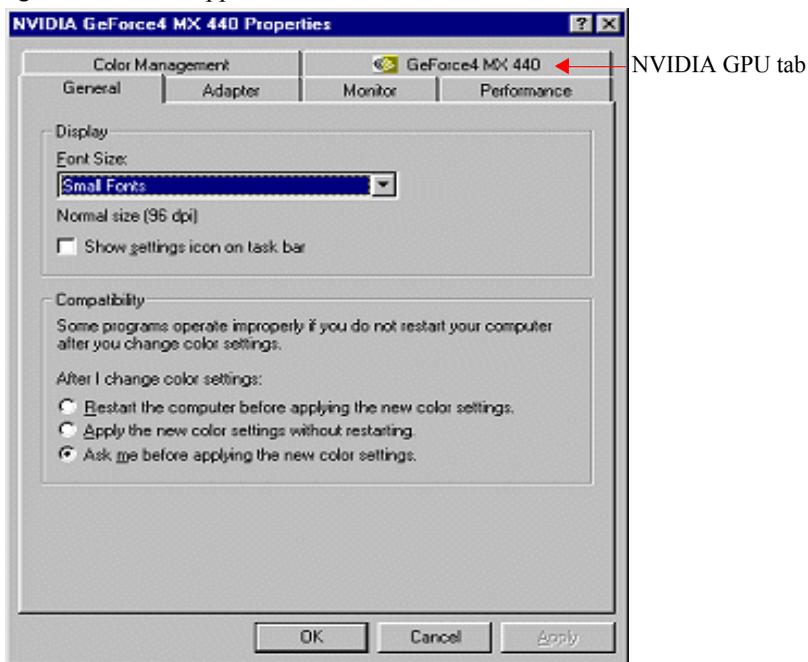
Figure 5.32 NVIDIA Media Center Menu: Windows 9x

Media Center
menu
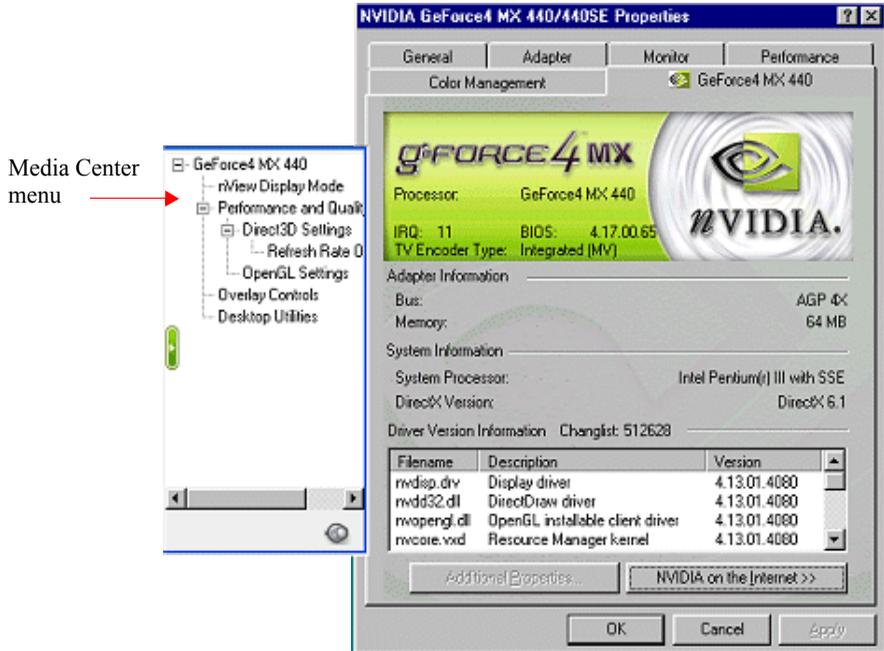
Figure 5.33 nView Clone Mode Available: Windows 9*x*

nView Clone
mode is *available.*
when Dualview
mode is disabled.
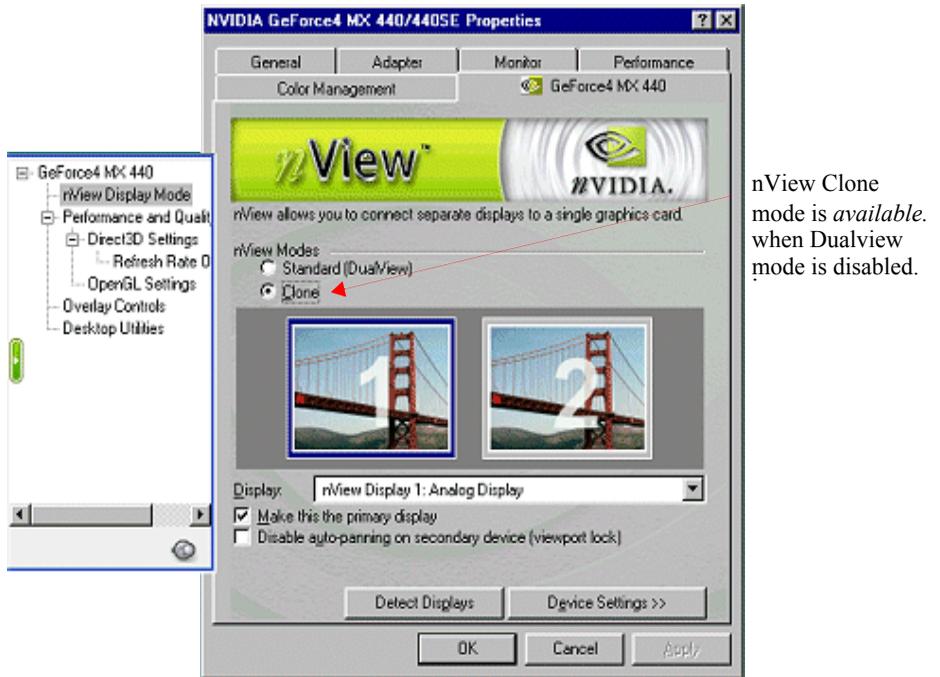
> **Note:** The nView **Clone mode** option is available, indicating that Dualview is disabled. (Under Windows 9*x,* Span mode does not appear.)

Enabling nView Modes: Windows NT 4.0

For details on enabling nView Multiview and nView Span/Clone modes under Windows NT 4.0, refer to the Application Note titled "*Configuring Multiple Display Devices With Quadro NVS Cards*".

nView Multiview Mode: Windows NT 4.0

Note the following about running nView Multiview mode under Windows NT 4.0:

- Under Windows NT 4.0, nView Multiview mode is only available with the NVIDIA Quadro NVS GPU-based series of graphics cards.

- If you want to enable more than two display devices under Windows NT 4, you must be running in Multiview mode, which supports up to sixteen (16) displays.

- Multiview mode does not support hardware accelerated OpenGL.

nView Span/Clone Modes

Under Windows NT 4.0, Span mode allows you to use up to a maximum of two display devices. If you want to enable more than two display devices under Windows NT 4, you must change modes to nView Multiview mode, which supports up to sixteen (16) displays.

Multi-Display Mode: Arranging Displays on the Windows Display Properties Settings Panel

> **Note:** The examples shown in Figure 5.34 through Figure 5.36 are Windows XP, but the procedure explained below applies to all Windows operating systems.

When using multiple displays, the desktop can be extended horizontally and vertically, as well as at other angles by repositioning the desktop monitor images in the Windows Display Properties Settings panel. You can drag the images to the positions that represent how you want to move items between your display devices.

- For example, if you're using two monitors and you want to **move items from one monitor to the other by dragging left and right**, position the images side-by-side (Figure 5.34).

- **To move items between monitors by dragging up and down**, position the images one above the other (Figure 5.35).

- **To move items between monitors by dragging at an angle**, position the images diagonally (Figure 5.36). The positions of the images don't have to correspond to the physical positions of your monitors. That is, you can position the images one above the other even though your monitors are side-by-side.

Figure 5.34 Display Settings (Horizontal)
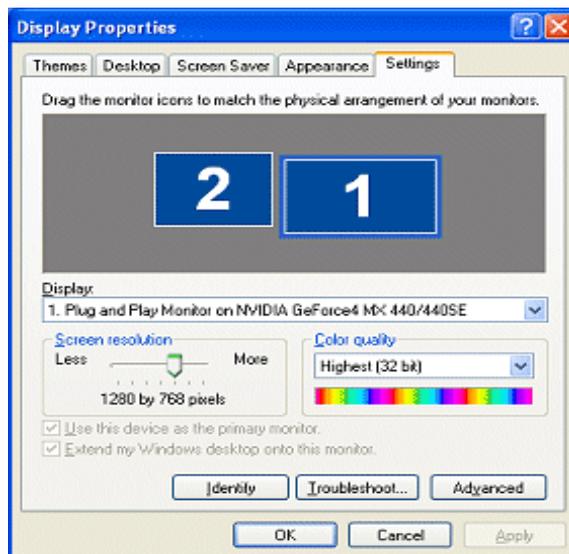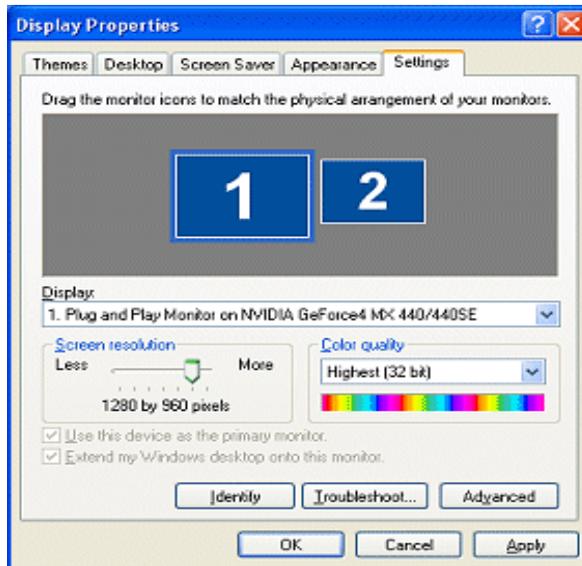
Figure 5.35 Display Settings (Vertical)
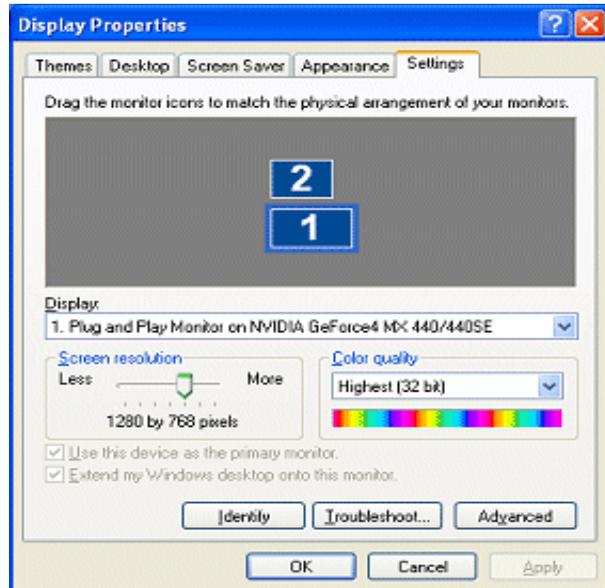
Figure 5.36 Display Settings (Diagonal)

6
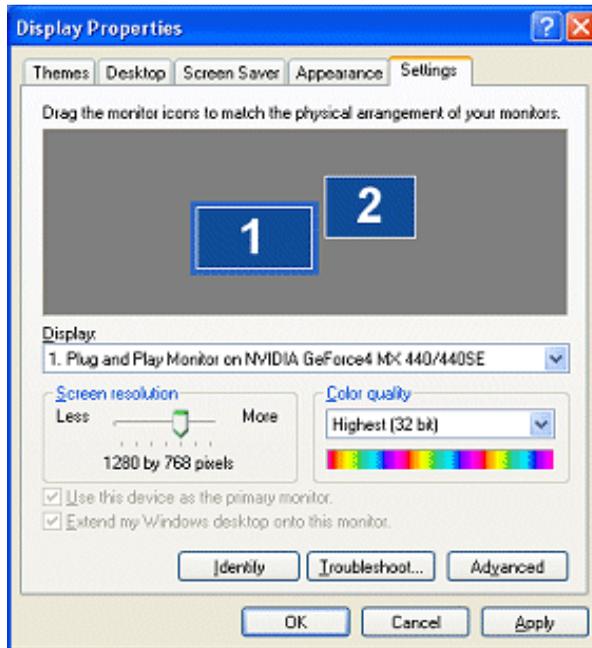
NVIEW APPLICATIONS

This chapter contains the following sections:

nView Multi-Display Options

nView offers tremendous flexibility in how multiple display devices are used. The following are sample display combinations:

- Two RGB monitors with second RAMDAC (digital-to-analog converter)
- Two analog flat panels
- Two digital flat panels (DFPs)
- One digital flat panel and one analog flat panel
- One digital flat panel and one RGB monitor
- One RGB monitor and one TV
- One RGB monitor and one analog flat panel (with second RAMDAC)
- One analog flat panel and one TV

Note: Actual combinations supported on a given card will vary.

Setting up a multi-display graphics card involves installing the card on a PC, attaching the two display devices to the PC, and installing the current version of

the NVIDIA Display Driver software. After rebooting the PC, the multiple display modes of the graphics cards installed are fully functional.

For detailed information on using and configuring nView options, see "nView Display Mode Basics" on page 69.

About nView Display Modes

The nView Display Mode panel provides several display modes for your multi-display configuration.

- **nView Span mode**: In this mode, the desktop area is spread across both displays, however the operating system treats both displays as one large display. Because of this the refresh rate, color depth, and resolution on both displays will be identical, and cannot be changed independently.

  The desktop may be "stretched" horizontally or "stacked" vertically, depending on your needs, as explained in "Horizontal & Vertical Span Modes" on page 83.

  Note: nView Span modes do not apply under Windows 9*x* operating systems.

  For further details on configuring multiple displays, see Chapter 4, "Using nView Multi-Display Modes: Dualview vs. Span/Clone" on page 34.

  nView Span mode supports the **Video Mirror** feature, where you may want to dedicate an application to one of the two displays or run the application across both displays. Examples include entertainment applications, digital video editing, and DVD playback. For details, see "Overlay Controls Panel" on page 129.

- **nView Clone mode:** Two displays may show exactly the same output, which is useful for presentations. The presenter may have a small monitor or other display device on the podium while a projector or presentation quality display shows the larger image to the audience. (*See* "Clone Mode" on page 74.)

  Virtual desktop: Full support for virtual desktops is available for panels and monitors with limited resolution. Virtual desktops, with full pan-and-scan mode, can be configured for one or both displays. *(See* "Change Resolution: Clone Mode (Virtual Desktop)" on page 81.)

  Application zoom mode: In this mode, part of the image from the primary monitor is shown on the secondary display, but zoomed in. This mode can be used for image editing, close-up work in modeling or CAD applications, or image processing and mapping applications.

  nView Clone mode supports the **Video Mirror** feature, where you may want to dedicate an application to one of the two displays or run the application

across both displays. Examples include entertainment applications, digital video editing, and DVD playback. For details, see "Overlay Controls Panel" on page 129.

nView Applications

Note: For extensive information on nView applications, refer to the Products tab on the NVIDIA Web site: **www.nvidia.com**

- **Engineering or mechanical CAD applications** can use multiple displays for different directional views of an object or a building, such as a front or side view or even a wireframe model on one screen and a textured version of the same model on another. Many professional applications offer extensive graphical user interfaces, which can be left fully enabled and visible on one display, while the second display remains unobstructed for viewing the actual work.

- **Training and Presentation:** nView **Clone mode**, where two monitors display identical images, is useful for presentations. A presenter may use the smaller monitor on the podium, while a projector monitor reflects the presentation to the audience. In training applications, the instructor can see what the student is doing under nView Clone mode. The ability to see the presentation while it's being projected can be especially useful in mobile PCs.**Virtual Desktop**, a sub-feature of nView Clone Mode, is useful for flat panels and monitors with limited resolution and is used to set a larger than viewable area on the second display, which supports full pan-and-scan of the entire desktop area.

- **Digital content creation** applications can use one display for toolbars and palettes and the other for rendered output. Additionally, many real-time or game development environments allow the authoring tools or game engine code to be visible on one display, while showing the art or game engine in a full screen, game play-like mode on the second display.

- **Graphics Artists** can have common applications such as Adobe Photoshop or 3D Studio Max open with the palettes and menus on one monitor and the other monitor dedicated to workspace. **Writers** can use one monitor for research and the other for writing.

- **Financial** applications, such as stock trading applications, can use a pair of large digital flat panels. This would allow you to watch real-time stock data on one screen and use the other screen for trading activity.

- **Video editing** applications would use one large PC display and one NTSC monitor. Since nView technology allows decoupling of refresh rates, the PC (editing) display could be a high-resolution RGB monitor for running the application (Adobe Premiere, for example), while the second display device

can be an NTSC or S-Video display for checking the video output for proper color balance and quality.

- **Entertainment** applications can use multiple display support in several ways. Game titles, such as Microsoft's Flight Simulator 2000, support multiple displays out of the box. With nView **Clone mode**, game play can be sent to a big screen TV or even to a VCR.

- **Home theater systems** can take advantage of the DVD capabilities of your PC. Simply hook up a large screen television as your second display device and you can watch DVDs -- without buying a dedicated DVD player. *See* "Overlay Controls Panel" on page 129.

- **Television and Movies:** Using the nView Video Mirror feature, you can watch TV and any other video while you work. *See* "Overlay Controls Panel" on page 129.

7

NVIEW DISPLAY MODE BASICS

This chapter contain the following major sections:

Notes Before You Begin

- To use nView features, you need a graphics card based on a multi-display NVIDIA GPU. See Table 2.1 in Chapter 1 for NVIDIA GPU support information.

- This chapter assumes you have an analog display (CRT) and either a digital display and/or a TV attached to your multi-display NVIDIA GPU-based graphics card. Follow the appropriate examples, depending on the display device(s) attached to your computer.

- The nView Display Mode panel offers the following display modes under Windows:

• "Horizontal & Vertical Span Modes" on page 83 (*only* for Windows XP/ 2000/NT 4.0)

Note: This chapter discusses the features accessible from the nView Display Mode panel. For details on using Dualview (nView Display Mode tab is disabled) vs. Span/Clone modes (nView Display mode tab is enabled) see the chapter on "Using nView Multi-Display Modes: Dualview vs. Span/ Clone" on page 34.

nView Display Mode Panel Options

The **monitor images** display a graphical representation of your nView display configuration.

• Click a monitor image to select it as the current display.

• When you right click the monitor image, a pop-up menu appears from which you can make adjustments to the associated display devices and access the Color Correction tab.

nView Standard (Dualview) Mode can be a single-display mode or a dual-display mode if your secondary monitor is "attached" or "enabled" on the Settings panel.

nView Standard mode disables the nView Span or Clone modes and features that depend on these modes.

However, you can access specific features that are not multi-display, such as those described in "Additional Features and Enhancements" on page 106.

nView Horizontal Span Mode allows you to extend the Windows desktop across two display devices horizontally. In this mode the two displays combine to form a wide, spanned display surface, which is useful when viewing items that are wider then a single display.

nView Vertical Span Mode allows you to extend the Windows desktop across two display devices vertically. In this mode the two displays combine to form a tall, spanned display surface, which is useful when viewing items that are taller then a single display.

nView Clone Mode outputs an exact copy of the primary display on the secondary device.

Display: Displays all current nView displays. If more than one device is connected and you have switched to a mode other than Standard, you can select which display is the current display by clicking the "down arrow" to display the drop-down menu.

You can also click on the monitor graphic in the control directly above to select it as the current display.

Make this primary: Click this option to select which display contains the top left corner of the desktop. The most obvious effect of this option is that it swaps the positions of the monitor images.

Disable Auto-panning: Click to lock the current pan position on the secondary Clone mode display. This lets you effectively freeze the virtual desktop at a certain position, which is useful for presentations or fine-detail work in applications.

Detect Displays: Click to detect all displays connected to the graphics card. Note Use this feature if you have plugged in any displays after the control panel was opened.

Device Settings: Click to set up or change settings related to the output device used for the current display.

Accessing nView Clone and Span Modes

To access the nView Clone and Span modes, follow these steps:

1 For multi-display functionality, be sure you have at least two display devices, such as an analog display (CRT) and a digital display or TV connected to your NVIDIA multi-display card.

2 Make sure the cable connections for your devices are well secured from the device to the graphics card installed on your computer.If you are connecting a TV, be sure you have the proper cables and connectors that apply to your TV.

3 If Dualview mode is enabled, you have to disable it. (See the procedure in "nView Span and Clone Modes" on page 51.)

4 From the Windows Display Properties Settings panel, click **Advanced**.

5 Click the **NVIDIA GPU** tab to display basic information about your display adapter, system, and the NVIDIA driver files you installed. Figure 7.1 shows an example.

6 Click the **nView Display Mode** option from the Media Center menu to display and access the nView Span and Clone modes.

The following sections explain how to use these modes:

  • Standard (Dualview) Mode

  • Accessing the Configuration Options

  • Clone Mode

- Horizontal & Vertical Span Modes

- Other Configuration Options

Note: If you are not using multiple displays and therefore have only one display device connected to your computer, the Clone and Span mode options will be disabled (grayed out) on your nView Display Mode panel.

Note: Under Windows 9x, only Standard (Dualview) and Clone modes are available.

Figure 7.1   NVIDIA GPU Tab and Panel with Media Center Menu
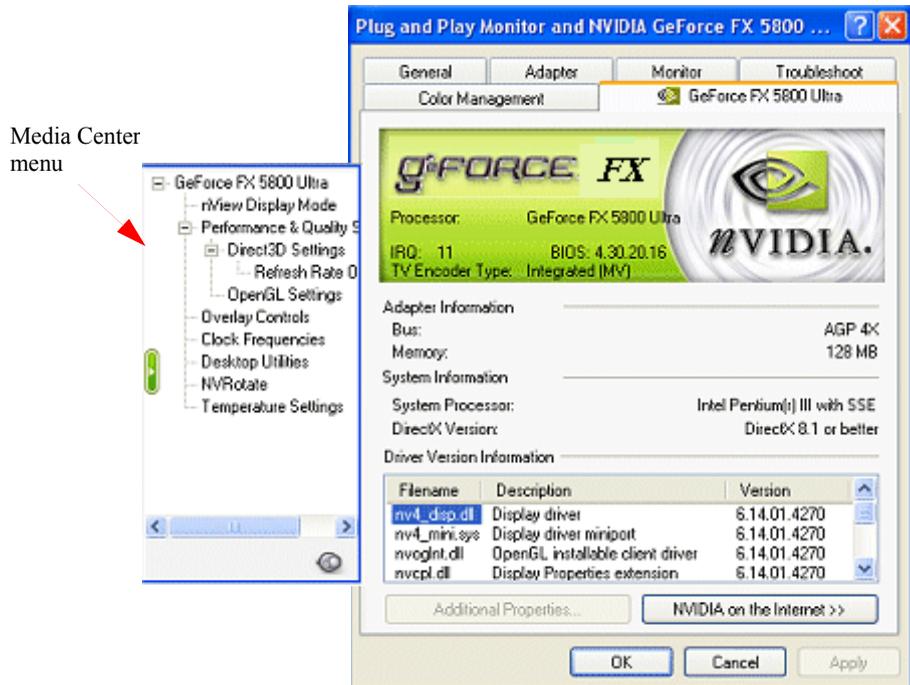
Standard (Dualview) Mode

The **Standard (Dualview)** mode option in the nView Display Mode panel allows viewing in only one display.

Note: If you have only one display device connected to your computer, the Clone and Span mode options will be disabled (grayed out) on your nView Display Mode panel.

Figure 7.2 and Figure 7.3 show the default Standard (Dualview) Mode.

Figure 7.3 shows the nView Display Mode panel in Standard (Dualview) mode showing three types of display devices: analog display, digital display, and TV.

To switch display devices from analog display (CRT) to either a digital display or a TV display device, or variations on this combination, *see* "Device Selection And Configuration" on page 87.

Figure 7.2   nView Standard (Dualview) Mode with Menu: Windows 98
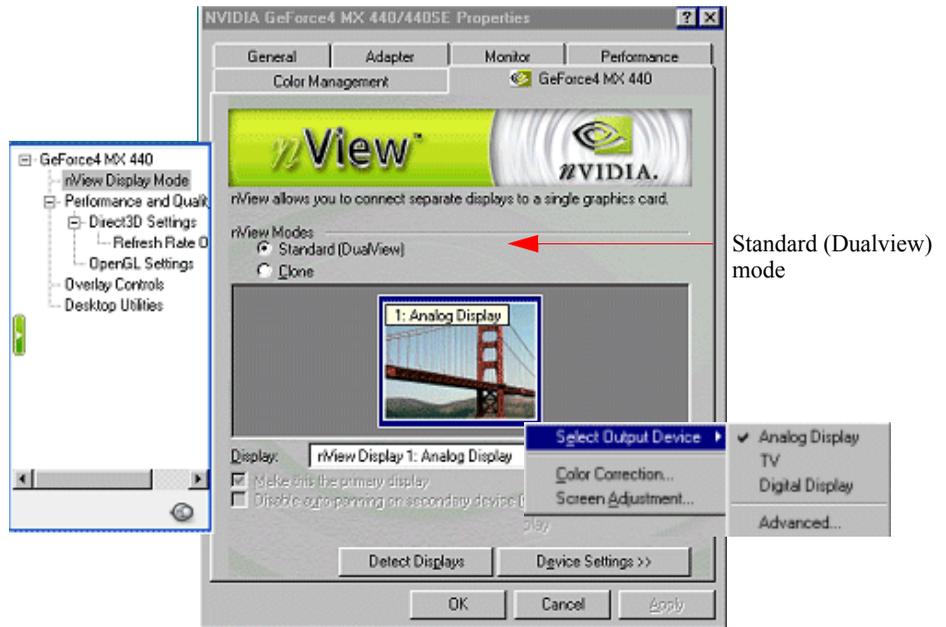
Figure 7.3   nView Standard (Dualview) Mode Menu: Windows XP (2000)
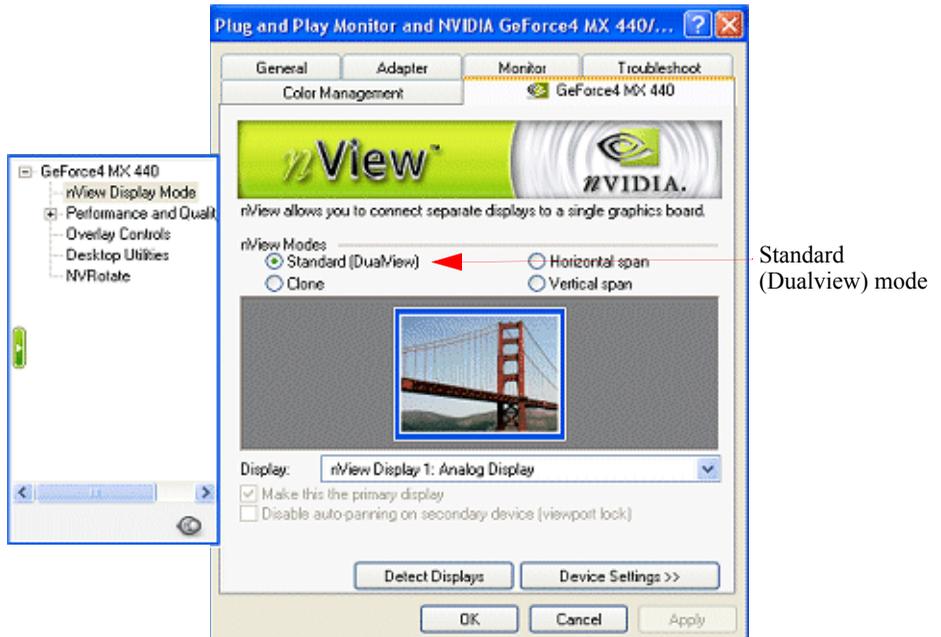
Accessing the Configuration Options

On the **nView Display Mode** panel, the monitor image numbered **1** represents the primary display device.

In **Standard (Dualview)** mode, only one monitor image appears.

In **Clone** and **Span** modes, the monitor image numbered **1** represents the primary display device and the monitor image numbered **2** represents the secondary display device.

To access nView configuration options, use any *one* of these procedures:

• Right click the monitor image (**1** or **2**) to display a pop-up menu, and than click the option you want.

• Click the down arrow in the **Display** field to select the display device (i.e., nView Display 1 or nView Display 2) you want to configure. Then click **Device Settings** to display a menu of options and choose the option you want.

Options Available for nView Clone and Span Modes

Make this the primary display: Use this option to select the display that contains the top left corner of the desktop. The most obvious effect of this option is that it swaps the positions of the monitor images.

Note: This option is also available as the **Primary Display** option on the pop-up menu that appears when you right click the monitor image on the nView Display Mode panel in Clone and Span modes.

Force detection of a monitor. . If this option appears on your nView Display Mode panel, click to check it *only* if you have a monitor connected to the secondary display connector that is not being detected. This is useful for older monitors or monitors with BNC connectors.

Clone Mode

Note: Clone Mode does not work if you have only one display device attached.

In Clone mode, two monitors display identical images, which is useful for presentations. A presenter may use the smaller monitor on the podium, while a projector monitor reflects the presentation to the audience.

The example in this section starts with the analog display (CRT) as the primary display and TV or digital display as the secondary display.

- Be sure your display devices are turned on before you access the nView Display Mode tab.

- If you turn on the devices after you have opened the nView Display Mode panel, click **Detect Displays** to enable the devices.

To access nView Clone mode, follow these steps:

1 Click the **Clone** mode option on the nView Display Mode panel and click **Apply**.

2 Click **OK** and **Yes** when the status messages appear. Your current screen is duplicated on the clone display.

3 If necessary, click **Detect Displays** to enable devices. Figure 7.4 shows the nView Clone mode setting.

4 Right click monitor image **1** to view the pop-up menu for the primary display, which is CRT (analog display) in this example.

5 From the menu, click **Select Output Device** to open the Device Selection panel. Figure 7.7 correctly shows analog display as the selected output device for display 1.

6 Click **OK** to return to the nView Display Mode panel.

7 Right click monitor image **2**, then **Select Output Device** to view the display device that is enabled (checked) as your secondary device. Figure 7.5 shows **Digital Display** as the secondary display.

8 Then click **Advanced . .**to display the Device Selection panel, which confirms that the **Digital Display** option is enabled.

9 To switch to another device, such as TV, you simply click the TV option and click **Apply**.

   Figure 7.11 shows **TV** as the secondary display. For information on configuring your TV display, *see* "TV Settings" on page 101.

10Then click **Advanced . .** to display the Device Selection panel, which confirms that the **TV** option is enabled.

Figure 7.4   nView Clone Mode Menu (Display 1= Analog Display): Windows 98

Two monitor images appear in Clone mode when you have two display devices connected to your computer.

Select a monitor image and right click on it to display the pop-up menu of options.
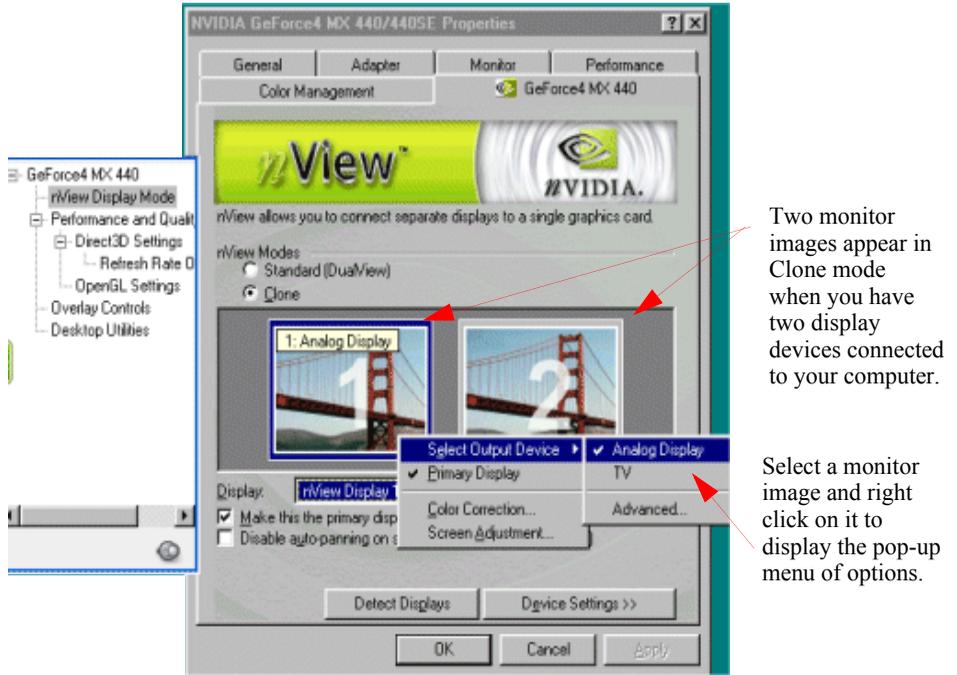
Figure 7.5   nView Clone Mode Menu (Display 2 = Digital Display): Windows 98

Right click on **monitor image 2** to see the **pop-up menu** for your **secondary** display device.
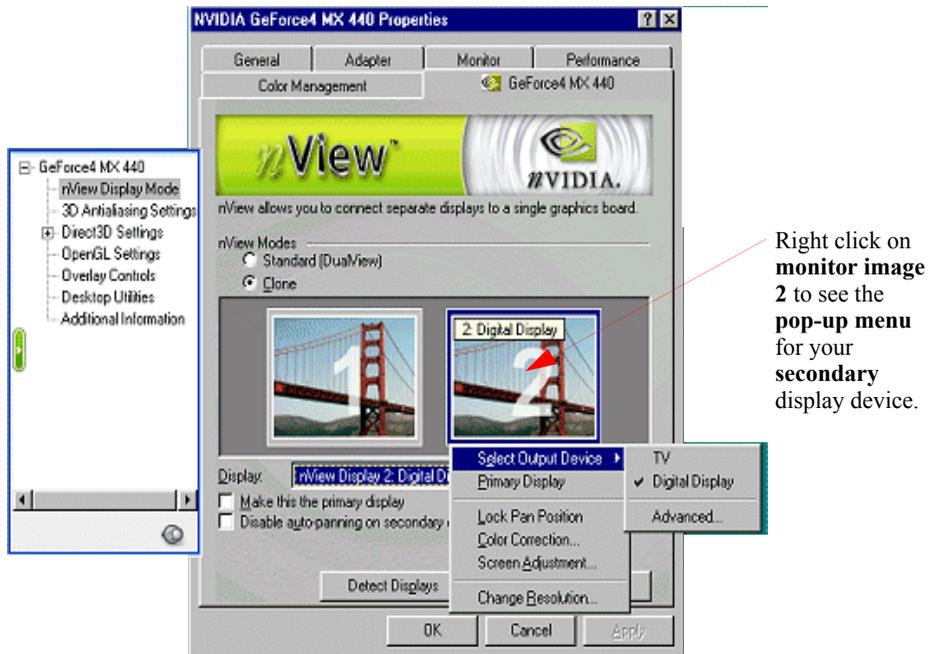
Figure 7.6   nView Clone Mode (Display 1= Analog Display): Windows XP
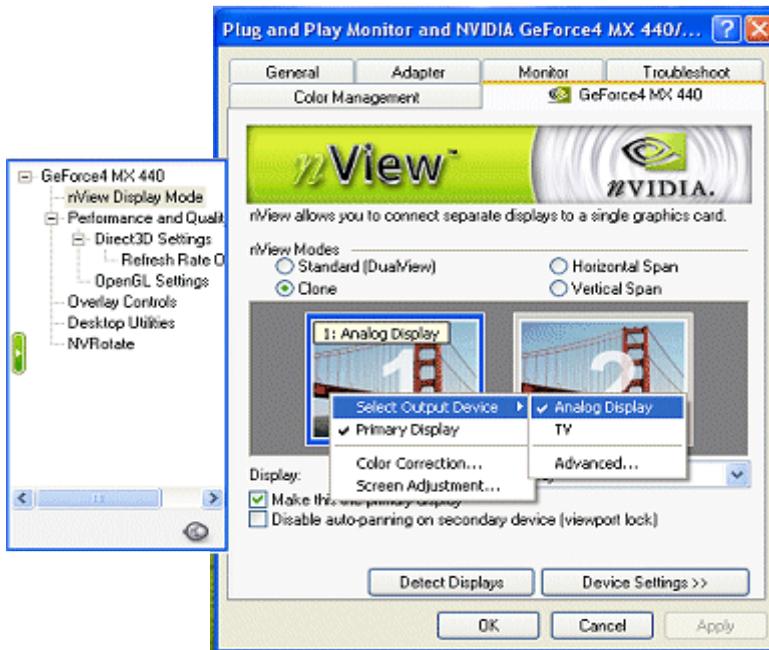
Figure 7.7   nView Device Selection Panel (Display 1= Analog Display)

Figure 7.8   nView Clone Mode Menu (Display 2 = Digital Display): Win 2000 (XP)
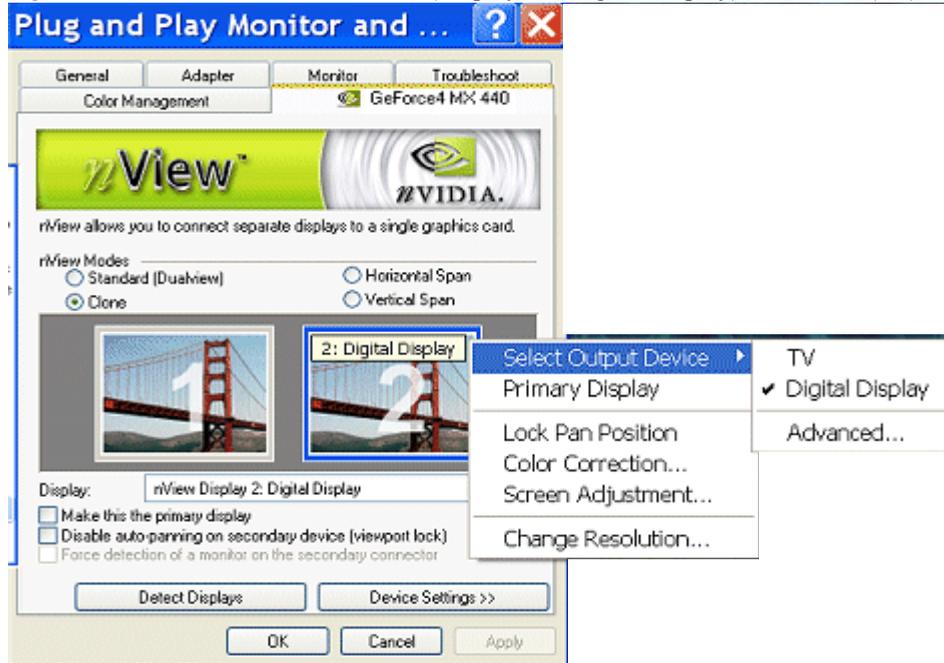
Figure 7.9   nView Device Selection Panel (Display 2 = Digital Display)

Figure 7.10 nView Clone Mode Menu (Display 2 = TV): Windows 2000 (XP)

Figure 7.11 nView Device Selection Panel (Display 2 = TV)

Figure 7.12 nView Clone Mode (Display 1 = Digital Display): Windows XP

Figure 7.13 nView Clone Mode (Display 2 = Analog Display): Windows 2000
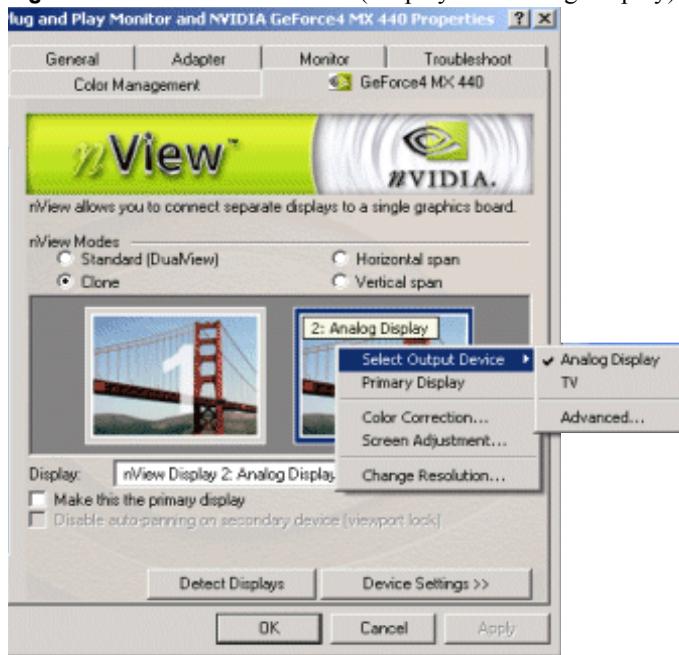
Change Resolution: Clone Mode (Virtual Desktop)

You can use the Change Resolution option to modify **Screen Resolution** and **Refresh Rate** for the secondary display, which allows you to enable **Virtual Desktop**, a useful feature for flat panels and monitors with limited resolution. This feature lets you pan-and-scan the entire desktop area on the secondary display when its resolution is set to less than the value set on the primary display.

Figure 7.14 shows the pop-up menu (right click the monitor image to display the menu) for the secondary display, which is a digital display in this example.

Note: Notice that the **Lock Pan Position** option is enabled on this menu. This is the same option as the **Disable auto-panning on the secondary device (viewport lock)** check box at the bottom of the nView Display Mode panel, which is also enabled. This feature locks the current pan position on the secondary clone display, letting you effectively freeze the virtual desktop at a certain position, which is useful for presentations or fine-detail work in applications.

Figure 7.14 nView Clone Mode Menu (Display 2 = Digital Display): Win 2000 (XP)
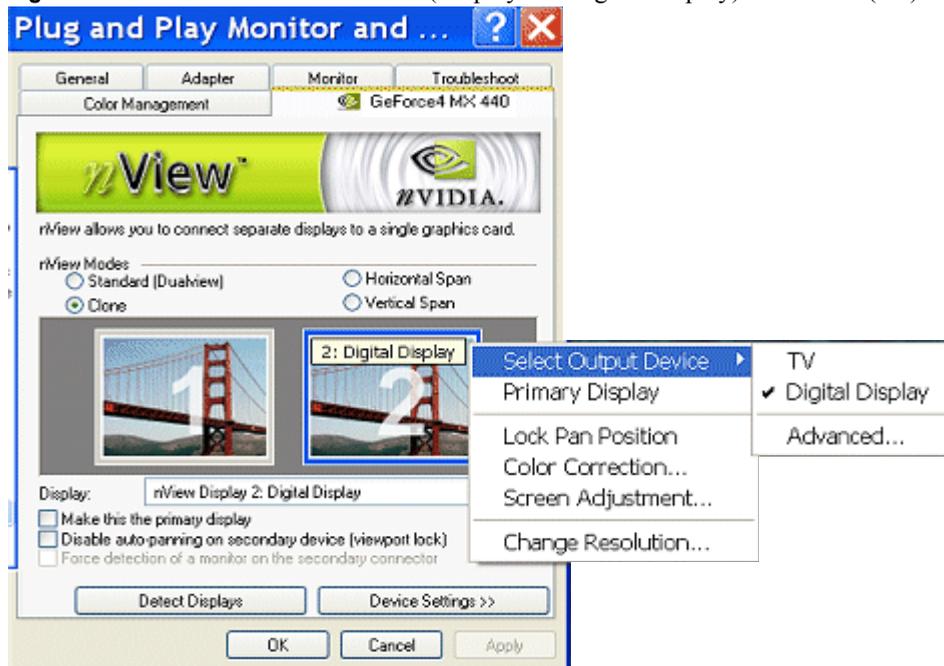
Note: If the maximum resolution of the secondary display is less than the current resolution of the primary display, once you enable Clone mode from the nView Display Mode panel, Virtual Desktop will already be enabled. However, you still may want to adjust the resolutions of the

primary and/or secondary device by using the Device Configuration
dialog box shown below for the secondary display or the Windows
Settings tab of your primary display.

Follow these steps to enable Virtual Desktop:

1 From the nView Display Mode panel, right click monitor image **2** (secondary
display) to display the pop-up menu and select **Change Resolution** to
display the Device Configuration dialog box.

> **Note:** If you do not see the Change Resolution option on the display 2 pop-up
> menu, adjust (increase) the resolution on the primary display until the
> Change Resolution option becomes available from the display 2 pop-
> up menu.

Figure 7.15 nView Clone Mode Device Configuration
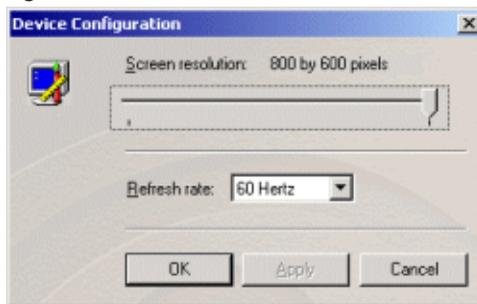
2 Use the slider (Figure 7.15) to set the Screen Resolution at a value that *is not
equal* to the Screen Resolution on the Windows Display Properties Settings
panel of your primary display.

> **Note:** If you set the same Screen Resolution value for both primary and
> secondary displays, you cannot pan/scan the desktop area on the
> secondary display; both displays will remain static.

3 Optional: If you want, you can select a refresh rate from the list box

4 Click **Apply** and **OK**. Notice that the resolution of your secondary display
changes and you can use your mouse to pan and scan the desktop on this
secondary display.

Horizontal & Vertical Span Modes

Note: Span modes do not work if you have only one display device attached.

In Span mode, the Windows desktop area is spread across both display devices. This mode can be set for multiple categories of displays, although display limitations may override the capabilities of your NVIDIA multi-display graphics card. For example, if the second display is an NTSC TV monitor, depending on the TV encoder on the graphics card, the resolution may not be set above 800 x 600 and the refresh rate cannot be set above 60 Hz. However, the PC monitor in such a configuration may have its refresh rate and resolution set much higher. The desktop may be "stretched" horizontally or "stacked" vertically, depending on user needs.

Due to operating system differences between Windows 9*x* and Windows NT 4.0/Windows 2000, the latter does not currently offer true multi-monitor support for Span mode using one NVIDIA multi-display graphics card [1]. As a result, the size of the actual desktop is limited to twice the smaller size of the two displays.

Note: The desktop can be extended either horizontally (Figure 7.16 through Figure 7.18) or vertically (Figure 7.18 and Figure 7.19).

To access the nView Span modes, follow these steps:

1 Click the **Horizontal** or **Vertical Span** mode option on the nView Display Mode panel and click **Apply**.

2 Click **OK** and **Yes** when the messages appear.

- If you just switched from Standard (Dualview) to one of the Span modes, your digital display or TV display will be activated. If needed, click **Detect Displays** to enable the display devices.

- If you just switched from Clone to one of the Span modes, the Windows display on the Clone device will be removed.

3 Depending on whether you have Horizontal or Vertical Span mode enabled, you can drag your active windows, images, or icons horizontally or vertically to move them to the secondary display.

---

1. If two graphics cards are installed, the Windows 2000 operating system does detect two devices

Figure 7.16 nView Horizontal Span Mode (Display 1= Analog Display): Windows XP

Two monitor images appear in Span mode when you have two display devices connected to your computer.

Select the monitor image and right click on it to display the pop-up menu of options.

Figure 7.17 nView Horizontal Span (Display 2 = Digital Display) Windows XP
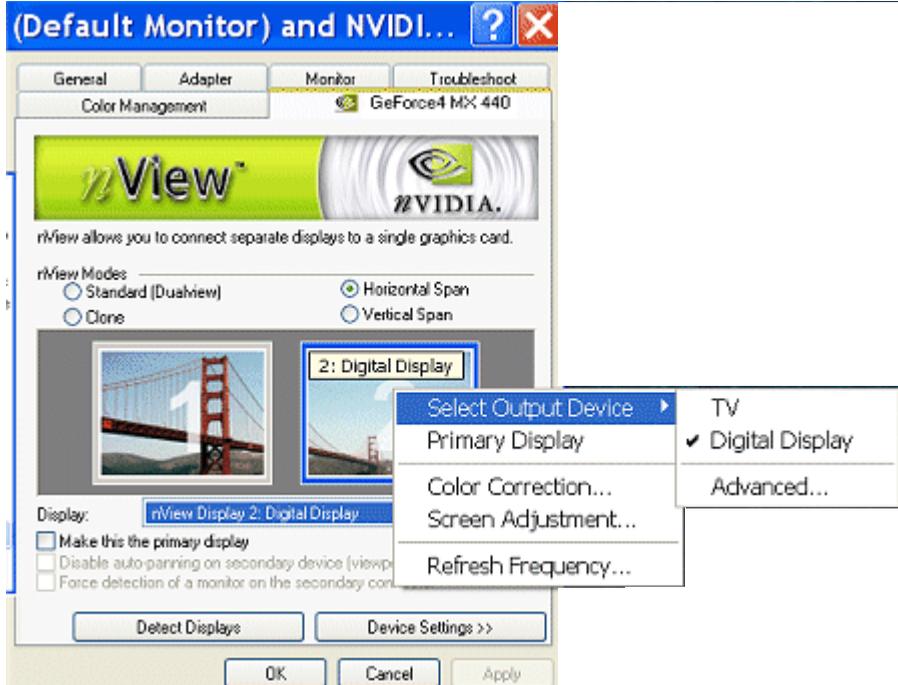
Figure 7.18 nView Clone & Horizontal Span Modes: Primary Displays (Windows XP)
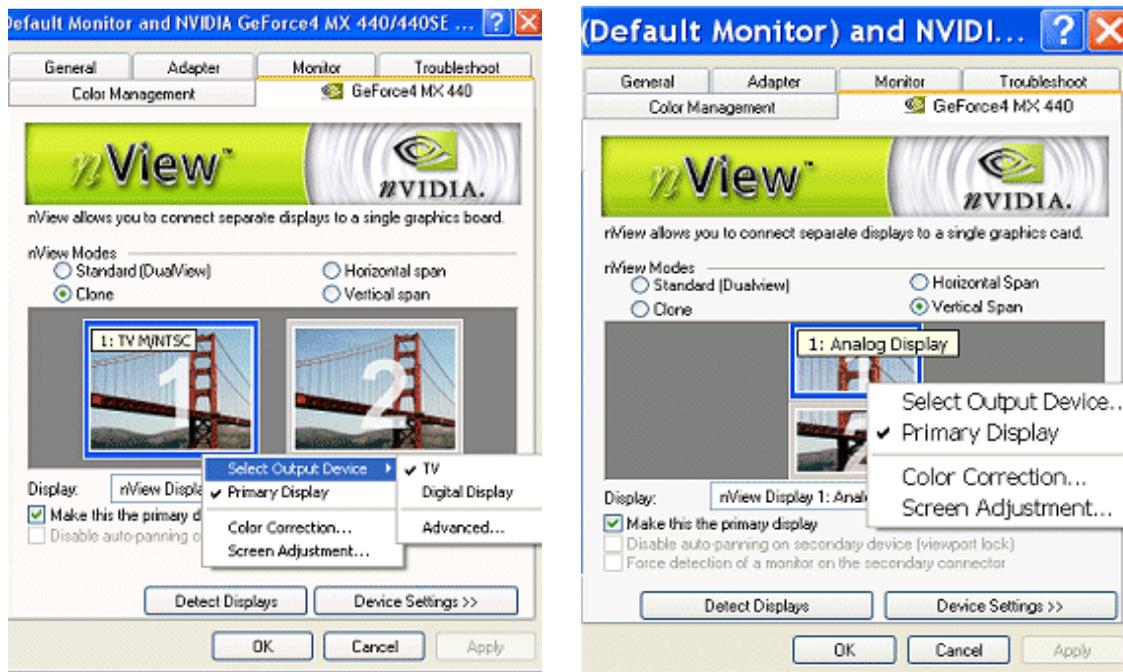
Figure 7.19 nView Vertical Span Mode (Display 2 = Digital Display): Windows XP
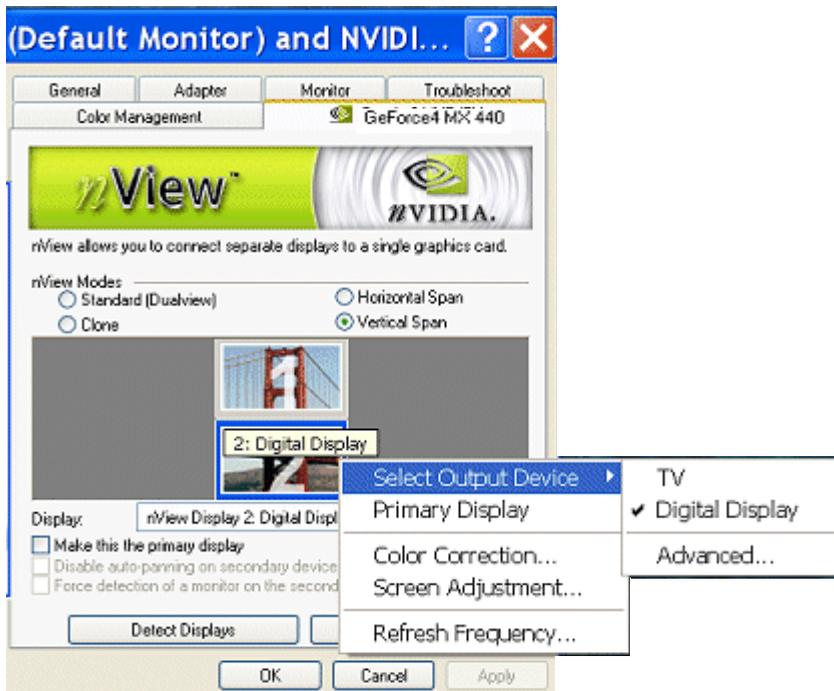
Other Configuration Options

For details on configuring display devices, such as a TV, see "Device Selection And Configuration" on page 87.

For details on configuring additional features, see "Additional Features and Enhancements" on page 106.

C H A P T E R

8

DEVICE SELECTION AND CONFIGURATION

This chapter contains the following major sections:

Switching Displays in nView Span, Clone, or Standard (Dualview) Mode

If you have the nView Display Mode (Standard (Dualview), Span, or Clone) enabled and have multiple display devices connected to your computer, you can easily switch between the displays by following these steps:

1 Right click on the monitor image of the secondary display device (2) if you are in Span or Clone mode; or, if you are in Standard (Dualview) mode, simply right click on the single monitor image that appears.

2 Click **Select Output Device.**

3 Then click the display device you want to switch to.

Select the output display device (monitor, digital flat panel, or TV) depending on the devices your graphics processor supports.

4 When you see the messages in Figure 8.1 and Figure 8.2, click **OK** and **Yes** to continue.

Figure 8.1 Display Settings Message
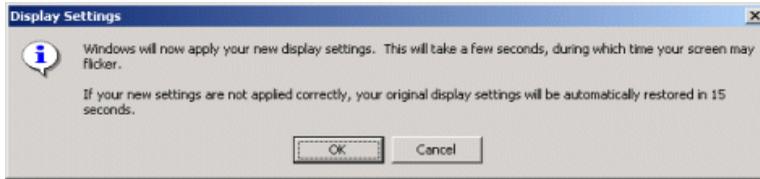
Figure 8.2 Confirm Display Settings Message

Switching Secondary to Primary Display: nView Clone or Span Mode

The examples in this section show a variety of changes to the monitor images in the nView Display Mode panel as you are switching devices between two secondary displays or switching from primary to secondary device or vice versa.

Figure 8.3 nView Clone Mode (Display 2 = Digital Display): Windows XP
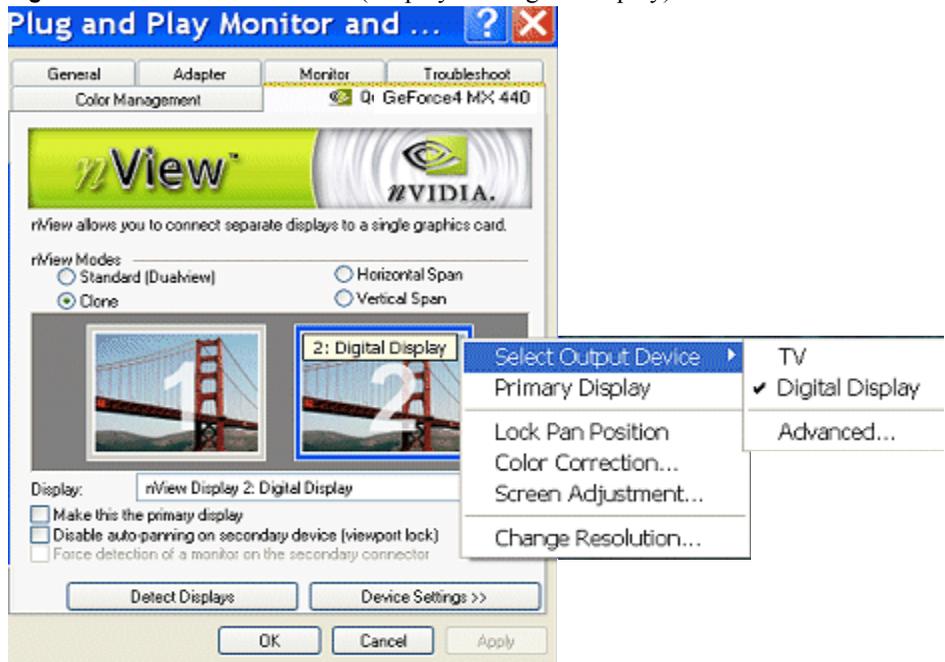
Figure 8.4   nView Clone Mode (Display 1 = Digital Display) Windows XP

Figure 8.5   nView Vertical Span (Display 2 = Analog Display): Windows XP

Figure 8.6   nView Horizontal Span/Clone Modes (Primary Displays): Windows XP
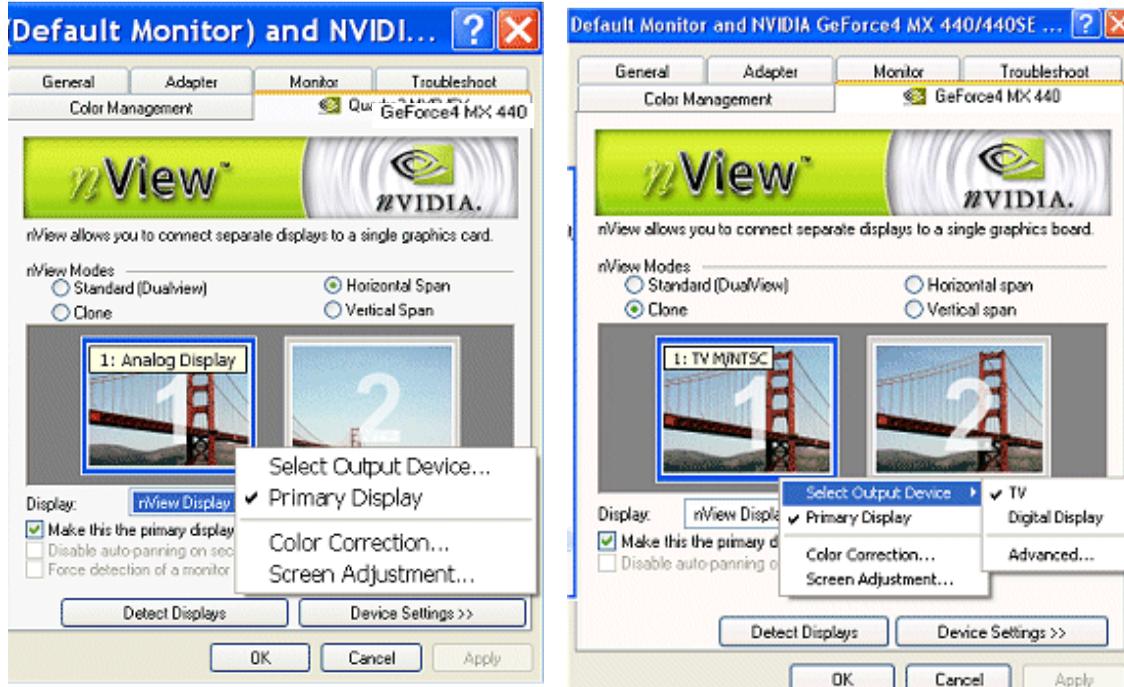
Figure 8.7   nView Vertical Span (Display 2 = Digital Display): Windows XP
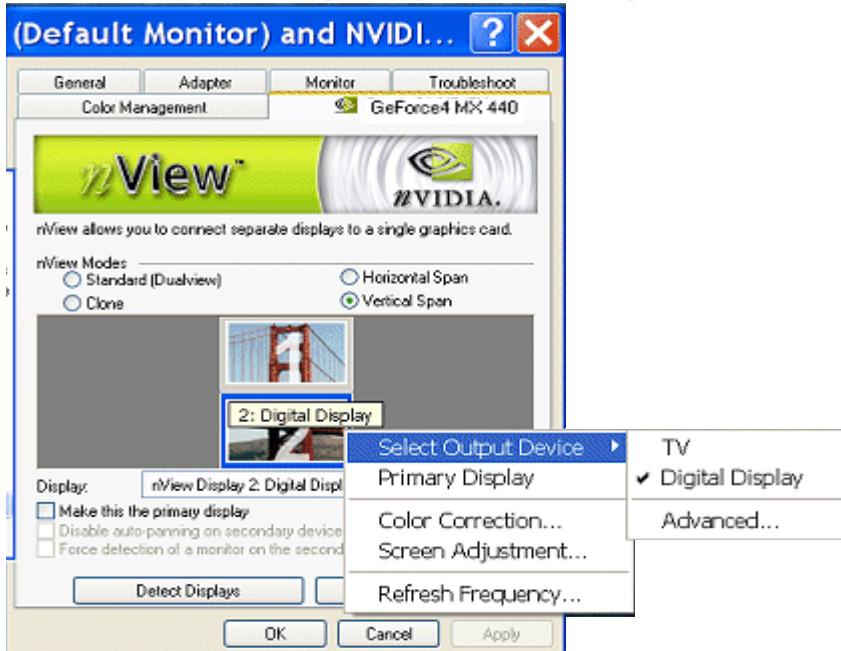
Figure 8.8   Device Selection: Analog or Digital Display as Primary Display

Figure 8.9   Device Selection: nView Standard (Dualview) Mode (1)

Figure 8.10 Device Selection: nView Standard (Dualview) Mode (2)

Switching Displays in Dualview Mode

Note: It is assumed that you have you have at least two display devices connected to your graphics card. You can use the basic procedure described here to switch between any devices that are connected.

When you are in Dualview mode (not in nView Stands, Clone, or Span Mode), you can use the following procedure to switch displays.

1 Right click from your Windows desktop and click **Properties** and the **Settings** tab to display the Settings panel in "Dualview" mode (Figure 8.11 through Figure 8.13).

2 Click either monitor image 1 or 2, depending on the display you want to work with and click **Apply**, if needed.

3 Click **Advanced** and then the NVIDIA GPU tab.

4 Click the **Device Selection** option from the Media Center menu to display the Device Selection panel. Figure 8.14 and Figure 8.15 show examples of Device Selection panels with different devices selected.

5 Click **Detect Displays** if you want to detect all display devices connected to the output device (analog display, digital display, or TV) that is enabled on the Device Selection panel.

Figure 8.11 Display Settings Dualview Mode: Windows XP
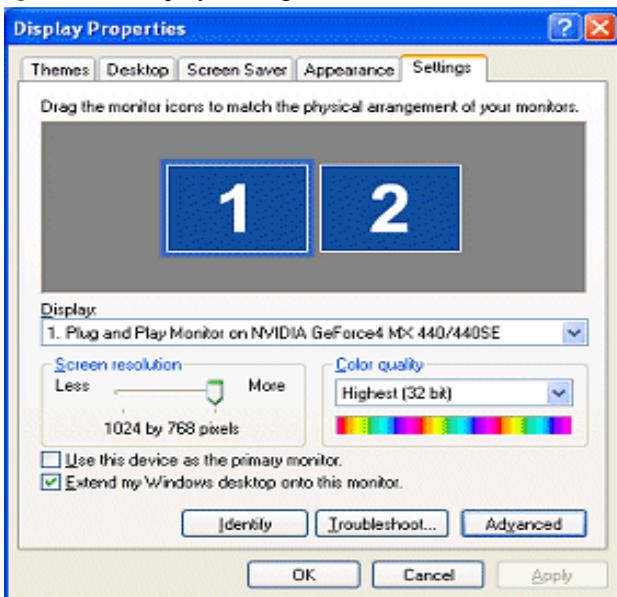
Figure 8.12 Display Settings Dualview Mode: Windows 2000
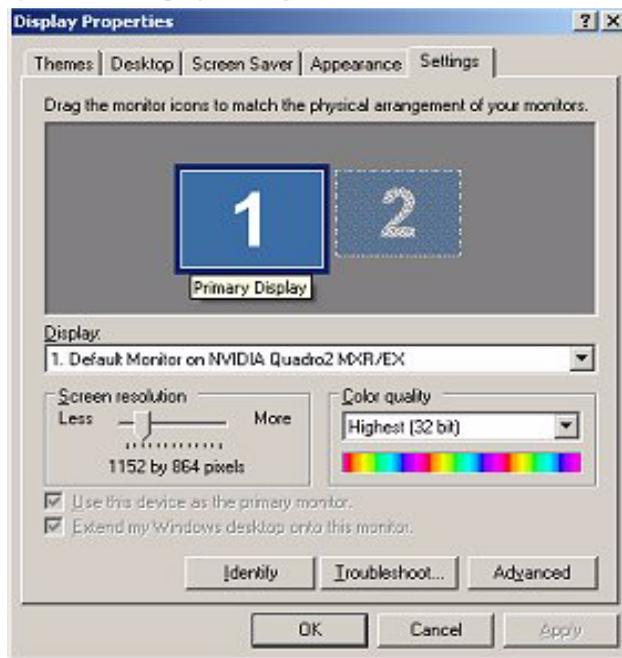
Figure 8.13 Display Settings Dualview Mode: Windows 98
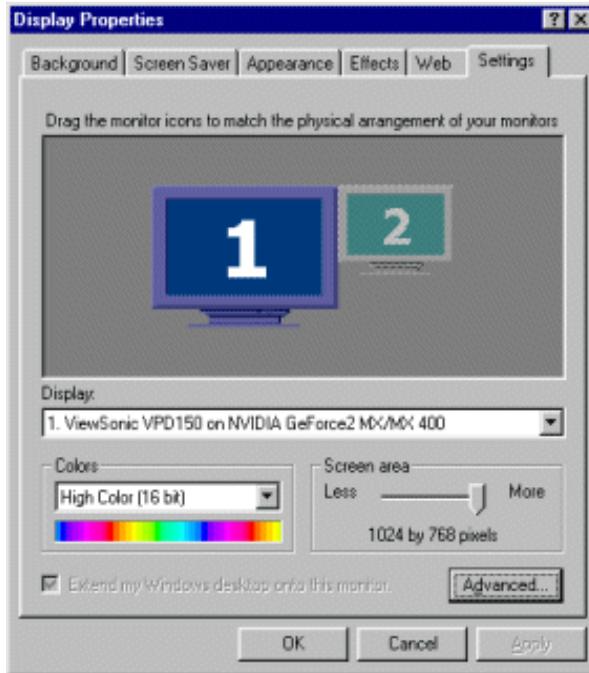
Note: Use this feature if you have plugged in any display devices after the control panel was opened.

6 Based on the example shown in Figure 8.14, you would click **TV** to switch from Analog Display (CRT) to TV *or*, based on the example in Figure 8.15, you would click **Digital Display** to switch from TV to Digital Display.

7 When the "Device Settings" message appears, click **OK** *before* the message times out. The "Confirm Display Settings" message appears on your digital display.

8 Click **Yes** before the message times out. You entire desktop moves over to the display you selected.

Figure 8.14 Device Selection: Analog Display and TV (Dualview mode)
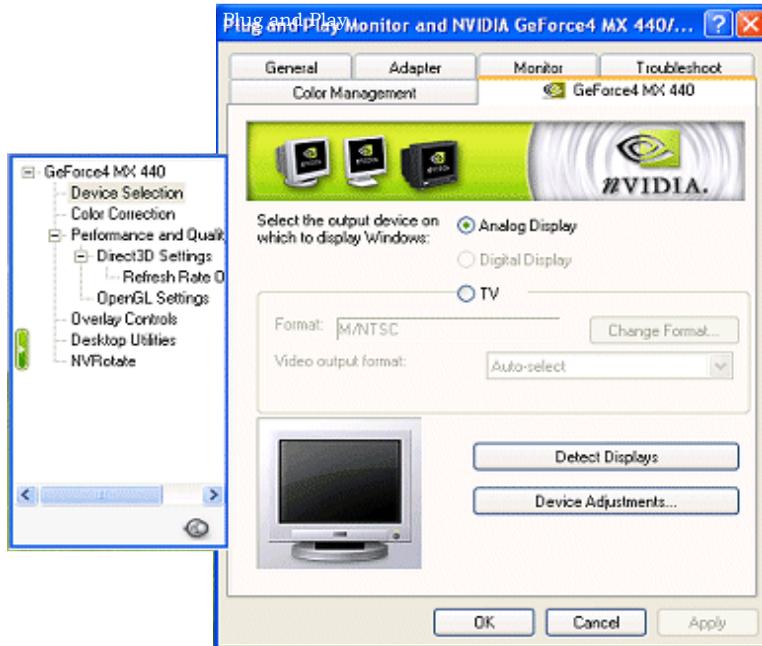
Figure 8.15 Device Selection: Digital Display and TV (Dualview mode)
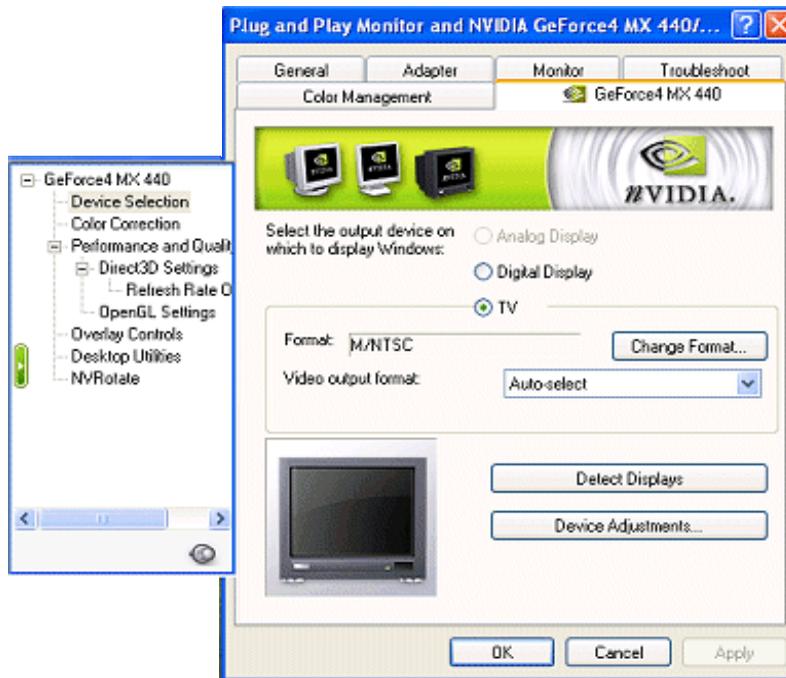
Device Adjustments: Analog Display (CRT)

Screen Adjustment

If your NVIDIA GPU-based graphics card is connected to a CRT (analog display), follow these steps to access the Screen Adjustment panel.

Note: If you are in the nView Display Mode panel, right click the monitor image to display the pop-up menu and choose **Screen Adjustment** to display the Screen Adjustment panel. Then go directly to step. **4** below.

1 Make sure you are in the Device Selection panel.

2 Confirm that the **Analog Display** option is selected on the Device Selection panel.

3 Click **Device Adjustments** to access the Screen Adjustment panel (Figure 8.16).

Figure 8.16 Screen Adjustment Settings: Analog Display

4 To adjust the screen position, move the mouse over the monitor image and drag the desktop to the desired position while holding down the primary mouse button. Use the arrow positioning buttons for fine adjustments.

Display Timing

If your NVIDIA GPU-based graphics card is connected to a CRT (Analog Display), follow these steps to access the Display Timing panel:

Note: If you are in the nView Display Mode panel, right click the monitor image to display the pop-up menu and select **Screen Adjustment** to display the Screen Adjustment panel. Then click the **Display Timing** tab to open the Display Timing panel and go directly to step. **4** below.

1 Make sure you are in the Device Selection panel.

2 Confirm that the **Analog Display** option is selected on the Device Selection panel.

3 Click **Device Adjustments** then click the **Display Timing** tab to open the Display Timing panel.

Figure 8.17 Display Timing Settings: Analog Display
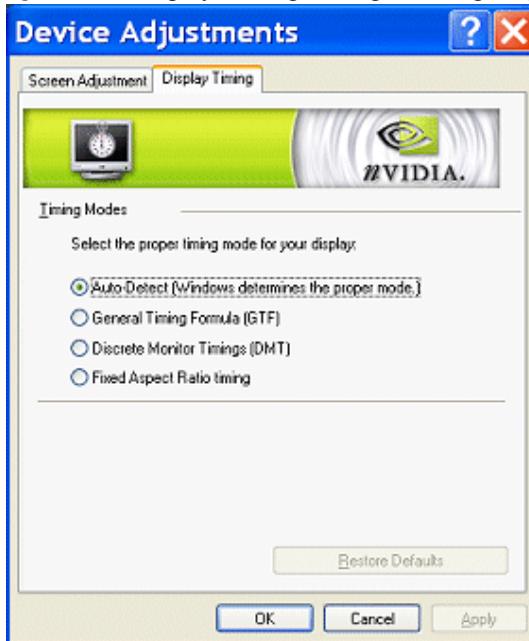
4 Select the proper timing mode for your display:

- **Auto-Detect** (*default setting*) allows Windows to receive the proper timing information directly from the monitor itself.

  Note: Some older monitors may not support this feature.

- **General Timing Formula** (GTF) is a standard used by most newer hardware.

- **Discrete Monitor Timings** (DMT) is an older standard still in use on some hardware. Enable this option if your hardware requires DMT.

- **Fixed Aspect Ratio.** Adjusts the monitor timing by maintaining the current aspect ratio.

Device Adjustments: Flat Panel

Flat Panel Display

If your NVIDIA GPU-based graphics card is connected to a flat panel (such as a digital flat panel), follow these steps to access the Flat Panel Display settings.

Note: If you are in the nView Display Mode panel, right click the Digital Flat Panel icon and select **Screen Adjustment** to display the Flat Panel Display settings. Then go directly to step. **4** below.

1 If you are in Dualview mode, confirm that the **Digital Flat Panel** option is selected on the Device Selection panel.

2 Click **Device Adjustments** to access the Flat Panel Display settings, as shown in Figure 8.18 (Digital Display represents the "primary display") or Figure 8.19 (Digital Display represents the "secondary display")

Figure 8.18   Flat Panel Display Settings: Digital Display = 1 (Primary display)

Figure 8.19 Flat Panel Display Settings: Digital Display = 2 (Secondary display)

3 You can use the options **Use display adapter scaling** and **Centered Output**
   to determine the placement of the image on your flat panel display when
   running at resolutions lower than the maximum supported resolution. Figure
   8.14 shows the **Centered Output** setting.

Figure 8.20 Flat Panel Display Settings: Centered Output

Note: The **Use monitor scaling** option is available for flat panels that support multiple native resolutions.

Monitor Settings (Refresh Frequency): Secondary Display

Note: The Monitor Settings option only appears for the secondary display device (Display 2), if the secondary device is a digital display or CRT (analog display). In this example, the secondary display device is a digital display.

Follow these steps to modify the Refresh Frequency of your secondary display device:

Note: If you are in the nView Display Mode panel, right click the Digital Flat Panel icon and select **Screen Adjustment** to display the Flat Panel Display panel, click **Monitor Settings** to open the Monitor Settings panel, then go directly to step. **4** below.

1 Make sure you are in the Device Selection panel.

2 Confirm that the **Digital Flat Panel** option is selected on the Device Selection panel.

3 Click **Device Adjustments** to access the Flat Panel Display panel.

4 Click **Monitor Settings** to open the Monitor Settings panel (Figure 8.21).

   Note: The Monitor Settings panel in Figure 8.21 "resembles" the Monitor panel for your primary display (**Properties** > **Settings** > **Advanced** > **Monitor** tab) but actually represents your secondary display.

The Refresh Frequency list box lists the refresh rates available for this monitor. You may select a different refresh rate than the one that appears in the list box. A higher refresh frequency reduces flicker on your screen.

Note: It is recommend that you keep the **Hide modes that this monitor cannot display** option checked. Unchecking the option will allow you to set your display to modes that this monitor cannot display correctly, which may lead to an unusable display an/or damaged hardware. Also, unchecking this option will prevent enabling nView Span modes.

Figure 8.21 Monitor Setting: Digital Display = Display 2

TV Settings

This section explains the TV formats and settings available on the Device Selection panel.

Note: The TV formats and settings are also supported on single-display NVIDIA GPU-based cards.

Note: Depending on the TV encoder that is used on your NVIDIA graphics card, certain TV features on the nView Device Selection panel may be unavailable or vary from what is described in this chapter.

Accessing the TV Option

If your NVIDIA graphics card is connected to a TV, follow these steps to access the TV configuration options:

• If you are in the nView Standard, Clone, or Span Mode, right click the monitor image that represents your TV and click **Select Output Device** to display the Device Selection panel with the TV option enabled.

- If you are in Dualview mode, click the **Device Selection** option from the Media Center menu to display Device Selection panel with the TV option enabled.

5 Make sure the **TV** option is selected. Figure 8.22 shows the Device Selection panel with the TV option enabled.

Figure 8.22 Device Selection with TV Enabled
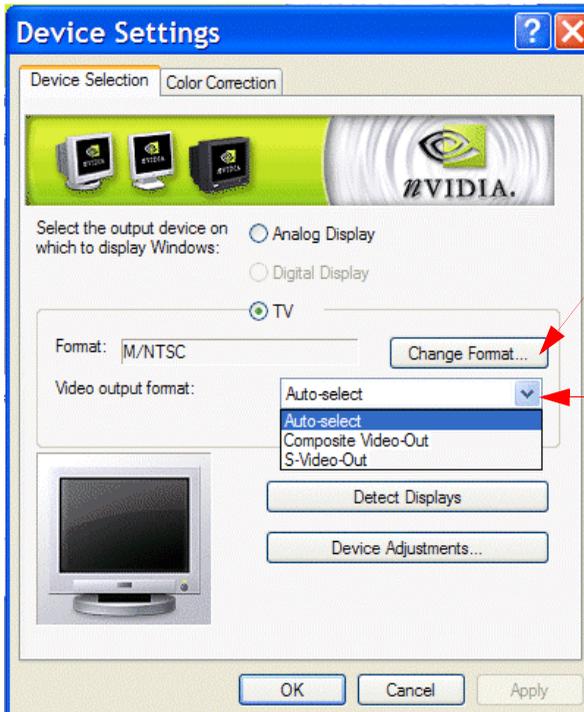
Click the **Change Format** button to display a list of Regional Settings and select a setting.

Click this arrow to display a list of video output format and select a format.

Video Output Format

The Video Output Format field lets you specify the type of output signal sent to the TV. The default setting is **Auto-select**

If you want to select **S-Video-Out** or **Composite Video-Out**, click the down arrow on the Video Output Format field and select the format (Figure 8.22).

If you have the proper connector cable, **S-Video-Out** generally provides a higher quality output than **Composite Video-Out**. If you are not sure which type of signal you should specify, choose the **Auto-select** setting.

Change Format: Regional Settings

From the Device Selection panel, click **Change Format** to access the Regional Settings (Figure 8.23) where you can specify a particular TV output format. The list that appears allows you to select the TV output format based on the country where you live.

Figure 8.23 Change TV Format: TV Regional Settings
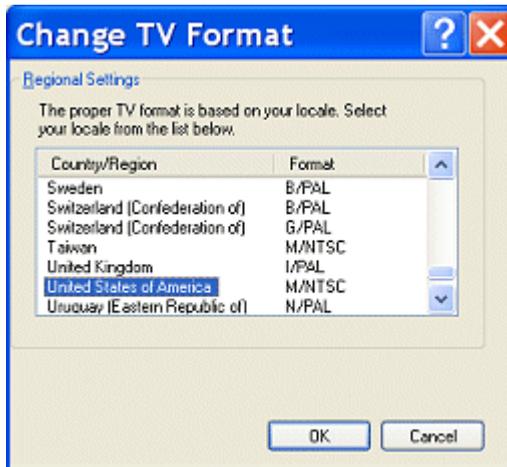
Note: If your country is not in the list, select the country closest to your location.

Device Adjustments: TV Output

From the Device Selection panel, click **Device Adjustments** to open the TV Output panel (Figure 8.24) where you can customize the settings for your TV display.

Note: Be sure to click **Apply** after you make any changes in order for the changes to take effect.

Support of TV adjustment features described in this section depend on the TV encoder you are using. Table 8.1 lists TV encoders and the TV adjustment features they support. The first four categories of TV encoders are supported by

the GeForce4 MX series and newer GPUs. The last category of TV encoder supports GPU families that are older than those just mentioned.

Table 8.1   TV Encoders and Supported TV Adjustment Features

TV Encoders	Supported TV Adjustment Features				
	Brightness	**Saturation**	**Screen Size**	**Positioning**	**Flicker Filter**
Integrated			x	x	x
Chrontel	x	x		x	x
Phillips				x	
Conexant			x	x	x
Conexant (with older NVIDIA GPUs)	x	x		x	x

Figure 8.24 Device Adjustments: **TV Output** Panel
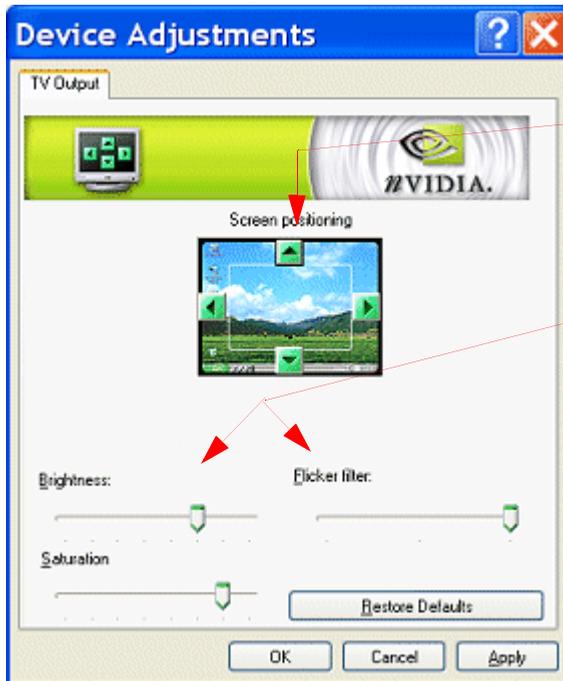
Click the **arrows** to adjust the position of the desktop on the TV.

Click any of the sliders and move it to adjust options such as Flicker filter, Brightness, and Saturation of your TV image.

Note: Depending on the TV encoder on your graphics chip, you may see different options than what is shown in this example.

*   **Screen Positioning:** Click the arrow buttons to adjust the position of the desktop on the TV.

    Note: If the TV picture becomes scrambled or is blank due to over-adjustment, simply wait 10 seconds; the picture will automatically return to its default position. Then you can begin your adjustments again. Once you have positioned the desktop where you want it, click

OK or **Apply** to save the settings before the 10 second interval has elapsed.

- **Brightness/Saturation**: Use these slider controls to adjust the brightness and saturation of the TV image.

- **Flicker Filter:** Use this slider to adjust the amount of flicker filter you want applied to the TV signal.

   Note: It is recommended that you turn off the flicker filter completely for DVD movie playback from a hardware decoder.

- **Screen Size**

   Note: This feature is available on the following TV encoders: **Conexant 871, 872, 873, 874, and 875**

   Use the slider (shown in Figure 8.24) by moving it to the level that adjusts the screen size of your TV. For example, if you see a black border on your TV screen, you can use the slider to enlarge the TV screen to remove the border.

   The extreme right setting (drag the slider all the way to the right) is optimal for **DVD viewing**.

9

ADDITIONAL FEATURES AND ENHANCEMENTS

This chapter explains how to configure the following NVIDIA Display Driver settings:

Desktop Utilities Panel

Use the NVIDIA Desktop Utilities panel to do the following:

- **Enable Dualview mode** for Windows 2000.

- **Enable Desktop Manager** and access its properties to configure settings.

- **Enable the NVIDIA Media Center icon** (a Windows task bar utility), which lets you quickly apply any of the custom Direct3D, OpenGL or color settings "on the fly" from a convenient pop-up menu. The menu also contains items

for restoring default settings and accessing the Windows Display Properties settings.

Enabling Desktop Manager

To enable (load) or disable (unload) Desktop Manager from the NVIDIA Desktop Utilities panel, follow these steps:

1 Right click from your Windows desktop.

2 Click **Properties** > **Settings** tab > **Advanced** > NVIDIA GPU tab and the **Desktop Utilities** option from the Media Center menu.

3 To enable the nView Desktop Manager application, click the **Enable Desktop Manager** check box and click **Apply** ((Figure 9.8).

Figure 9.1   Desktop Utilities: Desktop Manager (Windows XP)
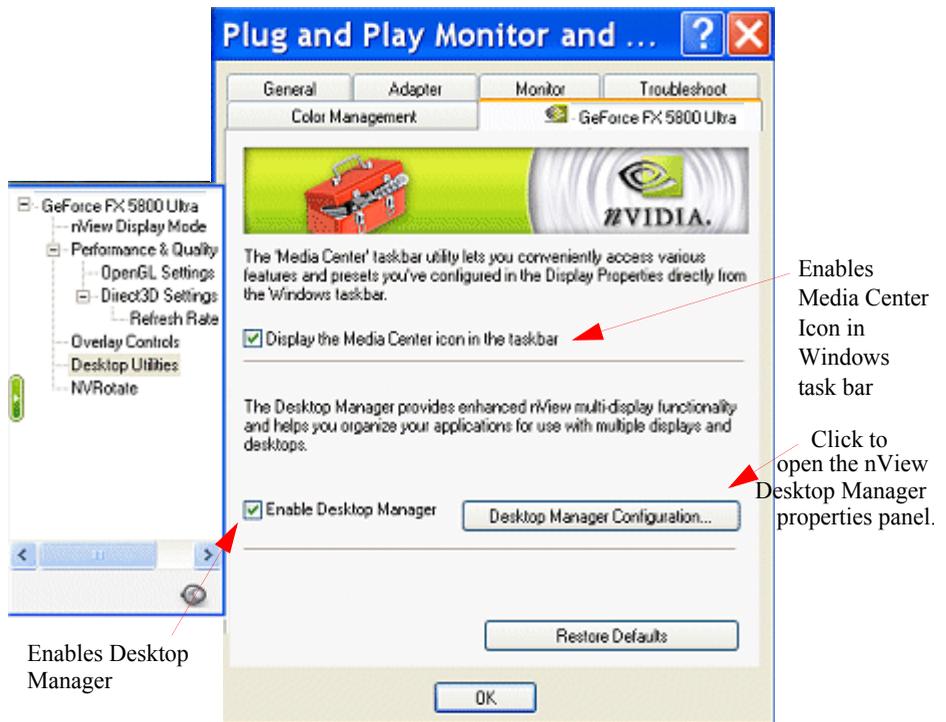
4 Right click from your desktop to view the desktop properties menu. You will see that nView Properties has been added to the menu (Figure 9.2).

Figure 9.2   Desktop Manager Enabled: nView Properties on Desktop Menu

nView Properties option has been added to the menu.
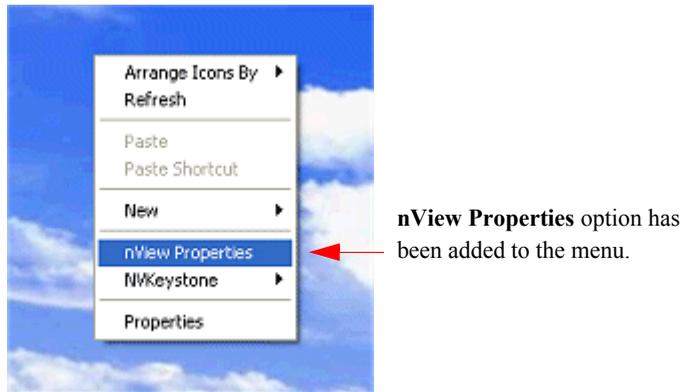
5 Click **nView properties** to open the nView Desktop Manager properties panel (Figure 9.3).

Figure 9.3   nView Desktop Manager Properties Panel
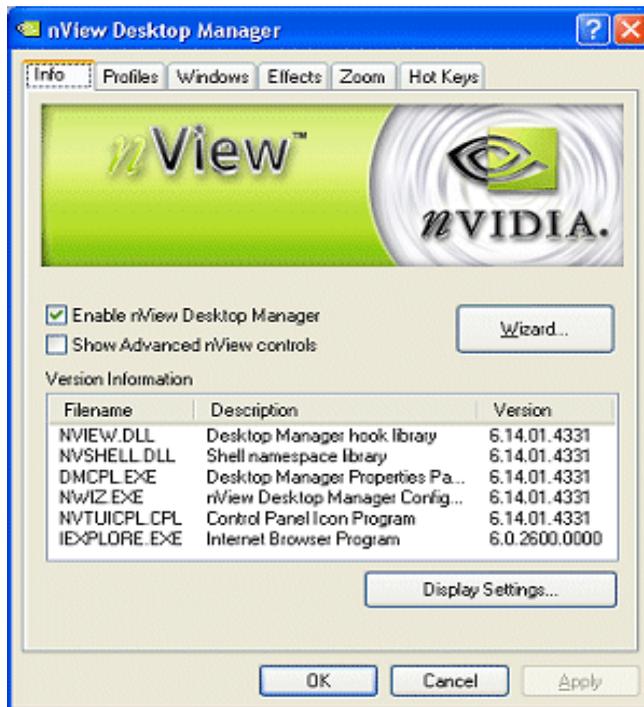
6 Also notice that the **Desktop Manager Configuration** button is activated (Figure 9.8). You can also click this button to open the nView Desktop Manager properties panel.

Note: For details on configuring and using nView Desktop Manager, see the *NVIDIA nView Desktop Manager User's Guide*.

7 To disable the Desktop Manager, simply click the **Enable Desktop Manager** check box to remove the check mark and **Apply**.

8 Right click from your Windows desktop and you will see that the **nView Properties** option no longer appears, indicating that the Desktop Manager has now been disabled.

Enabling the Media Center Icon

The **Media Center icon** allows you to apply any of the custom Direct3D, OpenGL or color settings "on the fly" from a convenient pop-up menu. The menu also contains items for restoring default settings and accessing the Windows Display Properties dialog box.

You can access the following settings through the Media Center icon:

• **Accuview Antialiasing™**

• **Custom OpenGL**

• **Custom Direct3D**

• **Custom Color**

• **Rotation**

• **nView Desktop Manager**

• **Windows Display Properties**

To enable the NVIDIA Media Center icon, follow these steps:

1 From your Windows desktop, right click to display the properties menu.

2 Then click **Properties** > **Settings** tab > **Advanced** > **NVIDIA GPU** tab and the **Desktop Utilities** option from the Media Center menu.

3 Click **Display the Media Center icon in the Windows taskbar** to enable (check) this option (Figure 9.8).

4 Click **Apply** to add the Media Center icon to your Windows taskbar, as shown in Figure 9.4.

5 Go to the Using the Media Center Icon in the next section.

Using the Media Center Icon

To use the Media Center icon on the Windows taskbar (Figure 9.4) simply right click this icon and then select the options you want from the menu that appears. Some of the menus are shown in Figure 9.5, Figure 9.6, and Figure 9.7.

Figure 9.4   NVIDIA Media Center Icon

Windows Taskbar   Media Center icon
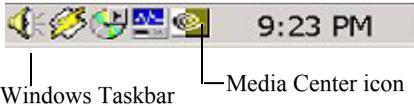
Figure 9.5   NVIDIA Media Center Icon: nView Desktop Manager Settings
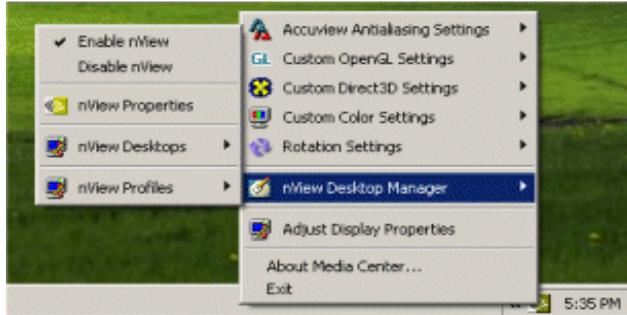
Figure 9.6   NVIDIA Media Center Icon: 3D Antialiasing Settings
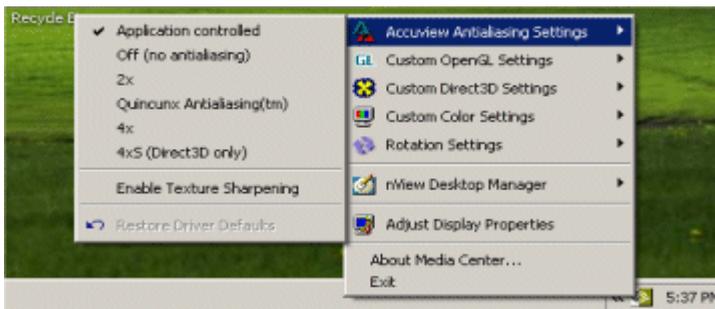
Figure 9.7   NVIDIA Media Center Icon: NVRotate Settings
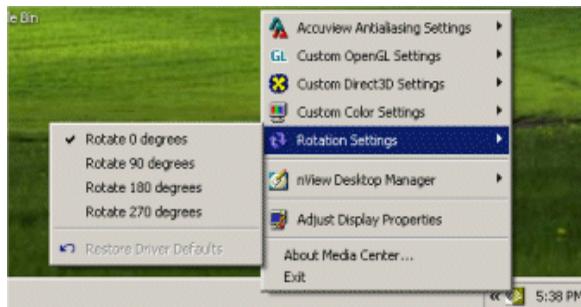
Enabling Dualview Mode for Windows 2000

To enable Dualview mode in Windows 2000, follow these steps:

1 Right click from your Windows desktop.

2 Click **Properties** > **Settings** tab > **Advanced** > **NVIDIA GPU** tab and the **Desktop Utilities** option from the Media Center menu.

3 Click the **Enable Dualview (Treat multiple . .)** option to insert a check mark in the check box as shown in Figure 9.8.

> **Note:** Under Windows 9*x* and Windows XP, this option does not apply and, therefore, is not available.

Figure 9.8   Desktop Utilities: Enabling Dualview (Windows 2000)

Enabling Dualview
(Windows 2000 only)
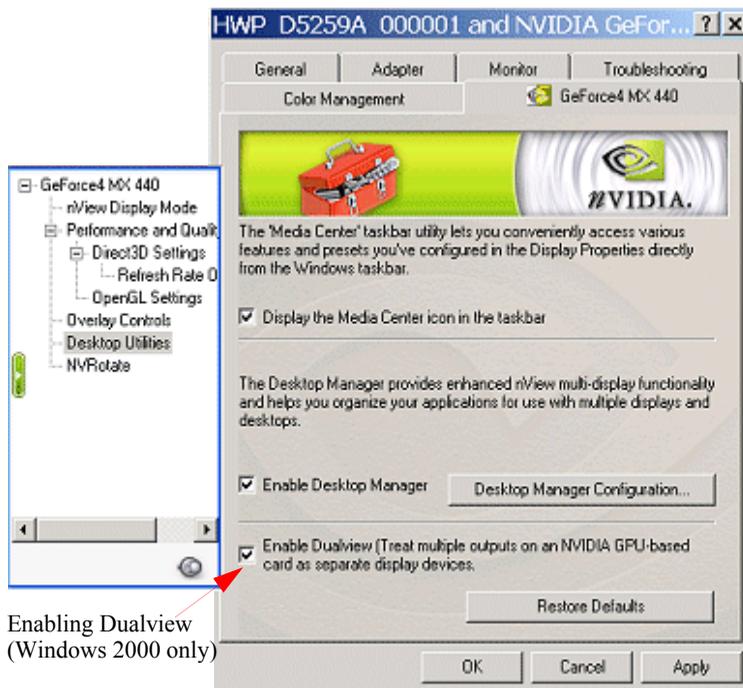
4 Click **Apply**.

5 Click **Restart your computer** when prompted.

6 After you log back on to your computer, from your desktop, right click to view the properties menu, then click **Properties** and the **Settings** tab. You'll notice that two monitor images appear on the Settings panel now, which indicates Dualview mode.

7 For further details on Dualview configuration, see "Using nView Multi-Display Modes: Dualview vs. Span/Clone" on page 34.

Color Correction Panel

Note: In order to access the Color Correction panel, your "Color" or "Color Quality" setting on the Display Properties Settings panel must be set to (16 bit) or higher. A setting of "256 colors" will not enable the Color Correction panel.

Follow *one* of these methods to access the Color Correction panel. (Examples are shown in Figure 9.9 through Figure 9.10.)

• In nView Dualview mode, do the following:

   a Right click from the Windows desktop to display the pop-up menu and then click **Properties** > **Settings** > **Advanced**.

   b Click the NVIDIA GPU tab.

   c From the Media Center menu, click **Color Correction** to display the NVIDIA Color Correction panel.

Figure 9.9   Color Correction Settings: Dualview Mode
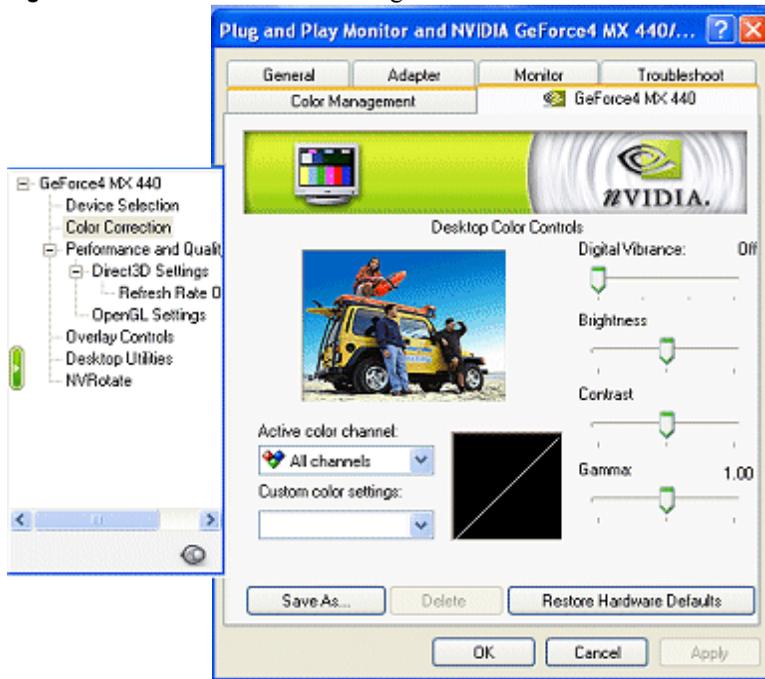
• From the nView Display Mode panel, do the following:

    a Right click on a monitor image *or* click **Device Settings >>**.

    b Select **Color Correction** to display the NVIDIA Color Correction panel.

Figure 9.10 Color Correction Settings: nView Display Mode

"Image Sharpening" is a new feature available with GeForce FX and newer GPUs.
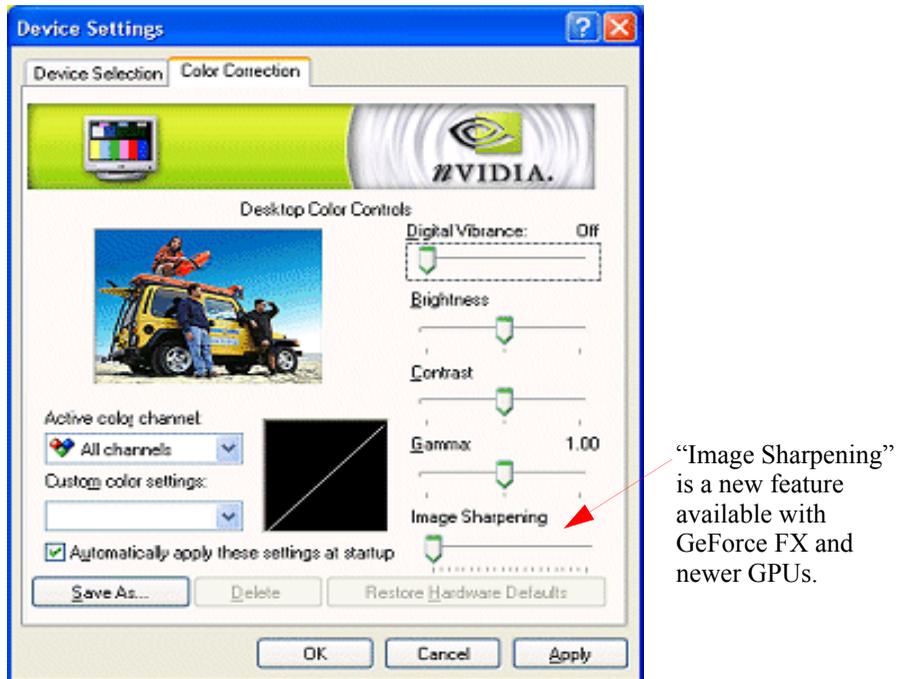
Description of Color Correction Settings

Digital Vibrance

Digital Vibrance Control (DVC), a mechanism for controlling color separation and intensity, boosts the color saturation of an image so that all images — including 2D, 3D, and video — appear brighter and crisper (even on flat panels) in your applications.

Note: DVC is supported by the GeForce2 MX and later series of NVIDIA GPUs.

Digital Vibrance can be turned off or set to different levels from low to high through the Color Correction panel as shown in Figure 9.9 or Figure 9.10.

Active Color Channel

Allows you to select the color channel controlled by the sliders. You can adjust the red, green or blue channels individually or all three channels at once.

Brightness, Contrast, and Gamma Controls

The slider controls allow you to adjust the brightness, contrast, or gamma values for the selected color channel.

The Color Correction controls help you to compensate for variations in luminance between a source image and its output on a display device. This is useful when working with image processing applications to help provide more accurate color reproduction of images (such as photographs) when they are displayed on your monitor.

Also, many 3D-accelerated games may appear too dark to play. Increasing the brightness and/or gamma value equally across all channels will make these games appear brighter, making them more playable.

Image Sharpening

Note: This option is only available on GeForce FX and later NVIDIA GPUs.

The slider allows you to adjust the sharpness of the image quality by amplifying high frequency content.

Diagonal Line/Curve

Diagonal Line/Curve shows a graphical representation of the color curve. This curve will change in real time as you adjust the contrast, brightness, or gamma.

Custom Color Settings

Provides a list of the custom color settings you have saved. Selecting an item from the list will activate the setting.

Other Settings

- **Automatically Apply these settings at startup**: Click to enable this option, which inserts a check mark in the check box, and click **Apply**. This option automatically restores the color adjustments you have after Windows is restarted.

  Note: If your computer is running on a network, the color is adjusted after you log on to Windows.

- **Save as** lets you save the current color settings as a custom setting. Saved settings will then be added to the adjacent list.

- **Delete** lets you delete the custom color setting currently selected in the list.

- **Restore Hardware Defaults** restores all color values to the hardware factory settings.

Performance and Quality Settings Panel

To access the Performance & Quality Settings panel, follow these steps:

1 Right click from the Windows desktop to open the pop-up menu.

2 Click **Properties** > **Settings** tab > **Advanced** > **NVIDIA GPU** tab and the **Performance & Quality Settings** option from the Media Center menu to display the panel shown in Figure 9.11.

Figure 9.11 Performance and Quality Settings Panel
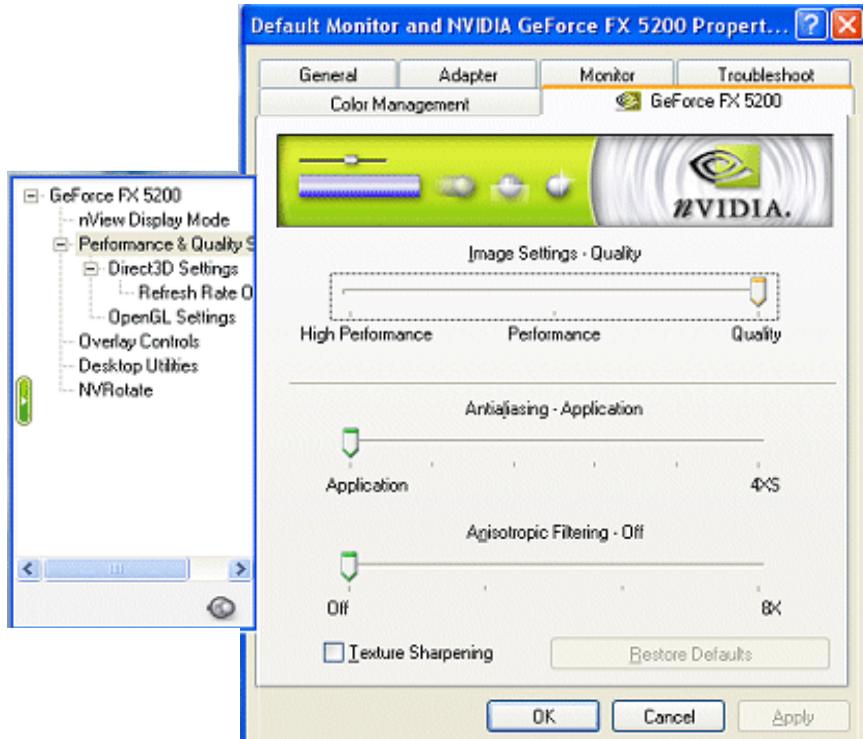
Image Settings

Move the slider to select the performance and quality enhancements settings for Direct3D and OpenGL applications.

• **High Performance** results in the highest performance for your applications.

• **Performance** results in the best performance for your applications with good image quality.

• **Quality** is the *default* setting that results in the best image quality for your applications.

Antialiasing

Antialiasing is a technique used to minimize the "stairstep" effect sometimes seen along the edges of 3D objects. Your selection can range from turning antialiasing completely off to selecting the maximum amount possible for a particular application. Use this slider to set the degree of antialiasing to be used in Direct3D and OpenGL applications.

Note: The availability of the following options depends on the type of NVIDIA GPU-based graphics card you are using.

- **Application** setting allows the application to determine the antialiasing level.

- **Off** disables antialiasing in 3D applications. Select this option if you require maximum performance in your applications.

- **2x** enables antialiasing using the 2x mode. This mode offers improved image quality and high performance in 3D applications.

- **Quincunx** enables a patented antialiasing technique available in the GeForce GPU family. Quincunx antialiasing offers the quality of the slower, 4x antialiasing mode, but at nearly the performance of the faster, 2x mode.

- **4x** enables antialiasing using the 4x mode. This mode offers higher image quality at the expense of some performance in 3D applications.

- **4x, 9-tap Gaussian** enables antialiasing using the 4x, 9-tap (Gaussian) mode. This mode offers higher image quality but at the expense of some performance in 3D applications.

- **6xS** affects only Direct3D applications and enables antialiasing using the 6xS mode. This mode offers better image quality than the 4xS mode.

- **8x** enables antialiasing using the 8x mode. This mode offers better image quality than the 6xS mode for Direct3D applications and better image quality that the 4x mode for OpenGL applications.

- **16x** enables antialiasing using the 16x mode. This mode offers better image quality than the 8x mode.

Note: Some options may not be available due to your hardware limitation. Please consult your NVIDIA User Guide for details.

Tips on Setting Antialiasing Modes

Some antialiasing settings require a large amount of video memory. If the mode you requested requires more video memory than available and you see unexpected results, try selecting the next lower mode, and so on, until you achieve the desired result.

You may also want to experiment with different screen resolutions, refresh rates, and/or color depths until you arrive at a setting or combination of settings for antialiasing to work.

Anisotropic Filtering

Note: Availability of options described below may depend on the NVIDIA GPU you are using.

Use this slider by dragging it to set the degree of anisotropic filtering for improved image quality. Enabling this option improves image quality at the cost of performance

* **Off** disables anisotropic filtering.

* **1x** results in maximum performance.

* **2x** results in improved image quality at the cost of performance.

* **4x** results in improved image quality at the cost of performance.

* **8x** results in best image quality.

Texture Sharpening
To improve image quality, select this option to sharpen textures when running 3D applications with antialiasing enabled.

Direct3D Settings Panel

To access the Direct3D Settings panel (Figure 9.12), follow these steps:

1 Right click from the Windows desktop to open the pop-up menu.

2 Click **Properties** > **Settings** tab > **Advanced** > **NVIDIA GPU** tab and the **Direct3D Settings** from the Media Center menu.

Performance & Compatibility Options

Note: Availability of options described below may depend on the NVIDIA GPU you are using.

* **Enable Fog Table Emulation** is used to turn fog table emulation *on* or *off*. Direct3D specifies that a display adapter capable of Direct3D hardware acceleration should be able to implement either vertex fog or table fog.

  Note: Some games do not correctly query the Direct3D hardware capabilities and expect table fog support. Enabling this option ensures that such games run properly with your NVIDIA graphics processor.

• **Display logo when running Direct3D applications:** Enabling this option displays the NVIDIA logo in the lower corner of the screen while Direct3D applications are running.

Figure 9.12 Direct3D Settings Panel
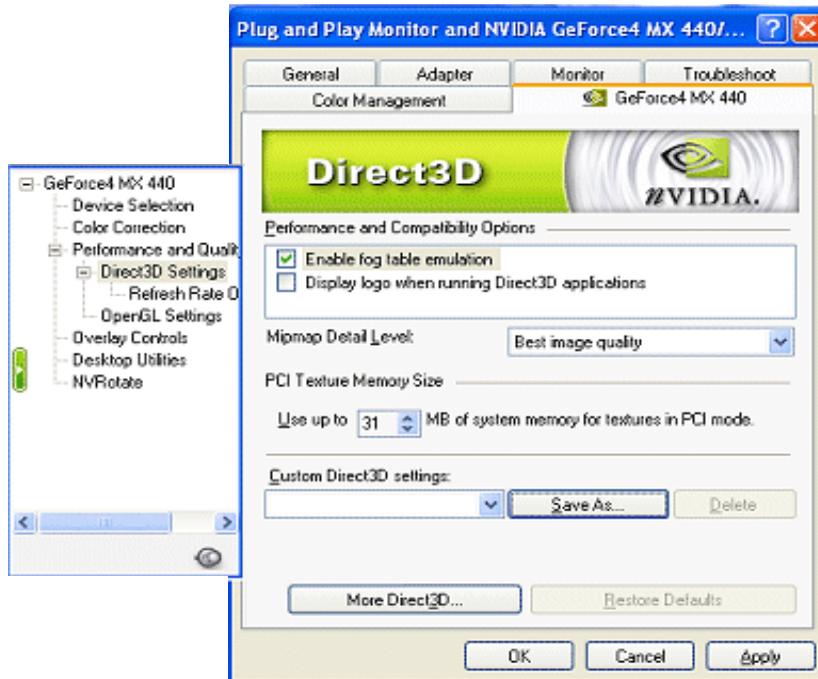
Other Direct3D Options

Mipmap Detail Level

Allows you to adjust the **LOD (Level of Detail)** bias for mipmaps. A lower bias will provide better image quality, while a higher bias will increase application performance. You can choose from five preset bias values:

• Best image quality

• High image quality

• Blend

• High performance

• Best performance

PCI Texture Memory Size

This option allows the graphics processor to utilize up to the specified amount of system memory for texture storage (in addition to the memory installed on the display adapter itself).

To specify the amount of system memory you want for textures in PCI mode, click the **Up** or **Down** arrow.

Note: This setting applies only to PCI display adapters or AGP display adapters running in PCI compatibility mode.

Tip   The maximum amount of system memory that can be reserved for texture storage is calculated based on the amount of physical RAM installed in your computer. The more system RAM available on your computer, the higher the value you can set.

Custom Direct3D Settings

Click the arrow button to display a list of the custom settings (or "tweaks") you have saved. Selecting an item from the list activates the setting. To apply the setting, click **OK** or **Apply**.

Save As

Saves the current settings (including those set in the More Direct3D dialog box) as a custom "tweak". Saved settings are then added to the adjacent list. Once you have found the optimal settings for a particular Direct3D game, saving the settings as a custom tweak lets you quickly configure Direct3D before starting the game and eliminates the need to set each of the options individually.

Apply

Saves all the changes you have made without closing the dialog box.

Delete

lets you delete the custom setting currently selected in the Custom Direct3D Settings field.

Restore Defaults

Restores any settings you have changed to their default values.

More Direct3D

Note: The **More Direct3D** option (button) on the Direct 3D Settings panel is not available under all NVIDIA GPU-based cards.

Displays a dialog box that allows you to customize additional Direct3D settings.

More Direct3D Options

Note: The **More Direct3D** option (button) on the Direct 3D Settings panel is not available under all NVIDIA GPU-based cards.

Click **More Direct3D** from the Direct3D panel (Figure 9.12) to display the More Direct3D panel. Examples are shown in Figure 9.13 and Figure 9.14.

Texel Alignment

Note: The Texel Alignment option appears *only* for certain older NVIDIA GPU-based cards.

Changes the hardware texture-addressing scheme for texels (texture elements). Changing these values will change where texel origin is defined. The default values conform to the Direct3D specifications. Some software may expect the texel origin to be defined elsewhere. The image quality of such applications will improve if the texel origin is redefined.

Use the slider control to adjust the texel origin between the upper left corner and the center of the texel.

Figure 9.13 More Direct3D Settings: Texel Alignment (applies to older NVIDIA GPUs)
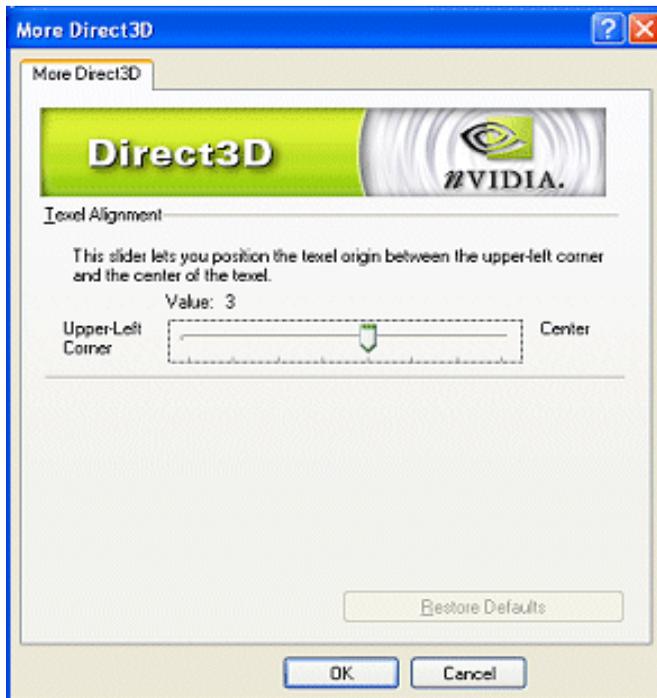
Vertical Sync Mode

Note: The Vertical Sync Mode options appear *only* for certain types of NVIDIA
       GPU-based cards.

These options specify how Vertical Sync is handled in Direct3D application.
Click the down arrow to display the following list of options and select one.

• **Auto-select:** The optimal mode is selected automatically, based on the
  whether the application requests the vertical sync mode to be enabled or
  disabled.

• **Always off**. This option disables vertical sync in Direct3D applications.

• **Always on**. This option enables vertical sync in Direct3D applications.

Figure 9.14 More Direct3D Settings: Vertical Sync (applies to certain NVIDIA GPUs)

Direct3D Settings: Refresh Rate Overrides

The Direct3D Refresh Rate Overrides panel lets you select refresh rate
overrides to be used in Direct3D applications. To access the Direct3D Refresh
Rate Overrides panel (Figure 9.15), follow these steps:

1 Right click from the Windows desktop to open the pop-up menu.

2 Click **Properties** > **Settings** tab > **Advanced** > **NVIDIA GPU** tab to open the Media Center menu.

3 If you can't see the **Refresh Rate Overrides** option, click the "+" on the left of the **Performance and Quality** option; then click the "+" on the left of the **Direct3D Settings** option to expand the menu.

4 Click the **Refresh Rate Overrides** option to display the panel in .

Figure 9.15 Direct3D Refresh Rates: Applications control refresh rates
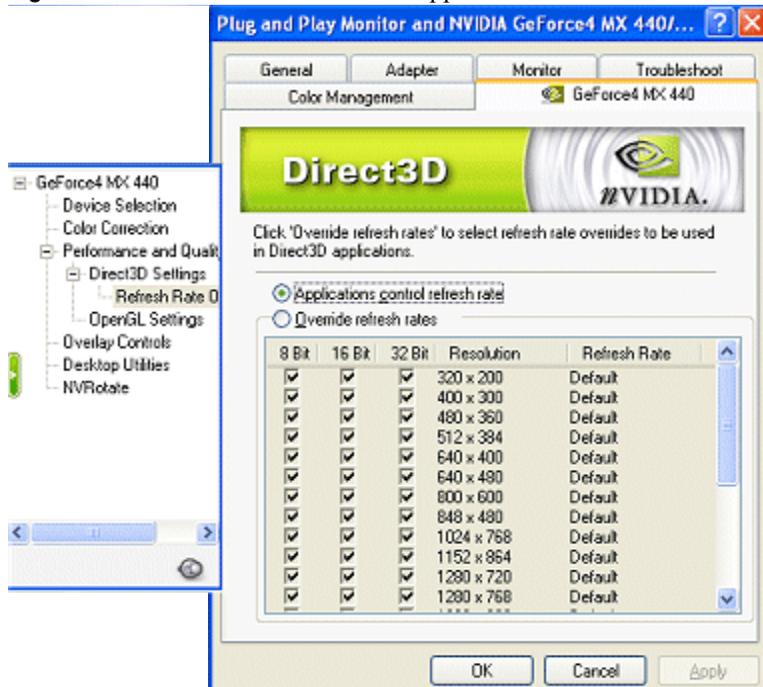
Applications control refresh rates

When enabled, this option allows the Direct3D application to select its own refresh rate.

(**Default** means that the application's refresh rate is used.) Any other value means to set the refresh rate to the value for full-screen Direct3D applications.

If you want to select refresh rate overrides to be used in Direct3D applications, click **Override refresh rates**.

Override refresh rates

When you click this option, the list box of values becomes enabled so you can select individual refresh rates for each resolution and combination of bit depths, as shown in Figure 9.16.

Figure 9.16 Direct3D Refresh Rate Overrides
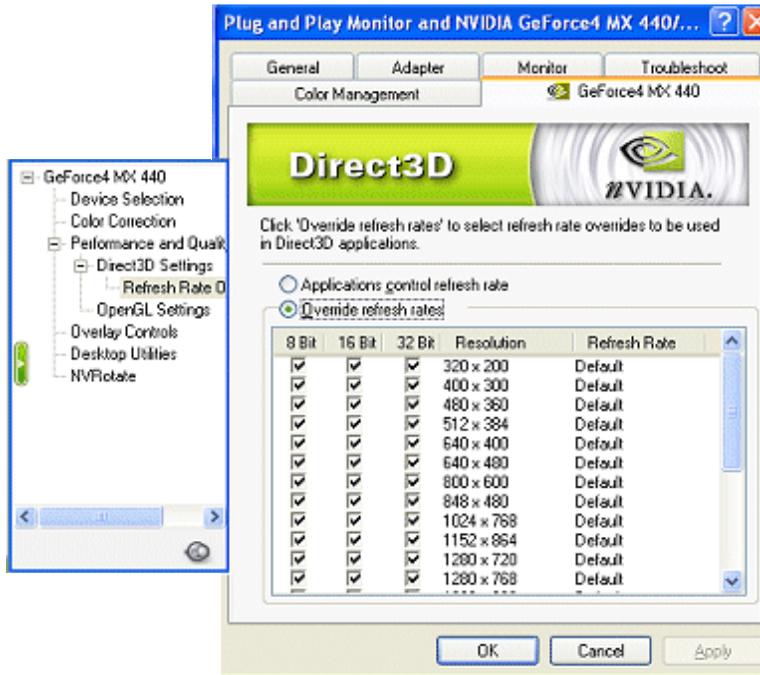
To override a refresh rate, follow these steps:

1 From the Refresh Rate column, click the word **Default** on the line that contains the Resolution for which you want to change the refresh rate. A list box of values appears, as shown in Figure 9.17.

2 From the list, select the refresh rate you want for the associated value in the Resolution column.

3 If you want to eliminate any of the three bit depths in the row, simply click to disable (remove the check mark from) that bit depth.

4 Click **Apply**.

Figure 9.17 Direct3D Refresh Rates: Override refresh rates (menu)
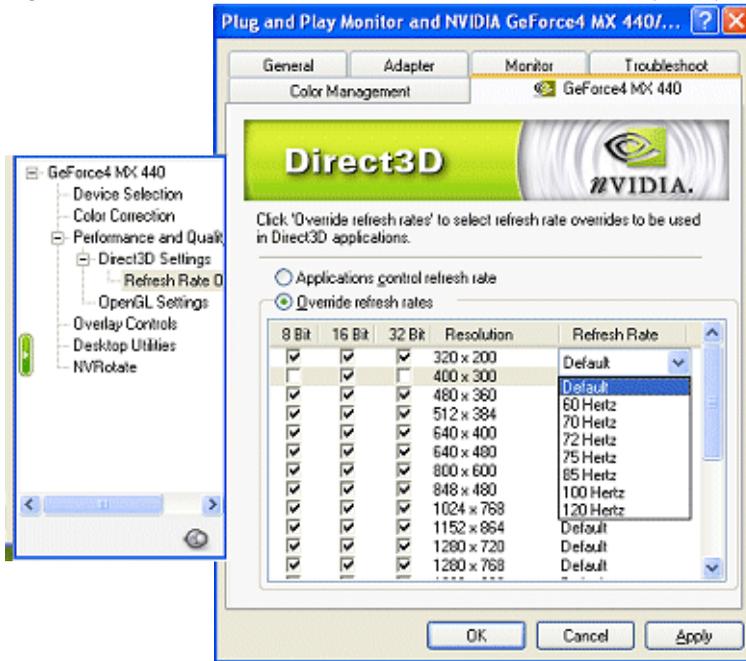
OpenGL Settings Panel

Note: Availability of options described in this section may depend on the NVIDIA GPU you are using.

To access the OpenGL Settings panel, follow these steps:

1 Right click from the Windows desktop to open the pop-up menu.

2 Click **Properties** > **Settings** tab > **Advanced** and the **NVIDIA GPU** tab to display the Media Center menu.

3 If the OpenGL Settings options is not readily visible on the menu, click the (+) sign on the left of the "Performance and Quality" option to expand the menu.

4 Then click the **OpenGL Settings** option to display the OpenGL Settings panel (Figure 9.18).

Figure 9.18 OpenGL Settings: Single-Display Hardware Acceleration

Performance &
Compatibility
Options

Default
**Single-display
Mode** option
for nView
Standard
mode

Performance and Compatibility Options

- **Disable support for enhanced CPU instruction sets**: Enable this option to disable driver support for enhanced instructions used by certain CPUs. Some CPUs support additional 3D instructions that complement your NVIDIA graphics processor and improve performance in 3D games or applications. This option allows you to disable support for these additional 3D instructions in the drivers. This can be useful for performance comparisons or for troubleshooting.

- **Enable conformant OpenGL texture clamp behavior:** "Texture clamping" refers to how texture coordinates are handled when they fall outside the body of the texture. Texture coordinates can be clamped to the edge or within the image.

- **Use unified back/depth buffer:** Enabling this option allows the OpenGL driver to allocate one back buffer and one depth buffer at the same resolution of the display.

  - *When the option is enabled*, OpenGL applications that create multiple windows use video memory more efficiently and show improved performance.

  - *When the option is disabled*, the OpenGL driver allocates a back buffer and depth buffer for every window created by an OpenGL application.

- **Maximize texture memory:** Enabling this option sets aside as much memory as possible for use by texture maps. This can increase performance for highly texture-intensive applications but at the expense of a minor amount of performance for non-textured applications

Other OpenGL Options

Multi-Display Hardware Acceleration

Note: Multi-display hardware acceleration options do not apply when using nView Multiview mode in Windows NT 4.0.

This option determines advanced rendering options when using multiple displays and/or different classes of NVIDIA GPUs.

- **Single-Display Mode**: If you have only one active display, this is the default setting (Figure 9.18). You can also specify this setting if you have problems with the multi-device modes.

- **nView Clone/Span Mode:** This is the default setting when your nView display configuration is set to nView Clone mode or nView Span mode. If multiple NVIDIA-GPU based graphics cards in your system are in use with active displays, this setting is replaced by one of the "Multi-Device" modes described below (Figure 9.19).

Figure 9.19 OpenGL Settings: nView Span/Clone Mode Hardware Acceleration
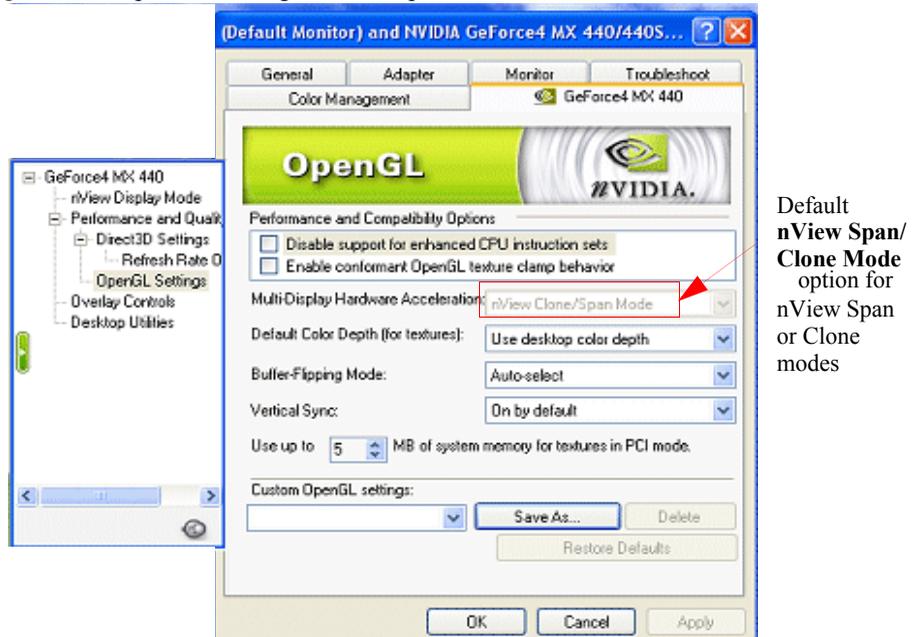
- **Multi-Device Compatibility Mode**: This mode is available if you have two or more active display devices when running in nView Dualview mode or if you are using different classes of NVIDIA GPU-based cards (Figure 9.20).

  Note: When this mode is in effect, OpenGL renders in "compatibility" mode for all displays. In this mode, when different classes of GPUs are in use, the lowest common feature set of all active GPUs is exposed to OpenGL applications. The OpenGL rendering performance is slightly slower than in Single-Display mode.

- **Multi-Device Performance Mode:** This mode is available if you have two or more active display devices when running in nView Dualview mode or if you are using different classes of NVIDIA GPU-based cards (Figure 9.20).

  Note: When this mode is in effect, OpenGL renders in "Performance" mode for all displays. As in "Compatibility" mode, when different classes of GPUs are in use, the lowest common feature set of all active GPUs is exposed to OpenGL applications. However, the rendering performance is "faster" than in Compatibility Mode, although switching or spanning display devices may result in minor transient rendering artifacts.

Figure 9.20 OpenGL Settings: Dualview Mode Hardware Acceleration Options
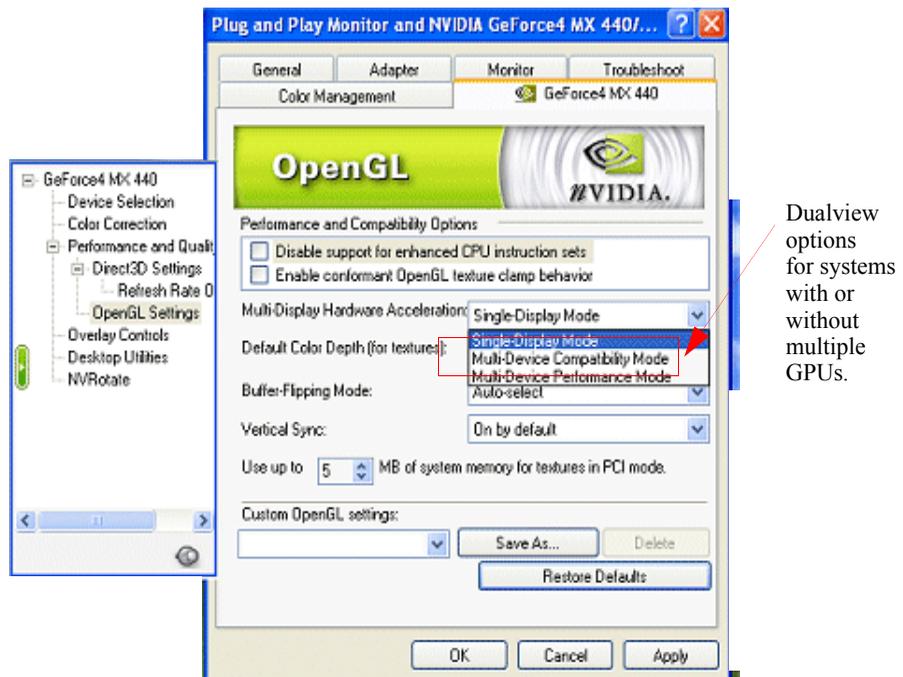
Default Color Depth for Textures

This option determines whether textures of a specific color depth should be used by default in OpenGL applications.

- **Use desktop color depth** always uses textures of the color depth at which your Windows desktop is currently running.

- The **Always use 16 bpp** and **Always use 32 bpp** options force the use of textures of the specified color depth, regardless of your desktop settings.

Buffer Flipping Mode

Click the "down-arrow" to display the buffer-flipping modes for full-screen OpenGL applications. You can select one of the following methods:

- **Use Block Transfer** is the block transfer method.

- **Auto-select** allows the driver to determine the best method based on your hardware configuration.

Vertical Sync

Click to specify how vertical sync is handled in OpenGL.

- **Always off**. Always disables vertical sync in OpenGL applications.

- **Off by default**. Keeps vertical sync disabled unless an application specifically requests that it be enabled.

- **On by default**. Keeps vertical sync enabled unless an application specifically requests that it be disabled.

Using System Memory for Textures in PCI Mode

The option "Use up to _ MB of System Memory for Textures in PCI mode" allows the graphics processor to utilize up to the specified amount of system memory for texture storage (in addition to the memory installed on the display adapter itself). This setting applies only to PCI display adapters, or AGP display adapters running in PCI-compatibility mode.

Tip: The maximum amount of system memory that can be reserved for texture storage is calculated based on the amount of physical RAM installed in your computer. The more system RAM, the higher the value you will be able to set.

Custom OpenGL Settings

This option shows a list of the custom settings (or "tweaks") you have saved.

Note: This option applies only to Windows XP/2000/NT 4.0.

To activate the setting:

1   Select an item from the list.

2   Click **OK** or **Apply**.

Save As

Click **Save As** to save the current settings as a custom "tweak," which is then added to the adjacent list. Once you have found the optimal settings for a particular OpenGL application, saving the settings as a custom tweak allows you to quickly configure OpenGL before starting the program and eliminates the need to set each option individually.

Delete

Click **Delete** to delete the custom setting currently selected in the Custom OpenGL settings field.

Restore Defaults

Click **Restore Defaults to** restores all settings to their default values.

Custom OpenGL Application Settings

This option displays a list of preconfigured settings that correspond to OpenGL workstation applications. Settings include AutoCAD, CATIA, 3D Paint, 3D Studio Max. Pro/ENGINEER, Lightwave, CDRS, Solidworks, Unigraphics, and others.

Overlay Controls Panel

Use the Overlay Controls panel to adjust the quality of video or DVD playback on your monitor.

Note: If any settings changes you make do not take effect (e.g., the controls have no effect on the video) after you click **Apply**, close the video overlay and then re-open it.

1   Open the DVD or video application that you want to view.

2   Right click from your desktop to display the properties menu and then click **Properties** > **Settings > Advanced** > the **NVIDIA GPU** tab > **Overlay Controls** option from the Media center menu.

Figure 9.21 through Figure 9.24 show Overlay Controls panels for Windows XP/2000 and Windows 98, highlighting various settings.

Figure 9.21 Overlay Controls Panel: nView Clone Mode

Full-Screen Device: *Primary display* and *Secondary display* are available options in nView Clone mode.

Track overlay rotation

Description of Overlay Settings

Full-Screen Video Mirroring Options

Note: Video Mirror features are not available under Windows NT 4.0.

The Video Mirror feature is supported by any NVIDIA GPU-based multi-display graphics card.

The Video Mirror feature allows a video or DVD application to mirror its playback in full-screen mode on any one of the connected display devices. (For sample combinations of display devices that are supported, see relevant text in "nView Applications" on page 65.)

Note: The Video Mirror features are supported only under **nView Clone** and **Dualview modes.** Also note that i**f you have only one display device connected to your computer**, you will not have Video Mirror functionality but will be able to access the other Overlay Control features

• **Full-Screen Device:** Selects the display device on which video is to be played back in full-screen mode.

> **Note:** After selecting any of these Full-Screen Device options, you may need
> to exit and restart your video application for the settings to take effect.

- **Disable** Disables Video Mirror.

- **Primary display/Secondary display**: These setting are only available
 under nView Clone mode in both Windows 2000/XP and Windows 9x.

  To enable Full-Screen Device functionality in *nView Clone* mode, click
  either Primary display or Secondary display as the Full-Screen Video
  Mirror device.

- **Auto-select:** This setting is only available under Dualview mode in
  Windows 2000/XP and Windows 9x.

  Auto-select enables full-screen device functionality, which creates the
  full-screen mirror on the display device on which there is no overlay. This
  implies that if the video being played is dragged to the other display, the
  full-screen mirror image will automatically switch displays.

- **Track Overlay Rotation**: Click to link the degree of rotation you specified
  in the NVRotate panel (*see* "NVRotate Panel" on page 133*)* for the video
  overlay on the Primary display to the Secondary display. This means that the
  degree of rotation you choose on the NVRotate panel is reflected on both the
  Primary and Secondary display devices.

Figure 9.22 Overlay Controls Panel: Dualview Mode
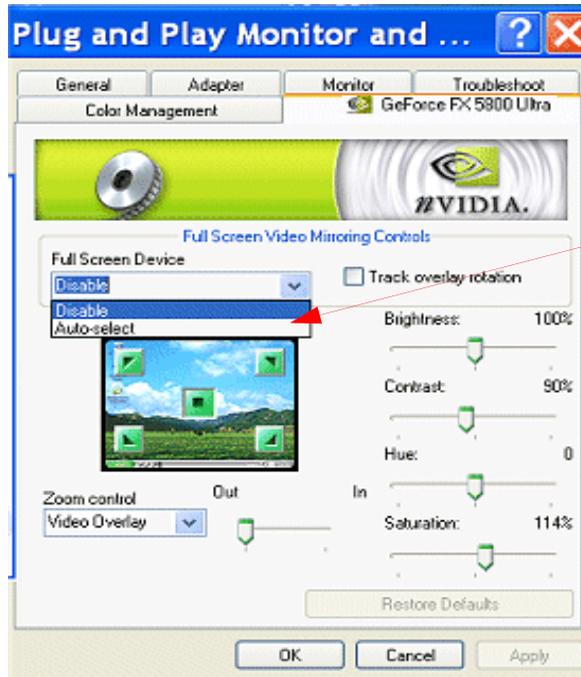
Full-Screen Device:
Auto-select is an
available option in
Dualview mode.

Figure 9.23 Overlay Controls Panel: Zoom Control

Click any of these screen region arrows to select the corresponding area of the video screen you want to zoom.

Use the slider to zoom in on or out of the selected region of the video play-back screen.

Figure 9.24 Overlay Controls Panel: TV Tuner Option (Windows 98)

Primary display and **Secondary display** are available options in in nView Clone mode.

TV Tuner option available on **Windows 9x**

Other Overlay and Video Mirror Settings

- **Brightness, Contrast, Hue, and Saturation**: You can independently control the brightness, contrast, hue, and saturation to achieve optimal image quality when playing back videos or DVD movies on your computer. Use these controls to adjust the quality of video or DVD playback on your monitor. You can independently control the brightness, contrast, hue and saturation to achieve optimal image quality when playing back videos or DVD movies on your computer.

- **Zoom Control** lets you zoom into the rendered video. Use the drop-down menu to select the display type to zoom and use the quadrant selection to select the screen region to zoom.

  - **Video Overlay** sets the zoom selection to the primary display on which the overlay video is rendered.

  - **Video Mirror** sets the zoom selection to the secondary display on which the video mirror is rendered.

  - **Both** applies the zoom selection to the both the primary and the secondary display on which the video is rendered.

  Note: Video players that cannot detect the presence of Video Mirror may not update the zoom factor immediately while displaying a still frame.

- **Screen Region to Zoom:** Select the area of the video screen on which you would like to zoom by clicking on the area. Once it is selected, you can zoom to that portion of the screen by moving the **Out/In** slider control, below.

- **Out/In:** Lets you zoom in on or out of the selected portion of the video playback screen.

- **Restore:** Click to restore all color values to the hardware factory settings.

- **Check here if you are having problems with your TV tuner:** (Windows 9*x only*) Enabling this option, as shown in Figure 9.24, forces the overlay software to use busmastering.

  Note: It is recommended that you leave this option unchecked unless you experience problems with video playback, such as image corruption or you cannot see a video image.

NVRotate Panel

Using the Release 40 NVIDIA drivers, you can access the NVRotate feature, which lets you view your Windows desktop in **Landscape** or **Portrait** mode. You can rotate your desktop by 90, 180, or 270 degrees.

Note: NVRotate is supported under Windows XP/2000 and under the following NVIDIA GPUs and family of GPUs, as categorized in Table 2.5, "Supported NVIDIA Products" on page 19:

- GeForce4 MX series of GPUs

- GeForce4 Go series of GPUs

- GeForce2 MX series of GPUs

- GeForce2 Go series of GPUs

Note: If you are using the Video Mirror feature, you can also use the NVRotate feature to rotate the overlay video. If you want to apply the specified rotation to both the Primary and Secondary displays, use the **Track overlay rotate** feature that is available on the Full-Screen Video Mirror Controls panel. For details, see "Full-Screen Video Mirroring Options" on page 130.

Enabling NVRotate

To enable NVRotate, follow these steps:

1 From your Windows desktop, right click to display the pop-up menu and then click **Properties** > **Settings > Advanced**.

2 Click the NVIDIA GPU tab and the **NVRotate** option on the Media Center menu to display the NVRotate panel (Figure 9.25).

3 The following desktop rotations options are available:

- **Landscape** is the "default" mode.

- **Portrait** results in a 90 degree rotation.

- **Inverted Landscape** results in a 180 degree rotation.

- **Inverted Portrait** results in a 270 degree rotation.

- **Restore Default** results in the default "Landscape" mode.

4 Click **OK** after selection any one of the options above for the change to take effect.

Note: You can use the arrow (->) buttons to perform rotation options displayed in the NVRotate panel. Or you can click circular arrow on the right top and drag it in the direction of the rotation.

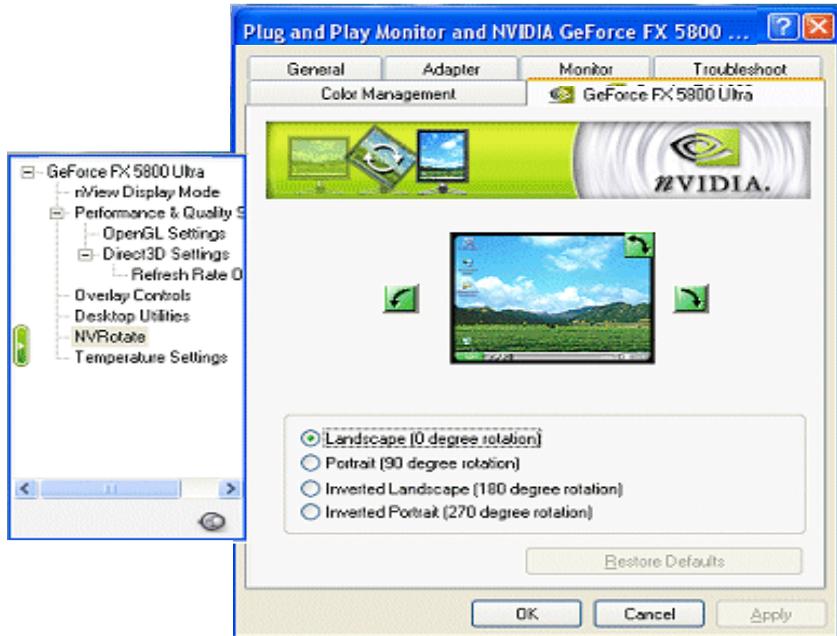**Figure 9.25** NVRotate Settings Panel: Landscape Mode

Figure 9.26 NVRotate Settings Panel: Portrait Mode

You can click any of these arrow buttons to perform the rotation options **or** click these options.
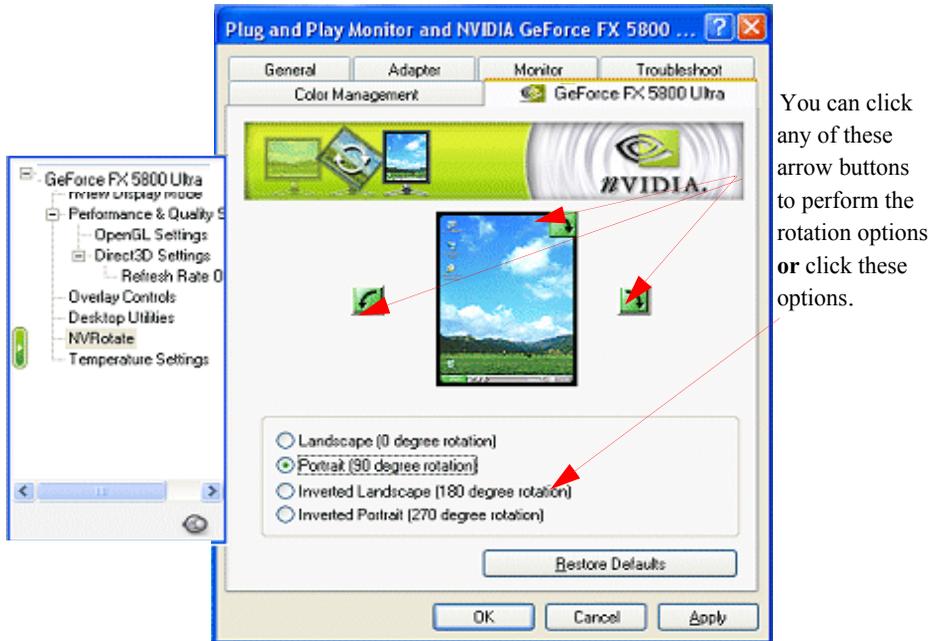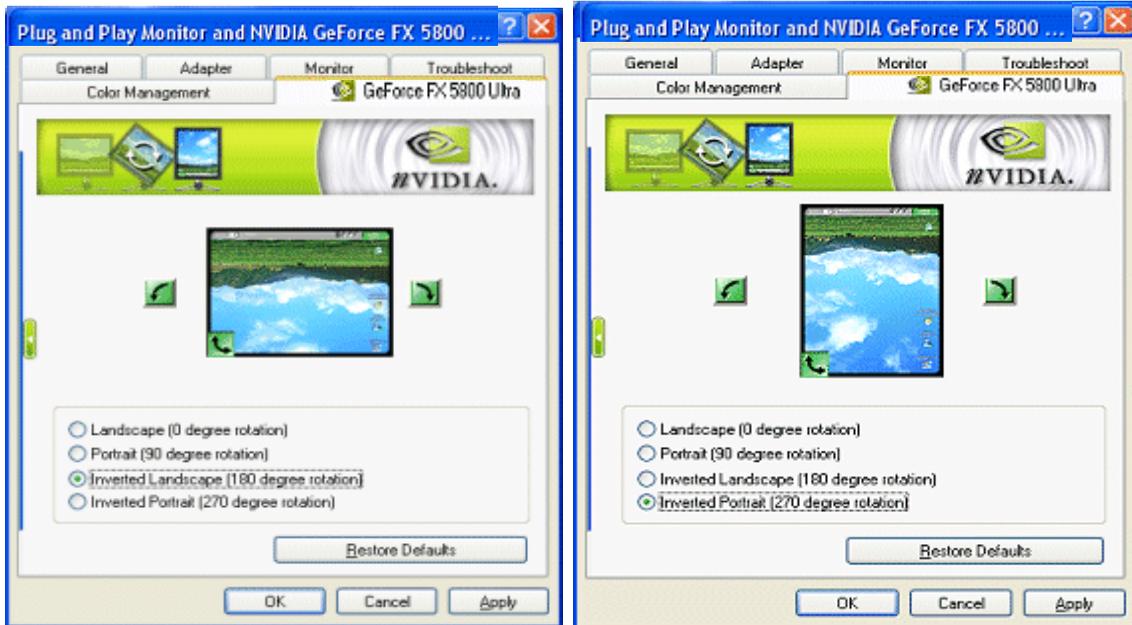
Figure 9.27 NVRotate Settings Panel: Inverted Landscape & Inverted Portrait Modes

Notes and Known Issues

- Rotation requires an additional video buffer equal to the settings for the rotated device. For systems with limited video memory, this can restrict the modes for which rotation can be supported.

- In **nView Clone mode**, both display devices are rotated.

- In Dualview mode, either of the display devices can be rotated provided there is enough memory to perform the rotation operation.

- Only those 3D games and application that include support for rotation will work in rotated modes.

Temperature Settings Panel

Note: This panel is available with GeForce FX and newer NVIDIA GPUs *and* on certain older NVIDIA GPUs only if the option has been enabled on your computer.

Temperature settings let you adjust the temperature of the selected NVIDIA GPU on your computer. To open the Temperature Settings panel, follow these steps:

1 Right click from your desktop to display the properties menu

2 Click **Properties** > **Settings > Advanced** > the **NVIDIA GPU** tab and then the **Temperature Settings** option from the Media center menu.The Temperature Settings panel appears, as shown in Figure 9.28.
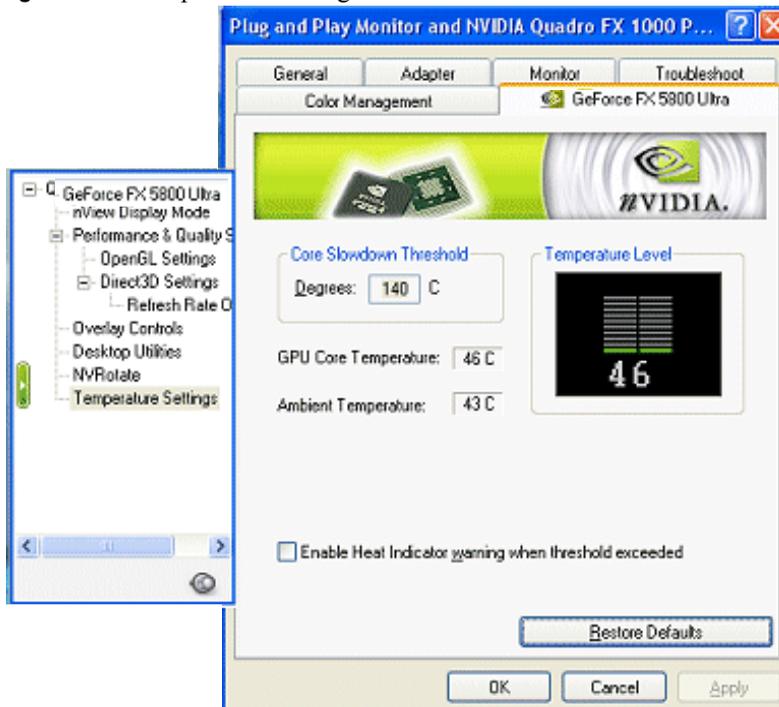
Description of Temperature Settings

*   **Temperature Level (GPU Core Temperature)** displays he current temperature of the selected NVIDIA GPU in your system.

*   **Core Slowdown Threshold:** Click the up or down arrow to change the value at which the GPU will slow itself down to prevent overheating.

    When this value matches the **GPU Core Temperature** value, a dialog box automatically appears warning of the condition and the actions that have been taken to prevent possible overheating and damage to any particular GPU(s) in your system.

    Note: The recommended value for this setting is the default that is preset. Any changes to this value should be made with extreme caution.

Figure 9.28 Temperature Settings Panel

- **Ambient Temperature**: This is the current temperature of the area surrounding the selected NVIDIA GPU in your system. This temperature varies greatly, depending on other heat sources located near the GPU.

- **Enable Heat Indicator Warning When Threshold Exceeded:** When the value of the NVIDIA GPU Core Temperature matches the Core Slowdown Threshold value, the Heat Indicator dialog box automatically appears describing the situation and the actions that have been taken to prevent possible damage to any particular GPU(s) in your system.
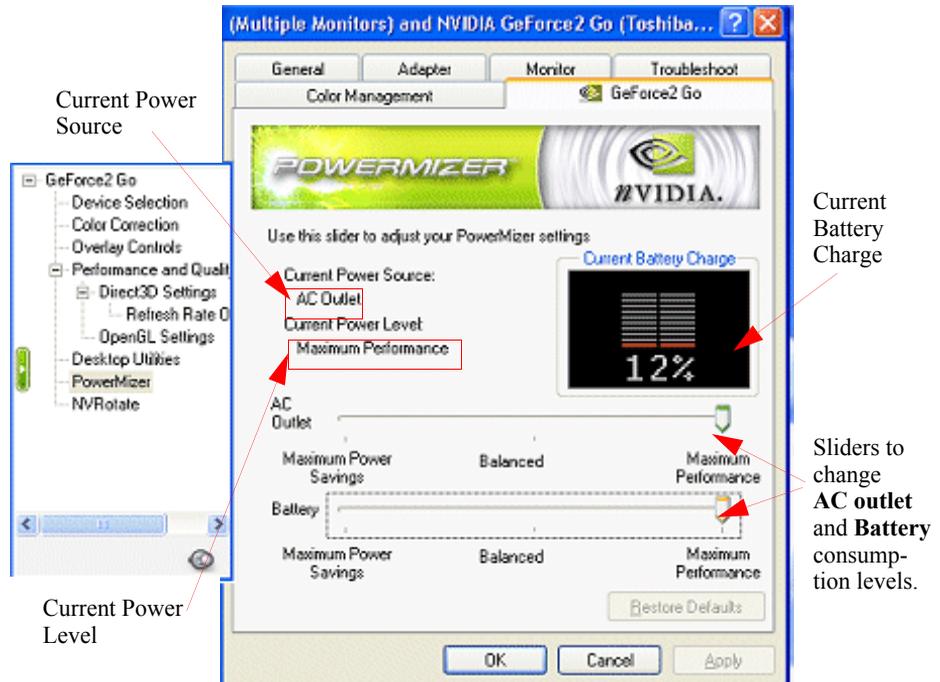
PowerMizer Settings Panel (Mobile computers *only*)

When using a mobile (laptop) computer, the NVIDIA PowerMizer™ panel lets you regulate the power consumption of your GPU.

To access the PowerMizer settings panel on your mobile computer, follow these steps:

1 Right click to display the pop-up menu

2 Click **Properties** > **Settings** > **Advanced** > the NVIDIA GPU tab, and then the **PowerMizer** option from the Media Center menu. A PowerMizer panel is shown in Figure 9.29

Figure 9.29 .PowerMizer Settings Panel (for mobile computers)

Description of PowerMizer Settings

- **Current Battery Charge:** This is the current battery charge being used by your mobile computer.

- **Current Power Source** can be either **AC Outlet** or **Battery**. In this example (Figure 9.29) it is AC Outlet.

- **Current Power Level** can be one of the following:

  - **Maximum Power Savings**

  - **Balanced**

  - **Maximum Performance** (example setting in Figure 9.29)

- **AC Outlet:** Use the slider to adjust the power consumption from the AC power source relative to performance, by setting **Maximum Power Savings Maximum Performance**, or **Balanced**.

- **Battery:** You can either conserve battery life by setting Maximum Power Savings, but at some decrease in performance, use the full graphics performance of your GPU by selecting Maximum Performance, or choose a compromise between the two settings by using Balanced.

A

USING MULTIPLE NVIDIA GPU-BASED CARDS

This appendix contains the following major topics:

Before You Begin

This chapter contains an example using two NVIDIA GPU-based graphics cards, the GeForce4 Ti 4200 AGP card and the GeForce2 MX PCI card, in one computer running **Windows XP**.

Note: Depending on the number of PCI slots your computer has, you can use several PCI cards. This example uses only one PCI card.

In this example:

- the **GeForce4 Ti 4200 GPU-based card** is connected to a digital display display *and* TV for multi-display nView functionality

- the **GeForce2 MX GPU-based card** is connected to a CRT (analog display) for multi-display functionality.

Setting Up the NVIDIA GPU-Based Cards

Follow these steps to use two NVIDIA GPU-based graphics cards on your computer:

1 Make sure you have an AGP slot and a PCI slot on your computer.

2 Install the appropriate PCI and AGP cards.

3 Install the most recent NVIDIA Display Driver software.

4 Restart your computer as necessary and as prompted so that your system detects both graphics cards.

5 Once your Windows has restarted for the final time and your desktop is no longer processing start-up tasks, right click on the desktop to display the pop-up menu.

6 Click **Properties** and the **Settings** tab. The first time you see the Settings panel, only the Display 1 monitor image will be attached. The other displays will not be attached (i.e., they will be turned off) and will appear grayed.

7 Click the down arrow in the Display windows, as shown in Figure A.1**.**

This example shows that the GeForce4 Ti GPU-based card is connected to a digital display and TV in multiple-display (nView) mode while the GeForce2 MX GPU-based card is connected to a single-display, which is a CRT.

- **Display 1**: Digital Display is connected to the GeForce3 Ti card and the display is enabled (turned on) as shown in Figure A.1. This display is part of the **nView (multi-display) mode** shared with Display 3.

- **Display 3: TV** is connected to the GeForce3 Ti card *but* the display is not enabled (turned off) in order to use **nView (multi-display) mode** (Figure A.2).

- **Display 2: CRT** is connected to the GeForce MX card and the display is enabled (turned on). This display is in Standard (Dualview) mode (Figure A.6.

8 For details on enabling (turning on) displays from the Display Properties Settings panel, see relevant sections in "nView Dualview Mode" on page 37.

GeForce4 Ti 4200 Panels: nView Span/Clone Mode

Both digital display and TV are connected to the GeForce4 Ti card for nView Span and Clone mode functionality.

For nView multi-display functionality, display **3** (TV) appears grayed because it is not turned on; this is the reason if you click **Identify**, the number **1** appears on both the digital display and TV.

If you enabled (turned on) the TV display, making this a Dualview setup (vs. nView Span/Clone), then if you click **Identify**, the number **3** appears on the TV.

Figure A.1   Display Properties Settings: Display 1 (Digital Display) nView Span/Clone Mode
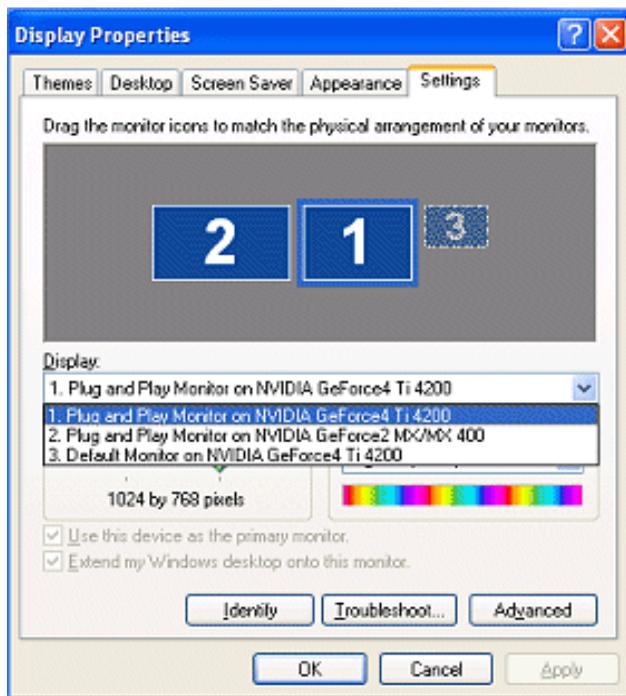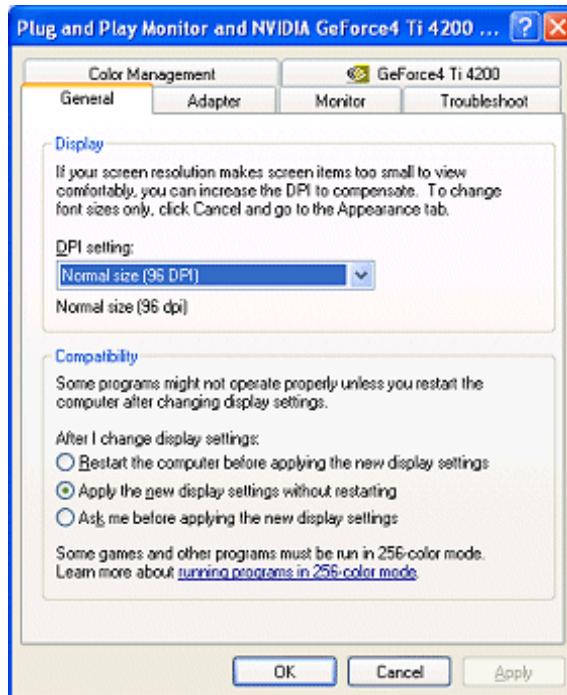
Figure A.2   Display Properties Settings: Display 3 (TV) in nView Span/Clone Mode
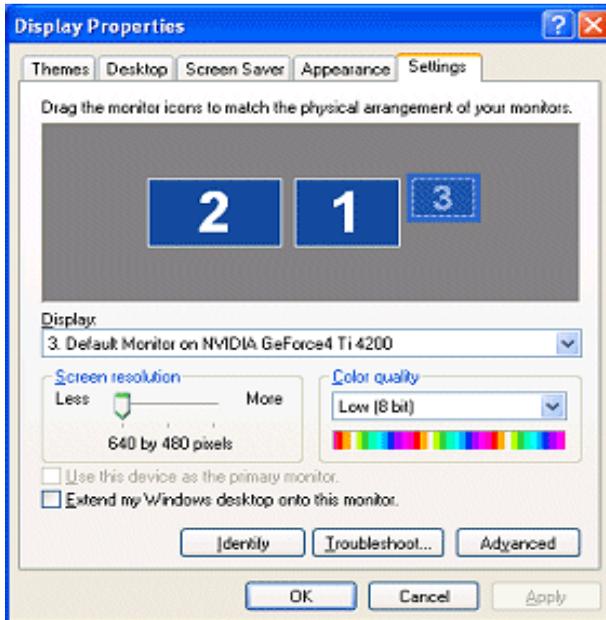
Figure A.3   NVIDIA GeForce4 Ti 4200 Tab

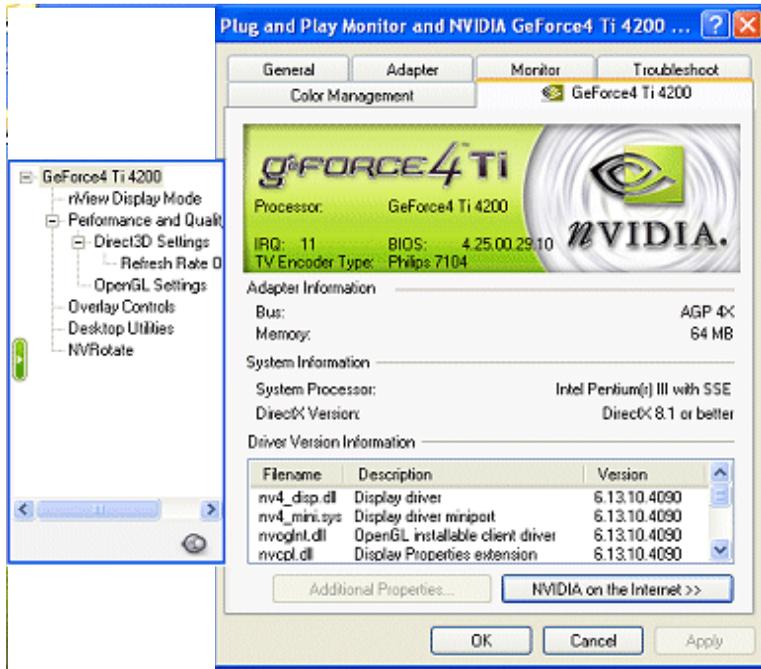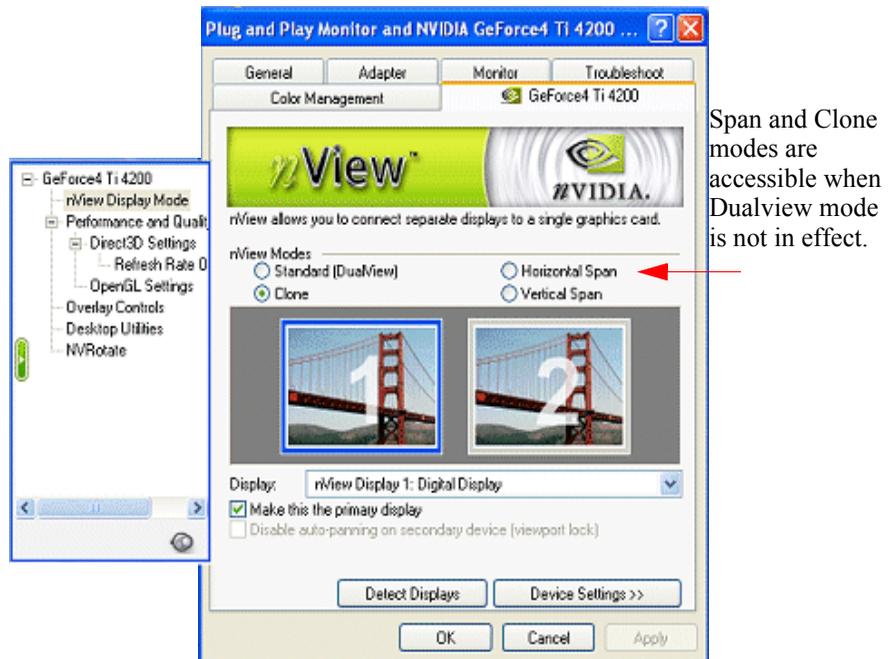**Figure A.4**   NVIDIA GeForce4 Ti 4200 Menu

Figure A.5   NVIDIA GeForce4 Ti 4200 nView Span and Clone Modes are Accessible

Span and Clone modes are accessible when Dualview mode is not in effect.

GeForce2 MX Panels: Standard (Dualview) Mode

Figure A.6   Display Properties Settings: Display 2 (CRT) Dualview mode
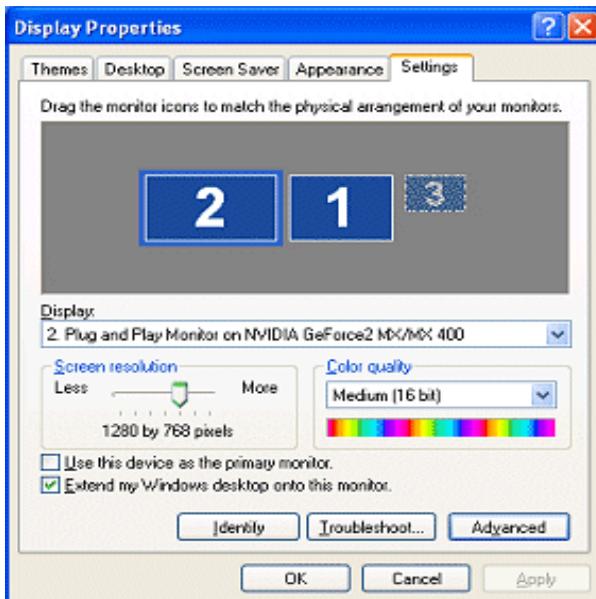

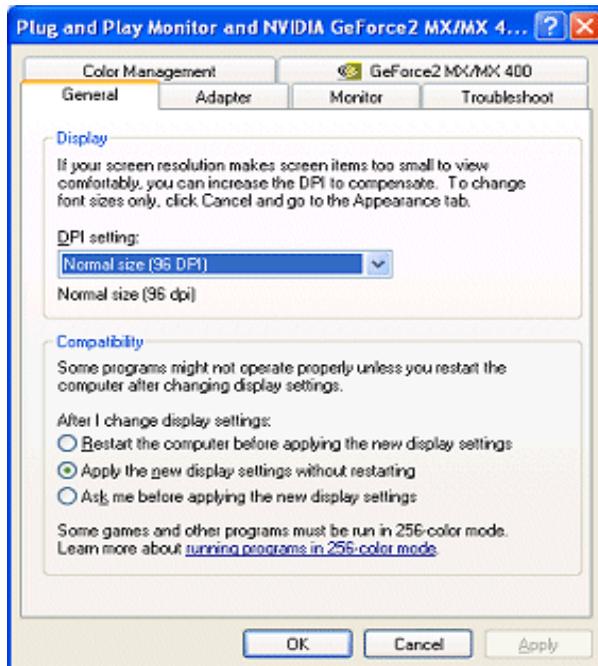**Figure A.7**   NVIDIA GeForce2 MX/MX 400 Tab

Figure A.8   NVIDIA GeForce2 MX/MX 400 Menu
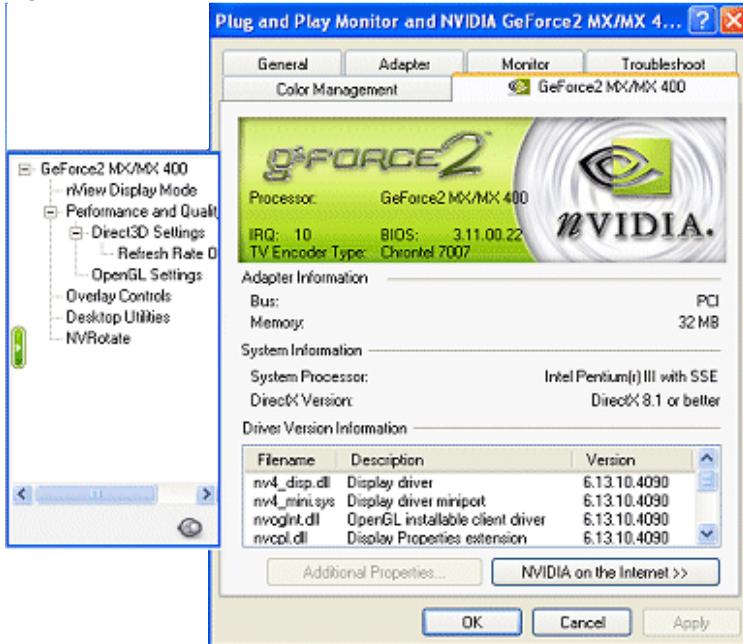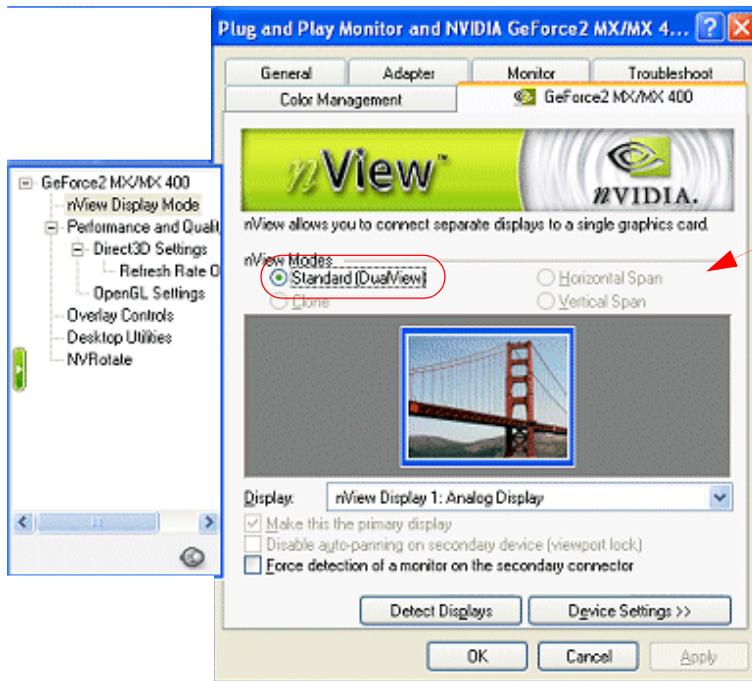

Figure A.9   NVIDIA GeForce2 MX Standard (Dualview) Mode

Span and Clone modes are not accessible when Standard (Dualview) mode is enabled.

Viewing Multiple GPU Configurations From the Media Center Icon

You can view the multi-GPU configurations through the NVIDIA Media Center icon.

If you don't have the NVIDIA Media Center icon enabled, see "Enabling the Media Center Icon" on page 109.

1 Right click the NVIDIA icon on your Windows task bar. A menu of configuration options appears, as shown in Figure A.10.

Notice that both GeForce4 Ti 4200 and GeForce2 MX GPU-based cards are shown in the menu.

2 To see the GeForce4 Ti and GeForce2 MX configuration options, point to the GPU names on the menu (Figure A.10) and then move the cursor to any of the options that appear on the next menu level**.**

Figure A.10 NVIDIA Media Center Icon Menu Displaying GeForce4 Ti 4200 and GeForce2 MX GPUs