Drivers for Windows
Detonator XP
User's Guide

Driver Version 21.83

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CHAPTER 1

ABOUT THE DETONATOR XP UNIFIED DRIVER

This document explains how to use the features and functions of the NVIDIA Detonator XP driver for Windows.

This chapter contains the following sections:

- "Overview of Features & Benefits" on page 1
- "System Requirements" on page 5
- "Notes & Conventions" on page 6

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

Overview of Features & Benefits

Note: For further technical details on the Detonator XP driver features and benefits, refer to the NVIDIA web page: **www.nvidia.com**.

The NVIDIA Detonator XP driver contains the following enhancements and features:

- Performance increases of up to 50% in both DirectX and OpenGL **Application Programming Interfaces (APIs)**
- Hardware acceleration enabling new features including 3D textures and shadow buffers

- Highly optimized OpenGL and DirectX pipelines with NVIDIA Pixel and Vertex Shaders
- New OpenGL 1.3 ICD with NVIDIA extensions
- Full hardware acceleration of Windows XP, including:
  - Fastest Windows XP 2D and 3D performance
  - **NVIDIA XPress Link**
  - Full hardware acceleration for the new Windows XP graphical user interface
  - NVIDIA patented **Unified Driver Architecture (UDA)** – all products supported in single driver binary

OpenGL 1.3 ICD with NVIDIA Extensions

Several new features and functions have been brought into the core functionality of OpenGL 1.3, including:

- Cube map texturing
- Higher quality environment mapping and lighting support
- Multisampling
- Order-independent antialiasing rendering of points, lines and polygons
- New Texture Modes
- More powerful ways of applying textures to rendered objects, such as:
  - Texture Add Environment Mode
  - Texture Combine Environment Mode
  - Texture Dot3 Environment Mode
  - Texture border filtering mode
- Compressed texture framework - allows for higher quality textures in less memory regardless of file format

The Detonator XP software OpenGL 1.3 ICD also supports the following NVIDIA Extensions under OpenGL:

- NV_Blend _square
- NV_evaluators
- NV_fence
- NV_fog_distance

- NV_light_max_exponent
- NV_multisample_filter_hint
- NV_packed_depth_stencil
- NV_register_combiners2
- NV_texgen_emboss
- NV_texgen_reflection
- NV_texture_compression_vtc
- NV_texture_env_combine4
- NV_texture_rectangle
- NV_texture_shader
- NV_texture_shader2
- NV_vertex_array_range
- NV_vertex_array_range2
- NV_vertex_program

With these advanced NVIDIA Extensions and OpenGL 1.3, developers can create real-time cinematic effects that were previously only possible on very high-end workstation computers.

OpenGL Performance Optimizations

Detonator XP software delivers the highest performing OpenGL driver because it is more efficient at helping the **NVIDIA GPU (graphics processing unit)** and CPU handle memory in parallel. This allows each processor to cache data before it is transferred between system and graphics memory, increasing performance in high-resolution antialiasing modes.

In addition, optimizations for Vertex Programs were added to the OpenGL 1.3 ICD, which yields gains in performance across multiple applications and in heavily vertex-processing-bound applications. Examples of applications that utilize these features are SPECViewperf, Pro/E and the NVIDIA Chameleon demo.

Detonator XP Software also optimizes the setup time needed to prepare vertex arrays for processing by NVIDIA hardware. A variety of applications benefit from the GPU's ability to process vertices more efficiently. Other optimizations in Detonator XP software reduce bus transfers effectively decreasing the peak saturation of the bus, which gives the GPU a larger pipeline to transfer texture and geometry information to and from the GPU. The result of these performance optimizations is higher performance for high-resolution antialiased

modes. This in turn allows developers to utilize more OpenGL 1.3 features with NVIDIA Extensions to deliver real-time, cinematic-quality graphics for the personal computer.

Optimized DirectX Pipeline with NVIDIA Pixel/Vertex Shaders

Detonator XP software features a highly-tuned DirectX pipeline specially designed to fully accelerate Windows XP and all other Windows-based operating systems. New optimizations were added to the pipeline to deliver increased performance in high-resolution antialiased modes.In order to achieve better performance, Detonator XP software optimizes the movement of data read/writes and decreases the memory requirements when transferring texture data. Detonator XP software reduces bus transfers, effectively decreasing the peak saturation of the bus. This reduction provides the GPU more bandwidth to transfer texture and geometry information. As the reference platform for developers creating new content using DirectX 8 Pixel and Vertex Shaders on both the PC and Microsoft Xbox game console, GeForce3 GPU family's performance must be extremely fast in order to deliver fluid, real-time cinematic effects for the consumer. All of these new optimizations will enable Detonator XP software to deliver the fastest NVIDIA Pixel and Vertex Shader performance, enabling high performance, real-time cinematic effects with the GeForce3 family of GPUs, regardless of platform.

Detonator XPress Link

The NVIDIA Detonator XP unified driver contains a proprietary Detonator XPress Link technology written specifically for Windows XP. Utilizing the patented **Direct Memory Access (DMA)** found on all NVIDIA hardware, the Detonator XPress Link provides a direct connection from the hardware to the operating system. As a result, the Detonator XPress Link assists in accelerating the new optimizations made in the I/O subsystem and memory management portions of the Windows XP core, thus delivering the fastest 3D graphics performance on all Windows XP platforms.

Windows XP contains new low-level enhancements designed to improve overall system, graphics, and multimedia performance. While current Windows drivers will work with Windows XP on NVIDIA-based platforms, it is necessary to re-write drivers in order to take advantage of the new improvements as new routines have been added to the Windows XP core.

System Requirements

Operating Systems

This release of the NVIDIA Detonator XP driver is

- designed for the Microsoft operating systems listed in Table 1.1 *and*
- requires 2 MB of disk space.

Table 1.1 Operating System Requirements

OS	Minimum Requirements
Windows XP	Home and Professional Editions
Windows 2000	
Windows NT 4.0	Service Pack 4
Windows 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

NVIDIA Products (GPUs)

The Table 1.2 lists the NVIDIA GPUs supported by the NVIDIA Detonator XP driver.

Table 1.2 Supported NVIDIA GPUs

NVIDIA Desktop GPUs	NVIDIA Workstation GPUs
GeForce3 Ti 500 GeForce3 Ti 200 Geforce3	Quadro DCC
GeForce2 Ti GeForce2 Ultra GeForce2 Pro GeForce2 GTS	Quadro2 Pro
GeForce2 MX [1] GeForce2 MX 400 [2] GeForce2 MX 200 [3] GeForce2 MX 100 [4] GeForce2 Go [5]	Quadro2 MXR [6] Quadro2 EX
GeForce 256	Quadro

Table 1.2 Supported NVIDIA GPUs (continued)

NVIDIA Desktop GPUs	NVIDIA Workstation GPUs
RIVA TNT2 family RIVA TNT2 Ultra RIVA TNT2 Pro RIVA TNT2 RIVA TNT2 M64 NVIDIA Vanta NVIDIA Vanta LT	---
RIVA TNT	---

1. through 6: These products, in their dual-head versions, support the TwinView feature.

Notes & Conventions

NVIDIA Single-Display vs. Dual-Display cards

To access TwinView and TwinView-based features using the NVIDIA Detonator XP driver, you need

- a dual-display graphics card based on an NVIDIA GeForce2 MX family, GeForce2 Go, or Quadro2 MXR GPU (*see* "NVIDIA Products (GPUs)" on page 5) *and*
- two display devices connected to the card.

Other non-TwinView features are supported by either single-display or dual-display cards; i.e., you can connect only one display device, such as a CRT (analog monitor) and access these features, provided the card supports these features.

NVIDIA Control Panels: Windows XP/2000/NT 4.0

The Windows 2000 NVIDIA control panel screens shown in this document also apply to Windows NT 4.0 and Windows XP; exceptions are noted, where applicable.

NVIDIA Control Panel Examples (GeForce2 MX & GeForce3)

For example purposes, the NVIDIA screen images generally show the NVIDIA GeForce2 MX (for dual-display TwinView functionality) and the GeForce3 GPU-based cards; you may be using a different NVIDIA GPU-based card, such as a GeForce2 Go (on a laptop), a Quadro2 MXR, or similar product. You may also be using a single-display NVIDIA GPU-based card for non-TwinView features and functionality.

CHAPTER 2

NVIDIA DRIVER FEATURE HISTORY

This chapter provides historic feature information on NVIDIA drivers for Windows and contains these sections:

- "Summary of Recent Driver Enhancements" on page 7
- "Summary of Earlier Driver Enhancements" on page 8

Summary of Recent Driver Enhancements

Recent NVIDIA Drivers for Windows features include:

- 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 capabilities of the GeForce3 family of GPUs:
  - 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

Summary of Earlier Driver Enhancements

- "TwinView" on page 8
- "Digital Vibrance" on page 9
- "OpenGL" on page 9
- "Direct3D" on page 11
- "Cursor Trails Support" on page 11
- "Control Panels" on page 11

TwinView

The TwinView feature is supported under dual display devices using a single dual-display graphics card based on the GeForce2, GeForce2 Go, or the Quadro2 MX GPU. TwinView includes major functionality, such as the *Virtual Desktop*, *Video Mirror*, and *Desktop Manage*.

TwinView supports a variety of display options, such as digital flat panels, red-green-blue (RGB) monitors, TVs, and analog flat panels.TwinView features the following display modes: Standard, Extended Desktop (Span), and Clone.

Virtual Desktop

Virtual Desktop is a TwinView feature that is useful for 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

- Windows XP/2000/NT 4.0 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 these Windows operating systems:

- Windows XP/2000 in TwinView Clone mode; Video Mirror is not available under Windows NT 4.0.
- Windows 9*x* in TwinView Clone or Span mode
- Windows 95 in TwinView Clone mode

Desktop Manager

Desktop Manager allows the user to run an application on one or both monitors. This configuration may be useful for entertainment applications, such as DVD playback and digital video editing.

Desktop Manager functions under the TwinView Extended Desktop (Span) mode and, in addition to being supported by the GeForce2 GPU family or the Quadro2 MX GPU, it is also supported by any two NVIDIA GPU-based graphics cards running in multi-monitor mode.

Note: Desktop Manager is currently not supported under Windows XP.

Digital Vibrance

Digital Vibrance, a mechanism for controlling color separation and intensity, boosts the color saturation of images so that all images — including 2D, 3D, and video — appear brighter and crisper, even on flat panels.

Note: Digital Vibrance is supported by the GeForce3 family, GeForce2 MX family, GeForce2 Go, and the Quadro2 MXR GPUs.

OpenGL

The NVIDIA OpenGL Settings control panel contains the following updates:

- Improved full-scene antialiasing methods
- Additional options for Windows 2000 and Windows NT 4.0
  - Force 16-bit Depth Buffer
  - Enable Advanced Multiple Monitors

OpenGL 1.2 Core Enhancements

The OpenGL 1.2 Core enhancements include:

- BGRA pixel formats
- Packed pixel formats (plus R5_G6_B5 formats and reversed formats)
- Rescaling vertex normals
- Specular highlights after texturing
- **Level-of-detail (LOD)** control for mipmapped textures (supported in software on TNT2)
- Texture coordinate edge clamping
- 3-D textures (performed in software on all platforms)

- Vertex array subranges for optimizing vertex array processing (`glDrawRangeElements()` retains the performance of `glDrawElements()`)

OpenGL Extensions

Table 2.1 lists earlier OpenGL Extensions that were modified.

Table 2.1 OpenGL Extensions Modified

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

- For RIVA TNT and TNT2, polygon offset is faster.
- For GeForce 256 and Quadro, 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 multitextured TexCoord2f+Color4ub+Vertex3f
  - vertex array range extension is fully functional
- Control Panel enables accelerated full-scene antialiasing (GeForce, Quadro, 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 with the Control Panel)
- Default anisotropic filtering can be triggered by checking the anisotropic filtering box on the Control Panel

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

Direct3D

The NVIDIA Direct3D Settings control panel contains the following updates:

- Improved full-scene anti-aliasing methods not previously available
- Removal of certain obsolete options and Clone.
- Accelerated full-scene anti-aliasing is enabled (GeForce, Quadro, 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.)

Cursor Trails Support

Added support for cursor trails in Windows 9*x*.

Control Panels

Control panels are available for all Windows operating systems.

TwinView, Digital Vibrance Control, OpenGL, and Direct3D features have associated NVIDIA-specific windows (control panels) from which these

features can be configured. These control panels are normally accessed by following one of these procedures from the Windows active desktop:

- Click **Start > Settings > Control Panel > Display > Settings > Advanced**

  or

- Click the right mouse button and select **Properties > Settings > Advanced**.

CHAPTER 3

THE GEFORCE3 FAMILY OF GPUS

Features and Benefits

Note: For detailed technical information on the GeForce3 family of GPUS, see the NVIDIA web site: **www.nvidia.com**.

GeForce3 is often called the "infinite effects" GPU. By utilizing technology such as the **nfiniteFX engine**, **Lightspeed Memory Architecture**, and **high-resolution antialiasing (HRAA)**, GeForce3 produces spectacular graphics in real time.

nfiniteFX engine is the NVIDIA programmable Vertex and Pixel Shaders, collectively. The nfiniteFX engine allows developers the freedom to program a virtually infinite number of custom special effects in order to create life-like characters and environments.

Vertex Shaders are used to breathe life and personality into characters and environments. For example, through vertex shading, software developers can create true-to-life dimples or wrinkles that appear when a character smiles.

Pixel Shaders alter lighting and surface effects that replace artificial and computerized appearances of images with materials and surfaces that mimic reality.

Lightspeed Memory Architecture is the NVIDIA memory bandwidth optimizations designed to make complex scenes render much faster. These optimizations make **full-scene antialiasing (FSAA)** practical and enable users to enjoy high-resolution antialiasing.

High-Resolution Antialiasing (HRAA) delivers fluid frame rates of 60 frames per second or more at high resolutions (e.g., 1024x768x32 or higher) with full-scene antialiasing (FSAA) turned on.

Featuring the **Quincunx Antialiasing (AA) mode** *(see* "Additional Quincunx Antialiasing Setting: GeForce3 only" on page 139*)*, HRAA delivers a high level of detail and performance for all applications.

DDR Memory Interface: 7.36GB per second memory subsystem ensures peak performance and the smoothest frame rates.

High-Definition Video Processor (HDVP) can turn your PC into a fully functional DVD player, and an HDTV player with the purchase of an additional third-party decoder.

AGP 4X/2X and AGP Texturing Support take advantage of new methods of transferring information more efficiently and allow content developers to use high-quality, 32-bit color textures and high-polygon-count scenes.

Microsoft DirectX 8.0 and OpenGL Optimizations ("OpenGL Settings" on page 130) **and Support** deliver the best performance and guarantees compatibility with all current and future applications and games. The GeForce3 family of GPUs supports DirectX 8.0 features and special effects for the ultimate 3D experience.

Unified Driver Architecture (UDA) ensures forward and backward compatibility with software drivers. This simplifies upgrading to a new NVIDIA product because all NVIDIA products work with the same driver software.

TV-Out ("TV Settings" on page 91) and **Video Modules** gives end users the option of big-screen gaming, digital timeshifting VCR, and video-editing applications.

Accessing the GeForce3 Control Panel

The examples in this chapter make use of a GeForce3 GPU-based card with three connectors:

- **CRT (analog monitor)**
- **DFP (digital flat panel)** *and*
- **TV**

This means that the user of such a graphics card can choose to connect three different devices and switch among them or simply connect one of the devices and use that device. Your GeForce3 GPU-based card may have anywhere between one and three connectors. So, you'll need to follow the example based on the number and type of connectors your card contains.

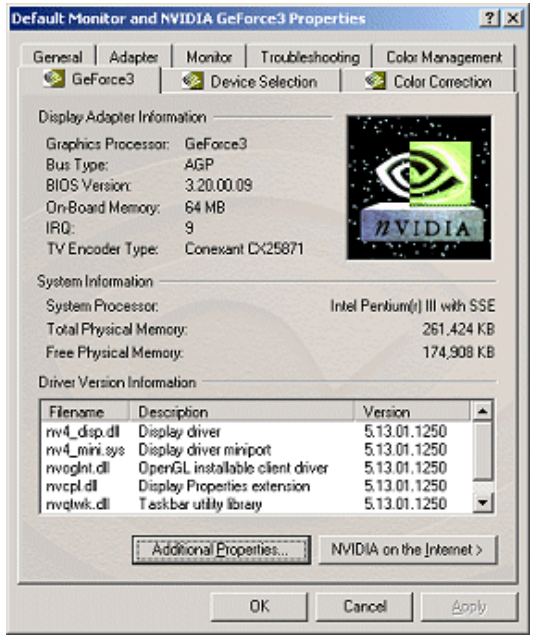
To access the GeForce3 control panel and its related panels of features, follow these steps:

1 Right-click on your Windows desktop to open the Windows context menu.

2 Click **Properties** and then the **Settings** tab to display the Windows Settings panel.

3 Click the **Advanced** button and then the **GeForce3** tab to display the GeForce3 control panel (Figure 3.1).

Figure 3.1 GeForce3 Control Panel



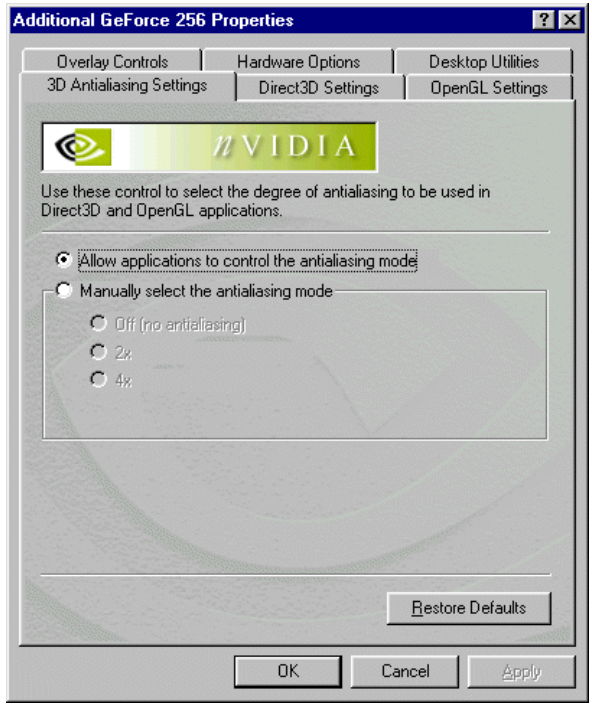
4 Click the **Additional Properties** button to display the 3D Antialiasing control panel (Figure 3.2).

- For details on the 3D Antialiasing control panel, *see* "3D Antialiasing Settings" on page 138.
- For details on the Direct3D Settings, click the **Direct3D Settings** tab and *see* "Direct3D Settings" on page 135.
- For details on OpenGL Settings, click the **OpenGL Settings** tab and *see* "OpenGL Settings" on page 130.
- For details on the Overlay Controls panel, click the **Overlay Controls** tab and see "Overlay Controls Panel" on page 140.
- For details on the Desktop Utilities panel, click the **Desktop Utilities** tab and see "Desktop Utilities" on page 125.

5 Click **OK** to return to the GeForce3 control panel.

- To access the Device Selection Panel, click the **Device Selection** tab and see “Device Selection & Configuration” on page 79.
- To access the Color Correction panel, click **Color Correction** and see “Color Correction Panel” on page 128.

Figure 3.2 3D Antialiasing Control Panel



CHAPTER 4

TWINVIEW APPLICATIONS

The NVIDIA TwinView architecture supports multiple displays on a single dual-display graphics card based on the GeForce2 MX, GeForce2 Go (for laptops) or the Quadro2 MXR family of GPUs.

This chapter contains the following sections:

- "TwinView Display Device Options" on page 17
- "TwinView Modes for Using Your Display Setup" on page 18
- "TwinView Applications" on page 19

TwinView Display Device Options

TwinView offers tremendous flexibility in how dual monitors are used. The following 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 dual-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 Detonator XP driver. After rebooting the PC, the multiple display modes of the graphics cards installed are fully functional.

For detailed information on using and configuring the TwinView options, see the following chapters:

- "TwinView Basics: Windows 9x" on page 21
- "TwinView Basics: Windows XP/2000/NT 4.0" on page 45

TwinView Modes for Using Your Display Setup

The NVIDIA Unified Driver Architecture offers several modes for using your display setup.

- **Windows Multimonitor Support:** In this mode, the desktop area is spread across both displays. The refresh rate, color depth, and resolution may be independently set for each display. You can set this mode for multiple categories of displays, although display limitations may override the capabilities of the TwinView-enabled graphics card. For example, if the second display is a NTSC TV monitor, you won't be able to set the resolution above 800 x 600, nor set the refresh rate above 60Hz due to the limitations of the monitor itself. 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 the user's needs. *See* "Extended Desktop: Windows 98/Me" on page 39 for Windows 9*x* or "Horizontal & Vertical Span Modes" on page 69 for Windows XP/2000/NT 4.0.
- **Application exclusive:** The user may choose to dedicate an application to one of the two monitors or run the application across both. Examples of this include entertainment applications, digital video editing, and DVD playback.
- **Clone mode:** Two monitors may show exactly the same output, useful for presentations. The presenter may have a small monitor on the podium while a projector or presentation quality display shows the larger image to the audience. (*See* "Clone Mode" on page 31 for Windows 9*x* or "Clone Mode" on page 59 for Windows XP/2000/NT 4.0.)
- **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.

  See "Desktop Manager" on page 105.

- **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 37 for Windows 9*x* or "Change Resolution: Clone Mode (Virtual Desktop)" on page 68 for Windows XP/2000/NT 4.0.

TwinView Applications

- **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:** TwinView **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 TwinView 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 TwinView 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 show real-time stock data on one screen and use the other for trading activity. You can also use two TwinView-enabled boards (one AGP, one PCI) to hook up four displays.
- **Video editing** applications would use one large PC display and one NTSC monitor. Since TwinView 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 monitor 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 TwinView **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 monitor and you can watch DVDs -- without buying a dedicated DVD player. *See* Video Mirror.
- **Television and Movies:** Using the TwinView Video Mirror feature, you can watch TV and any other video while you work.

CHAPTER 5

TwinView Basics: Windows 9x

To use the TwinView features you need a dual-display graphics card based on one of the following NVIDIA GPUs:

- GeForce2 MX family
- GeForce2 Go (for laptops)
- Quadro2 MXR

TwinView offers the following display modes:

- "Standard Mode" on page 25
- "Clone Mode" on page 31

Note: Your NVIDIA GPU-based dual-display graphics card supports the Windows Extended Desktop feature. To use this feature, see "Extended Desktop: Windows 98/Me" on page 39.

This chapter assumes you have an analog monitor (**CRT**) and either a digital flat panel (**DFP**) and/or a **TV** attached to your NVIDIA dual-display graphics card. Follow the appropriate examples based on the display device(s) attached to your computer.

Accessing the TwinView Panel

If you have only one display device connected, the TwinView panel will only have Standard (single-display) mode enabled and Clone mode disabled. In single-display mode, you will not have TwinView Clone mode (Virtual Desktop) and Video Mirror functionality and will have *limited* Desktop Manager functionality. However, you can access the features available through the **Additional Properties** button (*see* "Additional Features and

Enhancements" on page 125*)* button on the NVIDIA GPU panel provided these features are not dependent on TwinView.

To access the TwinView panel when you have *one* display device attached, you can follow the basic steps below, noting any exceptions, where documented.

To access the TwinView control panel and both the Standard and Clone mode features, follow these steps:

1. **For dual-display functionality, be sure you have at least two display devices**, such as an analog monitor and a digital flat panel (DFP) or TV, connected to your NVIDIA dual-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. Right-click on your Windows desktop and then click **Properties** > **Settings** tab to display the Settings panel (Figure 5.1). If you have only one display device connected, go directly to step 7.
4. Be sure that the option "Extend my Windows desktop onto this monitor." is *not checked*.If the option is checked, follow these steps:
   a. Right-click monitor icon **2** to display the context menu.
   b. Click the checked **Enable** option to uncheck it (Figure 5.2).
5. Click **Apply** and then **OK** to leave the Settings panel.
6. Right-click on your Windows desktop, click **Properties** > **Settings** tab to display the Settings panel again.
7. Click the **Advanced** button to display NVIDIA Properties panels (Figure 5.3).
8. Click the **GeForce2 MX/MX 400** tab to display the GeForce2 MX.MX 400 control panel (Figure 5.4). This NVIDIA product panel provides basic information about your display adapter, system, and the NVIDIA driver files and versions you installed.
9. Click the **TwinView** tab to display the TwinView control panel (Figure 5.5).

Figure 5.1 Display Properties Settings: Windows 98

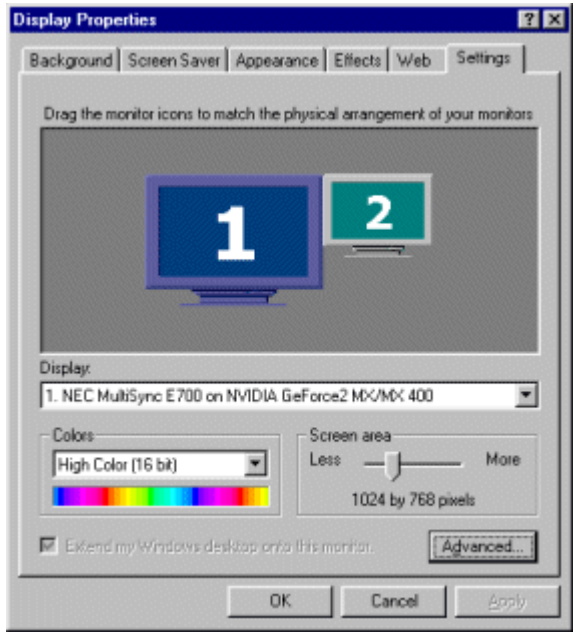


Figure 5.2 Disabling Extended Desktop: Windows 98

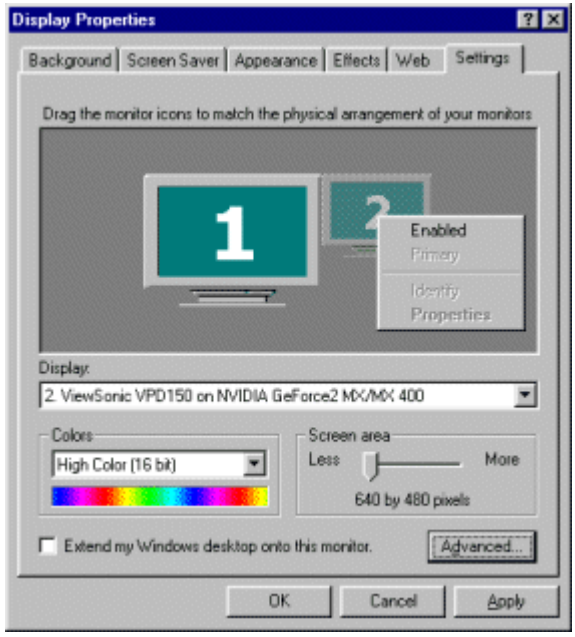


Figure 5.3 GeForce2 MX/MX 400 Properties Panels: Windows 98

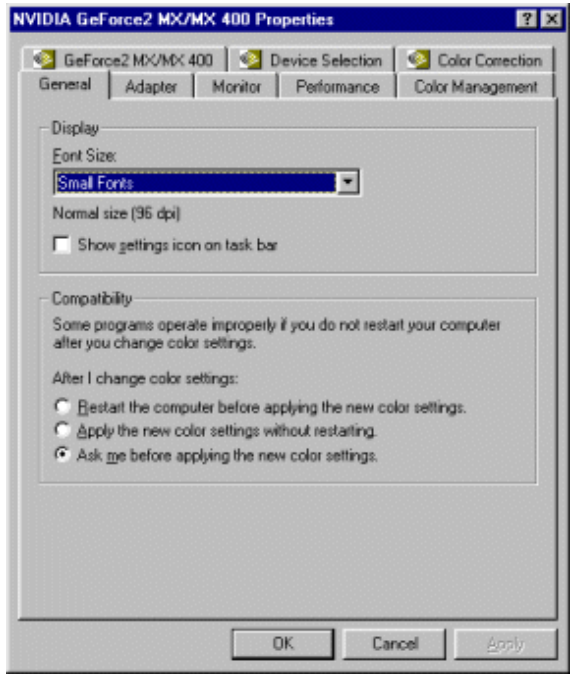
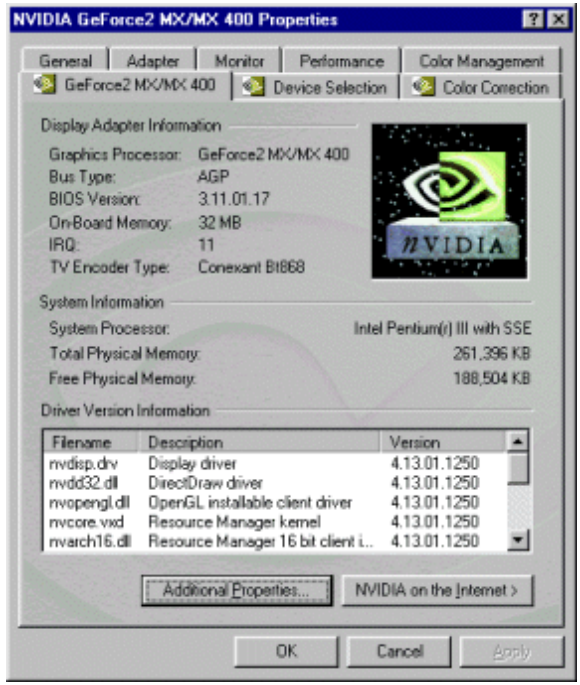


Figure 5.4 GeForce2 MX Control Panel: Windows 98



Accessing the Configuration Options

On the TwinView panel, the monitor icon numbered **1** represents the primary display device. In **Standard** mode, there is only one monitor icon. In **Clone** mode, the monitor icon numbered **1** represents the primary display device and the monitor icon numbered **2** represents the secondary display device. To access the configuration panels for Twin View modes, use any *one* of these procedures:

- Click the monitor icon (**1** or **2**) to display a context menu of options and click the option you want; *or*
- Click the down arrow in the **Display** field to select the display device (i.e., **TwinView Display 1** or **TwinView Display 2** if you have multiple display devices) you want to configure. Then left-click the **Device Settings** button to display a context menu of options and select the option you want.

Standard Mode

The Standard mode option in the TwinView control panel disables the Twin-View feature allowing viewing in only one display.

To access TwinView Standard mode,

1. Click the **Standard** option on the TwinView control panel
2. Click **Apply**.

Figure 5.5 shows analog monitor (CRT) as the primary display device (Display 1). If you have a DFP and/or a TV connected to your NVIDIA GPU-based graphics card, you can choose to display on the DFP or TV instead of the CRT. The next section explains how to switch between these devices.

Figure 5.6 shows a TwinView panel when only one display device, such as an analog monitor (CRT), is attached. Note that the Clone mode option is disabled in this case.

Note: Force detection of a monitor on the secondary connector is a check box on the TwinView control panel and is normally disabled (grayed out) as shown in Figure 5.5. Check this box if you have a monitor connected to the secondary display connector that is not being detected. This is useful for older monitors or monitors connected with BNC connectors.

Figure 5.5 TwinView Std (dual-display) with Context Menu: Windows 98

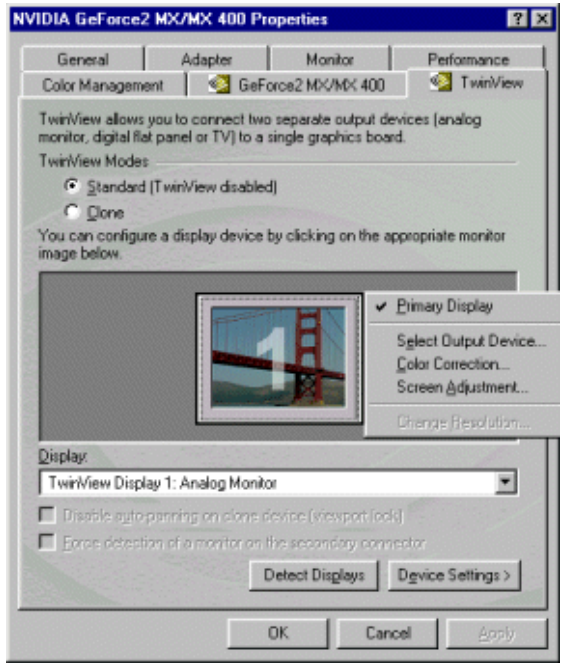
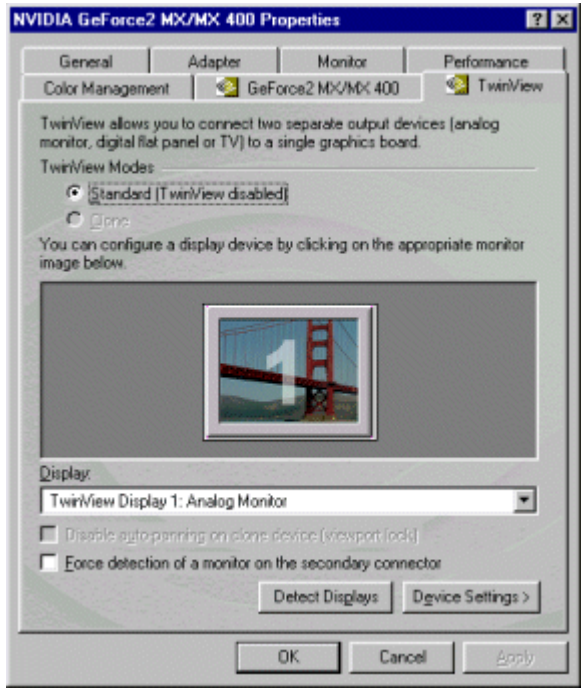


Figure 5.6 TwinView Std. Mode (single-display) Context Menu: Windows 98



Switching Display Device: Standard Mode

Primary Display

Figure 5.5 on the previous page shows TwinView Standard Mode with analog monitor as the primary display; **Primary Display** is checked in the context menu.

Select Output Device

Note: This section does not apply if you have only one display device attached.

Follow these steps to switch output devices in Standard mode:

1 Right-click the monitor icon to display the context menu (Figure 5.5) and click **Select Output Device** to display the Device Selection panel. The Device Selection panel correctly shows analog monitor as the selected output device for this example.

Figure 5.7 TwinView Device Selection (Analog Monitor): Windows 98

2 Click the **Digital Flat Panel** option (Figure 5.8) or the **TV** option (Figure 5.9) and click **Apply**.

An NVIDIA display settings message appears, as shown in Figure 5.10 Figure 5.11.

Figure 5.8 TwinView Device Selection (Digital Flat Panel): Windows 98

Figure 5.9 TwinView Device Selection (TV): Windows 98

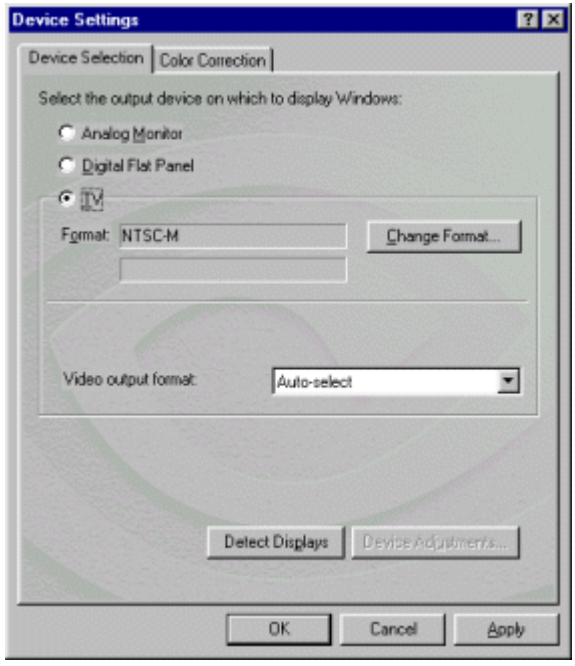
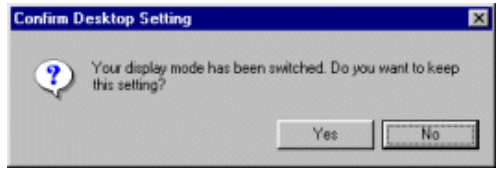


Figure 5.10 Switching Output Device Message: Windows 98

3 Click **OK** *before* the message times out.Your analog monitor screen will be blank for a few seconds followed by a Confirm Desktop Settings message in Figure 5.11, which shifts to your secondary display device (DFP or TV).

Figure 5.11 Switching Output Device Message: Windows 98



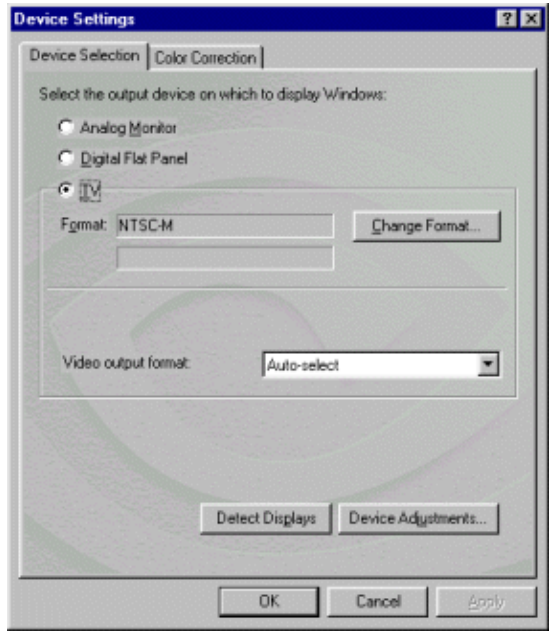
4 Click **Yes** to remove the message *before* it times out. The Device Selection panel and your entire Windows desktop appears on the secondary display device (TV or DFP).

For DFP, the Digital Flat Panel option is enabled in the Device Selection panel (Figure 5.12).

Figure 5.12 DFP Option Enabled on Digital Flat Panel Display: Windows 98

For TV, the TV option is enabled in the Device Selection panel (Figure 5.13).

Figure 5.13 TV Option Enabled on TV Display: Windows 98



5 Click **OK** on the Device Selection panel to view the main TwinView panel showing your DFP (Figure 5.14) or TV (Figure 5.15) as the Primary display.

Figure 5.14 TwinView Std. Mode (Display 1 = DFP): Windows 98

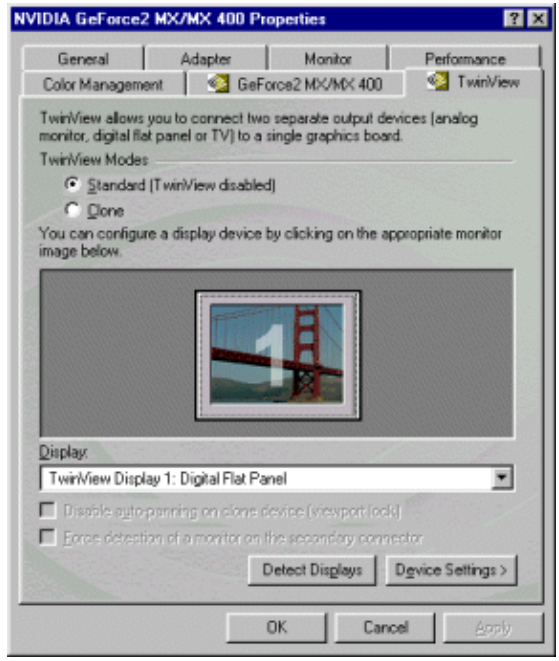
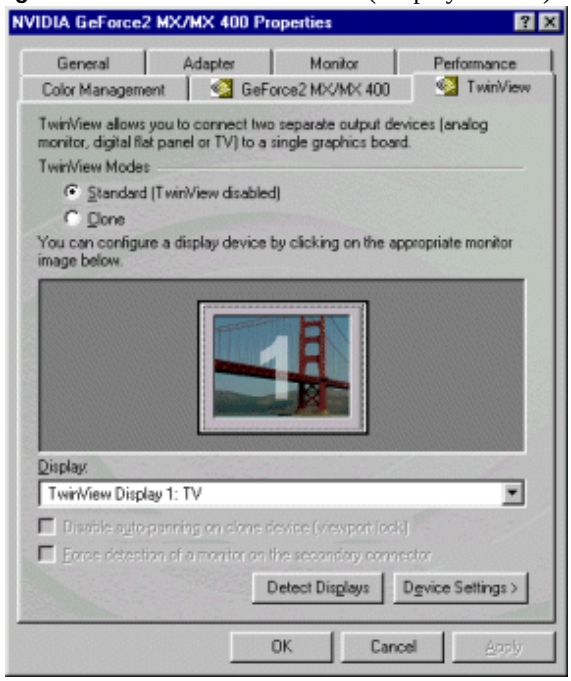


Figure 5.15 TwinView Std. Mode (Display 1 = TV): Windows 98



6 To switch back to the CRT or DFP, you can follow the procedures in this section, substituting either the **Analog Monitor** or the **Digital Flat Panel** option on the Device Selection panel, as applicable.

Clone Mode

Note: This section does not apply 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.

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

The example in this section starts with the analog monitor (CRT) as the primary display.

1 **To access TwinView Clone mode,** click the **Clone** mode option on the TwinView control panel and click **Apply**.

Your DFP display becomes enabled and you can see your current screen duplicated on the clone (DFP) display.

Figure 5.16 shows the TwinView Clone mode panel with the context menu on the primary display (analog monitor). Figure 5.17 shows the TwinView Clone mode panel with the context menu on the secondary display (DFP). The **Disable auto-panning on the Clone device (viewport lock)** is added to the control panel.(For details on using this option, see "Change Resolution: Clone Mode (Virtual Desktop)" on page 37. To use the configuration options in the context menu, proceed to the sections that follow

Figure 5.16 TwinView Clone Mode Menu (Display 1 = CRT): Windows 98

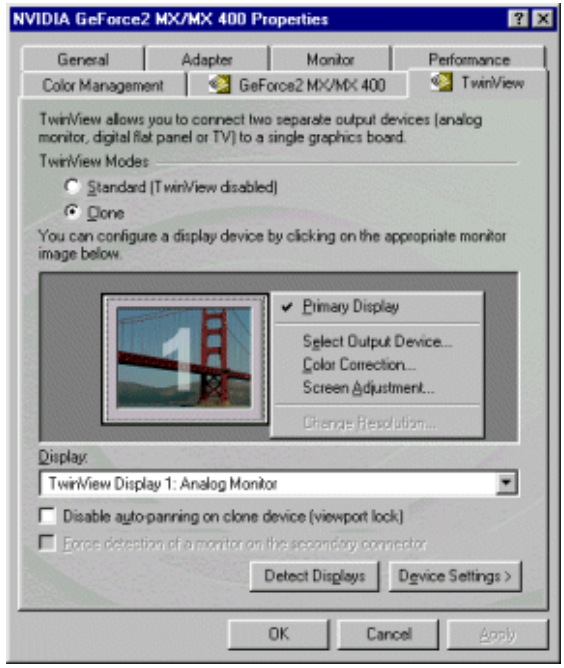
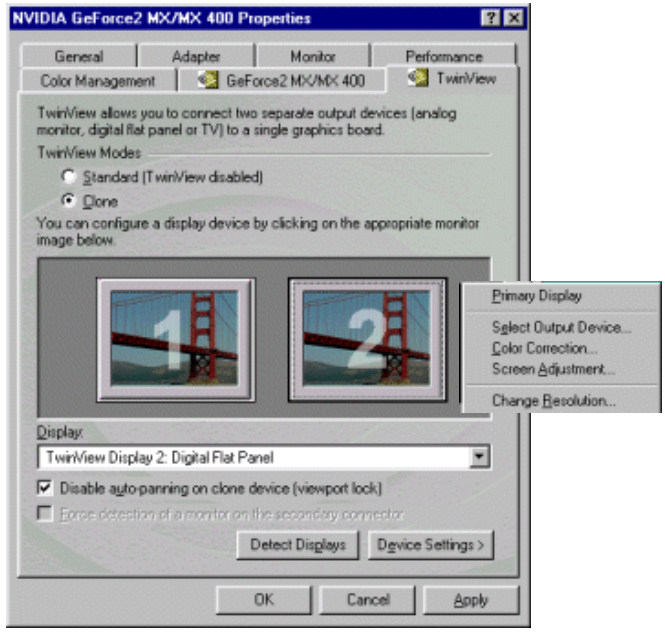


Figure 5.17 TwinView Clone Mode Menu (Display 2 = DFP): Windows 98



2 To use the configuration options in the context menu, proceed to the sections that follow.

Switching Secondary Displays: Clone Mode

Note: This example assumes the primary display is the analog monitor (CRT), the DFP is the secondary display, and you are switching from DFP to TV. You can use a similar procedure to switch from TV to DFP as the secondary display.

1 Right-click monitor icon **1** to view the context menu (Figure 5.16). Notice that the **Primary Display** option is checked on the context menu and the **Display** field indicates that the analog monitor is the primary display.

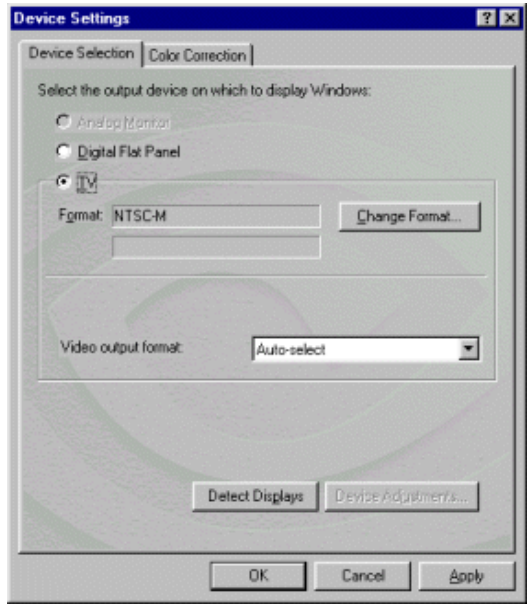
2 Right-click monitor icon **2** to view the context menu (Figure 5.17). Notice that **Primary Display** is *not checked* on the context menu and the **Display** field indicates that the digital flat panel is the secondary display.

3 If you have a TV connected and want to switch to TV as the secondary display, right-click monitor icon **2** to access the context menu and choose **Select Output Device** to display the Device Selection panel.

4 Select the **TV** option as shown in Figure 5.18 and click **Apply**. A message appears indicating that Windows will switch your desktop to the selected settings.

5 Click **OK** to remove the message. Your analog monitor becomes blank for a few seconds followed by a message titled Confirm Desktop Settings, which

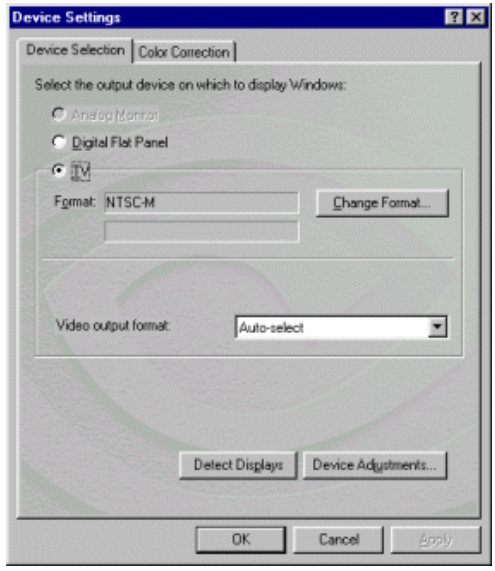
Figure 5.18 TwinView Clone Device Selection TV Option: Windows 98



now switches to your secondary display device, the TV.

6 Click **Yes** to remove the message box. The Device Selection panel appears on your TV display as shown in Figure 5.19.

Figure 5.19 TwinView Clone Device Selection Panel on TV: Windows 98



7 Click **OK** to view the main TwinView panel showing your TV as the secondary display (Figure 5.20).

Figure 5.20 TwinView Clone Mode (Display 2 = TV): Windows 98

Switching Secondary to Primary Display: Clone Mode

Note: The example in this section changes DFP or TV from a secondary to a primary display.

1 Right-click monitor icon **2** (secondary display) to view the context menu.

2 Click **Primary** to check the option. The context menu is removed.

3 Click **Apply**. The NVIDIA Control Panel Exit Requirement message appears.

4 Click **OK** to remove the message. The screen becomes blank for a few seconds and the Settings panel appears.

5 Click the **Advanced** button and then the **TwinView** tab.

6 To verify that the DFP or TV is now the primary display, right-click monitor icon **1** to view the context menu.

Primary Display is checked on the context menu and the Display field shows **TwinView Display 1: Digital Flat Panel** (Figure 5.21) or **TwinView Display 1: TV** (Figure 5.22).

Figure 5.21 TwinView Clone Mode (Display 1 = DFP): Windows 98

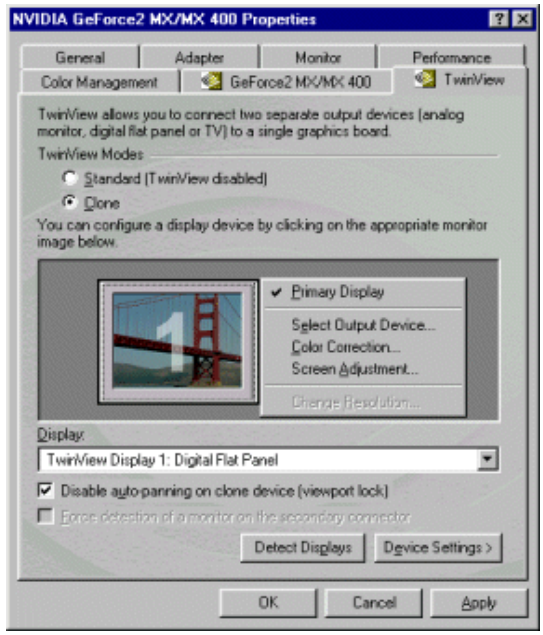
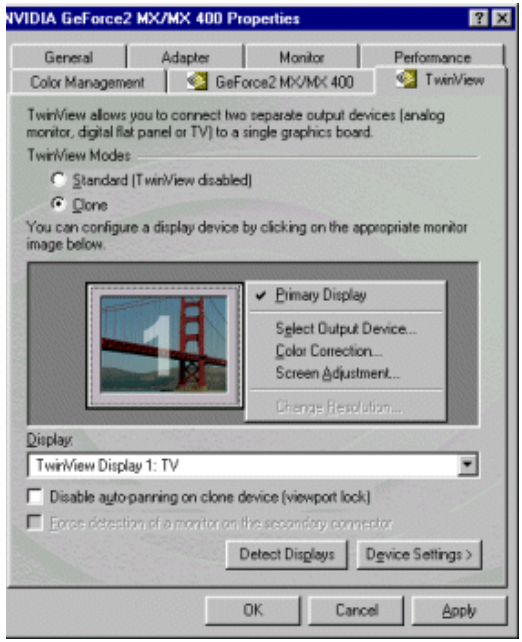


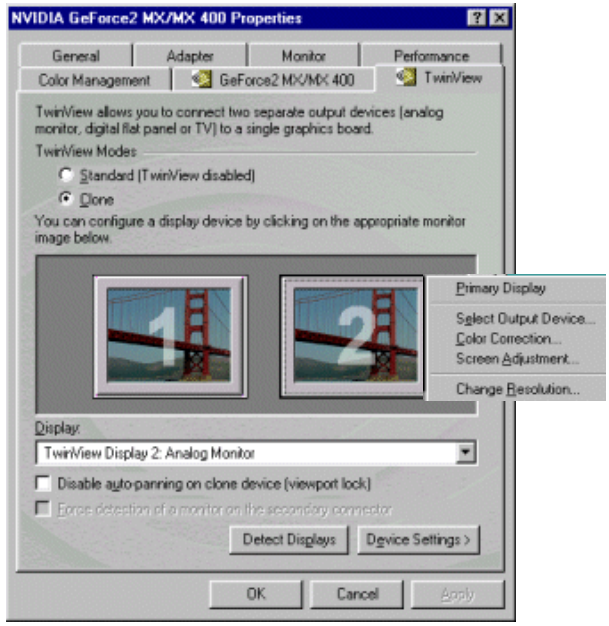
Figure 5.22 TwinView Clone Mode (Display 1 = TV): Windows 98



7 To verify that the analog monitor is now the secondary display, right-click monitor icon **2** to view the context menu. The *Primary option is not checked*

on the context menu and the **Display** field shows TwinView Display 2: Analog Monitor (Figure 5.23).

Figure 5.23 TwinView Clone Mode (Display 2 = CRT): Windows 98



Change Resolution: Clone Mode (Virtual Desktop)

You can use the Change Resolution option to modify Resolution and Refresh Frequency for the secondary display, which allows you to enable **Virtual Desktop**, a useful feature for 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.

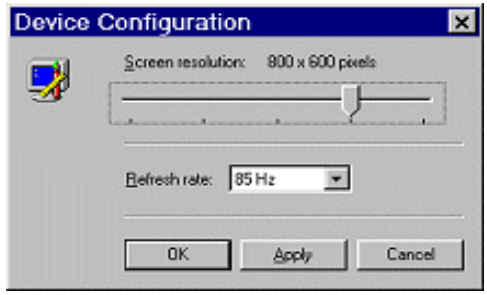
Note: If the maximum resolution of the secondary display is less than the current resolution of the primary display, once you enable Clone mode from the TwinView panel, Virtual Desktop will already be enabled. However, you still may want to adjust the resolutions of the primary and/or secondary device by using the Device Configuration dialog box (Figure 5.24) for the secondary display or the Windows Settings control panel of your primary display.

Follow these steps to enable Virtual Desktop:

1 From the TwinView panel, right-click monitor icon **2** (secondary display) to display the context menu and select **Change Resolution** to display the Device Configuration dialog box (Figure 5.24).

Note: If you do not see the Change Resolution option on the display 2 context menu, adjust (increase) the resolution of the primary display until the Change Resolution option becomes available from the display 2 context menu.

Figure 5.24 TwinView Clone Mode Device Configuration: Windows 98



2. Use the slider (Figure 5.24) to set the screen resolution to a value that *is not equal* to the screen resolution on the Windows Settings control panel of your primary display.

   Note: If you set the same screen resolution value for both primary and secondary displays, you cannot use your secondary device for the Virtual Desktop, i.e., to pan/scan the desktop; both displays will remain static.

3. *Optional:* If you want, 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.

5. If you want to lock the display position of the secondary display, check the **Disable auto-panning on the clone device (viewport lock)** check box on the TwinView panel (Figure 5.23).

Extended Desktop: Windows 98/Me

The Windows Extended Desktop feature is supported by any dual-display NVIDIA graphics card in the GeForce2 MX or Quadro2 MXR family of products or any two NVIDIA graphics cards.

Note:

- Extended Desktop mode is not supported under Windows 95.
- Under Windows Extended Desktop 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 Extended Desktop mode, OpenGL-based applications will only run using Microsoft's software rendering implementation of OpenGL. This is due to a design limitation within Windows.

Follow these steps to enable Windows Extended Desktop mode:

1. Make sure you have two display devices attached to your dual-display card.
2. Right-click on your Windows desktop and click **Properties** > **Settings** tab. You will see the Settings panel with two monitor icons, as shown in Figure 5.25.

   Note: If you are using an NVIDIA dual-display card **but have only one display device connected** (such as a CRT), you will see two monitor icons 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.
3. Right click monitor icon **2** (Figure 5.26) and click **Enable** to check the option (Figure 5.27).

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

   Notice that the "**Extend my Windows desktop onto this monitor**" check box becomes checked (Figure 5.27).
4. Click **Apply**.

   For details on configuring Extended Desktop, see "Configuring Extended Desktop" on page 42.
5. Click the **Advanced** button.

   Notice that the TwinView tab is not available when Extended Desktop is enabled (Figure 5.28).

Figure 5.25 Display Settings: Windows 98

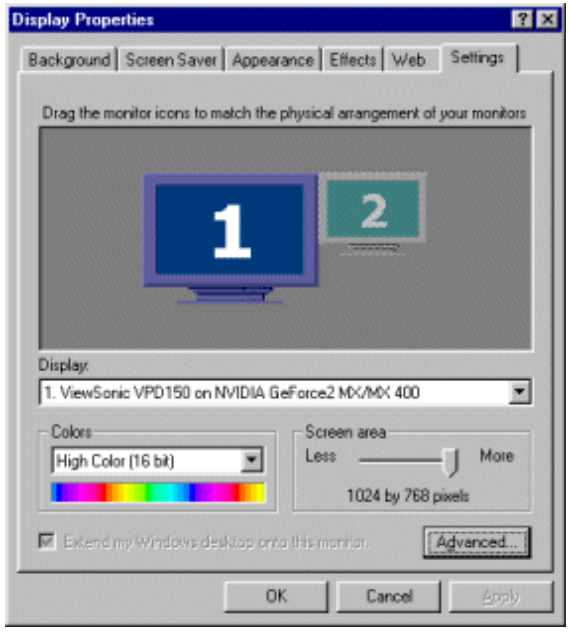


Figure 5.26 Enabling Extended Desktop (1): Windows 98

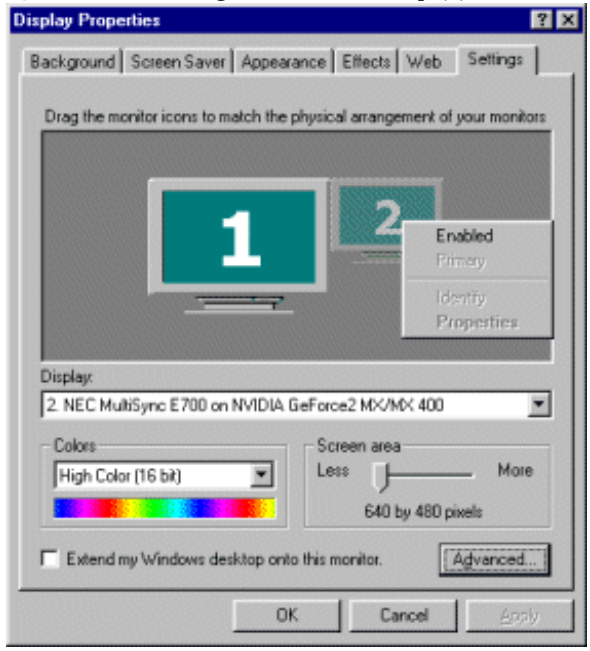


Figure 5.27 Enabling Extended Desktop (2): Windows 98

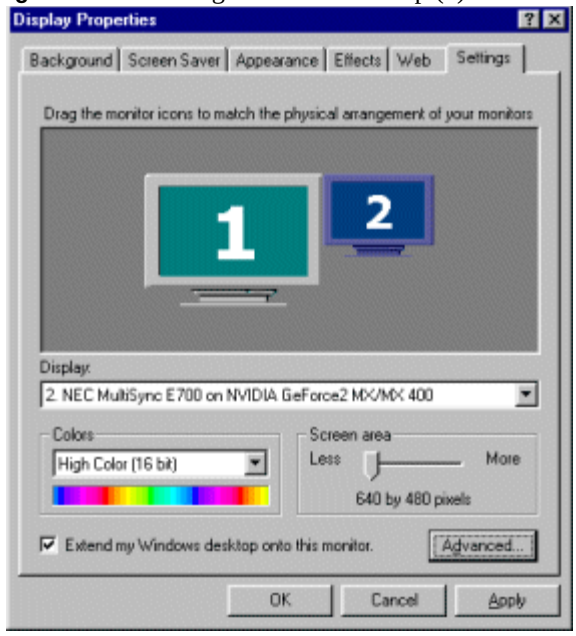
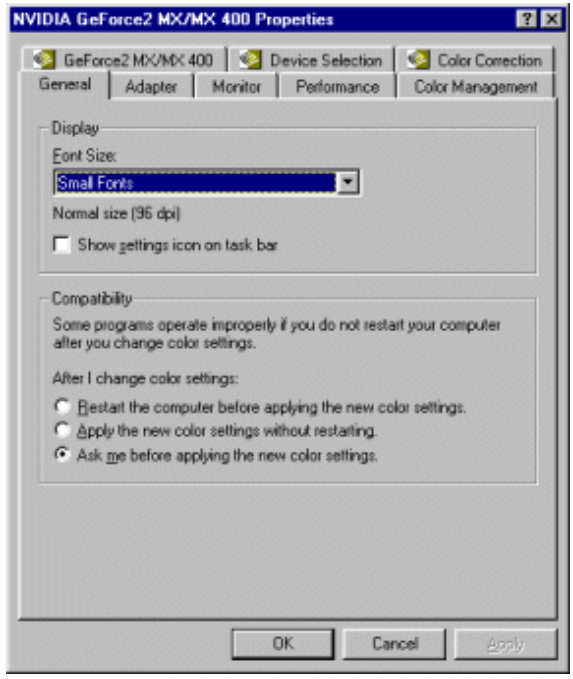


Figure 5.28 TwinView Tab Disabled: Windows 98



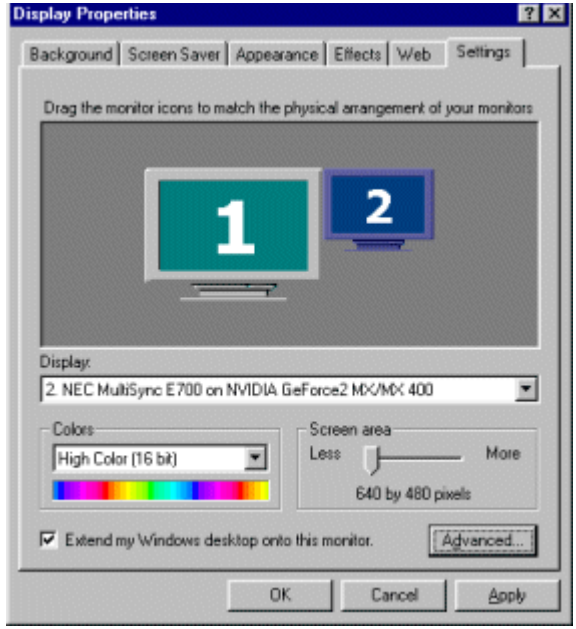
Configuring Extended Desktop

In Windows Extended Desktop mode, the desktop area is spread across two displays. This mode can be set for multiple categories of displays, although display limitations may override the capabilities of your NVIDIA dual-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 can be extended horizontally, vertically, as well as at other angles by repositioning the desktop display icons in the Windows Settings control panel.

You can drag the icons to the positions that represent how you want to move items between monitors.

- 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 icons side-by-side (Figure 5.29).

Figure 5.29 Display Settings (Horizontal): Windows 98



- **To move items between monitors by dragging up and down**, position the icons one above the other (Figure 5.30).
- **To move items between monitors by dragging at an angle**, position the icons diagonally (Figure 5.31). The icon positions don't have to correspond

to the physical positions of your monitors. That is, you can position the icons one above the other even though your monitors are side-by-side.

Figure 5.30 Display Settings (Vertical): Windows 98

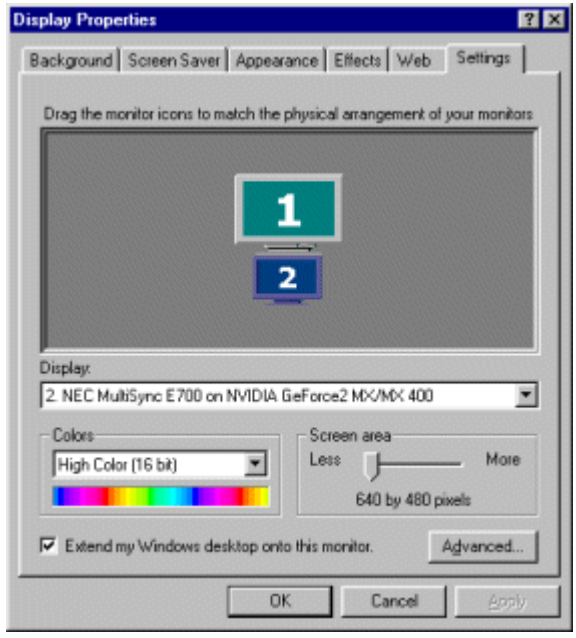
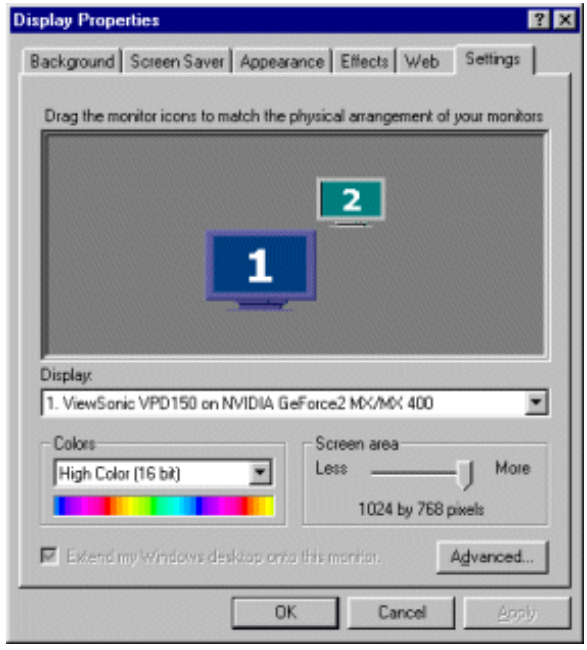


Figure 5.31 Display Settings (Diagonal): Windows 98



Other Configuration Options

For details on configuring display devices and additional features and enhancements of the Detonator XP driver, *see* the following chapters:

- "Device Selection & Configuration" on page 79.
- "Additional Features and Enhancements" on page 125.

CHAPTER 6

TWINVIEW BASICS: WINDOWS XP/2000/NT 4.0

To use the TwinView features you need a dual-display graphics card based on one of the following NVIDIA GPUs:

- GeForce2 MX family
- GeForce2 Go (for laptops)
- Quadro2 MXR

TwinView offers the following display modes under Windows XP/2000/NT 4.0:

- "Standard Mode" on page 56
- "Clone Mode" on page 59
- "Horizontal & Vertical Span Modes" on page 69

Notes Before You Begin

- This chapter assumes you have a CRT (analog monitor) and either a digital flat panel (DFP) and/or a TV attached to your dual-display graphics card that's installed in your computer. Follow the appropriate examples, depending on the display device(s) attached to your computer. (*See* "TV Settings" on page 91 for information on configuring your TV display.)
- Windows 2000 control panel screens also apply to **Windows NT 4.0 and XP**; exceptions are noted where applicable.

Accessing the TwinView Panel: Windows XP

If you have only one display device connected, the TwinView panel will only have Standard (single-display) mode enabled and Clone mode disabled. In single-display mode, you will not have TwinView Clone mode (Virtual Desktop) and Video Mirror functionality and will have *limited* Desktop Manager functionality. However, you can access the features available through the **Additional Properties** button (*see* "Additional Features and Enhancements" on page 125*)* on the NVIDIA GPU pane (Figure 6.3), provided these features are not TwinView-dependent.

TwinView Enabled by Default (Windows XP SingleView)

1. Start up your Windows XP system installed with a TwinView capable dual-display card connected to at least two display devices.
2. Right click on the desktop, click **Properties** and the **Settings** tab.The Settings page appears with the dual monitor icons (Figure 6.1).

   When you first enter Windows XP after installing and configuring your system for TwinView, the Windows XP **SingleView** setting (second monitor icon is greyed) is in effect, which allows you to access the TwinView panel.

   Note: Windows XP DualView is disabled in this setting since it is not compatible with TwinView Clone and Span mode. If you need to enable DualView, see "Enabling DualView" on page 49.
3. Click the **Advanced** button to display the panel in Figure 6.2
4. Click the **GeForce2 MX/MX 400** tab to display the GeForce2 MX panel, which provides basic information on your display adapter, system, and the NVIDIA driver files you installed (Figure 6.3).
5. Click the **TwinView** tab to display the TwinView control panel (Figure 6.4).

Windows XP DualView

Many modern display adapters are able to drive two or more different display devices simultaneously. DualView in Windows XP provides system-level support for features similar to those of Multimonitor but requires only a single display adapter.

Note: The **graphics device interfaces (GDIs)** and what you view as the end-user are identical for both DualView and Multimonitor.

Figure 6.1 Display Properties Settings: Windows XP

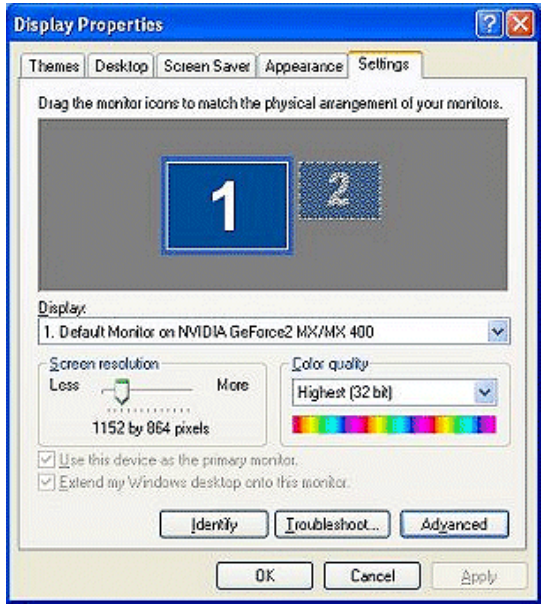


Figure 6.2 Advanced Options: Windows XP

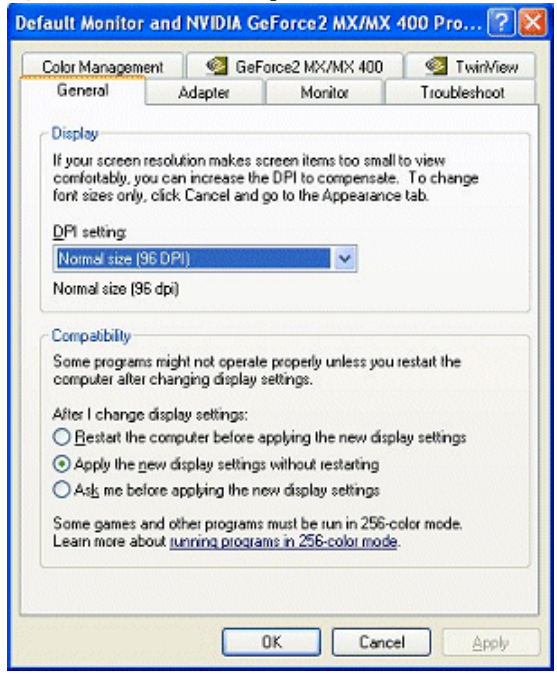


Figure 6.3 GeForce2 MX Control Panel: Windows XP

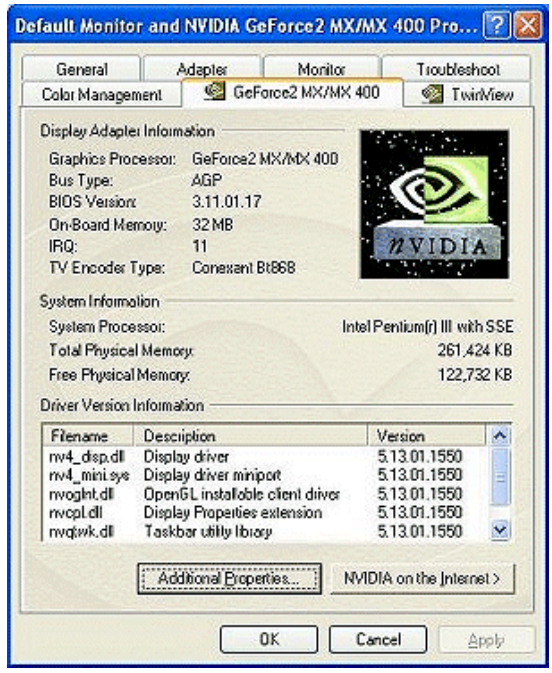
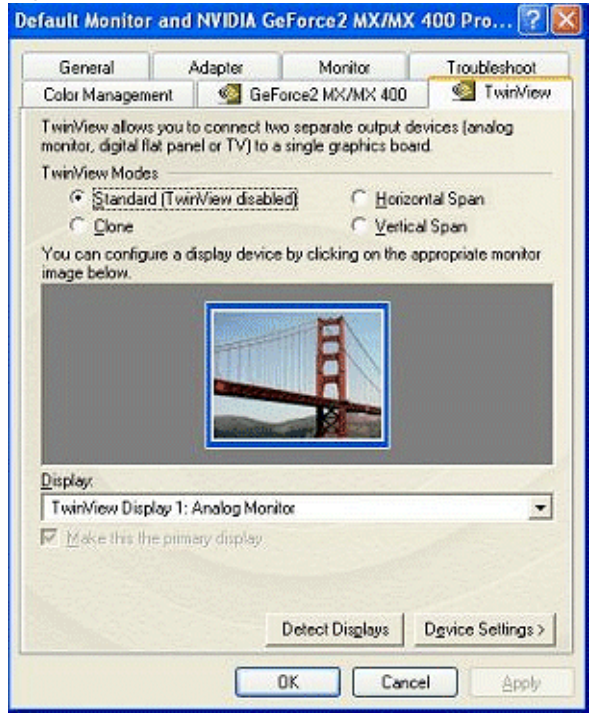


Figure 6.4 TwinView Panel: Windows XP



SingleView Mode

In SingleView mode, a display adapter drives a single display device, regardless of the number of monitors. This is the usual mode for most of the display adapters that Windows 2000 and later operating system versions currently support.

DualView Mode

A computer in DualView mode can use a single display adapter (with multiple video ports) to drive multiple images on different monitors, with each display device portraying a different part of the desktop. The primary image displays the *primary view*; other images display *secondary views*.

On a laptop computer, the primary display is always the LCD display screen. On a desktop computer, the primary display does not have this restriction. Once you attach the second monitor and turn on your computer, use the Windows **Display Properties** settings to configure your settings.

Enabling DualView

Follow these steps to enable Windows XP DualView:

Note: Currently, enabling dualview automatically disables the TwinView feature.

1. Go to the Display **Settings** panel. (If you're currently on the TwinView panel, click **OK** to return to the **Settings** panel.)
2. Right click on the secondary monitor icon (numbered 2) Figure 6.5 and click the **Attached** option in the context menu that appears.

   Notice that the **Extend my Windows desktop. .** checkbox becomes checked.Figure 6.6.
3. Set the Color Quality to **Highest (32 bit)**.
4. Click **Apply**.

Figure 6.5 Display Settings: Enabling DualView in Windows XP (1)

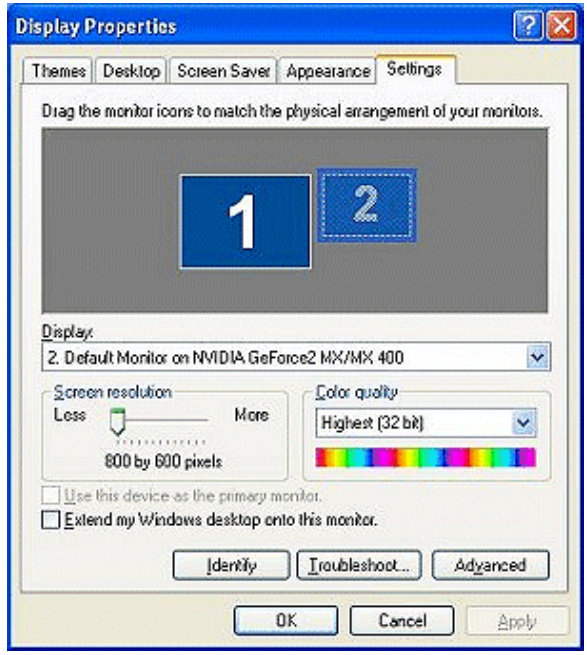
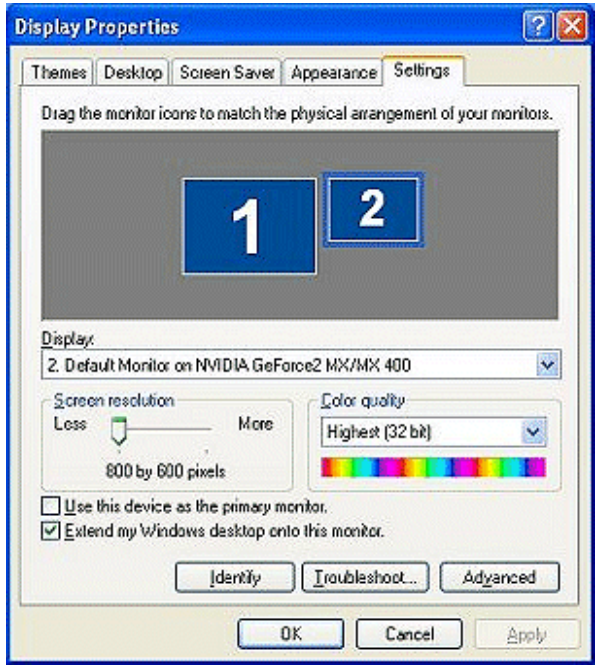


Figure 6.6 Display Settings: Enabling DualView in Windows XP (2)



Configuring DualView Settings

The settings in the DualView Settings panel (Figure 6.6) are explained in this section.

Note: Refer to the Windows XP online Help and documentation for further information on using these settings.

- The **monitor icons area** displays a monitor icon for each monitor attached to your computer. If you are using just one monitor, that monitor shows the relative size of items on your desktop, based on your current screen resolution.

  If you have more than one monitor installed, right-click a monitor icon, and click **Identify** to see a number appear on the monitor corresponding to the icon you clicked. The settings for that monitor appear in Display, Colors, and Screen Area.

  If more than one icon is displayed, drag them to the positions that represent how you want to move items between monitors. For example, if you are using two monitors and you want to move items from one monitor to the other by dragging left and right, position the icons side by side. To move items between monitors by dragging up and down, position the icons one above the other. The icon positions don't have to correspond to the physical positions of your monitors. You can position the icons one above the other even though your monitors are side by side.

- The **Display** window displays all installed video adapters. If you are using more than one monitor, the adapter for your primary monitor is in position 1.

- **Screen resolution** displays the current screen resolution settings for the monitor whose video adapter appears in the Display window. Drag the slider to specify the screen resolution you want. As you increase the number of pixels, you display more information on your screen, but the information decreases in size.

- **Color quality** displays the current color settings for the monitor attached to the video adapter that appears in the **Display** window.To use a different color settings, click the arrow, and then click a setting.

- **Use this device as the primary monitor**, when checked, specifies that the monitor corresponding to the icon you selected above is the primary monitor. The primary monitor will display the logon dialog box when you start your computer. In addition, most programs will display windows on the primary monitor when you initially open them.

  Note: On a laptop computer, the primary display is always the LCD display screen.

- **Extend my Windows desktop onto this monitor**, when checked, specifies that your desktop will be extended onto the monitor corresponding to the monitor icon you selected. This check box is unavailable for your primary monitor because additional monitors are all extensions of the primary monitor.

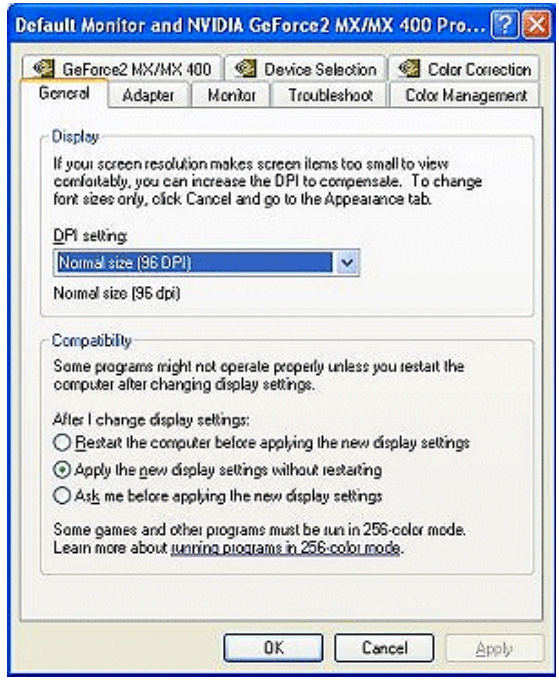
NVIDIA Panels With DualView Enabled

Click the **Advanced** button (Figure 6.6) to display the General page with several NVIDIA tabs but without the TwinView tab, as shown in Figure 6.7.

For details on using the **Device Selection** panel, see "Accessing the Device Selection Control Panel" on page 79.

For details on using the **Color Correction** panel, see "Color Correction Control Panel" on page 129.

Figure 6.7 Non-TwinView NVIDIA Panels: Windows XP



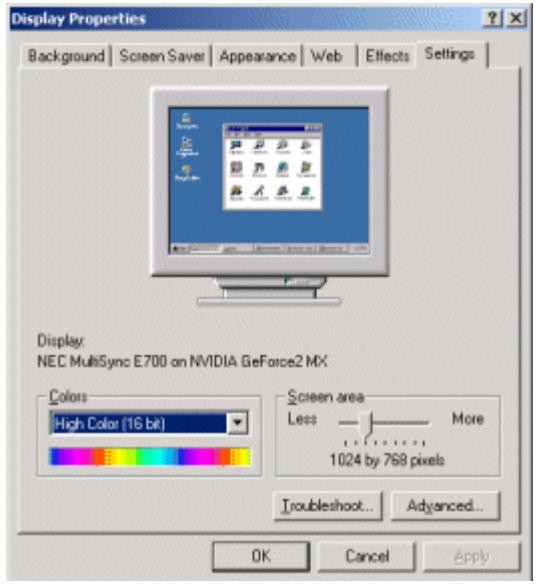
Accessing the TwinView Panel: Windows NT 4.0/2000

If you have only one display device connected, the TwinView panel will only have Standard (single-display) mode enabled and Clone mode disabled. In single-display mode, you will not have TwinView Clone mode (Virtual Desktop) and Video Mirror functionality and will have *limited* Desktop Manager functionality. However, you can access the features available through the **Additional Properties** button (*see* "Additional Features and Enhancements" on page 125*)* on the NVIDIA GPU pane (Figure 6.10), provided these features are not TwinView-dependent.

To access the TwinView control panel and all its modes, i.e, Standard, Clone, and Span, follow these steps:

1. **For dual-display functionality, be sure you have at least two display devices**, such as an analog monitor (CRT) and a digital flat panel (DFP) or TV, connected to your NVIDIA dual-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. Right-click from your Windows desktop and click **Properties** and the **Settings** tab to display the Settings panel (Figure 6.8).

Figure 6.8 Display Properties Settings: Windows 2000



4. Click the **Advanced** button to display the panel in Figure 6.9 Click the **GeForce2 MX/MX 400** tab to display the GeForce2 MX panel, which

provides basic information about your display adapter, system, and the NVIDIA driver files you installed (Figure 6.10).

Figure 6.9 Advanced Options: Windows 2000

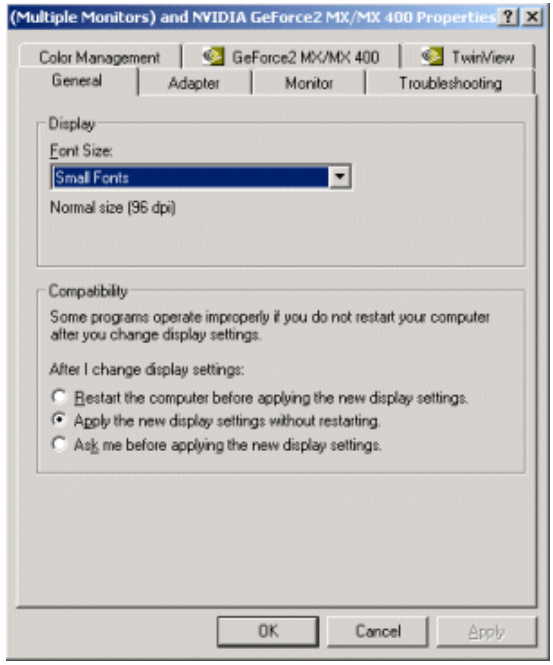
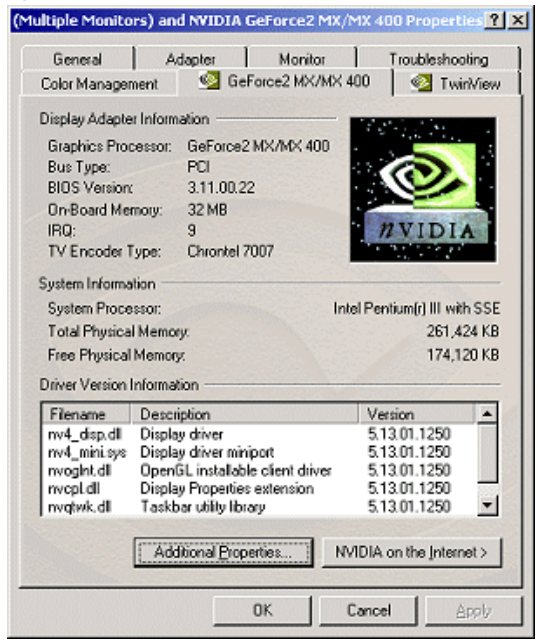
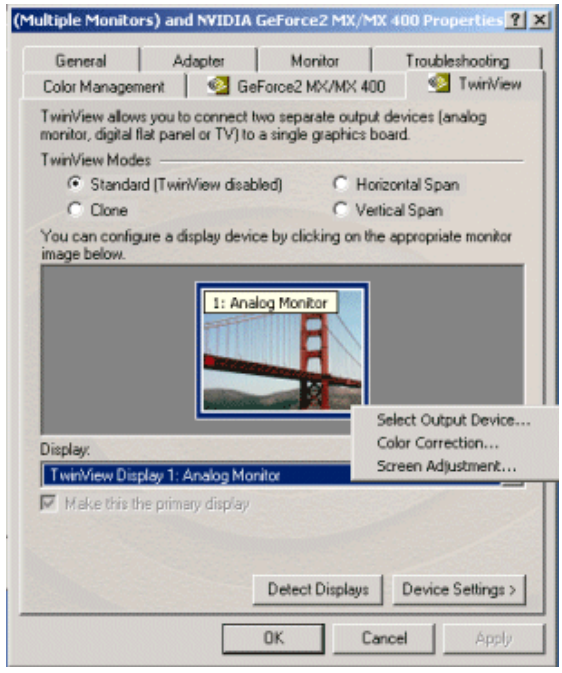


Figure 6.10 GeForce2 MX Control Panel: Windows 2000



5 Click the **TwinView** tab to display the TwinView control panel.

Figure 6.11 TwinView: Std. Mode (single-display) with Context Menu: Windows 2000



Accessing the Configuration Options

On the TwinView panel, the monitor icon numbered **1** represents the primary display device. In **Standard** mode, there is only one monitor icon. In **Clone** mode, the monitor icon numbered **1** represents the primary display device and the monitor icon numbered **2** represents the secondary display device.

To access the configuration panels for Twin View modes, use any *one* of these procedures:

- Right-click the monitor icon (**1** or **2**) to display a context menu of options and click the option you want; *or*
- Click the down arrow in the **Display** field to select the display device (i.e., TwinView Display 1 or TwinView Display 2) you want to configure. Then click the **Device Settings** button to display a context menu of options and click the option you want.

Standard Mode

Note: The **Windows 2000** NVIDIA control panel screens shown in this document also apply to **Windows NT 4.0 and XP**; exceptions are noted, where applicable.

The Standard mode option in the TwinView control panel disables the TwinView feature allowing viewing in only one display. Figure 6.12 shows a TwinView panel when only one display device (e.g, Analog Monitor) is connected to your computer. Notice that the Clone mode option is disabled.

Figure 6.12 TwinView: Std. Mode (single-display) with Context Menu: Windows 2000

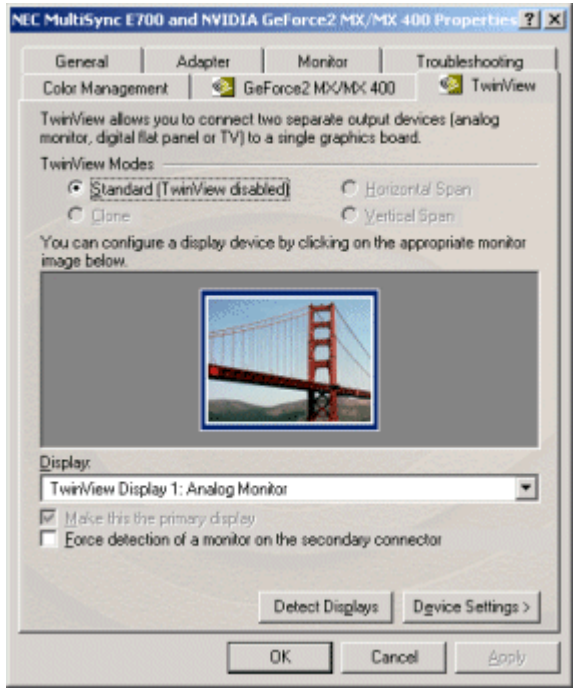
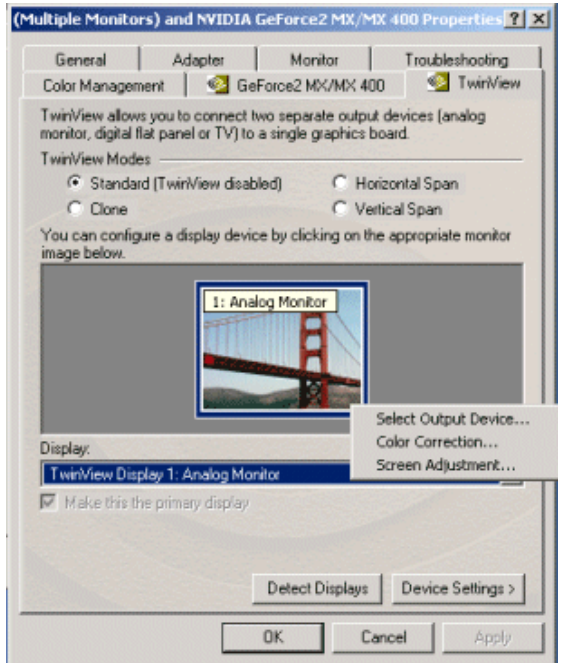


Figure 6.13 shows the TwinView control panel in Standard mode with Analog Monitor (CRT) as the *Primary* display device (Display 1). If you have a DFP and/or a TV connected to your dual-display graphics card, you can choose to display on the DFP or TV instead of the CRT.

Figure 6.13 TwinView: Std. Mode (dual-display) with Context Menu



Switching Display Device: Standard Mode

To switch devices from Analog Monitor (CRT) to either a DFP or a TV display device, or variations on this combination, *see* "Switching Displays" on page 83 in the chapter "Device Selection & Configuration" on page 79.

The figures in this section show the TwinView panel in Standard mode with either a DFP or TV as the display device.

Figure 6.14 TwinView Std. Mode (Display =TV): Windows 2000

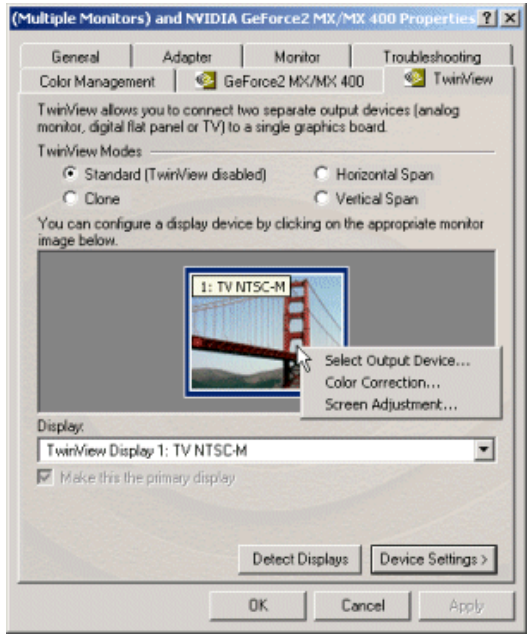
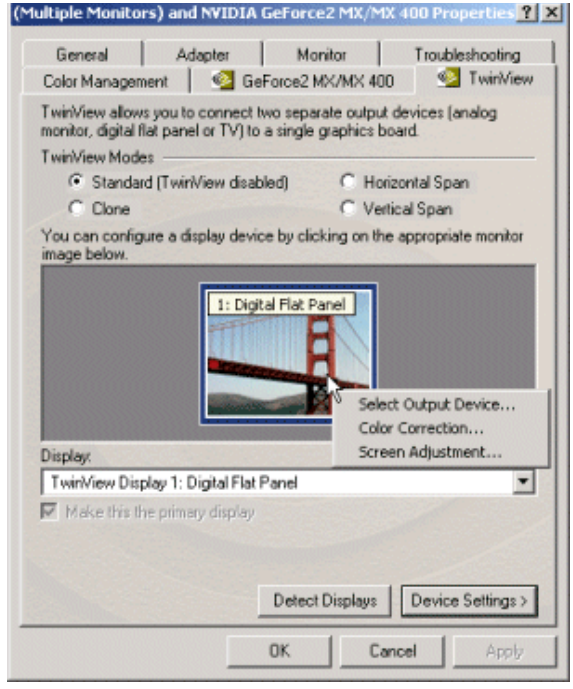


Figure 6.15 TwinView Std. Mode (Display =DFP): Windows 2000



Clone Mode

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

Note: The Windows 2000 NVIDIA control panel screens shown in this document also apply to Windows NT 4.0 and Windows XP; exceptions are noted, where applicable.

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 Monitor (CRT) as the primary display and TV or DFP as the secondary display. Make sure your display devices are powered on before you access the TwinView panel. If you power on the devices after you have opened the TwinView panel, click **Detect Displays** to enable the devices.

To access TwinView Clone mode, follow these steps:

1. Be sure your display devices are powered on before you access the TwinView panel.
2. Click the **Clone** mode option on the TwinView control panel and click **Apply**.
3. Click **OK** and **Yes** when the status messages appear. Your current screen is duplicated on the clone display.
4. If necessary, click **Detect Displays** to enable devices. Figure 6.16 shows a TwinView Clone mode control panel.
5. Right-click monitor icon **1** to view the context menu for the primary display, which is CRT (analog monitor) in this example (Figure 6.16).
6. From the context menu, click **Select Output Device** to select the Device Selection panel. Figure 6.17 correctly shows Analog Monitor as the selected output device for display 1.
7. Click **OK** to return to the TwinView control panel.
8. Click monitor icon **2** to view the secondary display. Figure 6.18 shows **TV** as the secondary display. Figure 6.19 shows **DFP** as the secondary display.
9. Click the **Select Output Device** button to display the Device Selection control panel.

   Figure 6.20 shows TV as the selected output device for the secondary display (display 2). For information on configuring your TV display, **see** "TV Settings" on page 91**.**

Figure 6.21 shows Digital Flat Panel as the selected output device for the secondary display (display 2).

Figure 6.16 TwinView Clone Mode (Display 1=Analog Monitor): Windows 2000

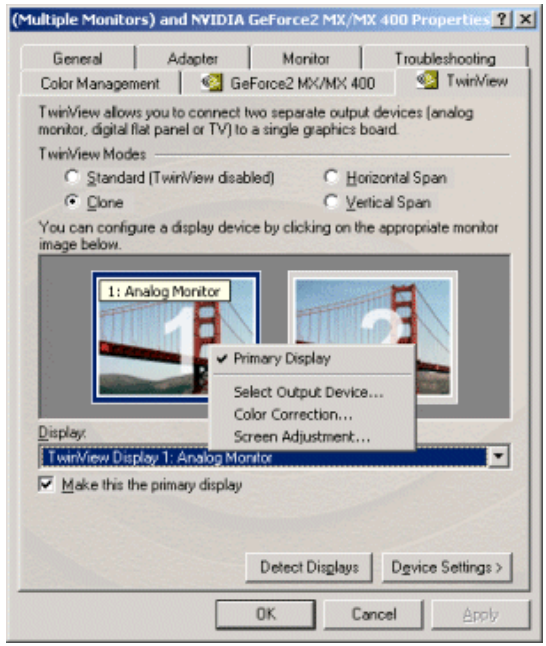


Figure 6.17 TwinView Device Selection (Display 1=Analog Monitor): Windows 2000

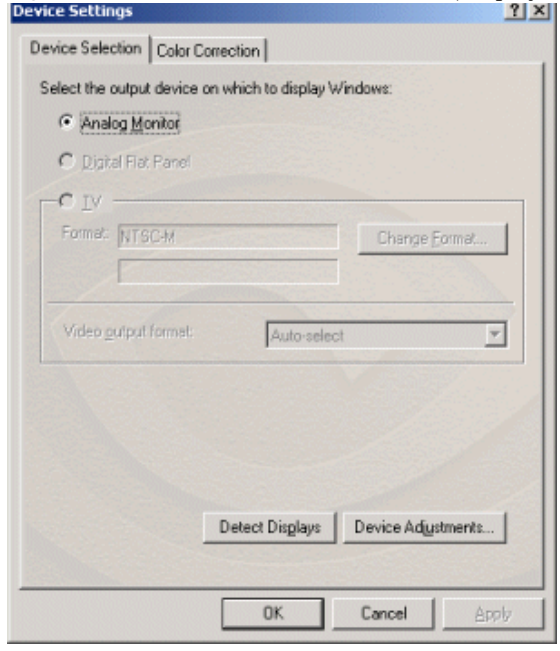


Figure 6.18 TwinView Clone Mode Menu (Display 2=TV): Windows 2000

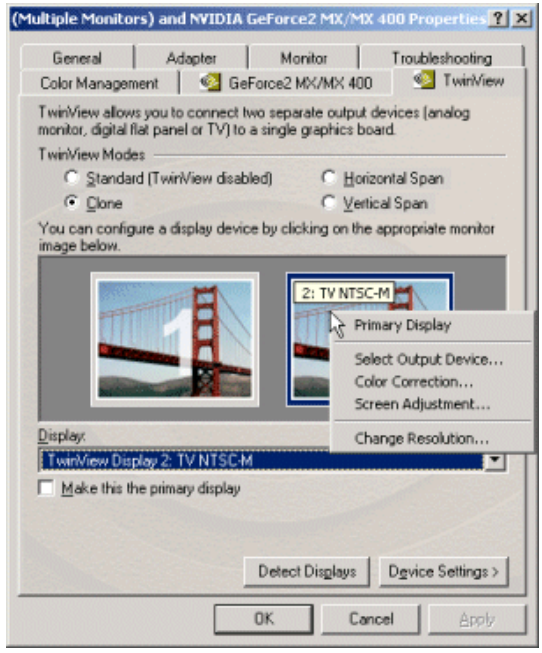


Figure 6.19 TwinView Clone Mode Menu (Display 2=DFP): Windows 2000

Figure 6.20 TwinView Output Device (Display 2=TV): Windows 2000

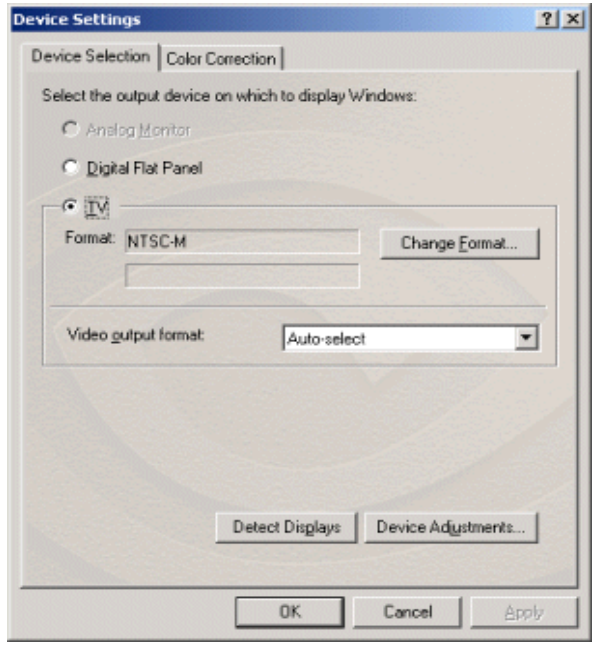


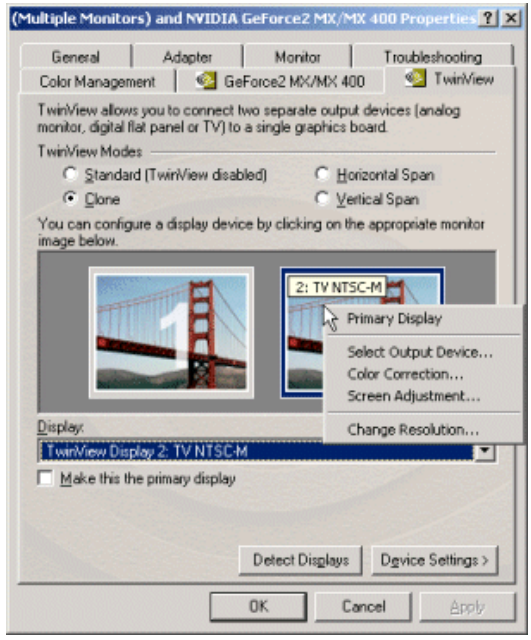
Figure 6.21 TwinView Device Selection Panel on DFP display: Windows 2000

Switching Secondary Displays: Clone Mode

Note: The example in this section uses TV as the secondary display device and describes how to switch from TV to Digital Flat Panel. You can use a similar procedure to switch from DFP to TV.

1 Right-click monitor icon **2** to view the context menu for the secondary display, which is TV in this example (Figure 6.22).

Figure 6.22 TwinView Clone Mode Menu (Display 2=TV): Windows 2000



2 From the context menu, click **Device Selection** to select the Device Selection panel. Figure 6.23 correctly shows TV as the selected output device for display 2 (secondary display).

For details on configuring TV settings, see "TV Settings" on page 91.

3 Click **Digital Flat Panel**, as shown in Figure 6.24.

4 Click **Apply**. The NVIDIA Display Settings message panel appears (Figure 6.25).

5 Click **OK** *before* the message times out. The Confirm Display Settings message (Figure 6.26) and the rest of your Windows desktop appears on your DFP display.

Figure 6.23 TwinView Output Device (Display 2=TV): Windows 2000

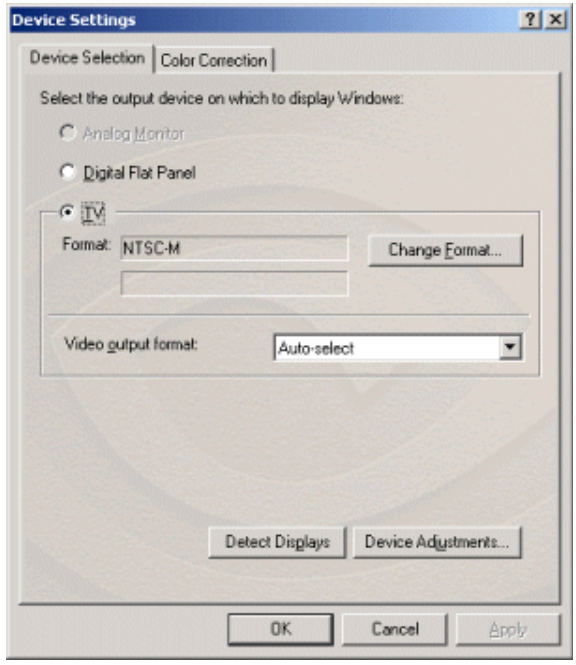


Figure 6.24 TwinView Output Device (Display 2=DFP): Windows 2000

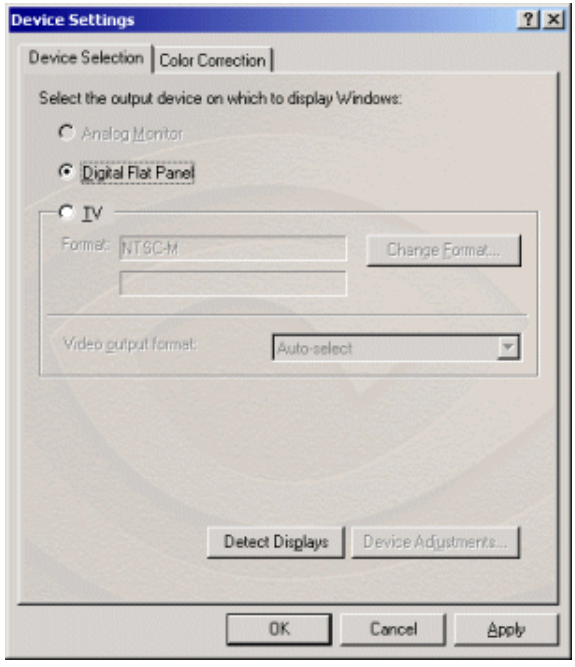


Figure 6.25 TwinView Settings Change Message: Windows 2000

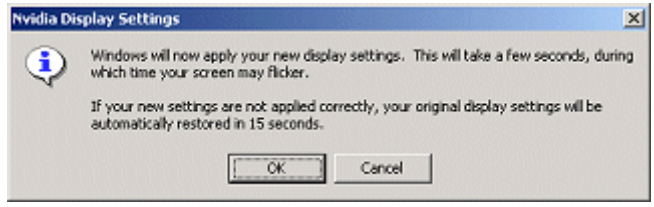
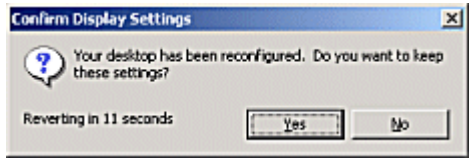


Figure 6.26 TwinView Confirm Display Settings Message: Windows 2000



6 Click **Yes** *before* the message times out. The Device Selection panel appears with Digital Flat Panel selected, as shown in Figure 6.27.

7 Click **OK** to display the TwinView Clone mode panel showing Digital Flat Panel as the secondary display. Figure 6.28 shows TwinView Clone mode panel with the context menu for the Digital Flat Panel display.

Figure 6.27 TwinView Device Selection panel on DFP display: Windows 2000

Figure 6.28 TwinView Clone Mode Menu (Display 2=DFP): Windows 2000

Switching Secondary to Primary Display: Clone Mode

Note: The example in this section changes DFP from a secondary to a primary display.You can use a similar procedure to change TV from a secondary to a primary display.

1. Make sure you have the TwinView panel open in Clone mode and DFP selected as display 2.
2. Right-click monitor icon **2** to display the context menu.
3. Select **Primary Display**. The “Make this the primary display” box becomes checked.
4. Click **Apply**. The NVIDIA Display Settings message appears.
5. Click **OK** *before* the message times out.

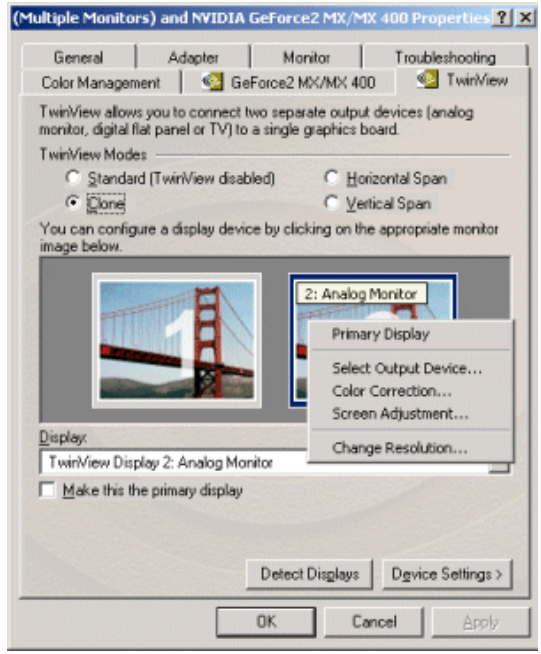
   The Confirm Display Settings message and the rest of your Windows desktop appears on your DFP display.
6. Click **Yes** *before* the message times out.

   When the TwinView panel appears, Digital Flat Panel is enabled as the primary display device (Figure 6.29).

Figure 6.29 TwinView Clone Mode (Switching DFP to Primary): Windows 2000

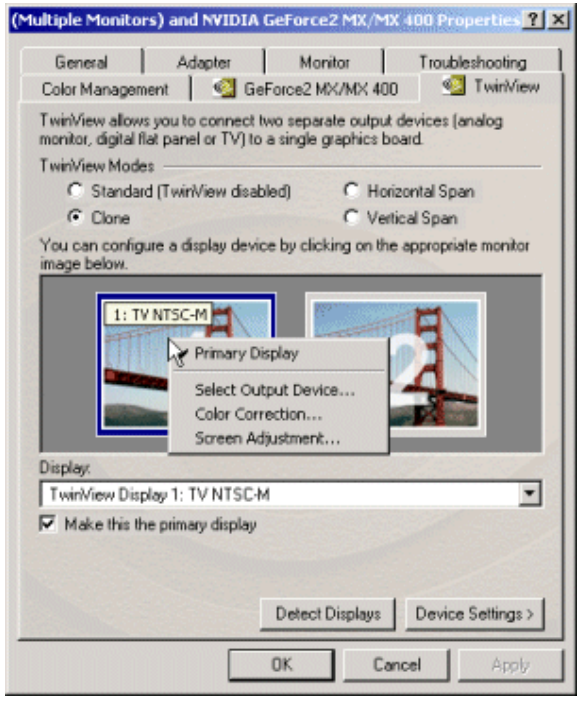
7 Right-click monitor icon **2** to confirm that the CRT (analog monitor) is now the secondary device (Figure 6.30).

Figure 6.30 TwinView Clone Mode (Display 2 = Analog Monitor): Windows 2000



8 You can use similar steps as described in this section to switch to TV as the primary display (Figure 6.31).

Figure 6.31 TwinView Clone Mode (Display 1 = TV): Windows 2000



Change Resolution: Clone Mode (Virtual Desktop)

You can use the Change Resolution option to modify Resolution and Refresh Frequency for the secondary display, which allows you to enable **Virtual Desktop**, a useful feature for 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.

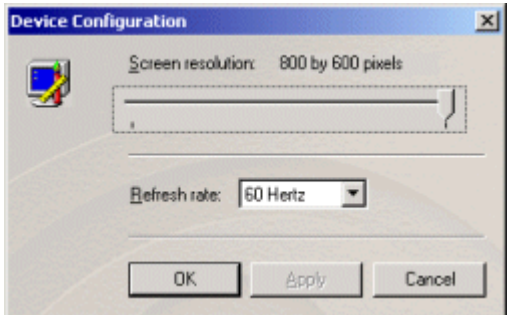
Note: If the maximum resolution of the secondary display is less than the current resolution of the primary display, once you enable Clone mode from the TwinView panel, Virtual Desktop will already be enabled. However, you still may want to adjust the resolutions of the primary and/or secondary device by using the Device Configuration dialog box (Figure 6.32) for the secondary display or the Windows Settings control panel of your primary display.

Follow these steps to enable Virtual Desktop:

1 From the TwinView panel, right-click monitor icon **2** (secondary display) to display the context menu and select **Change Resolution** to display the Device Configuration dialog box (Figure 6.32).

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

Figure 6.32 TwinView Clone Mode Device Configuration: Windows 98



2 Use the slider (Figure 6.32) to set the screen resolution at a value that *is not equal* to the screen resolution on the Windows Settings control 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.

Note: The Windows 2000 NVIDIA control panel screens shown in this document also apply to Windows NT 4.0 and Windows XP; exceptions are noted, where applicable.

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 dual-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 dual-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 6.33 through Figure 6.37) or vertically (Figure 6.40 and Figure 6.43).

To access the TwinView Span modes, follow these steps:

1. Click the **Horizontal** or **Vertical Span** mode option on the TwinView control panel and click **Apply**.
2. Click **OK** and **Yes** when the messages appear.
   - If you just switched from Standard to one of the Span modes, your DFP 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.

Switching Display Device: Span Modes

The basic procedure for switching devices in Span modes is the same as that used in Clone mode. The figures in this section include configurations where Analog Monitor, Digital Flat Panel, or TV is set as either the primary or secondary display. You can use the following basic steps below to switch to a different primary or secondary device.

1. Make sure your TwinView panel is set to Horizontal Span or Vertical Span mode.
2. **To switch a display device from secondary to primary**, follow these steps:
   a. Right-click monitor icon **2**.
   b. Click **Primary Display** to check the option. The "Make this the primary display" checkbox displays a check mark to reflect the primary display.

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

c. Click the **Apply** button.

d. When the NVIDIA Display Settings message appears, click **OK**. The TwinView control panel now appears on the secondary device. The TwinView **Display** field shows "TwinView Display 1: Digital Flat Panel", which correctly indicates that the Digital Flat Panel is now the primary display.

e. To switch back to CRT as the primary display, follow similar steps.

3. **To switch from TV to DFP, or vice versa,** follow these steps:

   a. Right-click monitor icon **2** or **1**, depending on whether the TV/DFP is your primary or secondary device.

   b. From the context menu, click **Select Output Device** to select the Device Selection panel.

   c. Click **Digital Flat Panel** or **TV**, depending on the device to which you want to switch.

   d. Click **Apply**. The NVIDIA Display Settings message appears.

   e. Click **OK** *before* the message times out. The Confirm Display Settings message and the rest of your Windows desktop appears on your newly selected display (TV or DFP).

4. Click **Yes** *before* the message times out. The Device Selection panel appears with Digital Flat Panel selected.

5. Click **OK** to display the TwinView Horizontal Span or Vertical Span mode panel showing DFP or TV as the secondary or primary display, depending on the display you were working with.

6. Right-click the monitor icon (**1** or **2**) to confirm correct results.

Figure 6.33 TwinView Horizontal Span (Display 1= CRT): Windows 2000

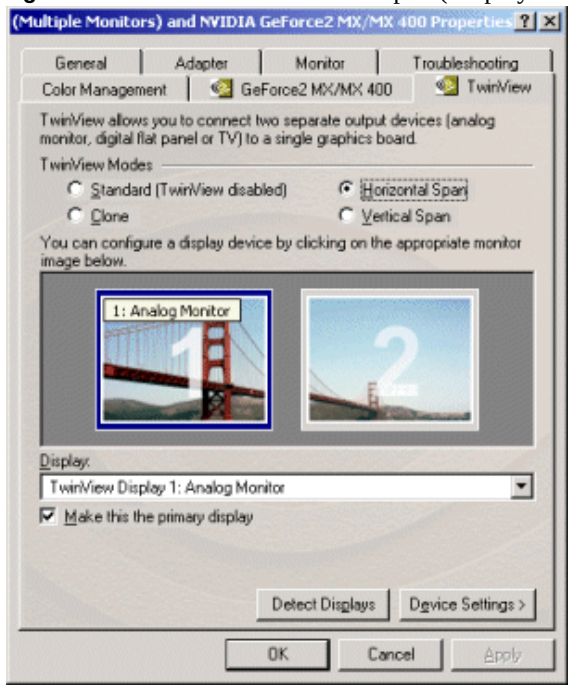


Figure 6.34 TwinView Horiz. Span (Display 1= CRT) Context Menu: Windows 2000

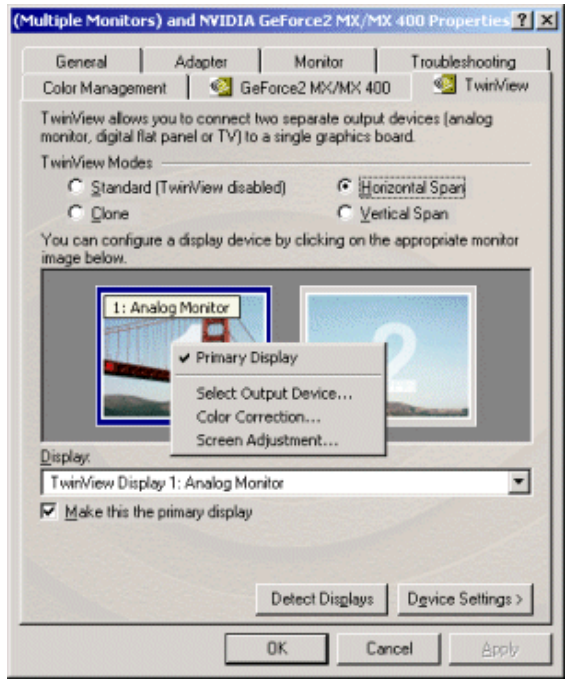


Figure 6.35 TwinView Horizontal Span Menu (Display 2 = DFP): Windows 2000

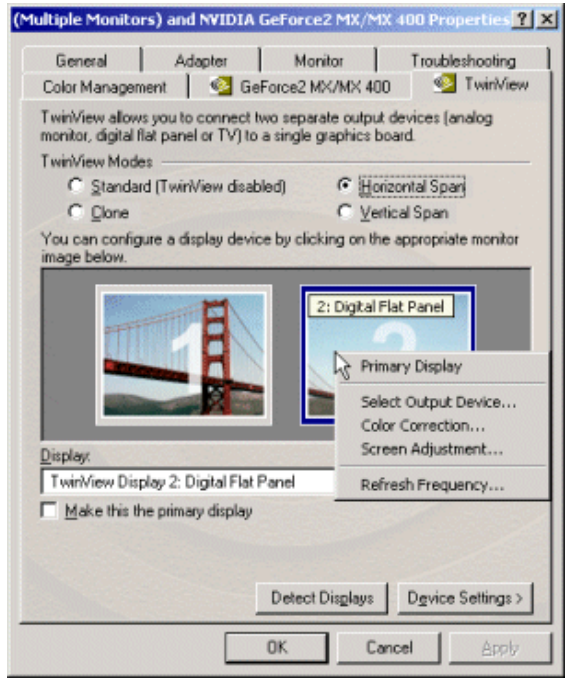


Figure 6.36 TwinView Horizontal Span Menu (Display 2 = CRT): Windows 2000

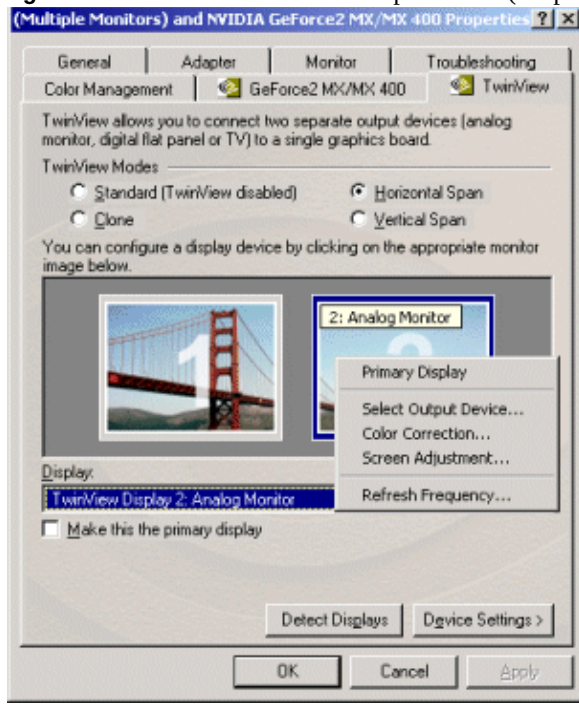


Figure 6.37 TwinView Horizontal Span (Display 1= DFP): Windows 2000

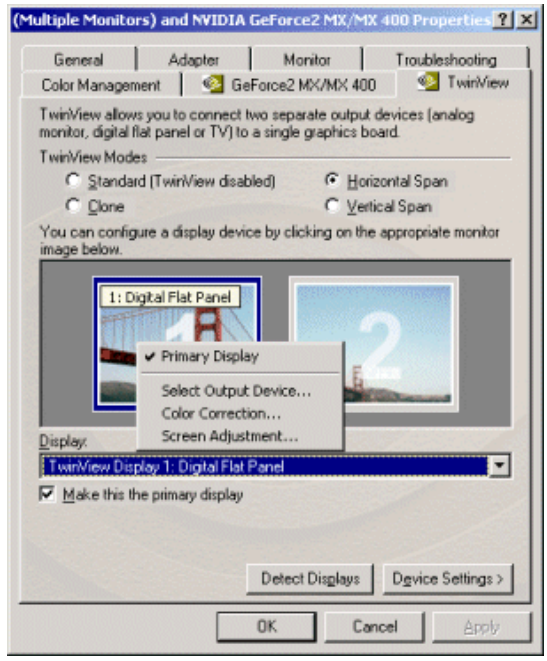


Figure 6.38 TwinView Horizontal Span (Display 2= TV): Windows 2000

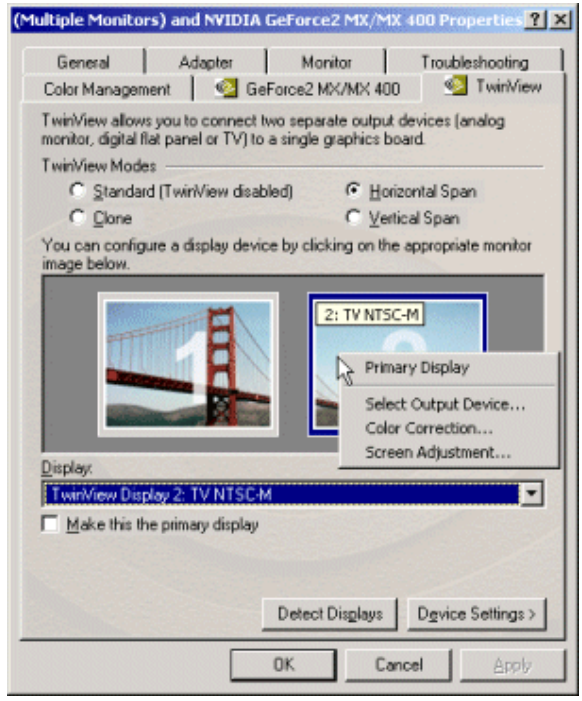


Figure 6.39 TwinView Horizontal Span (Display 1= TV): Windows 2000

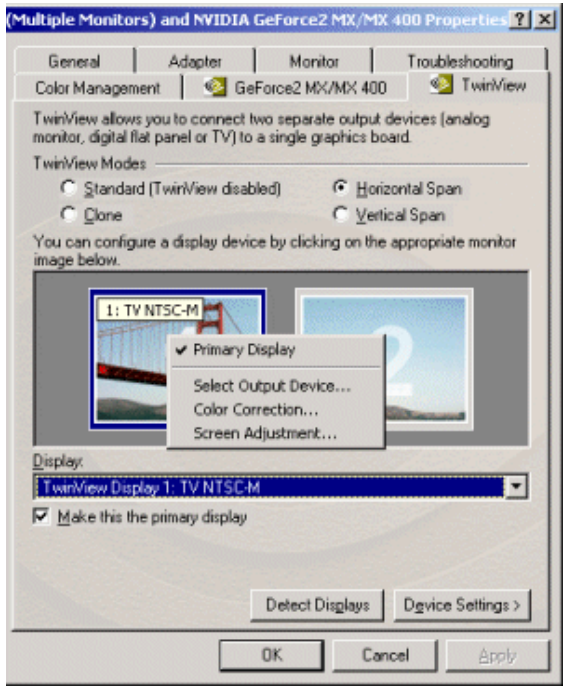


Figure 6.40 TwinView Vertical Span Menu (Display 1 = CRT): Windows 2000

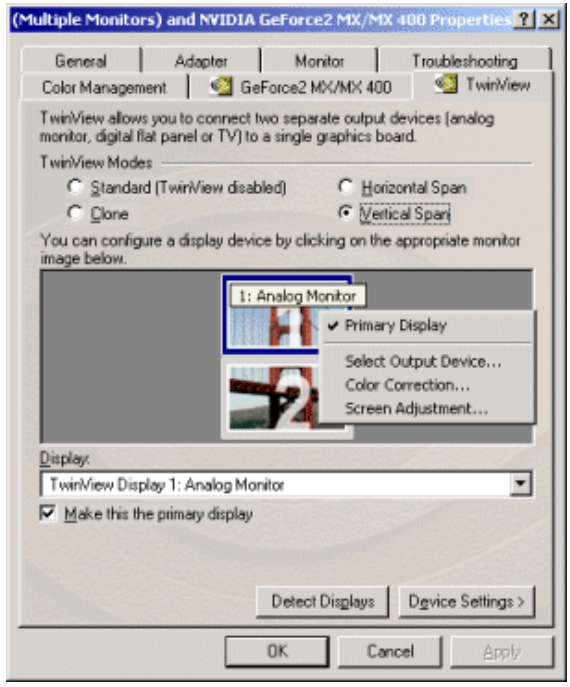


Figure 6.41 TwinView Vertical Span Menu (Display 1 = TV): Windows 2000

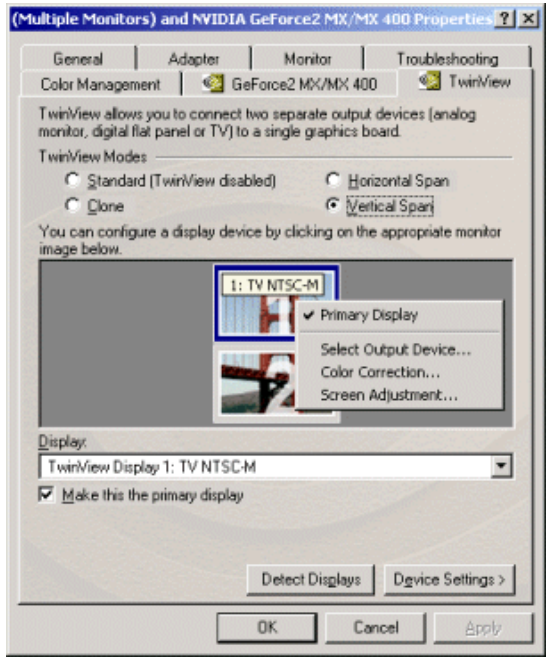


Figure 6.42 TwinView Vertical Span Menu (Display 1 = DFP): Windows 2000

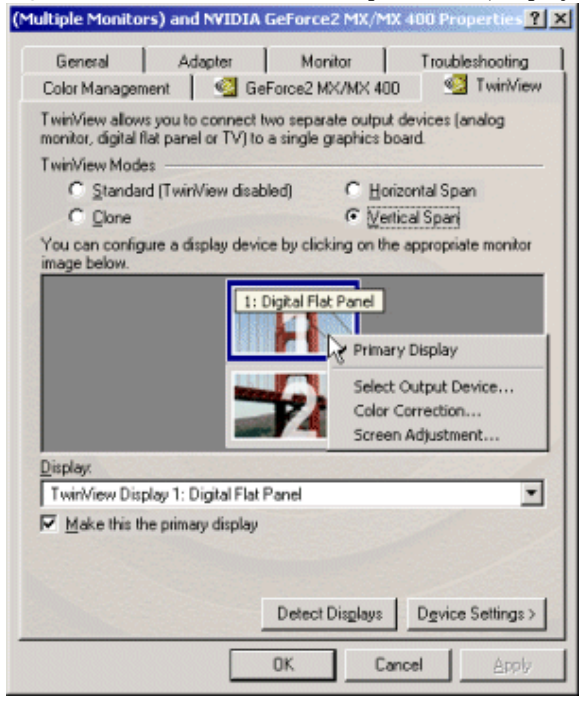
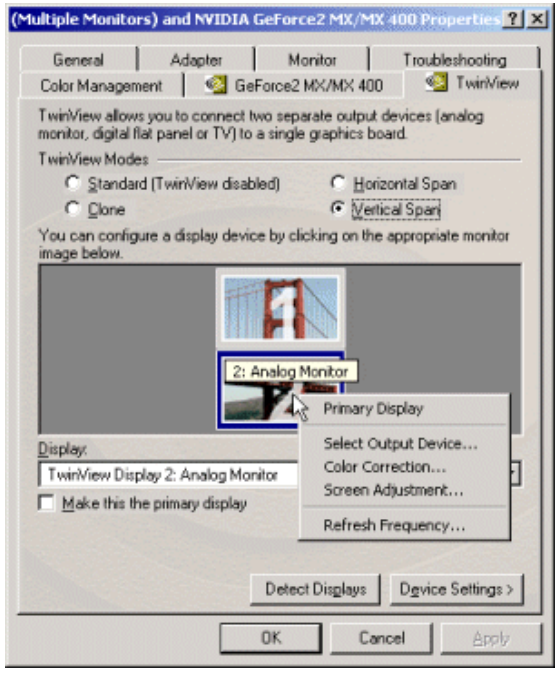


Figure 6.43 TwinView Vertical Span Menu (Display 2 = CRT): Windows 2000



Other Configuration Options

For details on configuring display devices, such as a TV, see "Device Selection & Configuration" on page 79.

For details on configuring additional features, see "Additional Features and Enhancements" on page 125.

CHAPTER 7

DEVICE SELECTION & CONFIGURATION

This chapter contains the following sections:

- "Accessing the Device Selection Control Panel" on page 79
- "Switching Displays" on page 83
- "Device Adjustments: Analog Monitor" on page 85
- "Device Adjustments: Digital Flat Panel" on page 87
- "TV Settings" on page 91

Note: Windows 2000 control panel screens also apply to **Windows NT 4.0 and XP**; exceptions are noted where applicable.

Accessing the Device Selection Control Panel

Note: This chapter assumes that you have at least a dual-display NVIDIA GPU-based card and you have at least two display devices connected to your card. You can use the basic procedure described here to switch between any devices that are connected.

1. Right-click from your Windows desktop and click **Properties** and the **Settings** tab to display the Settings panel (Figure 7.1).
2. Click the **Advanced** button.
3. Click the **Device Selection** tab to display the Device Selection panel. This example uses the GeForce3 GPU-based card (Figure 7.2) with Analog Monitor (CRT) enabled.
4. Click **Detect Displays** if you want to detect all display devices connected to the output device (Analog Monitor, Digital Flat Panel, or TV) that is enabled

on the Device Selection panel. Use this feature if you have plugged in any displays after this Device Selection control panel was opened.

Figure 7.1 Display Properties Settings

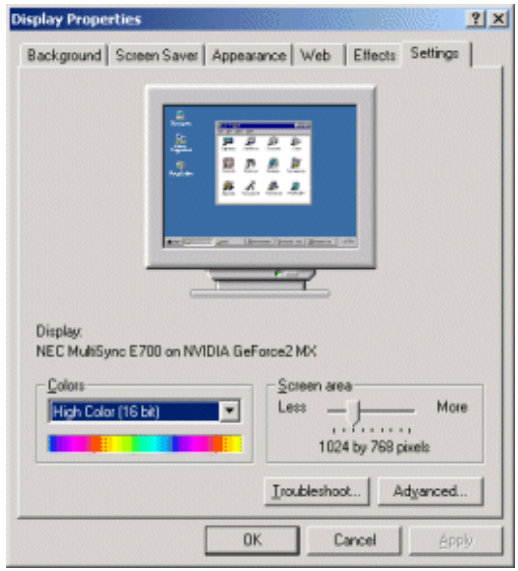


Figure 7.2 Device Selection (Single Display)

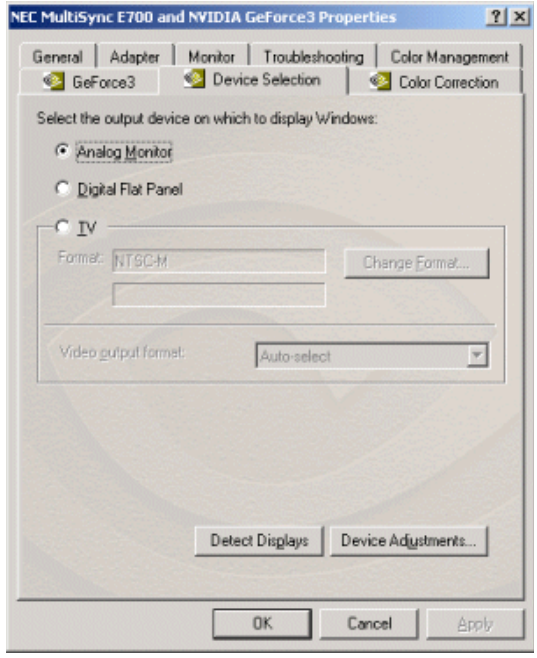


Figure 7.3 Device Selection CRT (TwinView)

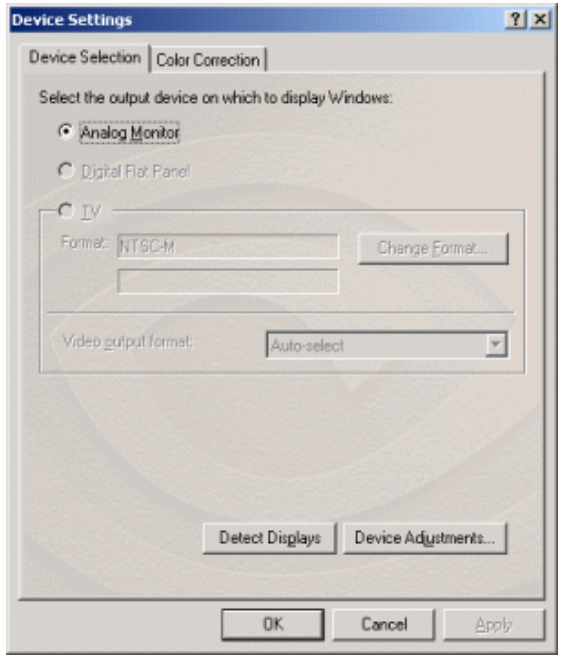


Figure 7.4 Device Selection DFP (TwinView)

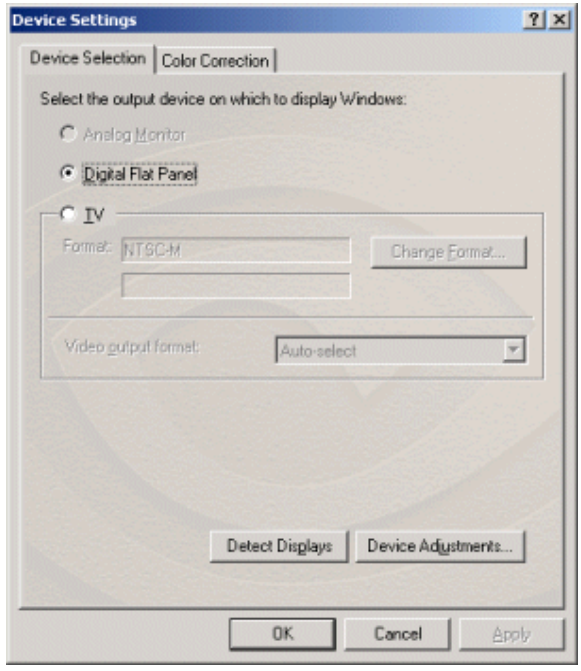


Figure 7.5 Device Selection TV (TwinView)

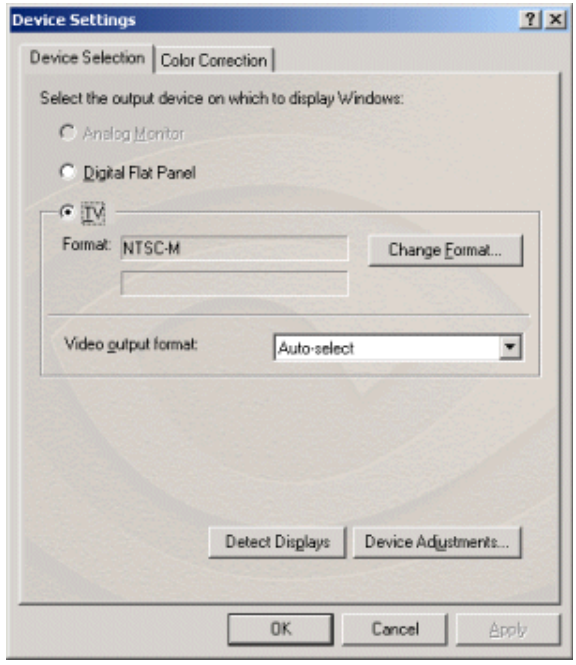
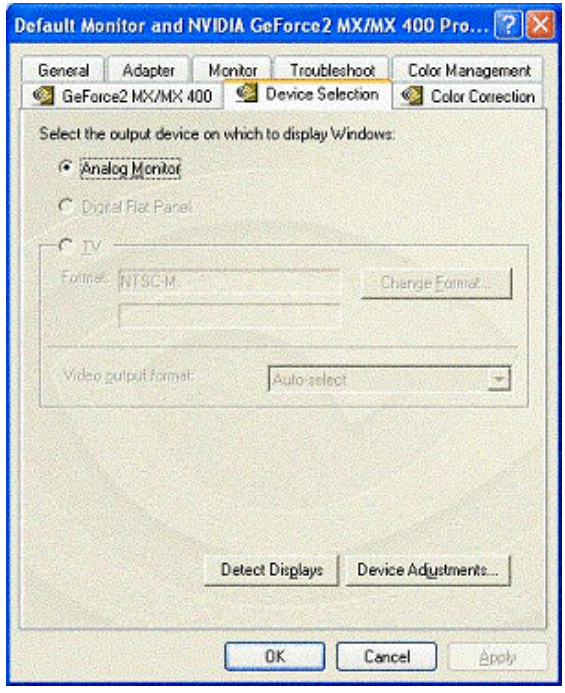


Figure 7.6 Device Selection: Windows XP DualView Enabled



Switching Displays

This section explains the procedure for switching the display from your CRT (analog monitor) to a DFP using the example of a GeForce3 GPU-based graphics card with three connectors:

- **CRT** (analog monitor)
- **DFP** (digital flat panel) *and*
- **TV**

This means that the user of such a graphics card can choose to connect three different devices and switch among them or simply connect one of the devices and use that device. Your GeForce3 GPU-based graphics card or any other multi-connector NVIDIA GPU-based card may have anywhere between one and three connectors. So, you'll need to follow the example based on the number and type of connectors your card contains.

Note: You can use the procedure in this section to switch between any combination of devices, such as CRT to TV, TV to CRT, DFP to CRT, TV to DFP, and so on. You can also use other NVIDIA GPU-based cards, such as the GeForce2 MX, Quadro2 MXR, and so on. In this case, you'll notice that the NVIDIA product tab names of GeForce3, Device Selection, and Color Correction do not exist if, for example, you have the TwinView feature enabled.

1. Make sure you are in the Device Selection panel. (*See* the previous section "Accessing the Device Selection Control Panel" on page 79, if needed.)
2. If you are using an NVIDIA GPU from the GeForce2 MX/Quadro2 MXR family and have TwinView enabled, on the **TwinView** control panel, right-click the monitor icon to display the context menu and click **Select Output Device** to display the Device Selection control panel.
3. Click the **Digital Flat Panel** Option as shown in Figure 7.7 and click **Apply**. The message in Figure 7.8 appears.
4. Click **OK** *before* the message times out. The Confirm Display Settings message in Figure 7.9 appears on your DFP display.
5. Click **Yes** before the message times out. Your TwinView and entire Windows display now shifts to the or DFP (Figure 7.10).

Figure 7.7 Device Selection with DFP Selected

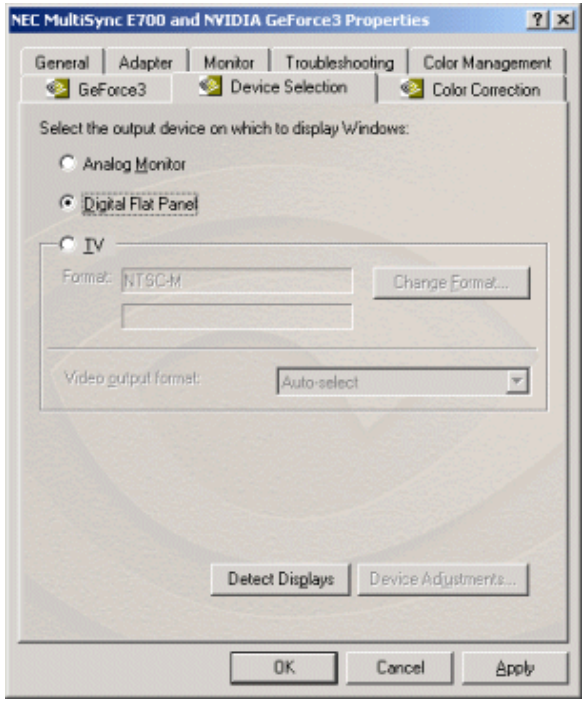


Figure 7.8 Display Settings Message: Windows 2000

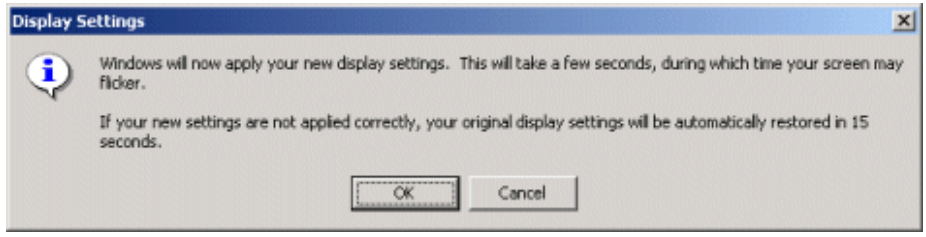
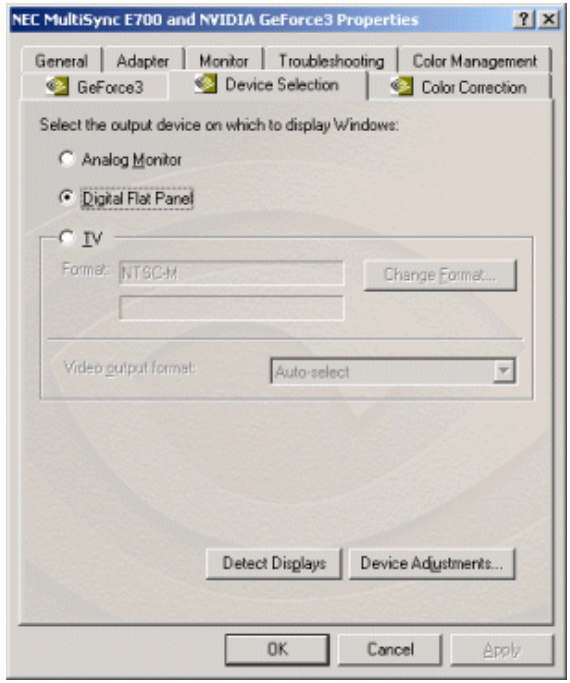


Figure 7.9 Confirm Display Settings Message: Windows 2000

Figure 7.10 Device Selection with DFP Enabled



Device Adjustments: Analog Monitor

Screen Adjustment

If your NVIDIA graphics card is connected to a CRT (Analog Monitor), follow these steps to access the Screen Adjustment panel:

Note: If you are in the TwinView control panel, right-click the Analog Monitor icon to display the context menu and select **Screen Adjustment** to display the Screen Adjustment panel. Then go directly to step. **4** below.

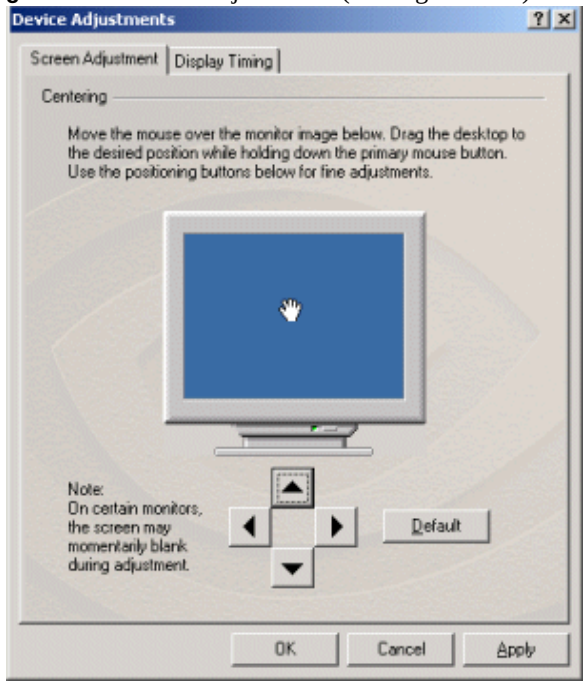
1 Make sure you are in the Device Selection panel. (*See* the earlier section "Accessing the Device Selection Control Panel" on page 79, if needed.)

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

3 Click the **Device Adjustments** button to access the Screen Adjustment panel (Figure 7.11).

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

Figure 7.11 Screen Adjustments (Analog Monitor): Windows 2000



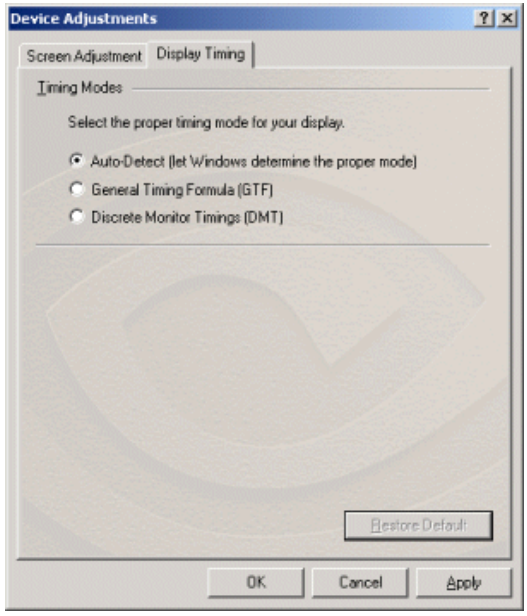
Display Timing

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

Note: If you are in the TwinView control panel, right-click the Analog Monitor icon to display the context 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. (*See* the earlier section "Accessing the Device Selection Control Panel" on page 79, if needed.)
2. Confirm that the **Analog Monitor** option is selected on the Device Selection panel.
3. Click the **Device Adjustments** button then click the **Display Timing** tab to open the Display Timing panel.

Figure 7.12 Display Timing (Analog Monitor): Windows 2000



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** that 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.

Device Adjustments: Digital Flat Panel

Flat Panel Display

If your NVIDIA graphics card is connected to a DFP (digital flat panel), follow these steps to access the Flat Panel Display control panel.

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

1 Make sure you are in the Device Selection panel. (*See* the previous section "Accessing the Device Selection Control Panel" on page 79, if needed.)

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

3 Click the **Device Adjustments** button to access the Flat Panel Display control panel (Figure 7.13)

Figure 7.13 Digital Flat Panel Display as Display 1: Windows 2000

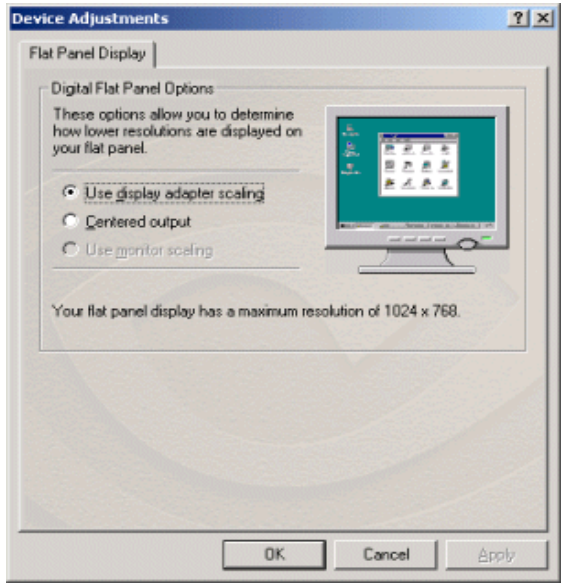
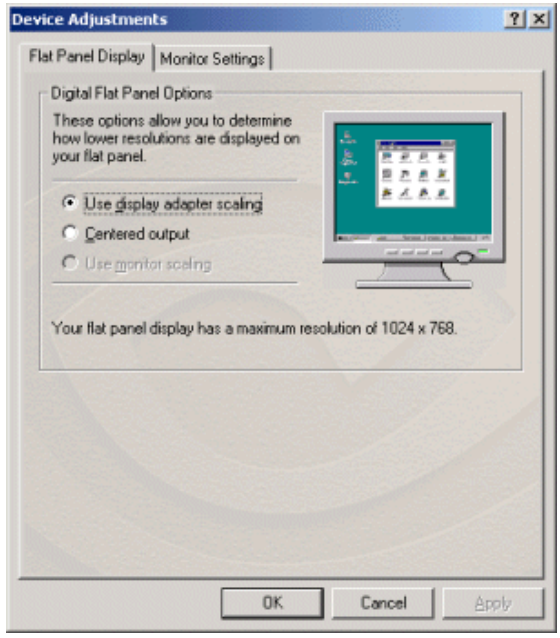
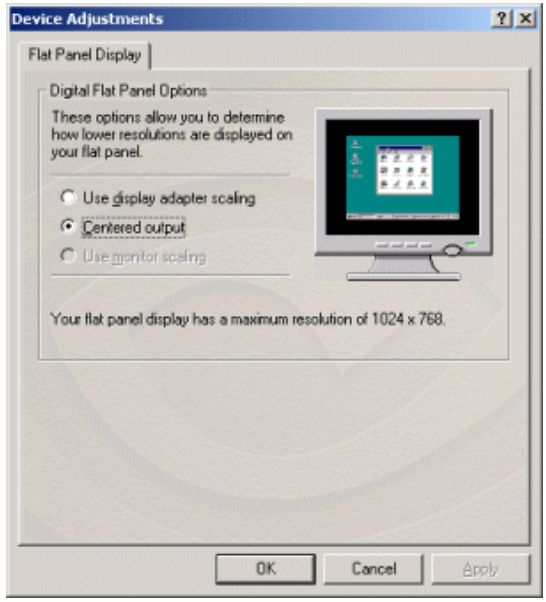


Figure 7.14 Digital Flat Panel Display as Display 2: Windows 2000



4 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 7.15 Digital Flat Panel Display - Centered Output: Windows 2000



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 DFP or CRT (analog monitor). In this example, the secondary display device is a DFP.

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

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

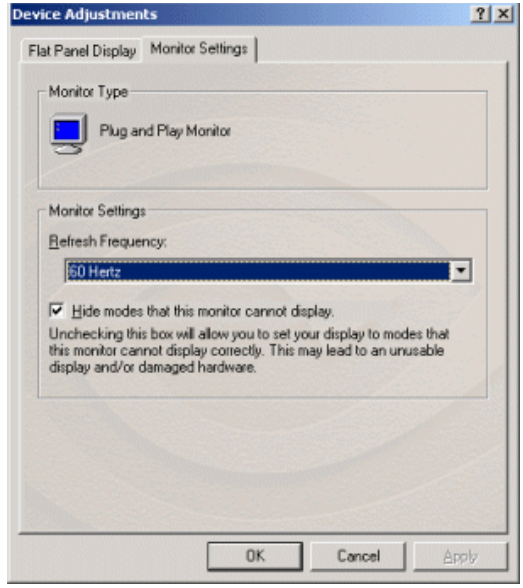
1 Make sure you are in the Device Selection panel. (*See* the earlier section "Accessing the Device Selection Control Panel" on page 79, if needed.)

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

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

4 Click **Monitor Settings** to open the Monitor Settings panel (Figure 7.16).

Figure 7.16 Monitor Setting for DFP as Display 2: Windows 2000



Note: The Monitor Settings panel in Figure 7.16 resembles the Monitor panel for your primary display (**Properties** > **Settings** tab > **Advanced** button > **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 TwinView Span modes.

TV Settings

This section explains the TV formats and settings available on the Output Device control panel accessible through the TwinView 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 TwinView Device Selection panel may be unavailable or vary from what is described in this appendix.

Accessing the TV Option in Non-TwinView Mode

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

Note: If you are in the TwinView control panel, right-click the TV monitor icon and click **Select Output Device** to display the Device Selection control panel with the TV option enabled, as shown in Figure 7.17.

1. Make sure you are in the Device Selection panel. (*See* the previous section "Accessing the Device Selection Control Panel" on page 79, if needed.)
2. Make sure the **TV** option is selected. Figure 7.17 shows the Device Selection panel with the TV option enabled.

Change Format: Regional Settings

From the Device Selection panel, click the **Change Format** button to access the Regional Settings (Figure 7.18) 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.

Note: If your country is not in the list, select the country closest to your location.

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 7.19).

If you have the proper connector cable, **S-Video-Out** will generally provide 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.

Figure 7.17 Device Selection with TV Enabled

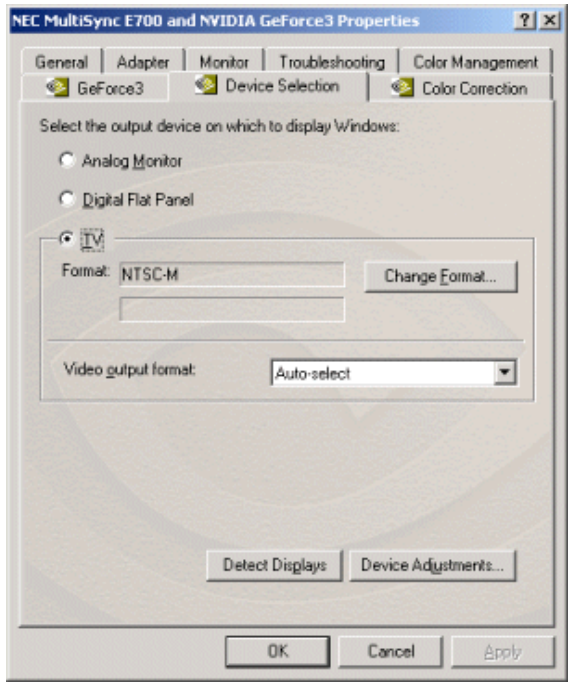


Figure 7.18 TV Regional Settings

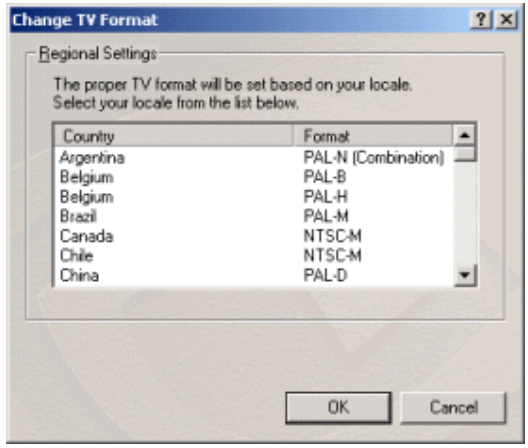
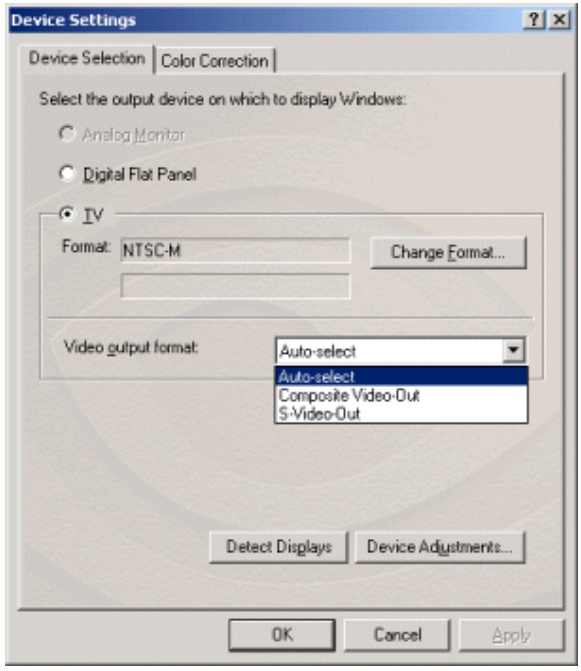


Figure 7.19 Device Selection: TV Video Output Format



Device Adjustments: TV Output

From the Device Selection panel, click the **Device Adjustments** button to open a TV Output panel (Figure 7.20) 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.

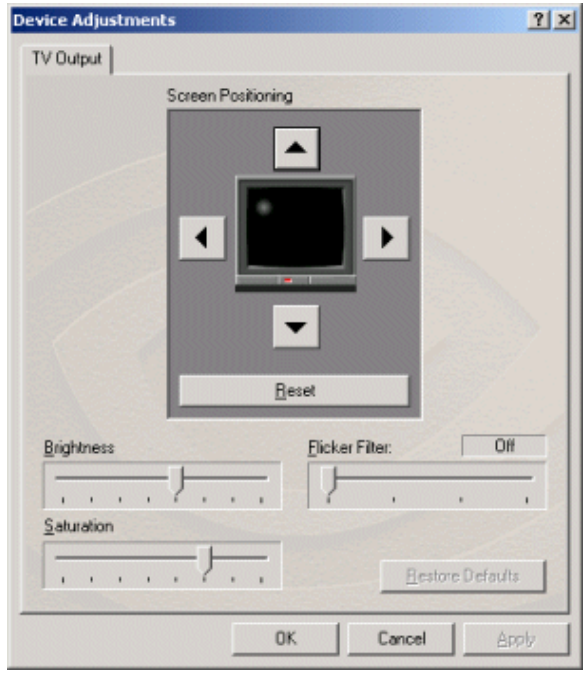
- **Screen positioning:** Use the arrow buttons to adjust the position of the desktop on the TV.

  Note: If the TV picture becomes scrambled or goes 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, press the **OK** or **Apply** button 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.

Figure 7.20 TV Output Control Panel



CHAPTER 8

VIDEO MIRROR

The Video Mirror feature works in conjunction with TwinView and is supported by any dual-display graphics card based on a GeForce2 MX, GeForce2 Go, or Quadro2 MXR GPU.

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. (For sample combinations of display devices that are supported, see relevant text in "TwinView Applications" on page 17.)

Major features of Video Mirror, such as Zoom and Aspect Ratio, can be configured through the Full Screen Video Mirror control panel. The Zoom settings allow part of the image from the primary monitor to be displayed on the secondary monitor, but zoomed in.

If you have only one display device connected to your computer, you will not have Video Mirror functionality but will be able to access the NVIDIA Overlay Control panel features, as explained in the "Overlay Controls" on page 96.

Accessing Video Mirror

This section explains how to use the following NVIDIA control panels:

- "Overlay Controls" on page 96
- "Video Mirror Controls" on page 99

To access the Video Mirror control panel, you need to go through the Overlay Controls panel.

The options on the Overlay Controls panel can be used on a single video image or display when you are in TwinView Standard mode. However, the Video Mirror Controls work only when you are in the following modes:

- **Windows XP/2000 TwinView Clone** or **Windows XP DualView**

  Note: Video Mirror is not available under Windows NT 4.0.

- **Windows 9*x* TwinView Clone** or **Extended Desktop** (non-TwinView)

Overlay Controls

Note: Be sure to click **Apply** whenever you make any changes to the control panels. If changes 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. **For Video Mirror functionality**, set your TwinView panel to one of these modes:
   - **Windows XP/2000 Clone** *or* **Windows XP DualView**
   - **Windows 9*x* Clone** *or* **Extended Desktop**
3. To access the Overlay Controls panel, click **Properties** > **Settings** tab > **Advanced** button > **GeForce2 MX** tab > **Additional Properties** button > **Overlay Controls** tab.

   Figure 8.1 through Figure 8.4 shows the Overlay Controls panels using examples for GeForce3 and GeForce2 MX GPUs.

   Note: If you are using a GeForce2 MX GPU-based card and your TwinView panel is set to **Standard** mode, the Video Mirror controls are enabled as shown in Figure 8.2 but they will have no effect until you enable TwinView Clone mode under Windows **XP/2000** or either TwinView Clone or Windows Extended mode under Windows 9x.
4. For description of the Overlay Settings, see "Overlay Settings" on page 97 below.
5. To use the Video Mirror controls, go directly to the next section "Video Mirror Controls" on page 99.

Overlay Settings

- **Check here if you are having problems with your TV tuner (Windows 9*x* only):** Activating this option forces the overlay software to be compatible with busmastering TV Tuner cards.

  Note: It is recommended that you leave this option *unchecked* unless you experience problems with video playback, such as image corruption or no video image at all.

- **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.

- **Enable video overlay zoom:** Click this check box and click **Apply** to use the Zoom control slider to zoom in (out) on a specific area of the video output (overlay) on your screen. Using the diagram of the screen regions shown on the Overlay Controls panel, you can select the area of the video screen you would like to zoom. Once selected, you can zoom to that portion of the screen by moving the Zoom Control slider between the Out and In range.

Figure 8.1 Overlay Controls for GeForce3: Windows 2000

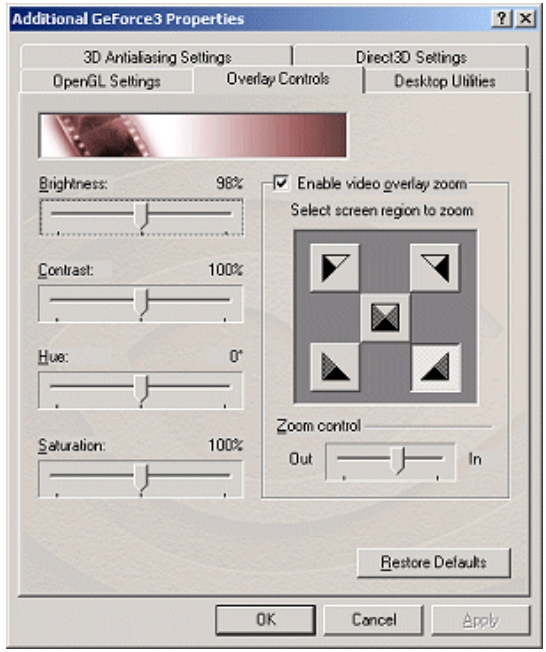


Figure 8.2 Overlay Controls for GeForce2 MX Single Display: Windows 2000

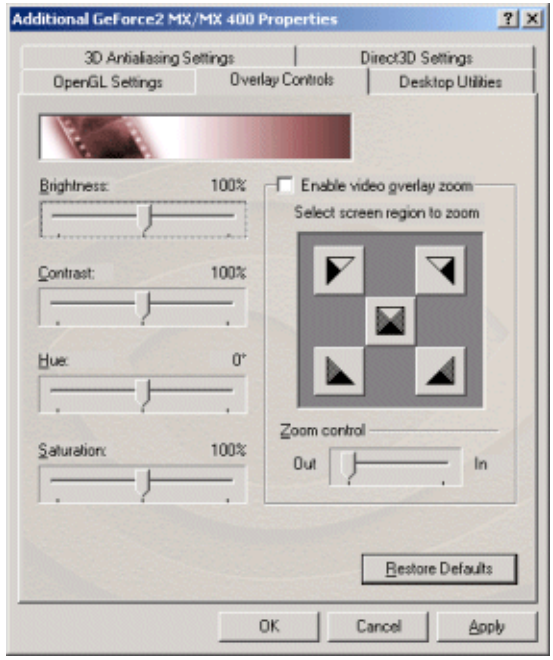


Figure 8.3 Overlay Controls for GeForce2 MX Dual-Displays: Windows 2000

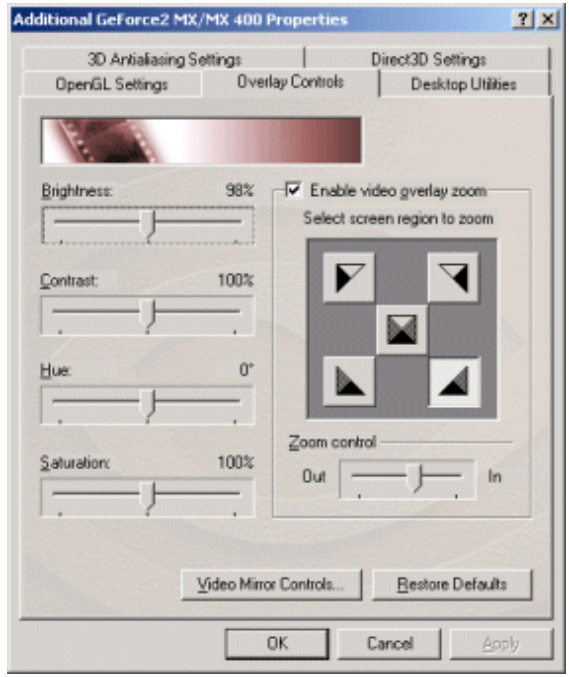
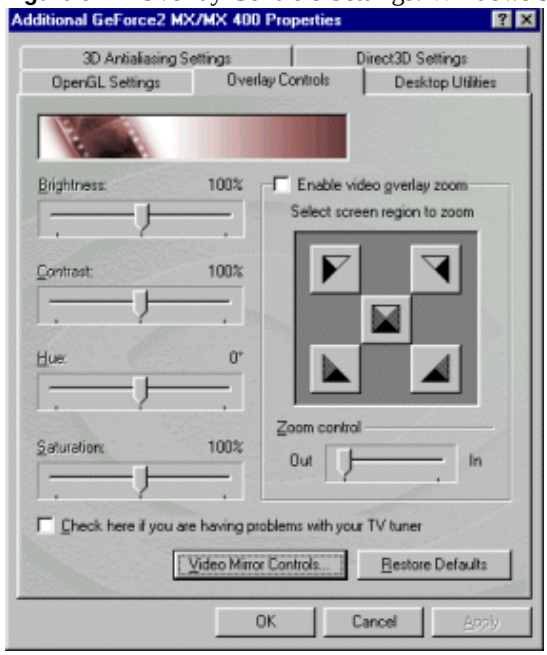


Figure 8.4 Overlay Controls Settings: Windows 98



Video Mirror Controls

Note: Be sure to click **Apply** whenever you make any changes to the control panels. If changes 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.

TwinView Clone Mode

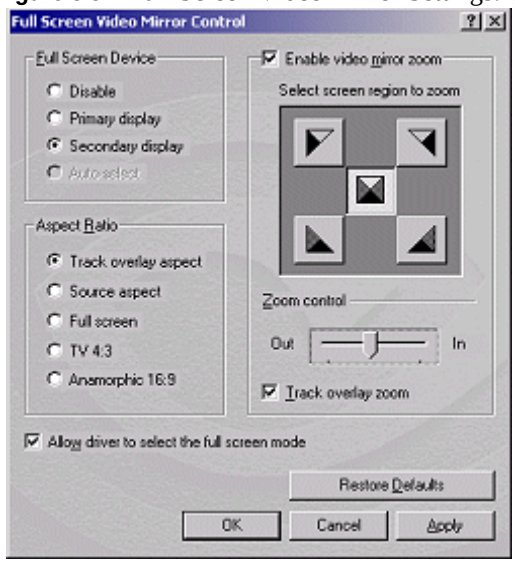
Follow these steps to access the Video Mirror settings if you are using TwinView Clone mode:

1. From the Overlay Controls panel, click **Video Mirror Controls** to open the Full Screen Video Mirror Control panel.

   The first time you enter this panel, the Disable option is selected and the Auto-select option is disabled.

2. Click either **Primary display** or **Secondary display** to duplicate the video image on the full screen of your secondary device (such as a TV or DFP) or primary device (such as your CRT). The other options on this panel become enabled as shown in Figure 8.5.

Figure 8.5 Full Screen Video Mirror Settings: Clone Mode (Windows 2000)



3 Make any other changes you want (see "Video Mirror Settings" on page 101) and click **Apply**.

Windows 9*x* Extended Desktop Mode

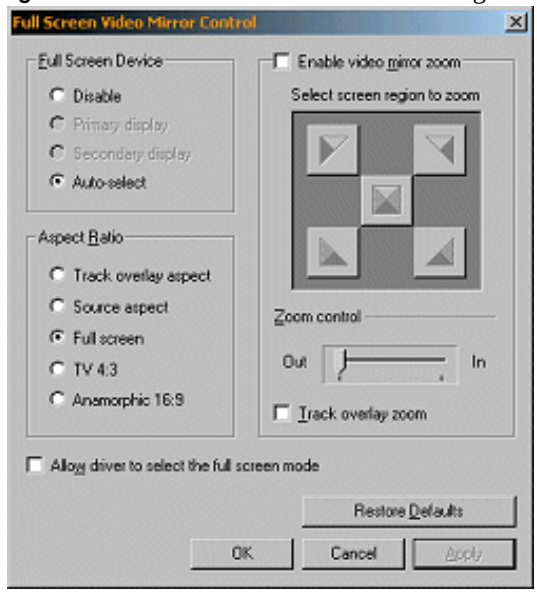
Follow these steps to access the Video Mirror settings if you have enabled the Windows 9*x Extended Desktop* option on the Windows Settings control panel:

1 From the Overlay Controls panel, click **Video Mirror Controls** to open the Full Screen Video Mirror Control panel. The first time you enter this panel, the Disable option is selected; the Primary display and Secondary display options are disabled.

2 Click **Auto-select** to enable Full Screen Device functionality (Figure 8.6).The other options on this panel become enabled.

3 Make any other changes you want (see "Video Mirror Settings" on page 101) and click **Apply**.

Figure 8.6 Full Screen Video Mirror Settings: Extended Desktop (Windows 98)



Video Mirror Settings

Table 8.1 describes the Video Mirror configuration settings. With the exception of Enable Video Overlay Zoom, which is available on the Overlay Controls panel, these settings are available on the Full Screen Video Mirror control panels.l

Table 8.1 Video Mirror Settings

Features	Description
Enable Video Overlay Zoom	Enables zooming to a quadrant of the video data on the overlay; this setting does not require a TwinView device. (*See also* description of **Track Overlay Zoom** later in this table.)
• Select screen region to zoom	Select the quadrant to zoom.
• Zoom control slider	Moves the slider to zoom in and out. Video players that are not able to detect the presence of Video Mirror may not update the zoom factor immediately while displaying a still frame.
Full Screen Device	
• Disable	Disables Video Mirror.
• Primary display • Secondary display	To enable Full Screen Device functionality in *Clone* mode, click either Primary display or Secondary display as the full-screen Video Mirror device.

continued on next page. . . .

Table 8.1 Video Mirror Settings (continued)

Features	Description
• Auto-select	This setting is not available under Windows 2000. Auto-select enables Full Screen Device functionality in Windows 9*x* Extended Desktop or Windows XP DualView mode, 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.
Note: After selecting any of the above options, you may need to exit and restart your video application for the settings to take effect.	
Enable video mirror zoom	Enables zooming to a quadrant of the video display on the full-screen image.
• Select screen region to zoom	Select the quadrant to zoom
• Zoom control slider	Move the slider to zoom in and out.
	Note: Video players that cannot detect the presence of Video Mirror may not update the zoom factor immediately while displaying a still frame.
Aspect Ratio	This category contains advanced settings used to change the aspect ratio of the video display on the Video Mirror.
• Track overlay aspect	Default and recommended setting. The aspect ratio of the Video Mirror tracks the aspect ratio of the overlay.
• Source aspect	The aspect ratio of the Video Mirror is the same as that of the source video, assuming square pixels.
• Full screen	The video is stretched to the boundaries of the Video Mirror device.
• TV 4:3	Forces the Video Mirror aspect ratio to 4:3 (width:height).
• Anamorphic 16:9	Forces the Video Mirror aspect ratio to 16:9 (width:height).
Allow driver to select the full-screen mode	This is an advanced setting enabled by *default*. When enabled, the Video Mirror driver selects the optimal display mode for the full-screen device. When disabled, the Video Mirror uses the desktop mode that is currently set on the display device.
Track overlay zoom	Activating this option links the Zoom control on the Overlay Controls panel to simultaneously control the zoom factor on the full screen video display. When **Track overlay zoom** is enabled, using either the Overlay Zoom or the Video Mirror Zoom controls affect both the overlay and the full screen video display. To use Track overlay zoom, follow these steps on the Video Mirror Controls panel: **1** Click **Track overlay zoom** to check it. **2** Click **Enable video mirror zoom** to check it. **3** Select a quadrant (screen region) to zoom. **4** Move the Zoom control slider to zoom. Both the video overlay and its full screen mirror image on a secondary device (such as TV or DFP) zoom simultaneously. **5** To achieve the same results from the Overlay Controls panel, continue with these steps:

continued on next page. . . .

Table 8.1 Video Mirror Settings (continued)

Features	Description
	6 Click **OK** to return to the Overlay Controls panel. 7 Click **Enable video overlay zoom** to check the option (if it's not already checked). 8 Move the Zoom control slider to zoom. Both the video overlay and its full screen mirror image on a secondary device (such as TV or DFP) zoom simultaneously
Apply	When changing the Full Screen Device settings, click **Apply** for the changes to take effect. In general, the changes automatically take effect for all other settings.

CHAPTER 9

DESKTOP MANAGER

This chapter contains the following sections:

- "Features Overview" on page 106
- "Enabling Desktop Manager" on page 107
- "Application Management" on page 109
- "Hot Keys" on page 114
- "Global Settings" on page 117
- "Pop-up Settings" on page 120
- "Zoom Settings" on page 121

Notes Before You Begin

Note: Desktop Manager is currently not supported under Windows XP.

- In this chapter, Windows 9*x* refers to Windows 98 and Windows Me, but *not Windows 95*. Desktop Manager does *not* support Windows 95 due to features lacking in the Windows 95 operating system.
- If you have only one display device connected to your computer, under Windows 9*x*, you will not have Desktop Manager functionality and under Windows 2000/NT 4.0, you'll have limited Desktop Manager functionality.
- Windows 2000 control panel screens also apply to Windows NT 4.0; exceptions are noted where applicable.

Features Overview

Note: The NVIDIA Desktop Manager is a software feature designed for use with any NVIDIA dual-display graphics card, such as any card in the GeForce2 MX or Quadro2 MXR family of products.

Desktop Manager allows you to run one or more applications on one or both monitors or desktops and primarily works in conjunction with the TwinView Span modes in Windows 2000/NT 4.0 and Windows 9*x* Extended Desktop modes.

Key features of and improvements to Desktop Manager include the following:

- Re-centered dialog boxes and menus, which prevents them from splitting across two monitors
- Application-management features, such as maximizing the image to a single monitor and restoring application windows to their last-used position
- Multiple-desktops support, such as the ability to launch applications on separate desktops, switch between desktops using hot keys, and an improved task switcher (Alt-Tab) window
- Window-management hot keys to move windows from one monitor to the other
- Specific application support, such as the ability to display Microsoft PowerPoint slide shows on a single monitor without breaking the display across two monitors under multi-monitor mode
- "Zoomed" views of the screen area under your mouse cursor and changing the zoom level on the fly using hot keys or the mouse wheel
- Resized task bar so that it no longer spans across monitors
- Unicode-enabled, which allows entering desktop names in any non-English language that is supported by the Windows operating system running NVIDIA software and hardware

Windows 2000/NT 4.0 vs. Windows 9*x*

Desktop Manager features are an artifact of how Windows 2000 handles multi-monitor.

- **Windows 2000/NT 4.0:** An NVIDIA dual-display card *is not* detected as two *separate* devices. Therefore, Desktop Manager adds functionality so that the two monitors can be used as if they were attached to two separate devices. Desktop Manager is available under **TwinView Standard, Clone, Horizontal Span** and **Vertical Span** modes.

Note: Span modes ensure full Desktop Manager functionality. Under the **Standard mode** setting, only "multiple desktop" features are supported.

- **Windows 9*x*:** An NVIDIA GPU-based dual-display card *is* detected as two separate devices resulting in much of the Windows NT 4.0/2000 Desktop Manager functionality being inherent to the Windows 9*x* operating system. For this reason, only a subset of the Windows NT 4.0/2000 features is required and available under the Windows 9*x* Desktop Manager.
  - Desktop Manager is available under **Windows 9*x* Extended Desktop** (*TwinView disabled*) mode; it is not available under Windows 9*x* TwinView Clone or Standard (*TwinView disabled*) mode.
  - Windows 9*x* does not support multiple desktops.

Enabling Desktop Manager

Follow these steps to enable Desktop Manager:

1. Before you can access NVIDIA Desktop Manager, you must have the following settings:
   - Under **Windows 9*x*,** from you desktop, click **Properties** and the **Settings** tab to open the Settings control panel; be sure the **Extend my desktop onto this monitor** option is checked.
   - Under Windows **2000/NT 4.0**, open the TwinView control panel and set to **Standard**, **Clone, Horizontal Span** or **Vertical Span** mode. Again, note that TwinView Horizontal and Vertical Span modes ensure full Desktop Manager functionality, while the Standard mode (*TwinView disabled*) setting only supports "multiple desktop" features in Desktop Manager.
2. To access Desktop Manager, you need to use the NVIDIA Desktop Utilities control panel to add the NVIDIA QuickTweak icon to the Windows task bar and add Desktop Manager to the QuickTweak utility, as shown in Figure 9.1

   For details on the procedure, *see* "Desktop Utilities" on page 125.
3. You can use one of two options to access the Desktop Manager Properties panels:
   - Click the **Desktop Manager Configuration** button (shown in Figure 9.1) *or*
   - Click the **NVIDIA QuickTweak** icon on the Windows task bar, then select **Desktop Manager Properties** from the context menu (Figure 9.2).

Figure 9.1 Displaying the QuickTweak Icon

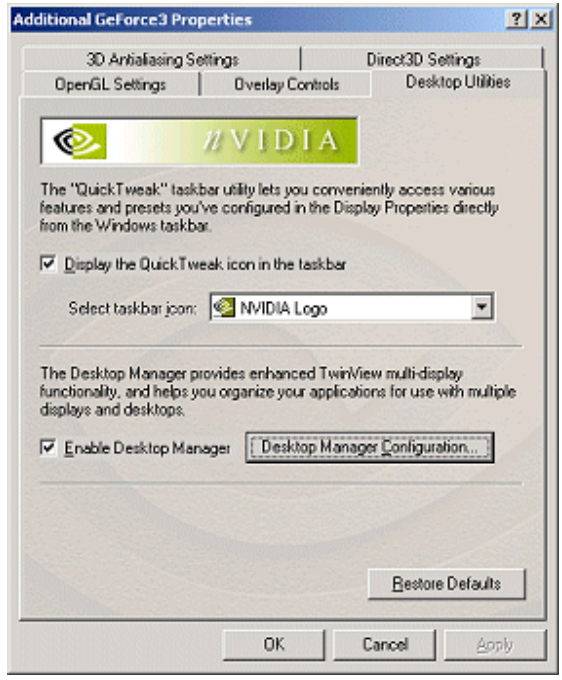
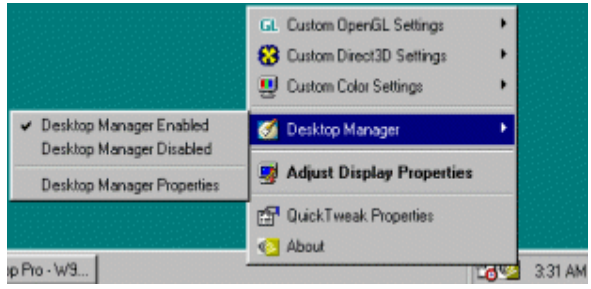


Figure 9.2 Starting Desktop Manager From the QuickTweak Icon



4 To configure Desktop Manager, use the NVIDIA Desktop Manager control panels (Figure 9.3 and Figure 9.4), which contain the Application Management, Hot Keys, Global Settings, Pop-Ups (*only* for Windows 2000/NT 4.0) and Zoom tabs, as described in the sections that follow.

Tips on Using Desktop Manager

- The first time you open the Desktop Manager control panels, click **Apply** on any of the settings windows, such as Global Settings and Hot Keys, for the current settings to take effect.
- **Important**: For application-specific settings, such as those in Figure 9.7 that involve **Starting . . .** or **Maximizing . . .** applications, you must exit and restart the application for the setting to take effect.
- Once you've completed configuring one or more applications under Desktop Manager, it is recommended that you close the Desktop Manager Properties panel.
- Any time you want to access the Desktop Manager settings, you can follow one of these procedures:
  - Click the NVIDIA Quick Tweak icon on the Windows status bar and select **Desktop Manager**, as explained in Enabling Desktop Manager earlier in this chapter.
  - If you are already running an application that you configured in Desktop Manager, you can right-click the title bar of the open application. (See "Global Settings" on page 117 to enable this feature.)

Application Management

Use the Application Management panel (Figure 9.3 and Figure 9.4) to add applications that you want to configure under Desktop Manager and then enable any of the settings that are listed.

Adding an Application to Desktop Manager

To add an application to configure in Desktop Manager, follow these steps:

1. **Important:** Be sure that the applications you want to run using Desktop Manager are already open.
2. Click the **Add** button on the Application Management panel. Your open applications will appear in the New Application window as shown in Figure 9.5 and Figure 9.6**.**

   Note: If you are not able to access **2** in the box even though your second monitor is active, close the Desktop Manager Properties panel and re-open it.

Figure 9.3 Desktop Manager: Application Management (Windows 2000)

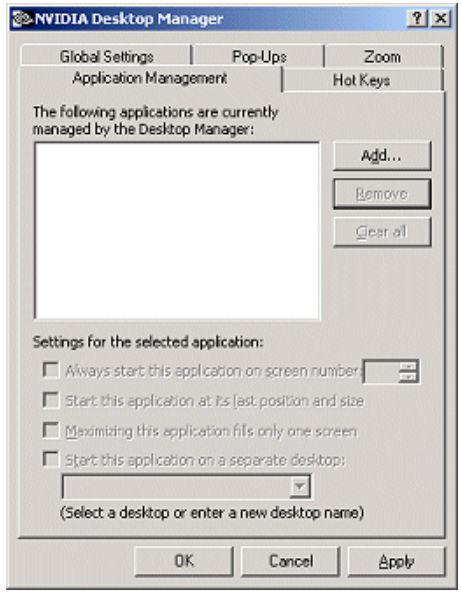


Figure 9.4 Desktop Manager: Application Management (Windows 98)

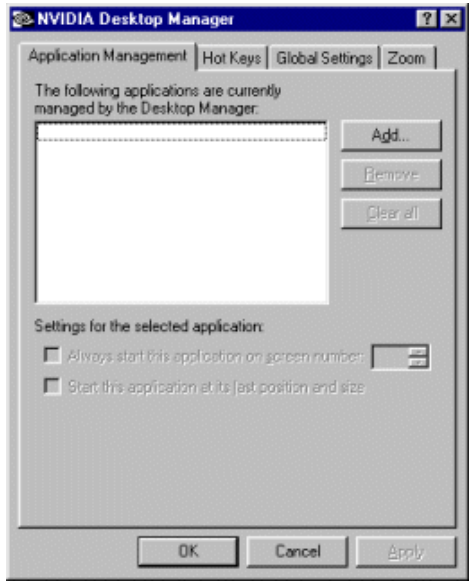


Figure 9.5 Desktop Manager: Adding the 1st Application (Windows 2000)

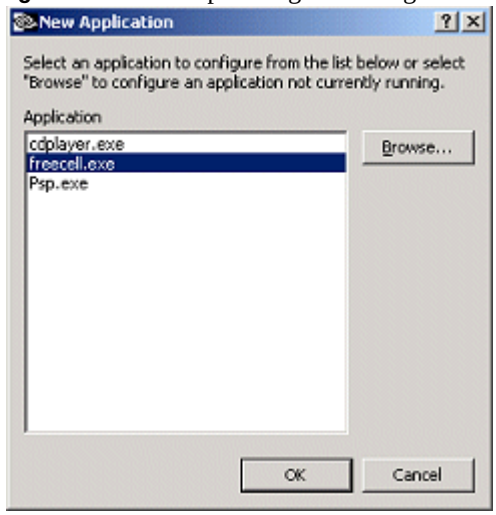
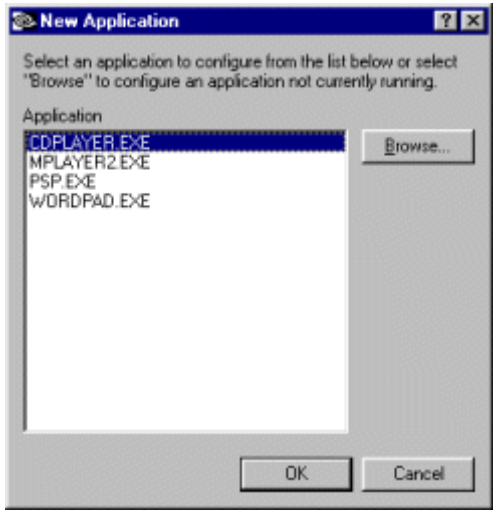


Figure 9.6 Desktop Manager: Adding the 1st Application (Windows 98)



3. Select the application you want to add, then click **OK**. The application appears in the Application Management panel, as shown in Figure 9.7 and Figure 9.8.
4. In the Application Management panel, configure the settings to your needs, then click **Apply**.
5. Repeat steps 1 through 4 for each application that you want to add to Desktop Manager. Figure 9.7 and Figure 9.8 show a variety of Desktop Manager settings that you can enable; descriptions of these settings follow:

Figure 9.7 Desktop Manager: Configuring the 1st Application (Windows 2000)

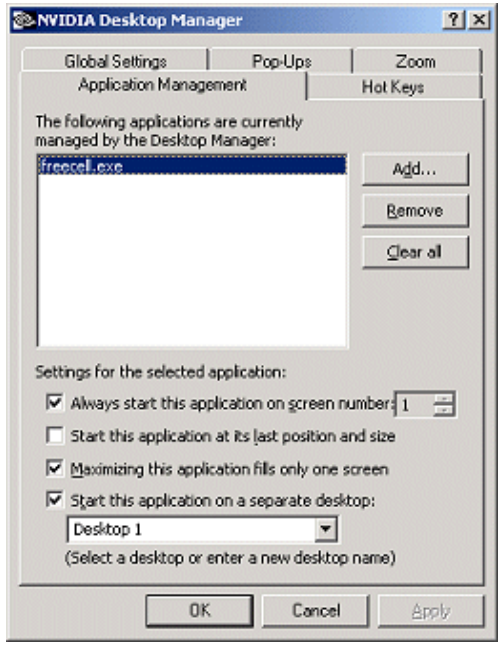
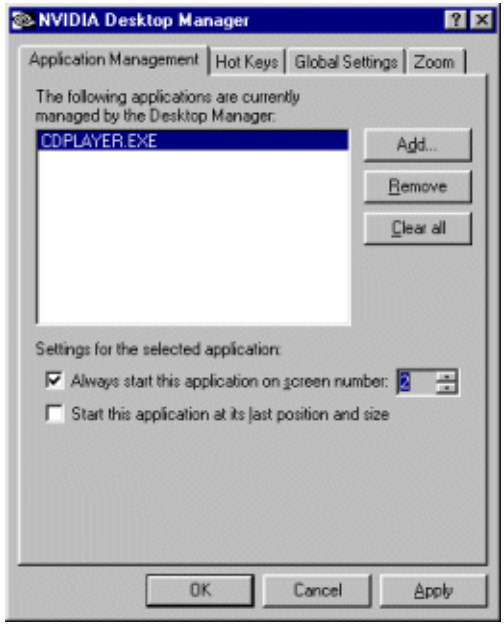


Figure 9.8 Desktop Manager: Configuring the 1st Application (Windows 98)



- **Always start this application on screen number**: Check this option to select the monitor (display device) on which you want to start the application. When you check this option, select **1** or **2** in the adjacent box.
- **Start this application at its last position and size:** When you check this option, the highlighted application starts at its previous position and size when you invoke it.
- **Maximizing the application fills only one screen:** When you check this option, the highlighted application fills only one screen (instead of both screens) when you maximize the application.
- **Start this application on a separate desktop:** When you check this option, enter a name of a new Desktop on which you want to start an application. You can create several Desktops in this manner and then select from the list of named desktops when you configure new applications.

Note: To display the NVIDIA Desktop Manager menu from any application that has been added in Desktop Manager, right-click the title bar of the open application. (See "Global Settings" on page 117.)

Figure 9.9 Desktop Manager: Adding Another Application (Windows 2000)

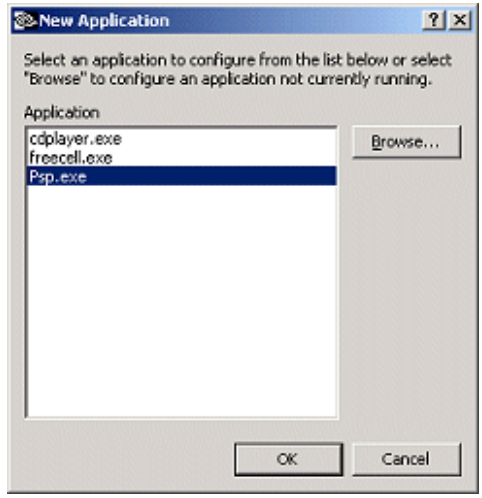
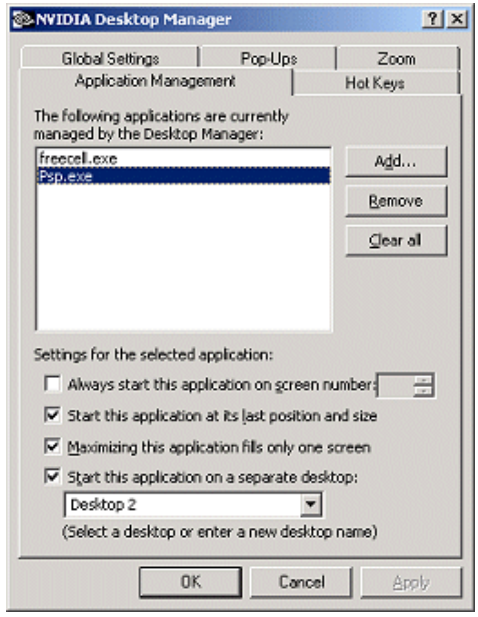


Figure 9.10 Desktop Manager: Configuring Another Application (Windows 2000)



Hot Keys

The Desktop Manager Hot Keys panel allows you to enter different key combinations and assign them to actions that involve moving active windows to another monitor or desktop, moving windows to a separate monitor, and so on. The default key combination for each action is shown in Figure 9.11 (Windows 2000/NT 4.0), Figure 9.12 (Windows 98), and listed below. You can replace any of the default hot key combinations with those you prefer.

- **Move the active window to another monitor**: (Alt + 1)
- **Move all windows to another monitor**: (Alt + 2)
- **Gather all windows to one monitor**: (Alt + 3)
- **Switch to another application desktop**: (Alt + `) [1]

Figure 9.13 shows customized hot-key settings. To specify hot key combinations other than the defaults, you can follow any one of these steps with the cursor in the Key combination field:

1. Applies only to Windows NT 4.0 & Windows 2000.

Figure 9.11 Desktop Manager: Hot Keys (Windows 2000)

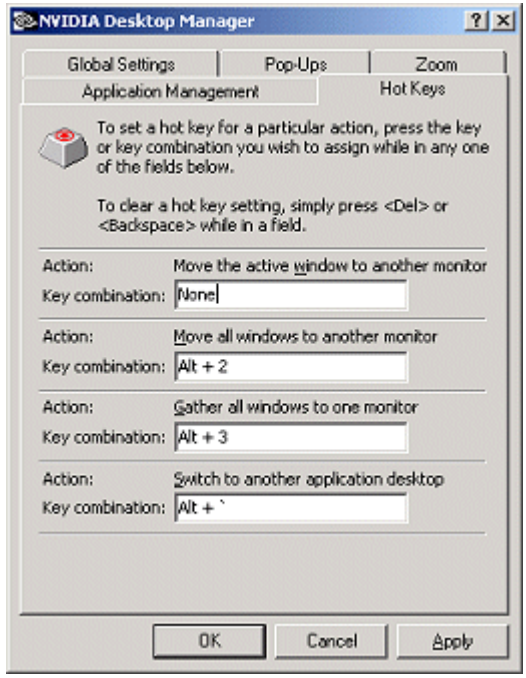


Figure 9.12 Desktop Manager: Hot Keys (Windows 98)

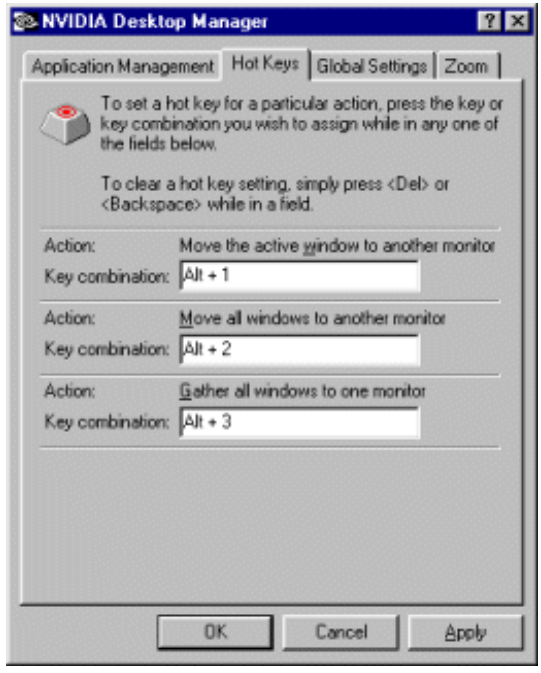
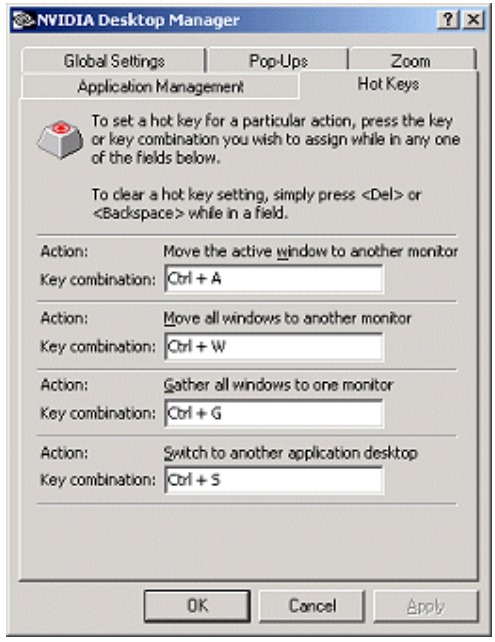


Figure 9.13 Desktop Manager: Customized Hot Keys (Windows 2000)

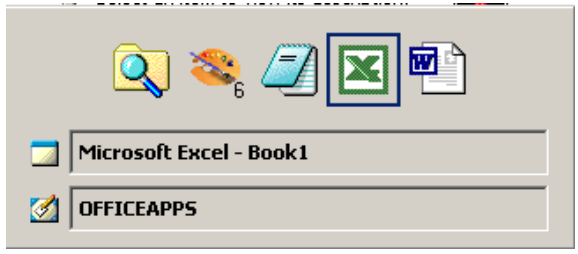


Task Switcher

You can switch amongst Desktop Manager applications using the following procedure:

1. Hold down the **Alt** key, then press and release the **Tab** key to display a menu of icons representing your active (open) applications (Figure 9.14).
2. Press the **Tab** key again until the application you want to open is highlighted, then release the keys.

Figure 9.14 Desktop Manager: Task Switcher Menu

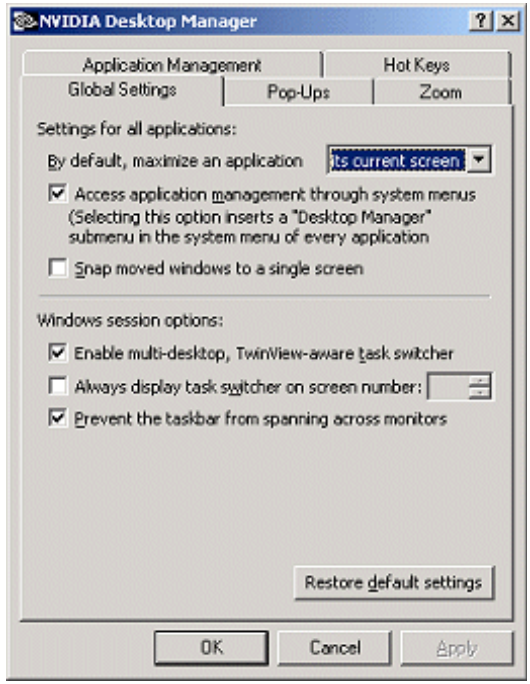


Global Settings

The Global Settings panel (Figure 9.15 and Figure 9.16) lets you specify settings that will apply to all applications running under Desktop Manager. Click on the settings checkboxes to toggle between enabling (checked) or disabling (unchecked) the settings. The settings are described below:

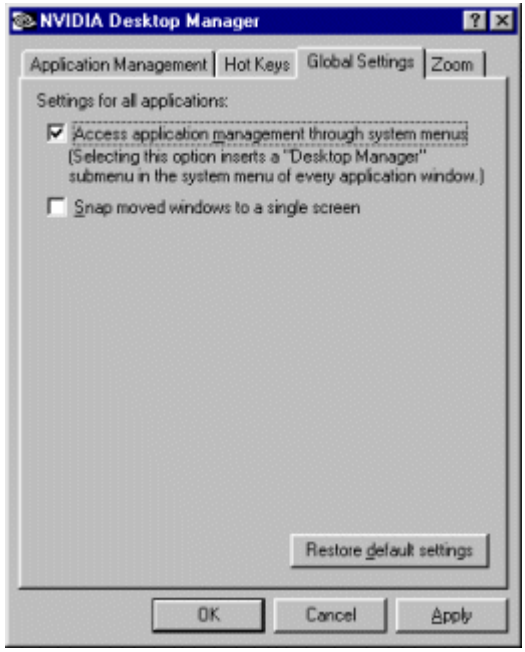
- **By default, maximize an application to**[2]: Click the down arrow in the box next to this option and select one of the following options:
  - its current screen *or*
  - the entire desktop
- **Access Application Management through system menus**: Select this option to insert a "Desktop Manager" submenu in the system menu (Figure 9.17 and Figure 9.18 in this document) of each application configured in Desktop Manager.
- **Snap moved windows to a single screen:** Check this option if you want any active application window that you are attempting to move to another monitor to automatically reposition (snap) to that monitor.

Figure 9.15 Desktop Manager: Global Settings (Windows 2000)



2. . Applies only to Windows NT 4.0 & Windows 2000.

Figure 9.16 Desktop Manager: Global Settings (Windows 98)



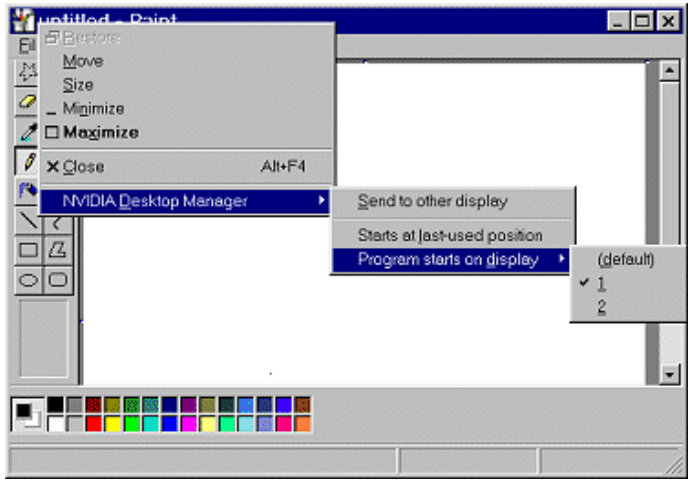
- **Enable multi-desktop TwinView-aware task switcher[3]:** Check this option to display the Desktop Manager task switcher whenever you press **Alt-tab** to switch to another application configured under Desktop Manager.
- **Always display task switcher on screen number[4]:** Check this option to select the monitor (display device) on which you want the task switcher to appear. After you check this option, select **1** or **2** in the adjacent box.

  Note: If you are not able to access the **2** in the box even though your second monitor is active, close the Desktop Manager Properties panel and re-open it.
- **Prevent the taskbar from spanning across monitors[5]:** Check this option to prevent the task bar from spanning across monitors.

3. , 4, & 5: Applies only to Windows NT 4.0 & Windows 2000.

Figure 9.17 Desktop Manager: Application Manager System Menu (Windows 2000)

Figure 9.18 Desktop Manager: Application Manager System Menu (Windows 98)



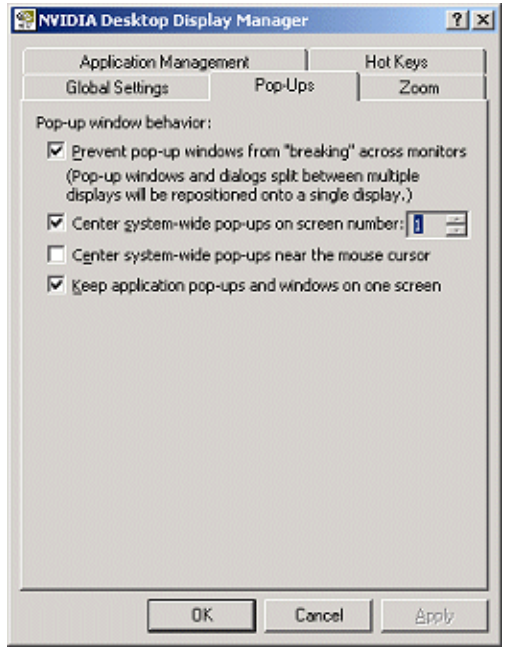
Pop-up Settings

Note: The Desktop Manager Pop-Ups panel only appears under the **Windows 2000/NT 4.0** operating systems; Pop-Up features are inherent to the Windows 9*x* operating system and, therefore, are not part of Desktop Manager.

The Desktop Manager Pop-Ups settings (Figure 9.19) allow you to control the functionality of pop-up windows or dialog boxes; descriptions of the settings follow.

- **Prevent pop-up windows from "breaking" across monitors:** Check this option to reposition pop-up windows or dialog boxes that are split across monitors to a single monitor.
- **Center system-wide pop-ups on screen number:** If you check this option, click the down arrow in the box next to this field and select 1 or 2 to center system-wide pop-up windows or dialog boxes on the specified monitor.
- **Center system-wide pop-ups near the mouse cursor:** Check this option to center system-wide pop-up windows or dialog boxes near the mouse cursor.
- **Keep application pop-ups and windows on one screen:** Check this option to keep application-specific pop-up windows or dialog boxes on a single monitor.

Figure 9.19 Desktop Manager: Pop-Up Settings: Windows 2000



Zoom Settings

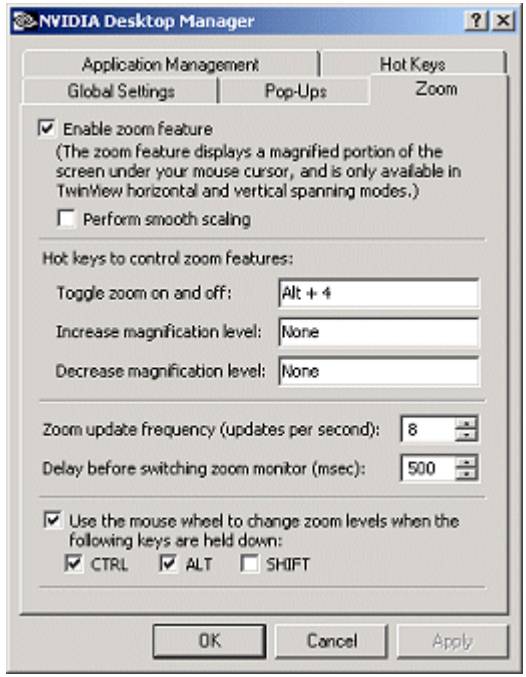
The Zoom feature is available under

- **Windows 2000/NT 4.0** Horizontal and Vertical Span modes
- **Windows 9*x*** "Extended Desktop" mode

Since the Zoom feature is "hardware-accelerated" under **Windows 2000/NT 4.0** but not in Windows 9*x*, it functions more slowly under Windows 9*x*.

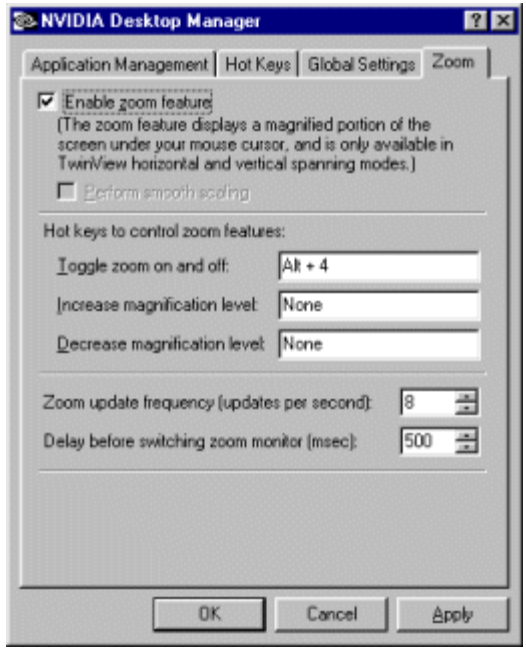
Zoom enables a magnified ("zoomed") view of a region of the screen under and around the mouse cursor. The zoomed view appears on the monitor on which the mouse cursor is *not* pointing. Zoom *default* options are shown in Figure 9.20 (Windows 2000), Figure 9.21 (Windows 98), and explained below.

Figure 9.20 Desktop Manager: Zoom Settings (Windows 2000)



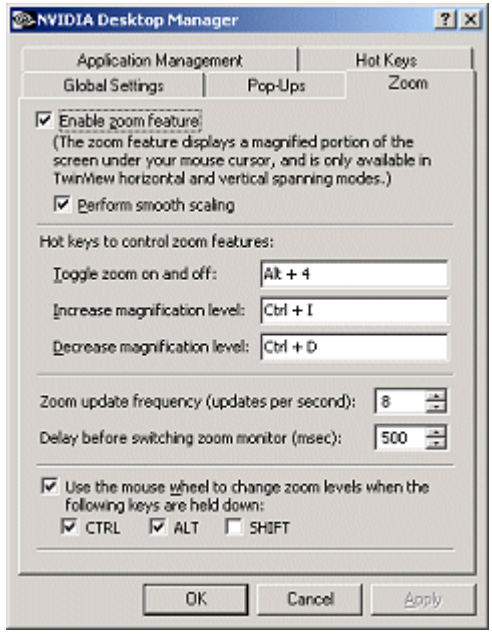
- **Enable Zoom:** By default, the Zoom feature is enabled (available for use) and can be activated by pressing **Alt + 4**, the *default*. This hot key combination can be customized. (See "Desktop Manager: Zoom Settings (Windows 98)" on page 122.)

Figure 9.21 Desktop Manager: Zoom Settings (Windows 98)



- **Perform Smooth Scaling: (Windows 2000/NT 4.0 *only*)** You can enable Perform Smooth Scaling for a “smooth” zoomed view. This option, disabled by default, causes the hardware to perform filtering when displaying the zoomed view. Filtering reduces the “blockiness” and hard edges caused by greatly magnifying the display; however the resulting view may appear fuzzy and is generally undesirable for applications such as photo and image editing.
- **Hot Keys to Control Zoom:** Figure 9.22 shows user-modified Zoom hot keys. To specify hot key combinations other than the defaults, you can follow the steps described in the section “Hot Keys” on page 114.
  - **Toggle zoom on and off:** Press **Alt + 4** (default) or any other key you’ve specified to turn zoom on and off. (To enter ‘None’, press the space bar.)
  - **Increase magnification level:** If None appears in this field, specify a key or key combination as described earlier.
  - **Decrease magnification level:** If None appears in this field, specify a key or key combination as described earlier.
- **Zoom update frequency:** The magnified view is updated whenever the mouse cursor is moved and is updated at a fixed interval when the mouse cursor is still. The update or “refresh” rate of the zoomed view is configurable and can be set from one to 100 times per second.

Figure 9.22 Desktop Manager: Modified Zoom Hot Keys (Windows 2000)



- **Delay before switching zoom monitor:** When you move the mouse cursor from one monitor to the other, the zoomed view automatically switches monitors after a user-definable time delay (0 to 1000 milliseconds, 500 being the default). The time delay exists to allow the mouse cursor to briefly "stray" to the other monitor without a disruptive popping of the zoomed view from one monitor to the other (and back). The delay can be set to 0 for instant switching of the zoom window.

Using Zoom

The default magnification level provided by the zoomed view is 8× the regular view. Using the defined hot-key, the magnification level can range from a minimum of 2× to a maximum of 32×. However, the easier way to change the zoom level is by holding down the **Ctrl** and **Alt** keys and using the mouse wheel.

Note: Changing the zoom level using the mouse wheel is currently *only* supported under Windows 2000/NT 4.0.

Scrolling the wheel forward (away from you) increases the magnification, and scrolling backward (towards you) decreases magnification. The current magnification level will be reset to the default whenever Desktop Manager is restarted, but will otherwise be maintained within one Windows session.

Figure 9.23 shows part of a zoomed application.

Figure 9.23 Desktop Manager: Zoomed Image (Windows 2000)

CHAPTER 10

ADDITIONAL FEATURES AND ENHANCEMENTS

This chapter explains the following additions and enhancements to the Detonator XP driver:

- "Desktop Utilities" on page 125
- "Color Correction Panel" on page 128
- "OpenGL Settings" on page 130
- "Direct3D Settings" on page 135
- "3D Antialiasing Settings" on page 138
- "Overlay Controls Panel" on page 140

Note: Windows 2000 control panel screens also apply to **Windows NT 4.0 and XP**; exceptions are noted where applicable.

Desktop Utilities

Use the NVIDIA Desktop Utilities control panel to enable the NVIDIA QuickTweak icon (a Windows task bar utility), which lets you conveniently view and even modify various features and configurations that are available on the NVIDIA control panels.

The following configurations can be accessed and modified through the QuickTweak icon:

- **3D Antialiasing Settings:** These settings are also available through the NVIDIA 3D Antialiasing Settings control panel.

- **Custom OpenGL Setting** These settings are also available through the NVIDIA OpenGL Settings control panel
- **Custom Direct3D Settings** These settings are also available through the NVIDIA Direct3D Settings control panel
- **Custom Color Settings** These settings are also available through the NVIDIA Color Correction control panel
- **Desktop Manager Settings** These settings are also available by click the title bar of an application that has already been configured with NVIDIA Desktop Manager.
- **Adjust Display Properties** These settings are also available by right-clicking from the Windows desktop, selecting **Properties** and then the **Settings** tab.

Enabling the NVIDIA QuickTweak Icon

Follow these steps to enable the NVIDIA QuickTweak icon:

1. From the Windows desktop, click **Properties** and the **Settings** tab to display the **Windows Settings** panel.
2. Click the **Advanced** button.
3. Click the tab with the name of your NVIDIA GPU-based card, such as GeForce3, GeForce2 MX/MX 400, Quadro2 MXR/EX, etc. In this example, it is **GeForce2 MX/MX 400**.
4. Click **Additional Properties,** then click **Desktop Utilities** to display the Desktop Utilities control panel.
5. Check the **Display the QuickTweak icon in the taskbar** check box as shown in Figure 10.2**.**

   Notice that the NVIDIA icon is added to your Windows task bar --- usually positioned at the bottom of your Windows desktop.
6. *Optional:* If you want to enable the Desktop Manager feature, check the **Enable Desktop Manager** check box also, as shown in Figure 10.2.

   For details on the **Desktop Manager** feature**,** *see* "Desktop Manager" on page 105**.**
7. Right-click the NVIDIA icon on your Windows task bar. A menu of configuration options appears, as shown in Figure 10.3 (for the GeForce2 MX card) and Figure 10.4 for the GeForce3 GPU-based card.
8. To see the configuration options for your card, point to the options that appear on the menu level and the next level of options appears, as shown in Figure 10.3 and Figure 10.3.

Figure 10.1 NVIDIA Desktop Utilities for GeForce2 MX: Windows 2000

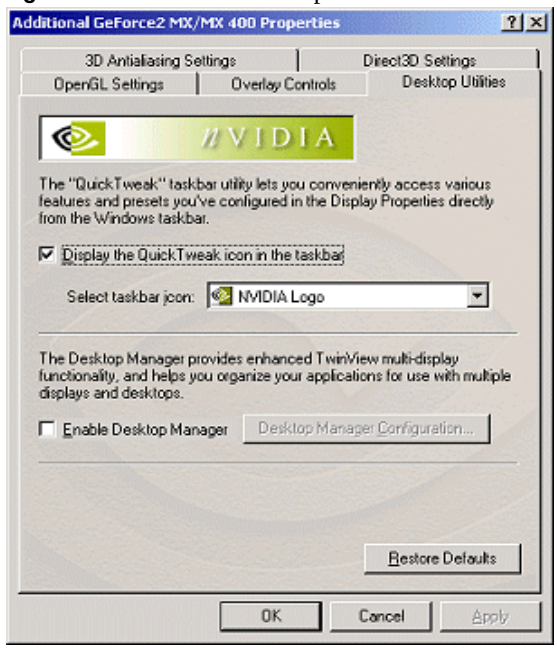


Figure 10.2 NVIDIA Desktop Utilities for GeForce3: Windows 2000

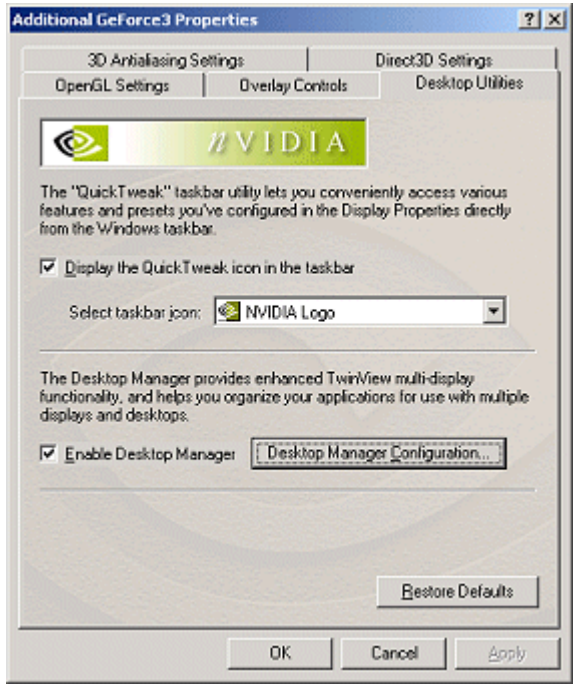


Figure 10.3 NVIDIA QuickTweak Icon Menu: GeForce2 MX on Windows 2000

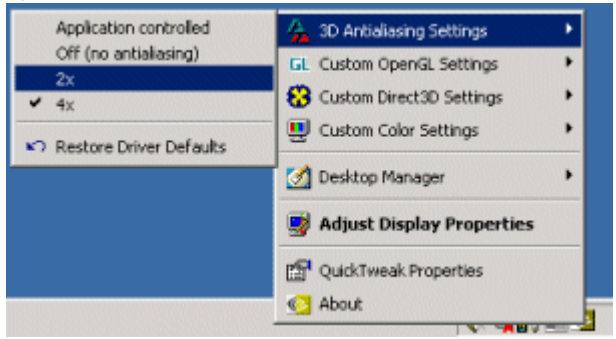
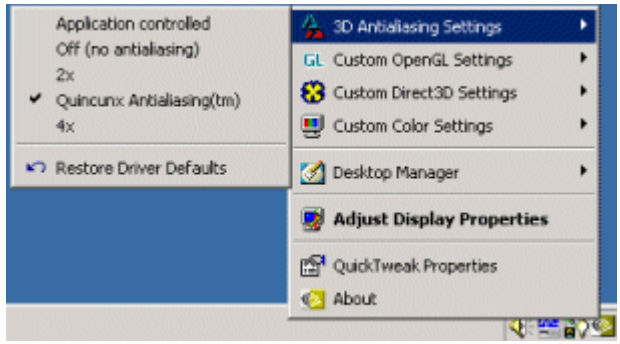


Figure 10.4 NVIDIA QuickTweak Icon Menu: GeForce3 on Windows 2000



Color Correction Panel

Follow these steps to access the Color Correction control panel:

- **If you are using a GeForce3 GPU-based card, another non-TwinView NVIDIA GPU-based card, or have not enabled TwinView on your system yet, follow these steps:**

  a Right click from the Windows desktop to display the context menu, click **Properties**, the **Settings** tab, and the **Advanced** button

  b Click the **Color Correction** tab to display the NVIDIA Color Correction panel. (Figure 10.5).

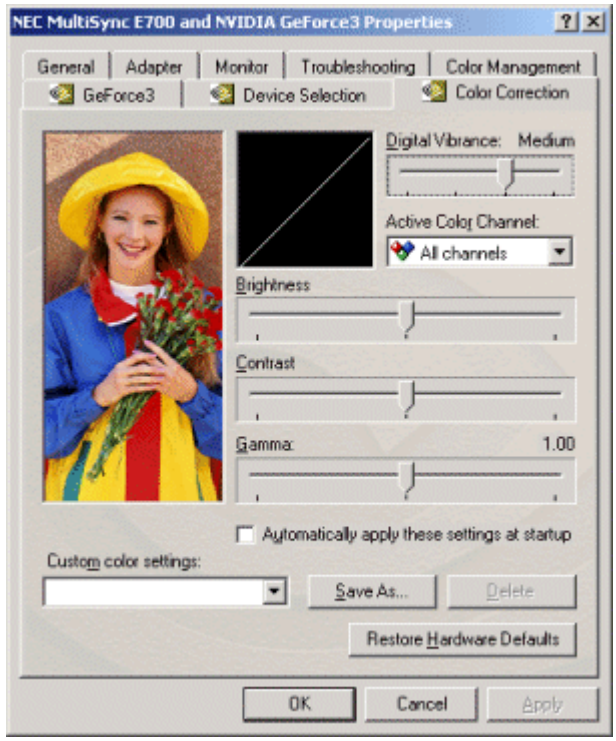
- **If you are using a TwinView-based card,** have TwinView enabled, and want to access the Color Control Panel from the TwinView panel, follow these steps:

  a Open the TwinView control panel.

  b To access the context menu, right click on a monitor icon that appears on the TwinView panel.

c Select **Color Correction** from the context menu.

Figure 10.5 Color Correction Control Panel



Color Correction Settings

- **Digital Vibrance**

  Note: The **Digital Vibrance** feature is supported by the GeForce3 family, GeForce2 MX family, GeForce2 Go, and the Quadro2 MXR GPUs.

  Digital Vibrance, a mechanism for controlling color separation and intensity, boosts the color saturation of images so that all images — including 2D, 3D, and video — appear brighter and crisper, even on flat panels.

  Digital Vibrance can be turned off or set to different levels from low to high through the Color Correction control panel as shown in Figure 10.5.

- **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.

- **Diagonal Line/Curve:** A graphical representation of the color curve. This curve will change in real time as you adjust the contrast, brightness or gamma.
- Selecting **Automatically apply these settings at startup** automatically restores the color adjustments you have made here when Windows is restarted.

  Note: If your computer is running on a network, the color will be adjusted after you have logged on to Windows
- **Custom color settings** provides a list of the custom color settings you have saved. Selecting an item from the list will activate the setting.
- **Save as** lets you save the current color settings as a custom setting. Saved settings will then be added to the adjacent list.
- **Delete** deletes the custom color setting currently selected in the list.
- **Restore Hardware Defaults** restores all color values to the hardware factory settings.

OpenGL Settings

Follow these steps to access the OpenGL Setting panel:

1. Right click from the Windows desktop to display the context menu, click **Properties**, the **Settings** tab, and the **Advanced** button
2. Click the tab with the name of your NVIDIA GPU, such as GeForce3, GeForce2 MX/MX 400, Quadro2 MXR/EX, etc.
3. Click **Additional Properties**, then click the **OpenGL Settings** tab to display the OpenGL Settings panel.

Figure 10.6 OpenGL Settings: GeForce3

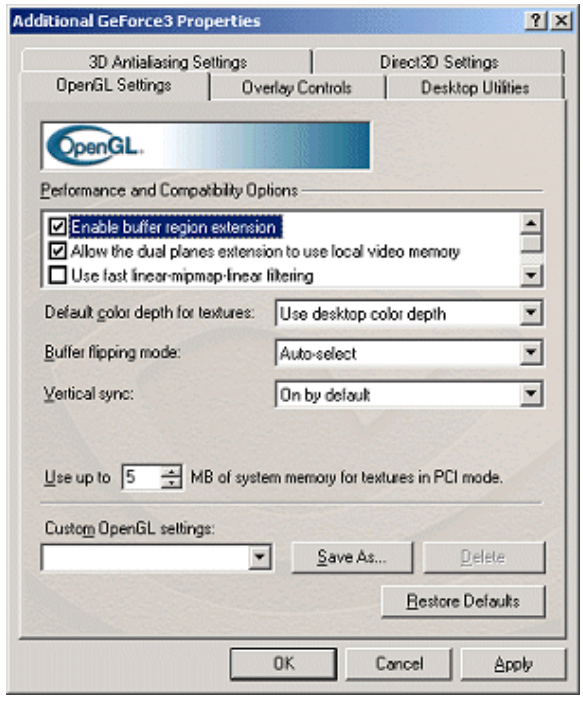


Figure 10.7 OpenGL Settings (GeForce2 MX)

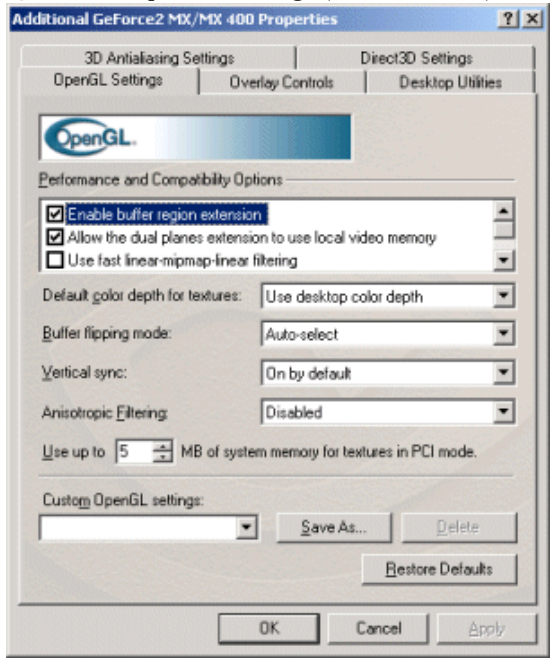
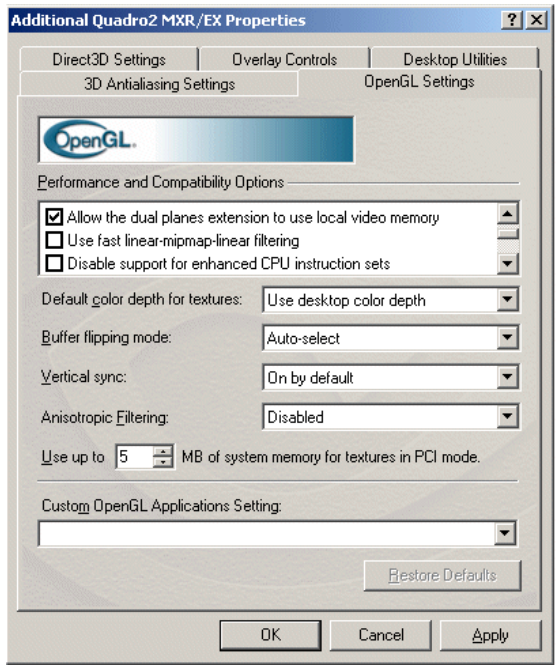


Figure 10.8 OpenGL Settings (Quadro2 MXR/EX)



Description of OpenGL Settings

Performance and Compatibility Options

- **Enable buffer region extension** allows the drivers to use the OpenGL extension `GL_KTX_buffer_region`, which can increase application performance in 3D modeling applications that support this extension.
- **Allow the dual pane extensions to use local video memory** allows the use of local video memory when the `GL_KTX_buffer_region` extension is enabled. However, if there are less than 8 MB of local video memory available, dual planes extension support will not be enabled.

  Note: This setting has no effect if the "**Enable buffer region extension**" option above is disabled.
- **Use fast linear-mipmap-linear filtering** allows fast linear-mipmap-linear filtering, which increases application performance but at the expense of some image quality. In many cases, a loss of image quality may not be noticeable, so you may want to take advantage of the extra performance that is gained by enabling this feature.

- **Disable support for enhanced CPU instruction sets** disables 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.
- **Force 16-bit depth buffer** is *only* supported by GeForce3 and the GeForce2 family of NVIDIA GPUs.

  Note: This feature is not available with the Quadro or Quadro2 family of NVIDIA GPUs.

  Windows XP/2000/NT 4.0: This option forces the OpenGL driver to use a 16-bit depth buffer regardless of the pixel format chosen by the application. Enabling this option improves the performance of depth buffer clears and operations but at the expense of less precision in the depth buffer.
- **Enable alternate depth buffering technique** enables an alternate technique for depth buffering. This lets the hardware use a different mechanism for depth buffering in 16-bit applications. Enabling this setting can produce higher quality rendering of 3D images.
- **Use unified back/depth buffer (UBB), Enable quadbuffered stereo API,** and **Enable Overlays** are *only* supported by:
  - Workstation graphics cards such as those based on the NVIDIA Quadro and Quadro2 family of GPUs
  - **Windows XP/2000/NT 4.0**

  When the UBB option is enabled, all OpenGL applications share memory for their depth and back buffers. When this option is disabled, each OpenGL window allocates its own depth and back buffer resources. Generally, the option should be enabled when you frequently have multiple large OpenGL windows open simultaneously.

  On cards using the Quadro series of graphics processors, UBB must be enabled to take advantage of such features as **OpenGL overlay planes** and **quadbuffered stereo**. These features can be enabled through this control panel page on NVIDIA workstation graphics cards.
- **Enable Advanced Multiple Monitors** is an option that is currently supported under **Windows/NT/XP** and appears on systems installed with any two NVIDIA GPU-based graphics cards; i.e., TNT family and later versions. For example, one TNT2 and one GeForce2 MX is an acceptable combination. However, RIVA 128/128ZX are excluded from this combination.

  When this option is enabled, an OpenGL application started on one monitor can continue rendering when moved to the other monitor or when spanning

both monitors. When this option is disabled, an OpenGL application only renders on the monitor on which it was started.

- **Default color depth for textures** determines whether textures of a specific color depth should be used by default in OpenGL applications.
  - **Use desktop color depth** will always use textures of the color depth at which your Windows desktop is currently running.
  - **Always use 16 bpp** and **Always use 32 bpp** options forces the use of textures of the specified color depth, regardless of your desktop settings.
- **Buffer flipping mode** determines the buffer-flipping mode for full-screen OpenGL applications. You can select from one of the following methods:
  - **Use block transfer** is the block transfer method
  - **Use page flip** is the page flip method.
  - **Auto-select** allows the driver to determine the best method based on your hardware configuration.
- **Vertical sync** lets you specify how vertical synchronization (sync) is handled in OpenGL.
  - **Always off** will always disable vertical sync in all OpenGL applications.
  - **Off by default** will keep vertical sync disabled, unless an application specifically requests that it be enabled.
  - **On by default** will keep vertical sync enabled unless an application specifically requests that it be disabled.
- **Anisotropic filtering** allows OpenGL to use anisotropic filtering for improved quality of images.
  - **Disabled** disables Anisotropic filtering
  - **Enabled** allows OpenGL to use anisotropic filtering for improved image quality. Note, however, that enabling this feature improves image quality but at the expense of performance.
- **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).

  Note: 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

- **Custom OpenGL settings** displays a list of the custom settings (or "tweaks") you have saved. Selecting an item from the list will activate the setting. To apply the setting, click OK or Apply.
- **Save As . .** lets you save the current settings as a custom "tweak". Saved settings will then be 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 of the options individually.
- **Delete** lets you delete the custom setting currently selected in the Custom OpenGL settings field.

Custom OpenGL Application Settings

Custom OpenGL Application settings (for workstation graphics cards) displays a list of preconfigured settings corresponding to OpenGL workstation applications.

Direct3D Settings

Follow these steps to access the Direct3D Setting panel:

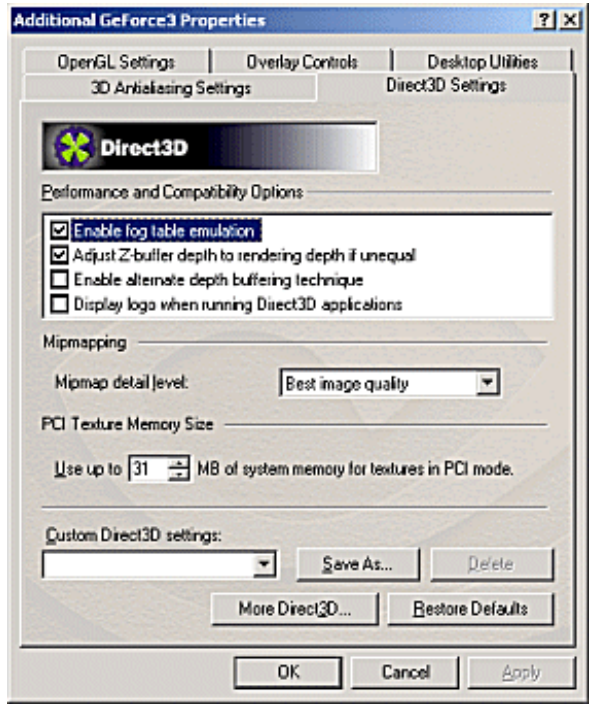
1. Right click from the Windows desktop to display the context menu, click **Properties**, the **Settings** tab, and the **Advanced** button
2. Click the tab with the name of your NVIDIA GPU-based card, such as GeForce3, GeForce2 MX/MX 400, Quadro2 MXR/EX, etc.
3. Click **Additional Properties**, then click the **Direct3D Settings** tab to display the Direct3D Settings panel. Figure 10.9 uses GeForce3 as an example.

Description of Direct3D Settings

- **Enable fog table emulation** is used to turn fog table emulation *on* or *off*. Direct3D specifies that a display adapter capable of D3D hardware acceleration should be able to implement either vertex fog or table fog. Some games do not correctly query the Direct3D hardware capabilities and expect table fog support. Enabling this option ensures that these games will run properly with your NVIDIA graphics processor.
- **Adjust Z-buffer depth to rendering depth if unequal** forces the hardware to automatically adjust the depth of its Z-buffer to the depth that the application requests. Normally, you will want to keep this option enabled, unless your application absolutely requires a specific Z-buffer depth. If this

option is disabled, any application with a working Z-buffer depth that does not match that of the current hardware configuration will not run.

Figure 10.9 Direct3D Settings



- **Enable alternate depth buffering technique** enables an alternate technique for depth buffering, which lets the hardware use a different mechanism for depth buffering in 16-bit applications. Enabling this setting can produce higher quality rendering of 3D images.
- **Display logo when running Direct3D applications** enables the NVIDIA logo in Direct3D. Enabling this setting will display the NVIDIA logo in the lower corner of the screen while running Direct3D applications.
- **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** 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).

  Note: 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.

  This setting applies only to PCI display adapters (or AGP display adapters running in PCI compatibility mode).

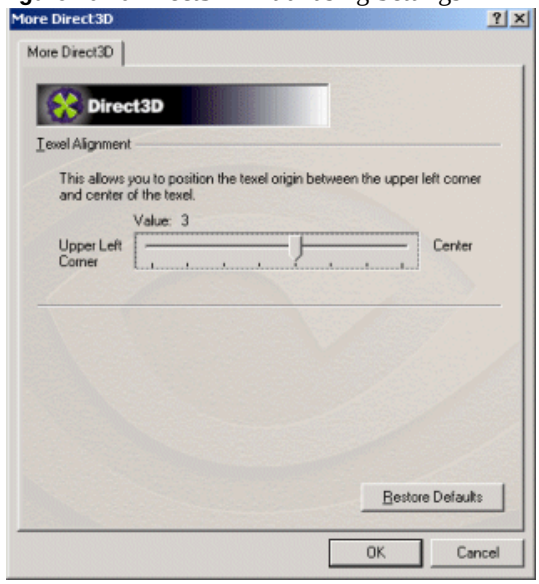
- **Save As . . .** lets you save the current settings (including those set in the "More Direct3D" dialog) as a custom "tweak". Saved settings will then be added to the adjacent list. Once you have found the optimal settings for a particular Direct3D game, saving the settings as a custom tweak allows you to quickly configure Direct3D before starting the game and eliminates the need to set each of the options individually.
- **Custom Direct3D settings** displays a list of the custom settings (or "tweaks") you have saved. Selecting an item from the list will activate the setting. To apply the setting, click **OK** or **Apply**.
- **Delete** lets you delete the custom setting currently selected in the Custom D3D Settings field.
- **Restore Defaults** restores all settings to their default values.

Description of More Direct3D Settings

Follow these steps to access the **More Direct3D** panel:

1. Right click from the Windows desktop to display the context menu, click **Properties**, the **Settings** tab, and the **Advanced** button.
2. Click the tab with the name of your NVIDIA GPU, such as GeForce3, GeForce2 MX/MX 400, Quadro2 MXR/EX, etc.
3. Click the **Additional Properties** button and then the **Direct3D Settings** tab.
4. Click the **More Direct3D** button to display the More Direct3D panel.

Figure 10.10 Direct3D Antialiasing Settings



Texel Alignment 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.

3D Antialiasing Settings

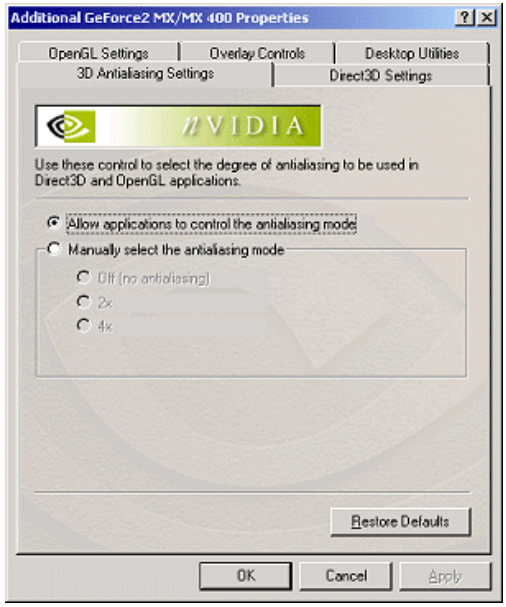
The 3D Antialiasing settings are supported by the following NVIDIA GPUs:

- GeForce2 MX (100, 200, 400), GeForce2 Go, and Quadro2 MXR/EX)
- GeForce2 GTS and Quadro2 Pro
- GeForce 256 and Quadro

Follow these steps to access the **3D Antialiasing Settings** control panel:

1. Right click from the Windows desktop to display the context menu.
2. Click **Properties**, the **Settings** tab, and the **Advanced** button
3. Click the tab with the name of your NVIDIA GPU, such as GeForce3, GeForce2 MX/MX 400, Quadro2 MXR/EX, etc.
4. Click **Additional Properties**, then click the **3D Antialiasing Settings** tab to display the 3D Antialiasing Settings panel.

Figure 10.11 GeForce2 MX/MX 400: 3D Antialiasing Settings



Description of 3D Antialiasing Settings

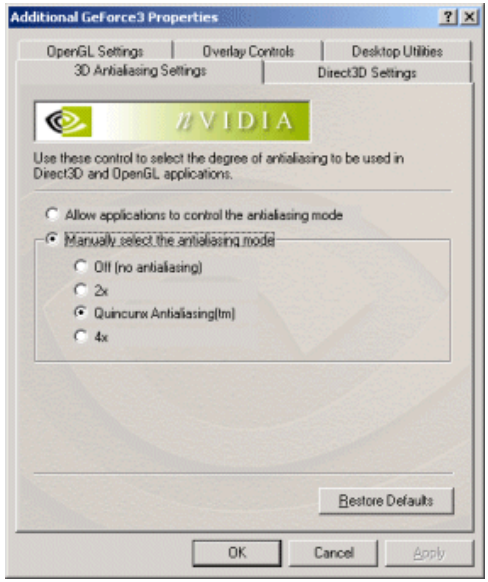
- **Allow applications to control the antialiasing mode** automatically enables the optimal antialiasing settings to be used by the 3D (OpenGL or Direct3D) applications that support antialiasing. Antialiasing is a technique used to smooth the edges of objects in a scene to reduce the jagged "stair-step" effect that sometimes appears.
- **Manually select the antialiasing mode** allows you to manually select the antialiasing mode to be used when running your 3D applications.
  - **Off (no antialiasing)** disables antialiasing in 3D applications. Select this option if your require *maximum performance* in your applications.
  - **2x** enables antialiasing in 3D applications using the 2x mode. This option offers improved image quality and high performance in 3D applications.
  - **4x** enables antialiasing in 3D applications using the 4x mode. This option offers the highest possible image quality at the expense of some performance in 3D applications

Additional Quincunx Antialiasing Setting: GeForce3 *only*

If you are using GeForce3, under **Manually select the antialiasing mode** on the 3D Antialiasing Settings panel, there is an additional option, **Quincunx**

Antialiasing. Quincunx Antialiasing offers better quality than the 2x option and better performance than the 4x option.

Figure 10.12: GeForce3: 3D Antialiasing Settings



Overlay Controls Panel

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

Note: Be sure to click **Apply** whenever you make any changes to the control panels. If changes 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. To access the Overlay Controls panel, click **Properties** > **Settings** tab > **Advanced** button > **NVIDIA GPU** tab > **Additional Properties** button > **Overlay Controls** tab.

   Figure 10.13 through Figure 10.16 show Overlay Controls panel for GeForce3 and GeForce2 MX.
3. For descriptions of the Overlay Settings, see "Description of Overlay Settings" on page 143.
4. To use the Video Mirror controls, go directly to "Video Mirror Controls" on page 99.

Figure 10.13 Overlay Controls: GeForce3 (Windows 2000)

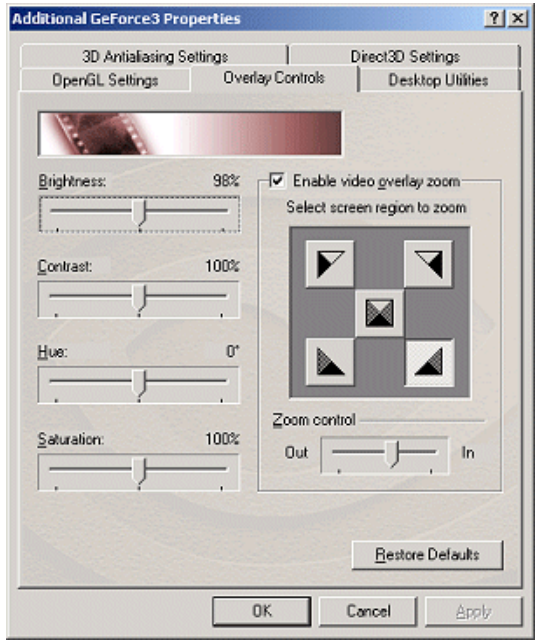


Figure 10.14 Overlay Controls: Single Display (Windows 2000)

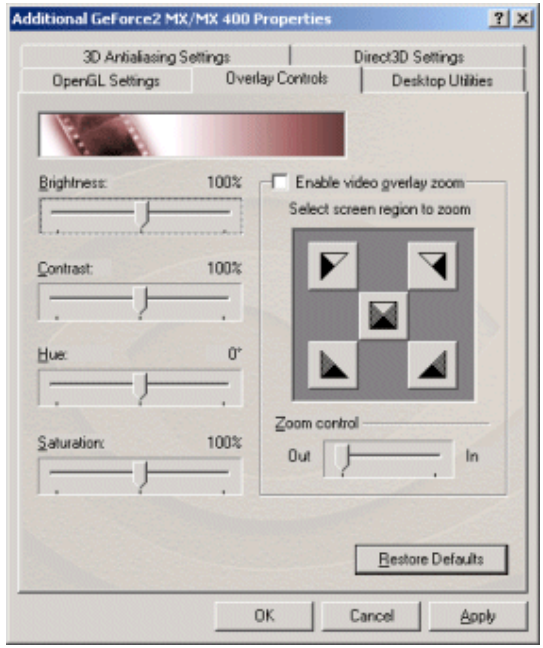


Figure 10.15 Overlay Controls: Dual Display (Windows 2000)

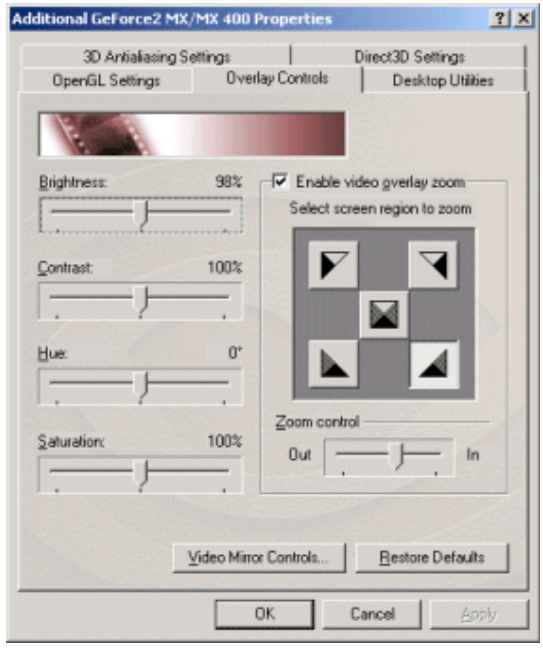
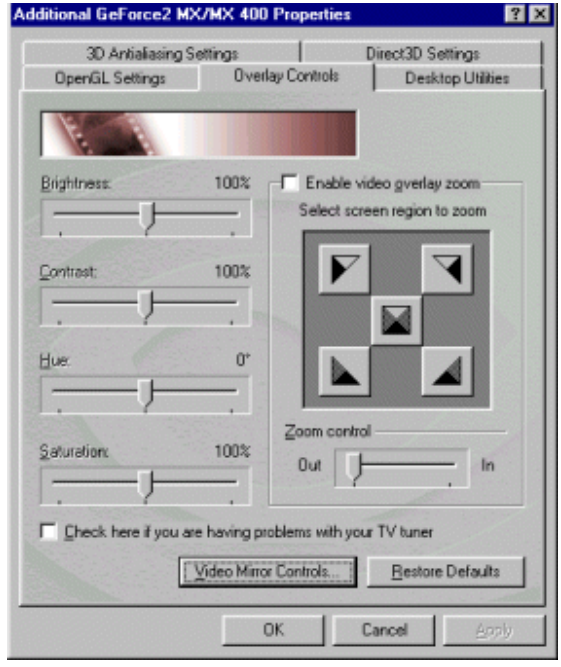


Figure 10.16 Overlay Controls: GeForce2 MX (Windows 98)



Description of Overlay Settings

- **Check here if you are having problems with your TV tuner (Windows 9*x* only)** (Figure 10.16)**:** Activating this option 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 no video image at all.

- **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.

- **Enable video overlay zoom:** Click this option, then click **Apply** to use the Zoom control to zoom in (out) on a specific area of the video output (overlay) on your screen. Using the diagram of the screen regions shown on the Overlay Controls panel, you can select the area of the video screen you would like to zoom. Once selected, you can zoom to that portion of the screen by moving the Zoom Control slider between the Out and In range.

APPENDIX

A

NVIDIA DUAL-CARD CONFIGURATION

This chapter contains an example using two NVIDIA GPU-based graphics cards, the GeForce3 AGP card and the GeForce2 MX PCI card, in one computer running **Windows 2000**.

Note: Windows 2000 control panel screens also apply to **Windows NT 4.0 and XP**; exceptions are noted where applicable.

In this example:

- the GeForce3 GPU-based card is connected to a DFP (digital flat panel) display *and*
- the GeForce2 MX GPU-based card is connected to a TV and CRT (analog monitor) for dual-display functionality.

Setting Up the Dual NVIDIA Cards

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

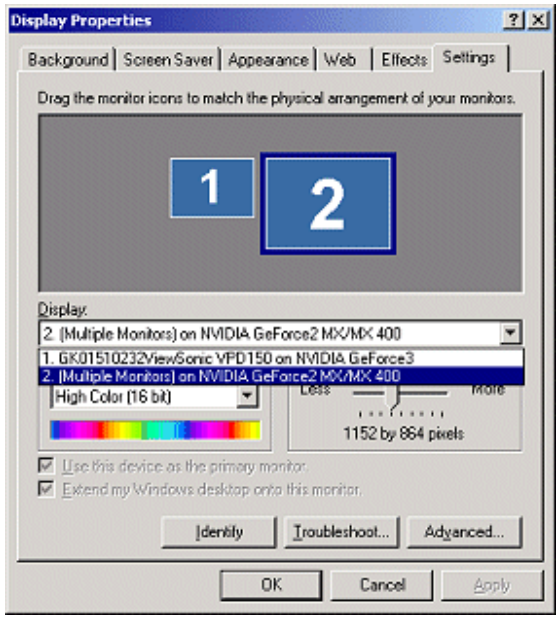
1. Make sure you have an AGP slot and a PCI slot on your computer.
2. Install the appropriate PCI and AGP cards.
3. Install the appropriate NVIDIA Release 10 drivers.
4. Restart your computer as necessary and as prompted so that your system detects both graphics cards.
5. Once your Windows has restarted for the final time and your desktop is no longer processing start-up tasks, right click on the desktop to display the context menu.

6 Click **Properties** and the **Settings** tab to display the Windows **Settings** panel.

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

This example shows that the GeForce3 GPU-based card is connected to a DFP and the GeForce2 MX GPU-based card is connected to “multiple monitors”, which is true: the GeForce2 MX card is connected to both a TV and a CRT.

Figure A.1 Settings Panel for Dual-Cards: Windows 2000



8 Go to the next section “Enabling the First Card: GeForce3” on page 146

Enabling the First Card: GeForce3

1 Make sure you’ve completed the instructions in the previous section “Setting Up the Dual NVIDIA Cards” on page 145.

2 Click on Display **1 DFP on NVIDIA GeForce3** so that it displays in the Display window.

3 Then, right-click on monitor icon 1 to display a context menu and select **Attached** to check the option. Notice the "Extend my windows desktop onto this monitor" check box becomes checked (Figure A.1).

4 Now click the empty check box **"Use this device as the Primary monitor"** (Figure A.2) to check it. Both check boxes are now grayed (Figure A.3). This indicates that your Display 1 device, which is the DFP in this example, is connected to the NVIDIA GeForce3 GPU-based card.

5 Click the **Advanced** button to display Figure A.4.

6 Click the **GeForce3** tab to display the GeForce3 control panel (Figure A.5).

Figure A.2 Dual-Cards Settings: GeForce3 on Windows 2000 (1)

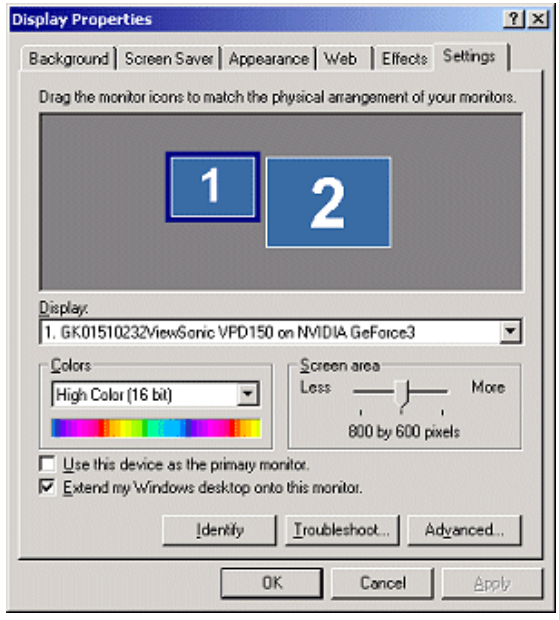


Figure A.3 Dual-Cards Settings: GeForce3 on Windows 2000 (2)

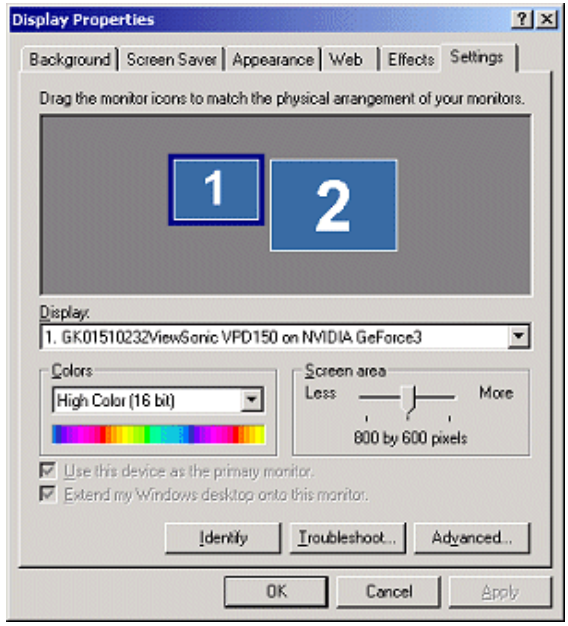


Figure A.4 GeForce3 & Other NVIDIA Control Panels: Windows 2000

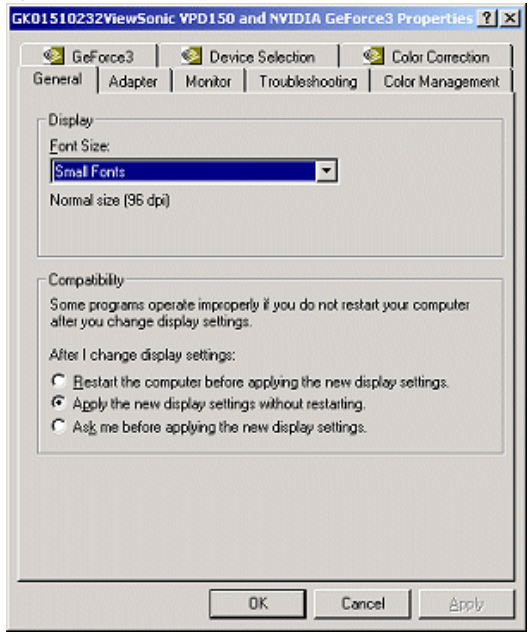
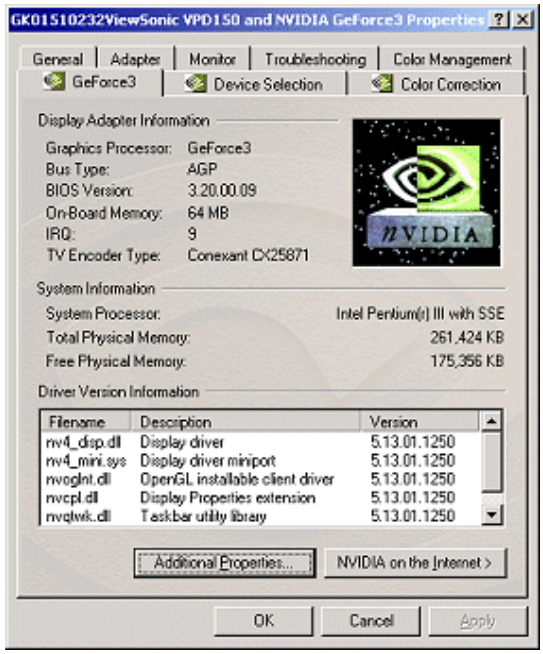


Figure A.5 GeForce3 Control Panel: Windows 2000



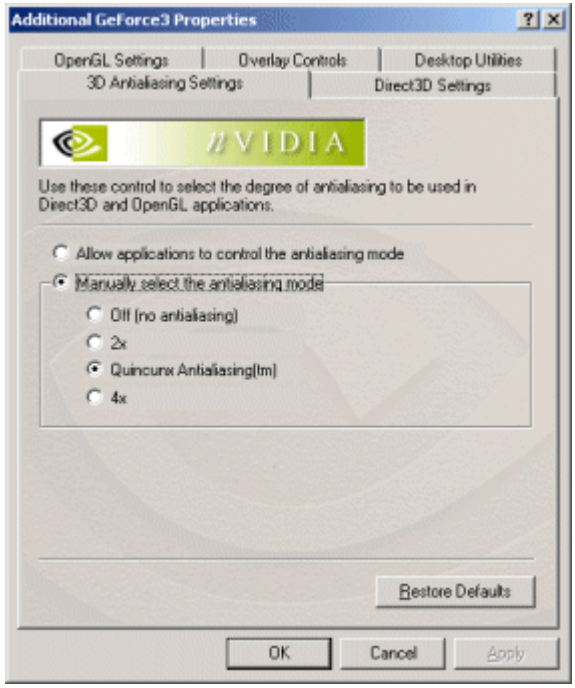
7 Click the **Additional Properties** to display the 3D Antialiasing Settings panel (Figure A.6). From here you can now access all the features & options for the GeForce3 card, as explained in the following chapters:

- "The GeForce3 Family of GPUs" on page 13
- "Device Selection & Configuration" on page 79

Note: "Additional Features and Enhancements" on page 125To easily view the dual-cards and its other features and options through the NVIDIA Quick Tweak icon, see "Accessing Dual Cards & Configurations With QuickTweak" on page 154.

8 Go to the next section "Enabling the Second Card: GeForce2 MX" on page 150.

Figure A.6 GeForce3 3D Antialiasing Settings: Windows 2000



Enabling the Second Card: GeForce2 MX

1. Make sure you've completed the instructions in the previous section "Enabling the First Card: GeForce3" on page 146.
2. Return to the Windows Settings control panel.
3. Click the down arrow in the Display windows, as shown in Figure A.7.
4. Click on Display **2 (Multiple Monitor) on NVIDIA GeForce2 MX/MX 400** so that this choice appears in the Display window.
5. Then, right-click on monitor icon **2** to display a context menu and click **Attached** to check the option. Notice the "**Extend my windows desktop onto this monitor**" check box becomes checked (Figure A.8).
6. Now click the empty check box **"Use this device as the Primary monitor"** to check it. Both check boxes are now grayed (Figure A.9), which indicates that your Display **2** device(s) (the multi-monitor setup of CRT and TV) are connected.
7. Click the **Advanced** button and click the **GeForce2 MX/MX 400** tab to display the GeForce2 MX control panel.

Figure A.7 Settings Panel for Dual-Cards: Windows 2000

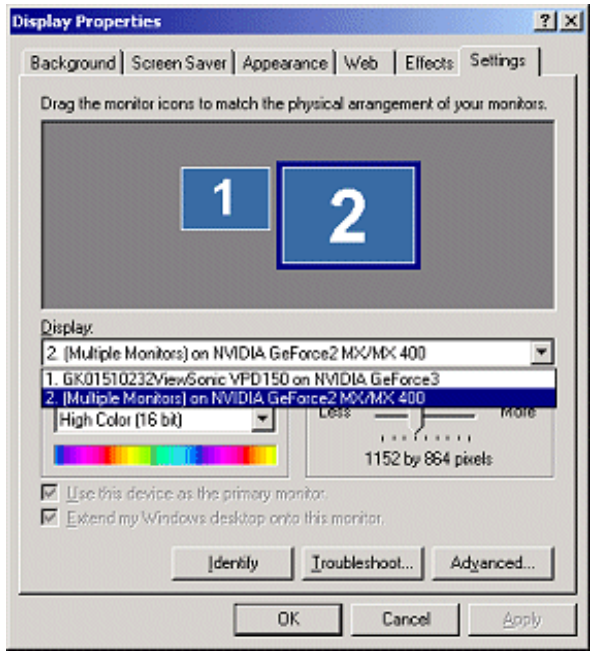


Figure A.8 Settings for Dual-Cards: GeForce2 MX on Windows 2000 (1)

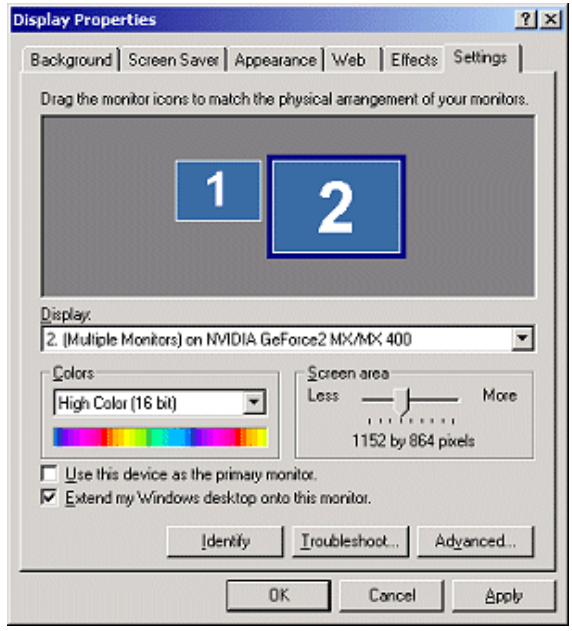


Figure A.9 Settings for Dual-Cards GeForce2 MX on Windows 2000 (2)

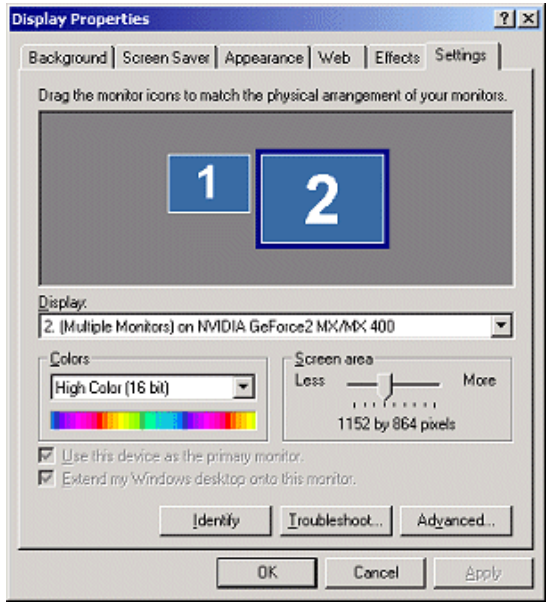


Figure A.10 GeForce2 MX & Other NVIDIA Control Panels: Windows 2000

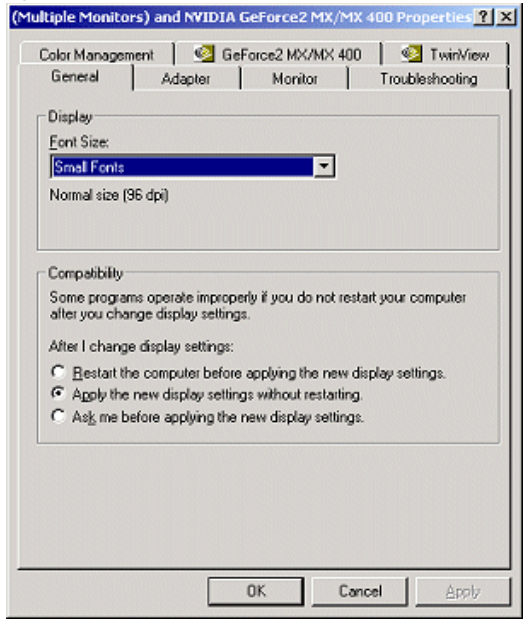
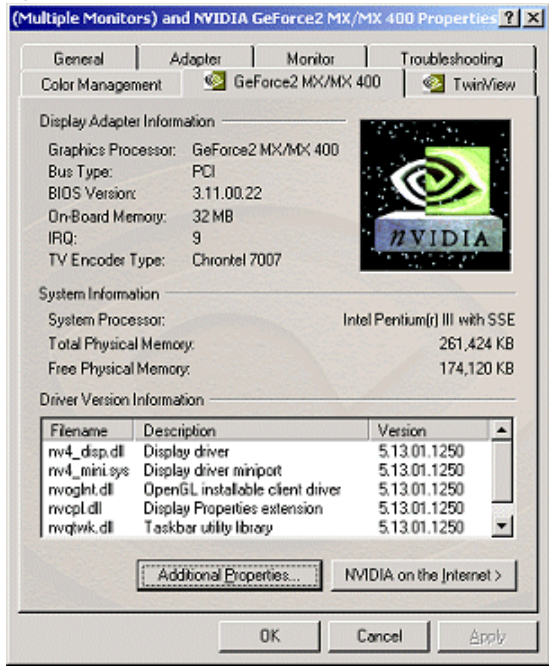


Figure A.11 GeForce2 MX Control Panel: Windows 2000

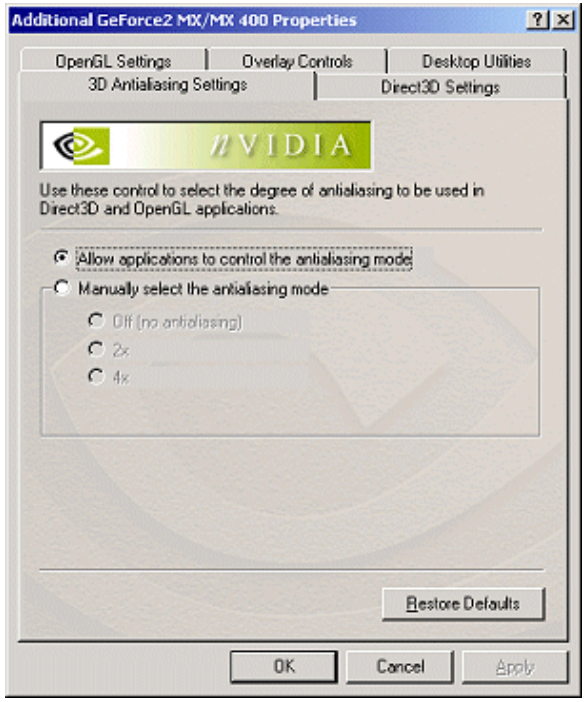


8 Click the **Additional Properties** to display the 3D Antialiasing Settings panel (Figure A.12).

From this point onward, you can access all the features and options for the GeForce2 MX card, as explained in various chapters in this documentation.

9 To easily view the dual-cards and its other features and options through the NVIDIA Quick Tweak icon, see "Accessing Dual Cards & Configurations With QuickTweak" on page 154

Figure A.12 GeForce2 MX/MX 400 3D Antialiasing Settings



Accessing Dual Cards & Configurations With QuickTweak

You can view the dual-cards and its other features and options through the NVIDIA Quick Tweak icon.

If you don't have the NVIDIA QuickTweak icon enabled, see "Desktop Utilities" on page 125.

1 Right-click the NVIDIA icon on your Windows task bar. A menu of configuration options appears, as shown in Figure A.13.

Notice that both the GeForce3 and GeForce2 MX GPU-based cards are displayed, as is Desktop Manager, since it was checked in the Desktop Utilities panel earlier.

1 To see the GeForce3 or GeForce2 MX configuration options, point to **GeForce3** or **GeForce2 MX/MX 400 (**Figure A.15 and Figure A.13) and then move the cursor to any of the options that appear on the next menu level**.** To see the next level of options, point to that option (that contains the arrow) and the next level of options appear.

Figure A.13 NVIDIA QuickTweak Icon Menu: Dual-Cards on Windows 2000

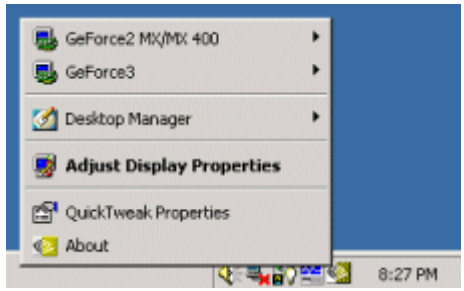


Figure A.14 NVIDIA QuickTweak Icon Menu: GeForce3 on Windows 2000

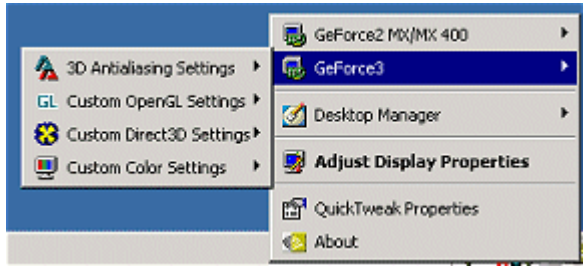
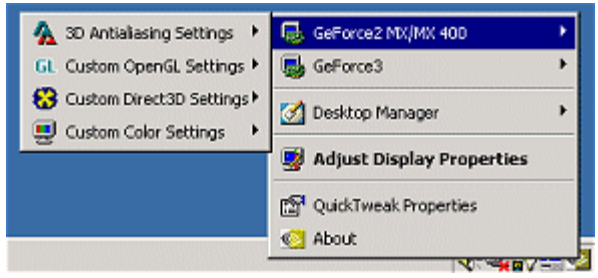



Figure A.15 NVIDIA QuickTweak Icon Menu: GeForce2 MX on Windows 2000