



ForceWare Graphics Drivers
***NVIDIA 3D Stereo User's
Guide***

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INTRODUCTION TO THE NVIDIA 3D STEREO DRIVER

About the NVIDIA 3D Stereo Driver

The NVIDIA 3D Stereo Driver, when used with compatible hardware, allows full-screen stereo¹ viewing of many Direct3D[®] or OpenGL[®] based games². No other stereoscopic driver software is required.

How the Driver Works

When 3D games are played and the driver is enabled, the driver converts the image to 3D stereo and displays it on the screen. You can set up the driver to use either the page flipping or anaglyph method of stereo imaging. With compatible viewing hardware, you'll see the image with the perception of depth.

Driver Features

Stereo Game Playing

The NVIDIA 3D Stereo Driver comes with a number of controls for use with games.

- **Stereo Separation Adjustment** to suit individual adaptation to stereo viewing
- **Hot keys** for in-game stereo control

1. For brevity, the term “stereo” in this manual pertains to stereoscopic viewing of images and games.
2. Actual stereo quality depends on each game. NVIDIA has rated most games for stereo viewing quality.

- **3D Laser Sight** for added realism in first-person shooter games
- **Stereo Test** for determining the best screen mode to use
- **Custom Game Configurations** for tailoring 3D stereo to a wide range of games

The list includes hundreds of games that NVIDIA has evaluated for stereo viewing. Where possible, NVIDIA has preset a number of stereo parameters for these games in order to optimize the 3D stereo experience.

Stereo Image Viewing

The NVIDIA 3D Stereo Driver also includes functions for viewing still images in stereo.

- **Stereo Image Capture Utility** takes a screen shot of a stereo game and stores the image on your hard drive.
- **Stereo Viewer Application** takes a stereo formatted image file and displays the stereo image on the screen. Supported file types include
 - JPS, PNS, or H3D side-by-side formatted images
 - JPG or PNG anaglyph formatted images

For Developers—API Support

The ForceWare 3D Stereo Driver includes support for DirectX 8 and DirectX 9 implementations of the StereoBLT API and Stereo API for developers.

System Requirements

- 3D Accelerator Card using one of the following NVIDIA GPU product families:
 - TNT (including any TNT2 and Vanta products)³
 - GeForce (including any GeForce256, GeForce2, GeForce3, GeForce FX, and GeForce 6 products.)
GeForce2 Go and GeForce 4xxx Go products require an external monitor that meets the requirements for page flip stereo viewing.
 - Quadro (including any Quadro2 or Quadro FX products)
Quadro2 Go and Quadro4 GoGL products require an external monitor that meets the requirements for page flip stereo viewing.
- Multiscan monitor^{4 5} capable of at least a 100 Hz vertical sync refresh rate at 640x480. (Requirement for page flip stereo)
- Pentium[®] 90 MHz or greater, but also refer to specific game requirements.
- 8 MB System Memory, but also refer to specific game requirements.
- Windows[®] 2000, Windows[®] XP, Windows 98, or Windows[®] Me, with DirectX[®] 8 or later runtime installed.
- The NVIDIA ForceWare[™] graphics driver must be installed.
- Compatible Stereoscopic Viewing System
 - **Page Flip Stereo** - The NVIDIA 3D Stereo Driver can be used with a number of stereo eyewear models as well as certain auto-stereoscopic LCD or flat panel displays.
 - **Anaglyph Stereo** - The NVIDIA 3D Stereo Driver can be configured for anaglyph stereo viewing. The default orientation and color is left-eye-red and right-eye-blue.

Some eyewear may require additional configuring of its hardware in order to work properly. Consult the manufacturer's Web site and documentation for instructions on how to configure the hardware to work with the NVIDIA 3D Stereo Driver.

A list of compatible viewing products can be found at the NVIDIA website www.nvidia.com, in the 3D Stereo section under driver downloads. The listed products have been tested and verified by NVIDIA to work without requiring additional hardware configuring.

3. OpenGL stereo is not supported on the TNT family of products.

4. The 3D Stereo Driver in page flip mode is not designed for LCDs or flat panel displays, with the exception of those that are auto-stereoscopic or the Sharp 3D display. For other notebooks, an external monitor can be connected and used to view page flip mode stereo.

5. With the 3D Stereo Driver in anaglyph mode, stereo images can be viewed on a flat panel LCD.

Safety - Read Before Using!



WARNING!

Do not wear stereo glasses in any situations that require unimpaired visual perception.

Maximizing Safe Use

Under normal conditions, stereo viewing is safe for any duration that you would normally view your PC monitor. However, some people may experience discomfort. To minimize the potential for experiencing visual problems or any adverse symptoms:

- Adjust the monitor refresh rate to the highest possible setting, preferably over 120Hz. Consult your monitor manual for instructions.
- **Take the stereo medical test to verify your ability to see stereo images.**
- Take regular breaks, at least 5 minutes after every hour of stereo viewing.
- If you experience any of the following symptoms—
 - nausea, dizziness, or queasiness,
 - headache, or eyestrain,
 - blurry vision,
 - double vision that lasts longer than a few seconds,

refer to [“Tips and Troubleshooting” on page 40](#) for suggestions on how to correct the problem.

Do not engage in any potentially hazardous activity (for example, driving a vehicle) until your symptoms have completely gone away.

If symptoms persist, discontinue use and do not resume stereo viewing without discussing your symptoms with a physician.

Epilepsy

WARNING!

If you or any member of your family has a history of epilepsy, consult a physician before using computer game products.

A small percentage of the population may experience epileptic seizures when viewing certain types of TV images or video games that contain flashing patterns of light.

The following people should consult a physician before viewing in stereo:

- Children under 5 years of age
- Anyone with a history of epilepsy, or who has a family member with a history of epilepsy
- Anyone who has ever experienced epileptic seizures or sensory disturbances triggered by flashing light effects.

WARNING!

Some light patterns may induce seizures in persons with no prior history of epilepsy. Discontinue stereo use if you experience any of the following symptoms while viewing stereo images:

- Involuntary movements, eye or muscle twitching
- Muscle cramps
- Nausea, dizziness, or queasiness
- Convulsions
- Disorientation, confusion, or loss of awareness of your surroundings
- Do not engage in any potentially hazardous activity (for example, driving a vehicle) until your symptoms have completely gone away.
- Do not resume stereo viewing without discussing the symptoms with your physician.

USING THE NVIDIA 3D STEREO DRIVER

This chapter describes the basic functions of the 3D Stereo Driver Control Panel, and contains the following sections:

- [“Getting Started” on page 7](#)

describes how to install the 3D stereo driver and how to use the control panel to play 3D games in stereo.

- [“Game Ratings for Stereo” on page 16](#)

describes how to determine if your game is suitable for viewing in stereo.

- [“Stereo Test and Refresh Rate Setup” on page 17](#)

describes how to test different color depth, resolution, and refresh rate combinations to determine the best display modes to use when playing games in stereo.

- [“3D Stereo Laser Sight” on page 20](#)

describes how to use the NVIDIA laser sight feature for first-person shooter games.

Getting Started

Perform the following steps to use the NVIDIA 3D Stereo Driver. Each step is explained in greater detail later in this section.

- **Step 1: Install the Drivers and the Stereo Viewing Hardware.**

Make sure the NVIDIA ForceWare Graphics driver is installed, then install the NVIDIA 3D Stereo Driver.

The NVIDIA 3D Stereo driver version must match the NVIDIA Forceware driver version. For example, if you installed the NVIDIA driver *version 71.84*, then you must install the NVIDIA 3D Stereo *version 71.84* for proper operation.

- **Step 2: Choose Page Flipped or Anaglyph Stereo Mode**

In the Stereo Properties sheet, click either Page Flipped or Anaglyph stereo type, depending on the type of stereo glasses you have.

- **Step 3: Enable the Stereo Function.**

In the Stereo Properties sheet, under Stereo Enable Mode, select either Enabled or Enabled by Hot Key, then click Apply. Be sure to take the stereo medical test.

- **Step 4: Set Up Basic Stereo Parameters**

- **Verify the Hot Keys.**

Under Display Properties > Stereo Properties, click Additional Properties, then set up or verify setup of the six hot keys—Toggle Stereo On/Off, Less Stereo Separation, More Stereo Separation, Save Image, Increase Gamma, and Decrease Gamma.

- **Adjust the Stereo Separation.**

Under Stereo Properties, click Stereo Setup & Test, then in the Monitor Size section of the Stereo Setup & Test page move the bar to your monitor size. In the Stereo Properties sheet, preselect the stereo separation using the Stereo Separation slide bar.

- **Adjust the Stereo Gamma Setting**

The default setting should be adequate for all games, but can be adjusted by moving the Stereo Gamma slide bar in the Stereo Properties sheet.

- **Step 5: Play Games in Stereo.**

Under the Stereo Properties > Stereo Setup & Test sheet, set the stereo refresh rate you want to use for your games, then start the game in full-screen mode and use the hot keys to control the stereo display.

Step 1: Install the Drivers and the Stereo Viewing Hardware

Install Drivers and Hardware

- 1 Install the NVIDIA ForceWare graphics drivers (v56.56 or later).
Refer to the installation instructions that came with the new drivers or the display card.
- 2 Install the NVIDIA 3D Stereo Driver.
If downloaded to your hard drive, or on a CD, locate the executable stereo file, double-click the file, then follow the instructions to complete the installation..
The version indicated in the executable file name must match the ForceWare graphics driver version. For example, if the executable file name is 71.84_win2kxp_stereo.exe, then the system must have ForceWare v71.84 installed.
- 3 Install the stereo viewing hardware.
Refer to the documentation that came with your stereo eyewear for instructions.

Access the Stereo Control Panel

- 1 Right click on the Desktop, then choose Properties, or click Start > Settings > Control Panel and double-click Display from the Control Panel window.
- 2 Click the Settings tab, then click **Advanced** from the Settings page and click the NVIDIA graphics card tab.

The main NVIDIA panel appears, with a slide out tray showing other NVIDIA pages.

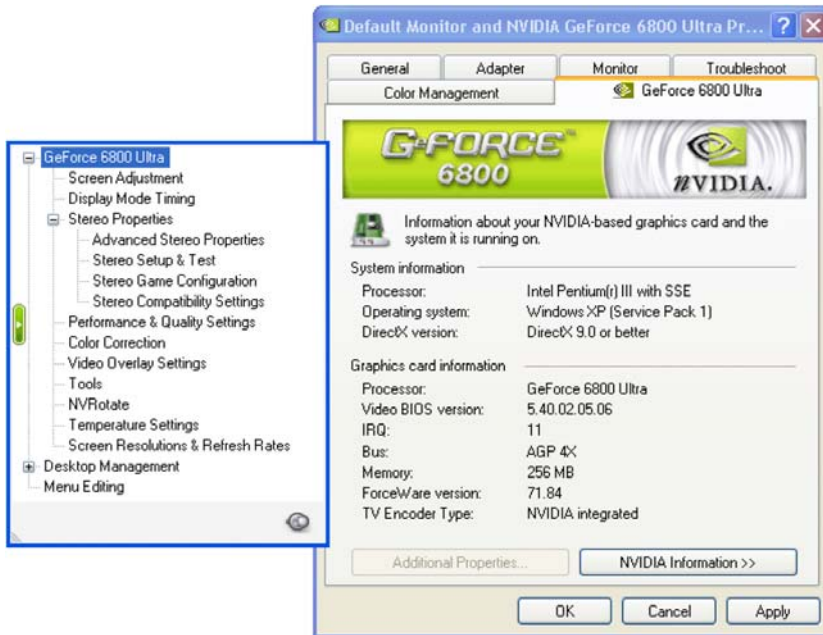
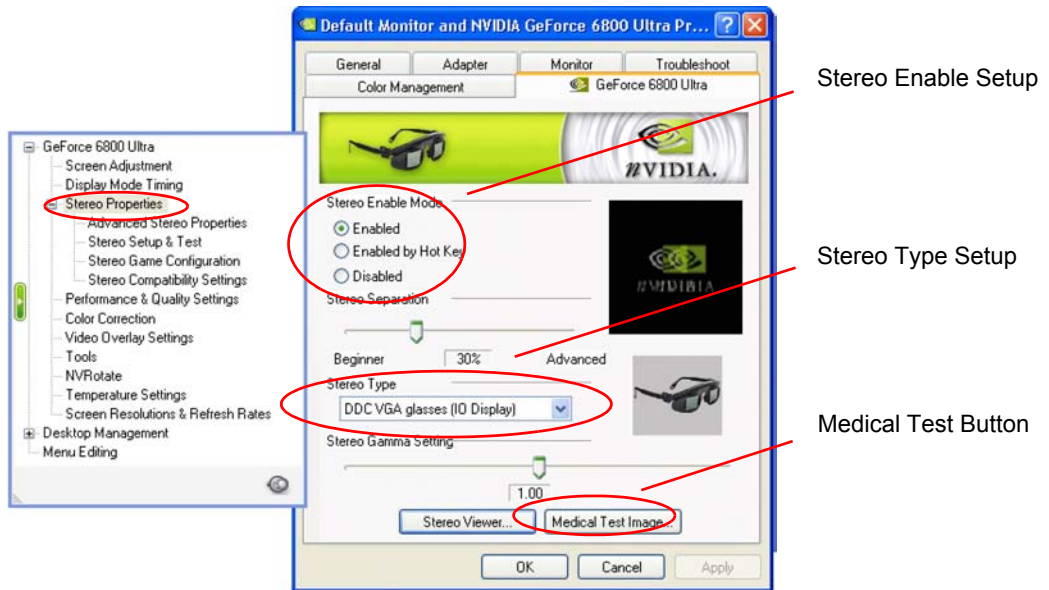


Figure 2.1 NVIDIA Control Panel—Main Page

- 3 Click the **Stereo Properties** tree item from the slide-out tray.



Note: The pages for anaglyph-only versions differ slightly from the examples shown.

Figure 2.2 Stereo Properties Control Panel—Stereo Setup Controls

Step 2: Choose Page Flipped or Anaglyph Stereo Mode

- 1 In the **Stereo Type** section, click the list arrow and then choose the method that corresponds to the type of glasses you will use to view stereo. (See [Figure 2.2](#).)
- 2 Click **Apply**.

Step 3: Enable the Stereo Function

- 1 Choose the Stereo Enable Mode. (See [Figure 2.2](#))

Click either the **Enabled** or **Enabled by Hot Key** radio button, then click **Apply**.

- **Enabled:** If you select Enabled, stereo turns on as soon as the game starts. Some programs start with simple startup screens that are best viewed with stereo off. The driver attempts to detect this case and waits until the “triangle rich” game starts before turning stereo on.

Hot keys are functional when Enabled is selected.

- **Enabled by Hot Key:** If you select Enabled by Hot Key, you must use the hot keys to turn stereo ON or OFF after starting a game. This is useful if you want to view game menus and setup screens in non-stereo mode.

2 Take the stereo medical test.

Each user should take the stereo medical test before playing games in stereo for the first time.

a To launch the test, click **Medical Test Image**.

When you click **Apply** after enabling stereo for the first time, the test launches automatically.

The Medical Test Image appears on the screen.

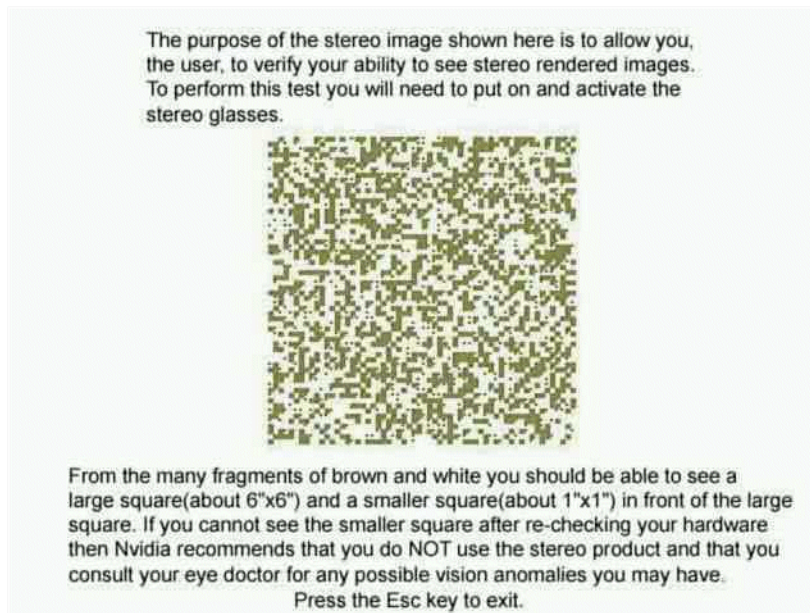


Figure 2.3 Medical Test Image

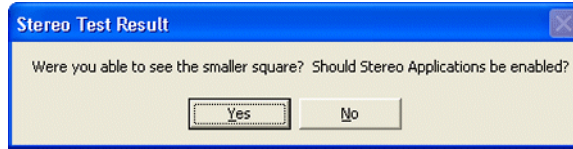
b Follow the instructions on the screen.

- If you do not see the image immediately, allow a few seconds for your eyes to adjust, while changing your viewing distance from the screen.
- If the page flipping method is used and the image is blurred, verify that the stereo eyewear is functioning.

The view through the eyewear should darken because each eye view is cycling on and off. If the eyewear does not darken, check the hardware installation and setup.

- c Press **ESC** when you are finished viewing the image.

The Stereo Test Result dialog box asks whether you can see the image in stereo.



- d Confirm your ability to see the image in stereo.
 - If you are able to see the image, click **Yes**. Stereo is now enabled.
 - If you are not able to see the image, click **No**.

Any further attempts to enable stereo launches the Medical Test Image again.

Inability to see the Medical Test image in stereo might be due to

- **Adjustments needed for improved stereo viewing**
See “[Stereo Test and Refresh Rate Setup](#)” on page 17 for instructions in setting optimal refresh rates and resolutions for stereo.
- **Hardware problems or visual problems**
See “[Possible Cause: Eyewear Hardware Not Set Up Properly or Eyewear Driver Support not Installed Properly](#)” on page 46 in the Troubleshooting chapter for help in diagnosing a problem with the eyewear setup or driver installation.
Consult a physician if you suspect a physical problem seeing stereo.

Step 4: Set Up Basic Stereo Parameters

Adjust the Stereo Separation

Stereo separation refers to the difference in horizontal position between the right and left images. The greater the stereo separation, the greater the stereo effect. Too much separation, however, can be uncomfortable if your eyes are not adjusted to stereo.

1 Adjust separation according to the diagonal screen dimension of your monitor.

The driver calculates the maximum stereo separation (100%) based on the screen size.

a Click the **Stereo Setup & Test** tree item in the slide-out tray.

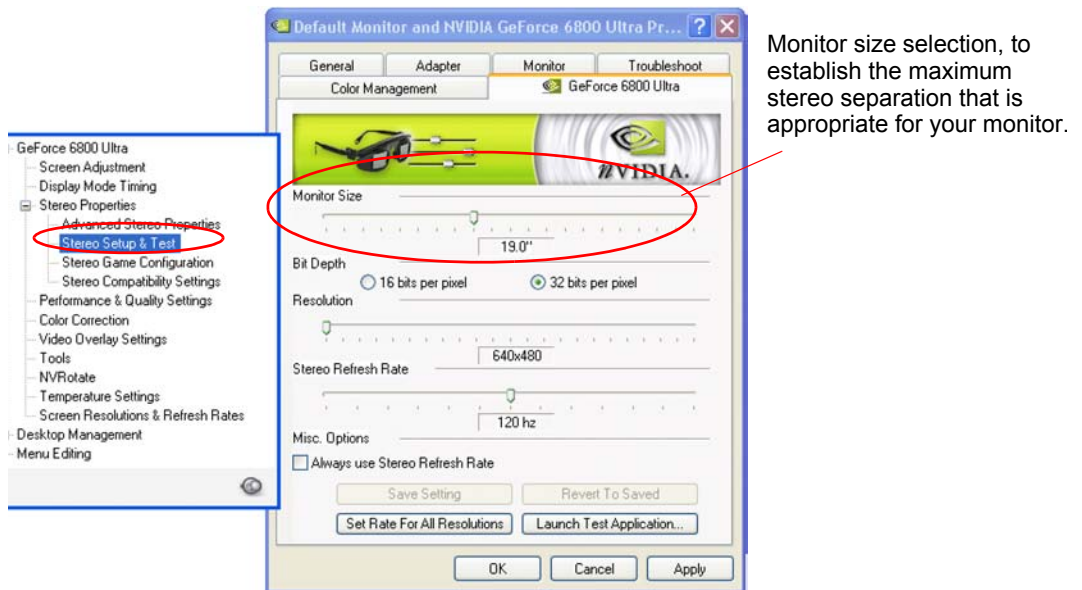


Figure 2.4 Selecting the Monitor Size

b Move the Monitor Size slide bar to a position corresponding to the diagonal screen dimension of your monitor.

Do not exceed the size of your monitor, as this can result in too much stereo separation and cause visual problems and headaches.

2 Adjust the separation according to your stereo viewing comfort level—either using the property page or during gameplay..

- In the Stereo Properties page, under Stereo Separation (see Figure 2.5), move the slide bar to the expected comfort level, then click **OK** or **Apply**.

A recommended starting point is at 30%. You can increase the separation over time as your eyes grow accustomed to stereoscopic viewing..

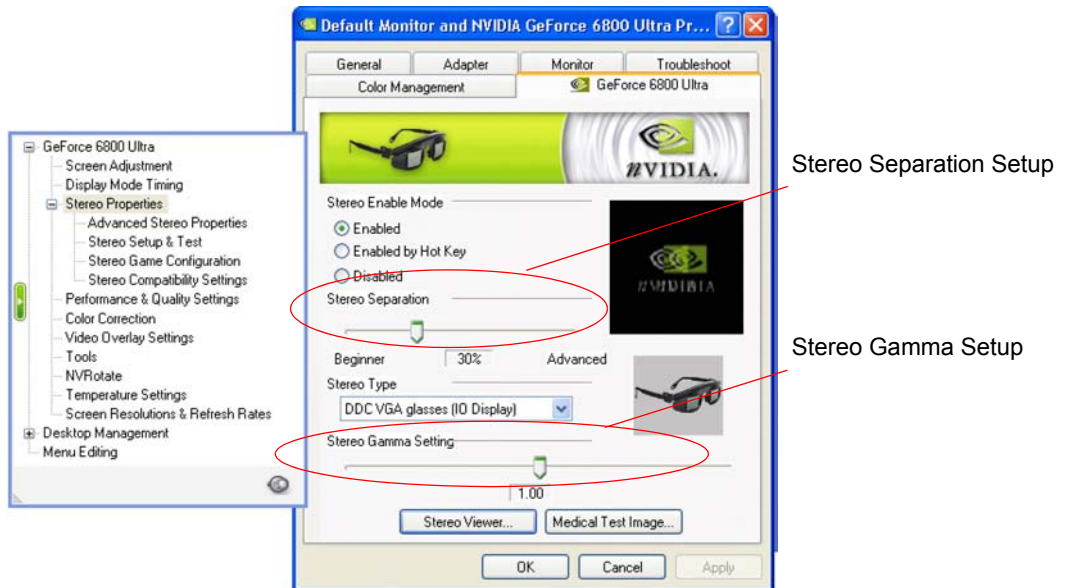


Figure 2.5 Stereo Separation and Stereo Gamma Setup Controls

- During gameplay, use the hot keys to adjust the stereo separation.
See “Verify the Hot Keys” on page 14 for instructions on how to verify and set the hot keys.

Adjust the Stereo Gamma Setting

The On/Off action of LCD shutter glasses (page flipped stereo) darkens the display. To compensate for this effect, you can adjust the gamma as follows:

- In the Stereo Gamma Setting section of the Stereo Properties page (see Figure 2.5), move the slide bar to the desired gamma value (0.5–6.00), then click **OK** or **Apply**.

This value is ‘added’ to the gamma that is already set by the game.

One setting should work for all games. NVIDIA recommends a value of 1.0.

- During gameplay, you can also use hot keys to adjust the stereo gamma. This is useful when the game has no gamma adjustment of its own.

See “Verify the Hot Keys” on page 14 for instructions on how to verify and set the hot keys.

Verify the Hot Keys

Make sure the hot keys are set up so you can control stereo functions during gameplay.

- 1 Click the **Advanced Stereo Properties** tree item in the slide-out tray.

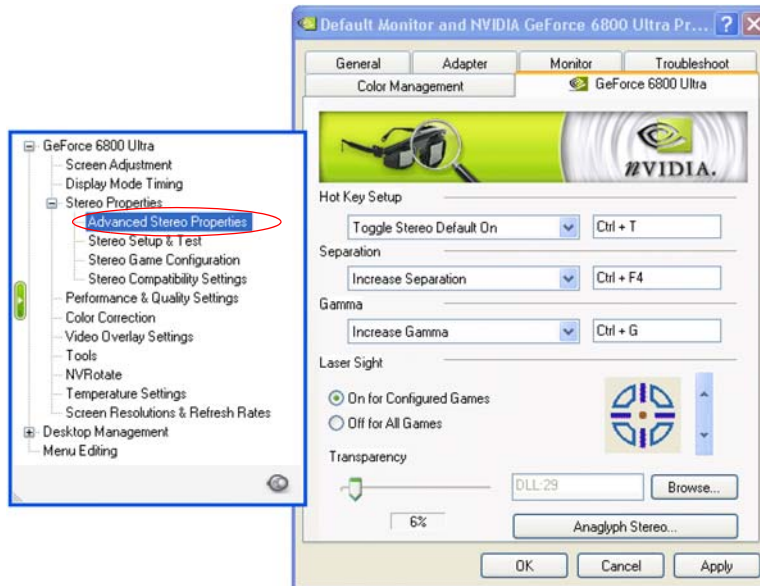


Figure 2.6 3D Stereo Driver Hot Key Setup

- 2 Get familiar with the hot keys. If they are not assigned, set up each hot key as follows:
 - a In the section **Hot Key Setup**, click the list arrow and then click the action for which you want to verify or change hot keys.
 - b To assign new hot keys for the selected action, click in the adjacent box and then press the hot keys on your keyboard.
The keystrokes appear in the box.
 - c Repeat for the remaining sections, **Separation** and **Gamma**, then click **Apply**.

NVIDIA recommends using the following default hot keys:

- Toggle Stereo Default On—**Ctrl+T** (turns 3D stereo on or off while playing a game)
- Save Image—**Alt+F1**
See “[Capturing Images](#)” on page 30 for an explanation of this function.
- Increase (Stereo) Separation—**Ctrl+F4**
- Decrease (Stereo) Separation—**Ctrl+F3**
- Increase Gamma—**Ctrl+G**
- Decrease Gamma—**Alt+G**

Step 5: Play Games in Stereo

Basic Gameplay

You can now play compatible games in stereo.

- 1 Determine the suitability of your game for stereo viewing.

See [“Viewing the Game Ratings”](#) on page 16.

- 2 Set the stereo refresh rate for your game.

For detailed information on testing the capabilities of your monitor before setting the stereo refresh rate, refer to [“Stereo Test and Refresh Rate Setup”](#) on page 17.

a Click the **Stereo Setup & Test** tree item from the slide-out tray.

b Set the color depth and resolution to correspond to the display mode of your game, then set the stereo refresh rate and click **Set Rate for All Resolutions**.

Set the refresh rate to 120 Hz if it is available, otherwise use 100 Hz as a minimum.

c Click **Apply**.

- 3 Start the 3D game and set to full-screen display mode.

For setting up the 3D laser on first-person shooter games, see [“3D Stereo Laser Sight”](#) on page 20.

- 4 Use the hot keys to toggle 3D stereo ON or OFF, and to adjust the stereo separation to a comfortable level.

Advanced Features and Help

Refer to other sections of this manual for instructions on how to maximize the stereo display quality:

- [“Creating and Modifying Game Configurations”](#) on page 23

provides instructions for advanced users on how to adjust various stereo parameters such as screen depth, convergence, and backplane positioning.

- [“Tips and Troubleshooting”](#) on page 40

provides suggestions to help you successfully play games in stereo and maximize the stereo quality of your games.

Game Ratings for Stereo

The level of effective stereo viewing varies from game to game. NVIDIA has evaluated a number of games and provides information to help users determine how well their game will look in stereo.

Understanding the Game Ratings

Ratings for each game are provided in two areas:

- **Stereo Value** - Indicates how much added entertainment value the game has in stereo. Some games are rich in 3D information while others are little more than 2D.
- **Stereo Compatibility** - Indicates how well the game translates to stereo. Some games may contain issues that interfere with good stereo viewing, such as placing objects at depths that are difficult to view.

Viewing games that have a low rating can result in adverse symptoms such as headaches and visual problems. It is the user's responsibility to use the information to decide whether to view certain games in stereo.

Viewing the Game Ratings

Click the **Stereo Game Configuration** tree item from the slide-out tray, then locate your game from the menu and click the name.

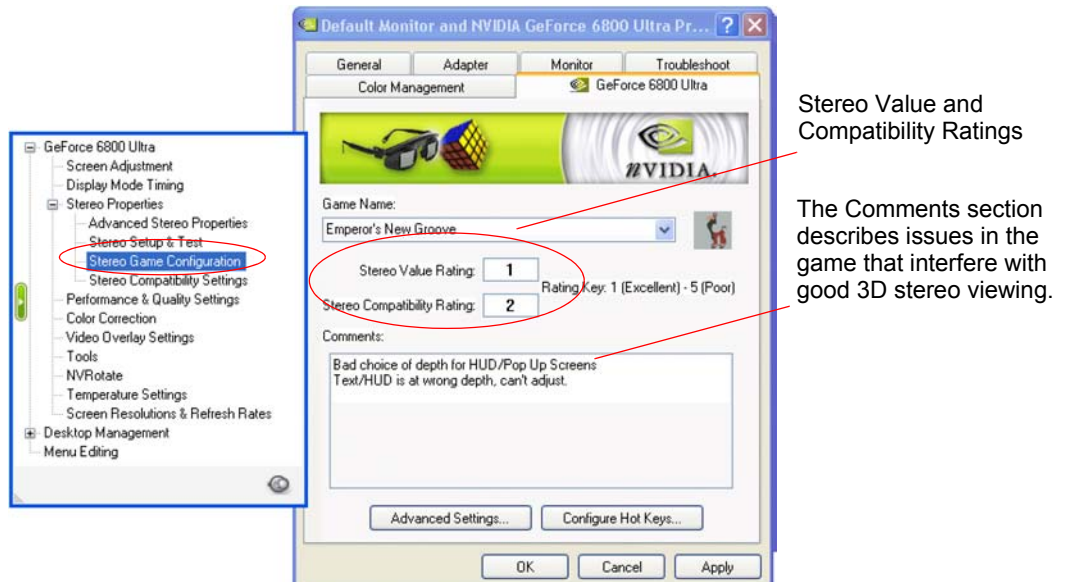


Figure 2.7 Game Configuration Page

Stereo Test and Refresh Rate Setup

The Stereo Setup & Test feature allows you to:

- **Test** different color depth, resolution and refresh rate combinations to determine the limitations of your system and the optimum display mode for your games.
- **Set** the stereo refresh rate for your games.

This refresh rate overrides the display adapter control panel refresh rate setting. Stereo must be enabled and a mode change performed for the stereo refresh rate to go into effect.

Controlling the Refresh Rate

Specifying the Refresh Rate

- 1 Click the **Stereo Setup & Test** tree item from the slide-out tray. .

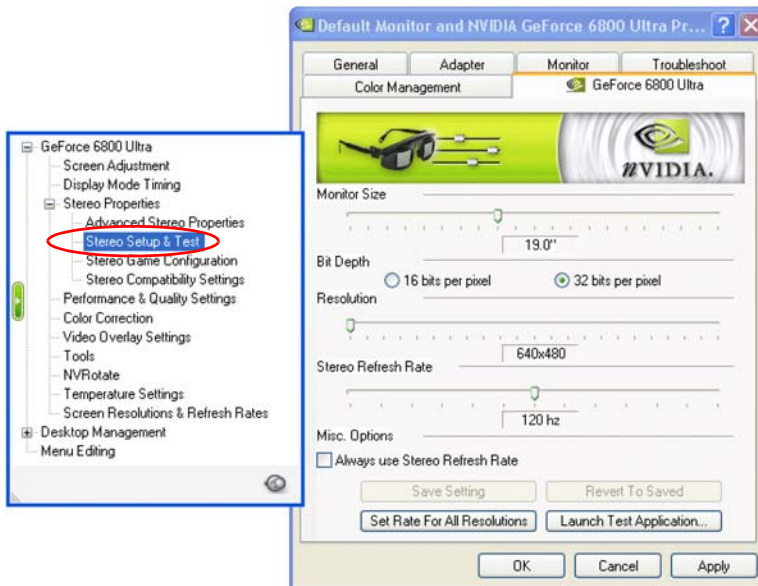


Figure 2.8 Stereo Setup & Test Page

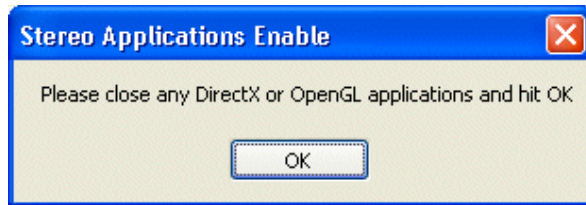
- 2 Select the color depth using the Bit Depth radio buttons, then move the Resolution slide bar to the desired resolution.
- 3 Set the refresh rate using the Stereo Refresh Rate slide bar. The best stereo image is achieved at high refresh rates, preferably over 100 Hz.
- 4 Click **Apply**.

The New Refresh Rate Behavior

You can control when the new refresh rate is applied as follows:

- Check the **Always Use Stereo Refresh Rate** check box to use the new refresh rate immediately.
- Clear the **Always Use Stereo Refresh Rate** check box to use the new refresh rate when the corresponding resolution is set by the game, or if the resolution is set during the display test procedure described below.

Each time you you change this setting, the following dialog box appears.



Note: There must be a mode change for any refresh rate changes to go into effect. If stereo is disabled, the stereo refresh rate will continue until a change is made to the desktop resolution.

Testing Display Combinations

This section explains how to test the mode and refresh rate capabilities of your monitor for 3D stereo.

- 1 Click the **Stereo Setup & Test** tree item from the slide-out panel.
- 2 Choose a mode and refresh rate combination.

Method A

Choose a new bit depth, resolution, and refresh rate individually.

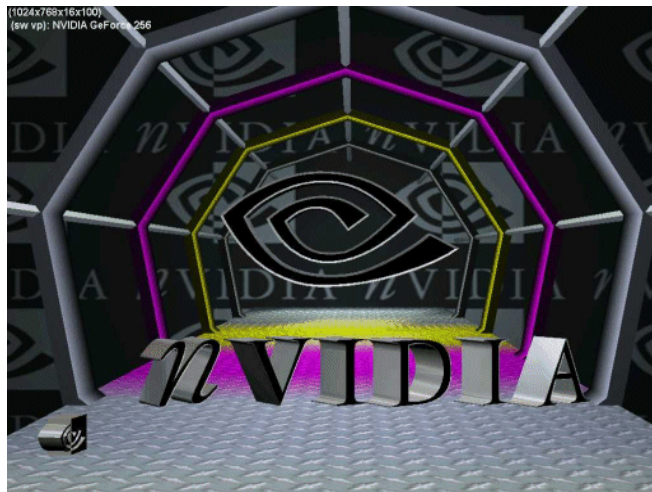
Method B

- a Choose the desired bit depth, then select an optimum refresh rate, such as 120 Hz.
- b Click **Set Rate for All Resolutions**.

This forces the selected refresh rate on all resolutions in the test. If the rate is not available, the driver will select the closest available refresh rate for that resolution.

- 3 Click **Launch Test Application**. (DirectX 8 is required to view the test screen.)

A blank screen appears while the refresh rate is measured, then the test screen appears..



- 4 To change settings while viewing the test screen
 - a Press **F1**.

A hot key menu appears.
 - b Use the hot keys to adjust the refresh rate and resolution until you find the highest refresh rate that will pass the test, then press **F6** to save this setting.

The settings will revert to a “safe” refresh rate, such as 60 Hz, after 15 seconds. Make sure to press **F6** before the time runs out if you want to save the current settings.

3D Stereo Laser Sight

Cross-hair sights in first-person shooter games are usually positioned at screen depth when view in stereo, making it difficult to aim. To resolve this, NVIDIA provides a selection of 3D “laser” sights that appear on the targeted object. The NVIDIA laser sights work in properly configured first-person shooter games with screen-centered sights.

- 1 Click the **Advanced Stereo Properties** tree item from the slide-out tray.

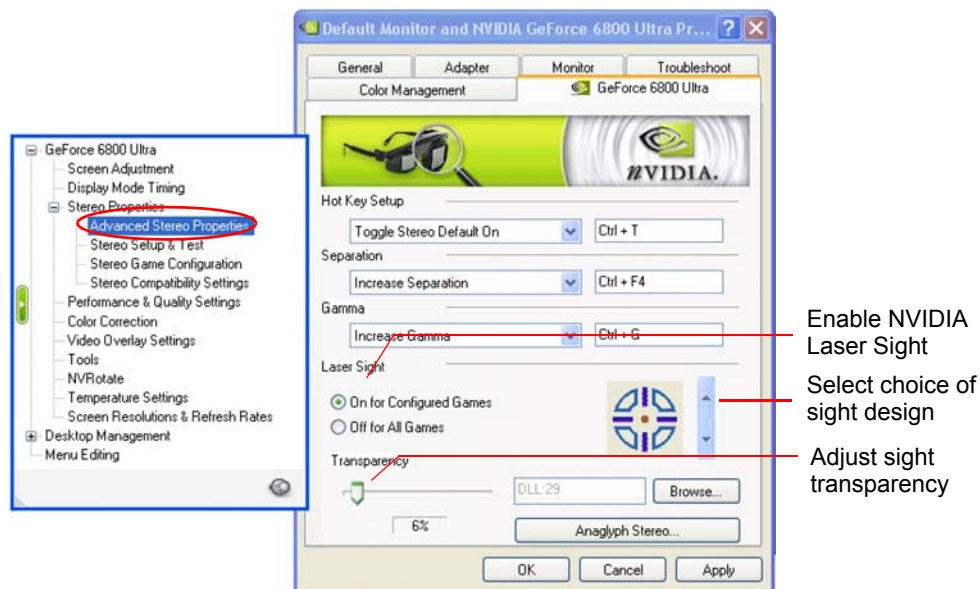


Figure 2.9 Advanced Stereo Properties Sheet

- 2 Enable the NVIDIA laser sight.
Select **On for Configured Games**.
- 3 Select a laser sight design.
Click the up or down arrow button to scroll through the selection of sights.
- 4 Move the Transparency slide bar to adjust the laser transparency—from 0% (solid laser sight) to 100% (almost see-through sight).
The recommended setting is at 25%.
- 5 When finished, click **Apply**.

The laser sight appears when stereo is turned on during a game. To avoid confusion, disable the sight provided by the game. Refer to the Config Values section under Stereo Game Configurations > Advanced Settings for any special instructions.

You can also use the hot keys to toggle the NVIDIA laser sight on and off. See “[About the Configuration Hot Key Functions](#)” on page 26.

USING THE GAME CONFIGURATION FEATURE

This chapter describes the advanced game configuration feature of the NVIDIA 3D Stereo Driver. It contains these sections:

- [“The Purpose of Game Configurations” on page 22](#)
explains the purpose of the game configurations.
- [“Creating and Modifying Game Configurations” on page 23](#)
explains how to change the configuration parameters and save the changes.
- [“Assigning Configurations to Games” on page 28](#)
explains how to use demo version configurations for the full game version of a game, or visa versa.

The Purpose of Game Configurations

Characteristics of Good Stereo Viewing

Optimum stereo is achieved when the game display consists of the following:

- Meaningful range of depth, or distance between the nearest and farthest objects.
- Nearest objects which are not too close for comfortable viewing.
- Heads up displays (HUDs) which are positioned so as not to interfere with the stereo experience. Ideally, HUDs should be at screen depth.

The NVIDIA 3D Stereo Driver takes certain 3D information contained in the game and uses it to generate the stereo display. Since most games are not designed with stereo in mind, the resulting stereo display quality will vary from game to game. In some cases, the game is not viewable at all in stereo without making adjustments based on observation.

What the NVIDIA 3D Stereo Driver Provides

Preset Configurations

For most games, NVIDIA has established settings that adjust the display to achieve meaningful stereo, based on the needs of each game.

After you launch a game and enable the NVIDIA stereo support, the driver compares the game executable name with its own list. If the driver finds a match, it applies the adjustments to that game to improve the stereo display.

You can view the list of these games in the Stereo Properties > Game Configuration sheet under Game Name.

Hot keys to Change or Create Configurations

The NVIDIA provided settings are designed for optimum stereo viewing, and should not require further adjustments. It is possible, though, to change these settings to suit individual tastes.

Configuring game parameters for stereo is a complex process and should be performed only by persons who are thoroughly familiar with the parameters involved in creating stereo images.

See [“Creating and Modifying Game Configurations”](#) on page 23 for instructions on how to change settings for listed games and how to create settings for games that are not listed.

Creating and Modifying Game Configurations

You can change the stereo parameters for 3D games. When you save the changes, the driver uses the saved settings automatically the next time the game is launched.

Hints to Keep In Mind

- To undo changes that have not been saved, just exit the game.
- To undo changes that have been saved, you must uninstall and then re-install the 3D Stereo Driver.
- To restore original configurations that have been deleted, you must uninstall and then re-install the 3D Stereo Driver.

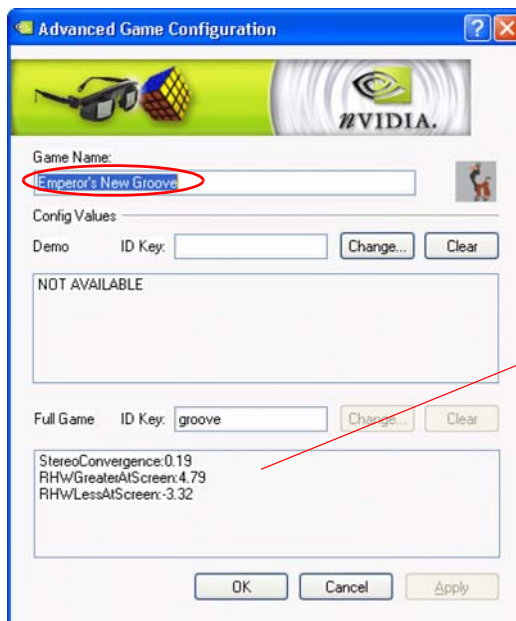
To View the Current Configuration

- 1 Find the listed games.

Click the **Stereo Game Configuration** tree item from the slide-out tray, then scroll through the Game Name list to find your game, then click it.

- 2 Click **Advanced Settings** to open the Advanced Game Configuration page.

The Advanced Game Configuration sheet shows the current settings for the game.



Custom configuration data appears here.

Figure 3.1 Stereo Game Configuration Page

- To delete all settings and start over, press **Alt+F7**.

This removes *all* stereo configuration settings, *including the original NVIDIA settings*.

Configuration Guidelines

Play a game to see how it looks in stereo. Make adjustments using [Table 3.1](#) as a guide.

Table 3.1 Stereo Improvement Suggestions

Problem	Suggestion
Objects are too close	Decrease Convergence (Ctl+F5)
HUD items too close	Increase Screen Depth (Ctl+F10)
HUD items in the background	Increase Backplane (Alt+F9)
Side borders blurred, not clear, not visible.	Cycle Frustrum Adjust until borders are clear. (Ctl+F11)
Convergence setting not good for all parts of the game.	Toggle Auto Convergence (Ctl+F8)
Stereo unclear, but not sure what needs to be adjusted..	Suggest Settings (Ctrl+F2)

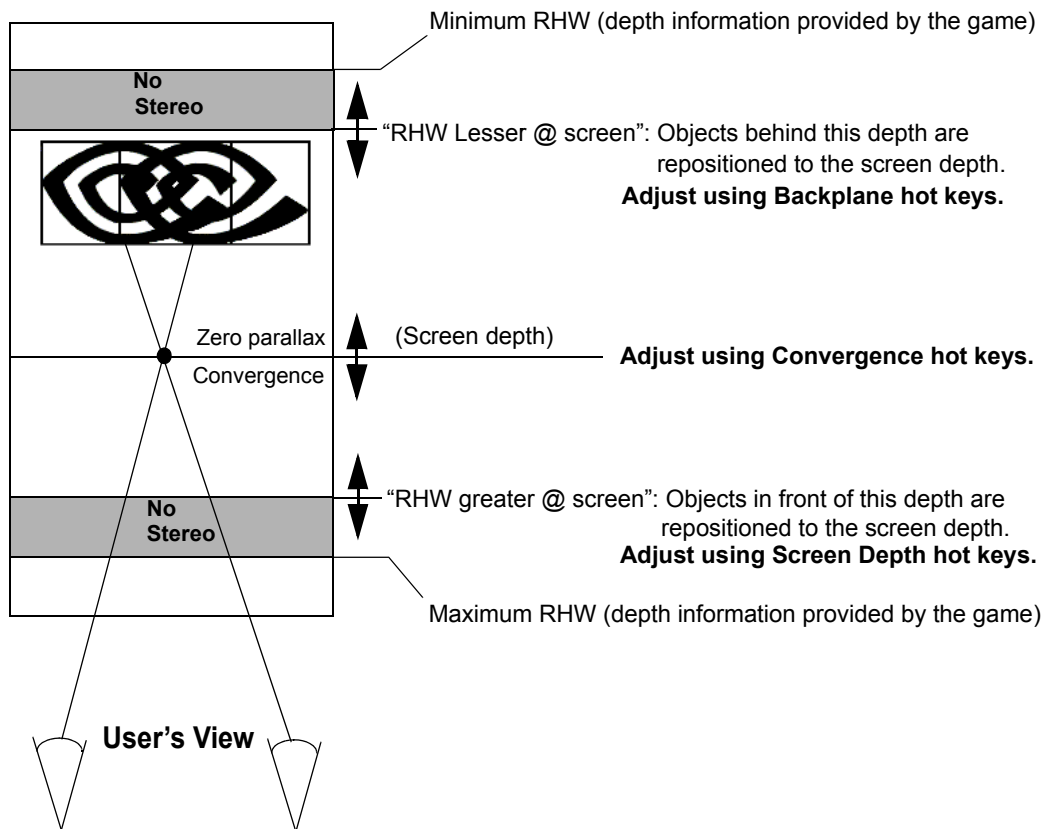


Figure 3.3 Graphical Illustration of Stereo Parameters

About the Configuration Hot Key Functions

Table 3.2 lists the functions in the Stereo Game Configuration Hot Keys page. Use the information in the table as well as the illustration in Figure 3.3 to gain an understanding of each game configuration function.

Table 3.2 Stereo Configuration Hot Key Functions

Label	Hot Key	Hot Key Action	Comments
Cycle Frustum Adjust	Ctrl+F11	Cycle through three different frustum settings. First setting: No frustum adjustment. Second setting: Expand the display in the x direction. Third setting: Clear left or right edges of each eye view.	Use to fix problems with the left and right borders.
Toggle Laser Sight	Ctrl+F12	Toggle the laser sight ON or OFF.	
Increase Screen Depth	Ctrl+F10	Progressively repositions objects to the screen depth, starting with the closest objects. Moves the most forward plane (RHW greater@screen) farther back.	Use if the closest objects are positioned inconsistently with the game, such as HUDs.
Decrease Screen Depth	Ctrl+F9	Reverses the “Increase Screen Depth” action. Moves the most forward plane (RHW greater@screen) closer.	Use to maximize the range of depth in front of the screen.
Increase Backplane	Alt+F10	Progressively repositions objects to the screen depth, starting with the farthest objects. Moves the backplane (RHW lesser@screen) closer to the screen.	Use if the farthest objects are positioned inconsistently with the rest of the game.
Decrease Backplane	Alt+F9	Reverses the “Increase Backplane” action. Move backplane (RHW lesser@screen) away from the screen.	Use to maximize the range of depth behind the screen.
Increase Convergence	Ctrl+F6	Move objects towards you. Maximum convergence places all objects “in front of” the screen, in user space.	Use along with the Decrease Convergence hot key to achieve a good balance between objects in front of the screen and objects behind the screen.

Table 3.2 Stereo Configuration Hot Key Functions (continued)

Label	Hot Key	Hot Key Action	Comments
Decrease Convergence	Ctrl+F5	Move objects away from you. Minimum convergence places all objects “behind” the screen, in CRT space.	Use along with the Increase Convergence hot key to achieve a good balance between objects in front of the screen and objects behind the screen.
Toggle Auto Convergence	Ctrl+F8	Toggles Auto Convergence ON or OFF. When ON, dynamically adjusts the convergence according to the position of objects in the game.	Use when the range of depth varies quite a bit from scene to scene throughout the game.
Restore Default Convergence	Alt+F8	Clears any convergence changes made by the Auto Convergence function.	Use to undo changes made by Auto Convergence.
Suggest Settings	Ctrl+F2	Sets configurations based on data collected during the game.	Use as a starting point to improve undesirable configuration settings.
Unsuggest Settings	Alt+F2	Reverses any changes made by the Suggest Settings function.	
Write Configuration	Ctrl+F7	Saves settings to the registry.	Use when you wish to use the new settings at another time.
Delete Configuration	Alt+F7	Removes the stereo configuration settings from the registry.	CAUTION: This hot key clears all settings, including original NVIDIA provided settings.

Assigning Configurations to Games

If only one version of a game contains configuration settings, such as the demo or full game version, you can apply the settings to another version of the game. If the demo version looks good with the current configuration, the full game version should also look good with the same configuration.

To use a particular configuration for another version of the game, or for another game:

- 1 Find the listed configuration.
 - a Click the **Stereo Game Configuration** tree item in the slide-out tray.
 - b In the Stereo Game Configuration page, scroll through the **Game Name** list to find the configuration you want to use, then click it.
 - c Click **Advanced Settings** to open the Advanced Game Configuration page.
- 2 Select the game to assign to the configuration.
 - a In the Advanced Game Configuration sheet, click **Change**.
 - b Locate the new game executable file and select it.
 - c Click **Open**.

The current configuration is now assigned to the chosen game.

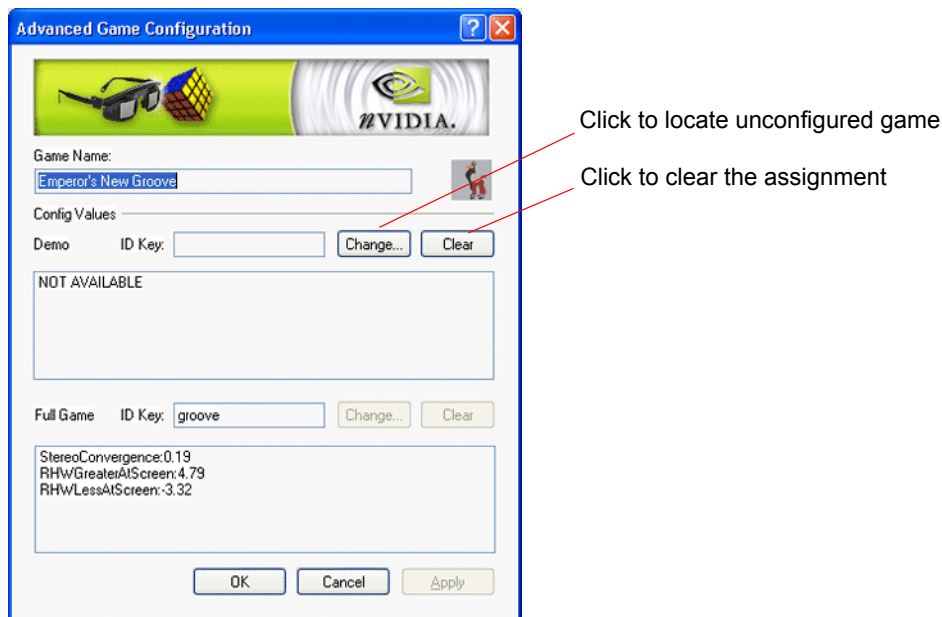


Figure 3.4 Assigning Configurations to Unconfigured Games

USING THE NVIDIA STEREO VIEWER

The NVIDIA 3D Stereo Driver comes with a Stereo Viewer application for viewing and manipulating static stereo images.

The Stereo Viewer is designed to display images created using the NVIDIA stereo image capture utility, and can also display images from other sources—including JPS, H3D, JPEG, PNG, PNS, and anaglyph JPEG images.

The following sections describe the capabilities of the NVIDIA Stereo Viewer:

- “Capturing Images” on page 30
- “Viewing Images” on page 30
- “Setting Resolution and Gamma” on page 36
- “Viewing a Set of Images as a Slide Show” on page 37
- “Moving the Image Files” on page 38

Capturing Images

The NVIDIA driver includes a stereo image capture function that takes a snapshot of a stereo video or game. It saves page flipped images as a JPS file, and anaglyph stereo images as a JPEG. To capture a stereo image, press **Alt+F1** while playing a game in stereo.

- The hot key for “Save Image” is defined under the Stereo Properties > Additional Properties sheet.
- The driver assigns the image a sequential filename based on the original application, and stores it in the folder `\Nvstereo.img`.

Viewing Images

Table 4.1 lists the types of files that can be viewed with the Stereo Viewer, and provides a brief description of applicable requirements.

Table 4.1 File Types Viewable with the Stereo Viewer

File Type (extension)	Stereo Type	Comments
JPEG Stereo (.jps) PNG Stereo (.pns)	Page Flipped	Created by the Stereo Capture utility from page flipped stereo, or provided by an outside source. Regular JPEGs (or PNGs) that consist of a side by side image must be renamed with the .jps (or .pns) extension in order to be viewed as a stereo image.
JPEG (*l.jpg and *r.jpg) PNG (*l.png and *r.png)	Page Flipped	Both “left” and “right” image files are viewed as a set. Both filenames must be identical except for the last letter. When one of the files is opened (see “Viewing Images” on page 30) the Stereo Viewer searches for the complementary file in the same directory and opens both files. If a complementary file does not exist in that directory, the first file is opened without any stereoscopic properties.
H3D (.h3d)	Page Flipped	Must be a true H3D file, and not another file type renamed with the .h3d extension.
JPEG (.jpg)	Anaglyph	Created by the Stereo Capture utility from anaglyph stereo, or provided by an outside source. JPEG files that are not anaglyphs are opened without any stereoscopic properties.

Using the Stereo Viewer

Starting the Viewer

Open the Stereo Viewer by clicking **Stereo Viewer** from the Stereo Properties page.

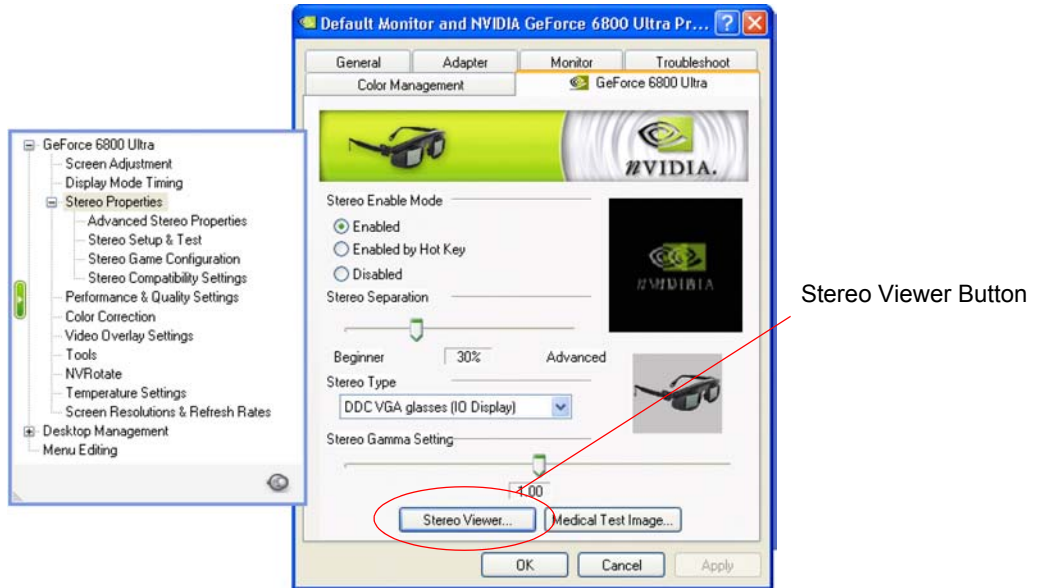


Figure 4.1 Starting the Stereo Viewer

The Stereo Viewer window appears.

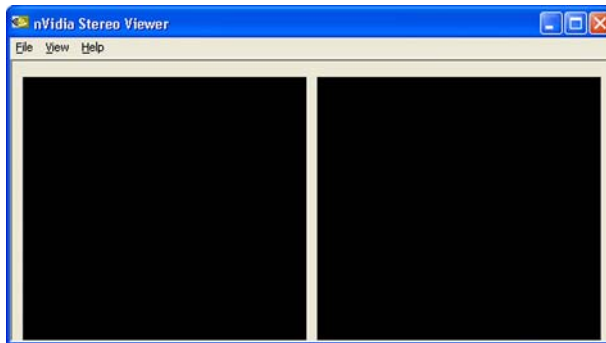


Figure 4.2 NVIDIA Stereo Viewer

Opening a 3D Stereo Image

You can load images into the viewer two ways:

- Use **Method 1** for loading JPS, PNS, true H3D stereo files, or one of a pair of 'l' or 'r' JPEG or PNG files.
- Use **Method 2** for loading one at a time separate left and right JPEG or PNG files that are stereoscopic when viewed alternately (page flipped).

Method 1: Load Both Eyes Simultaneously

1 From the NVIDIA Stereo Viewer window, do one of the following

- Click **File->Open** from the main menu
- Press the hot key (**Ctrl+O**)
- Right-click the stereo viewer window, then click **Open**.

The browser window opens.

2 From the browser, locate and choose a stereo file, then click **Open**

The Viewer displays separate left and right images..

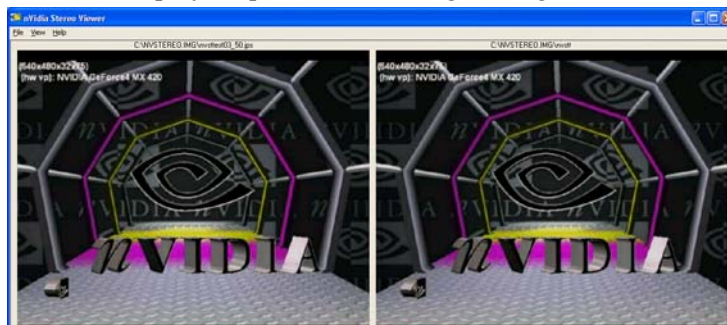


Figure 4.3 Stereo Viewer—Windowed View

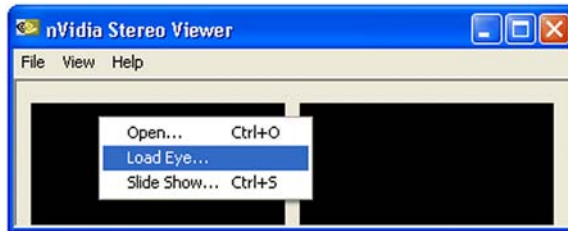
- JPS, PNS, and true H3D files are treated as page flipped stereo images, with the left and right images corresponding to each respective 'page'.
- If a JPEG or PNG file is opened and the filename contains the letter 'r' or 'l' before the extension, the Viewer searches for a similar filename that contains the letter 'l' or 'r'. The Viewer then opens both files and treats them as a single page flipped stereo image.

Example filenames: `NVIDIA_l.jpg` and `NVIDIA_r.jpg`.

- Other JPEG and PNG files are not treated as stereo images, and the left and right images will be identical. However, you can use the stereo viewer to open and view anaglyph JPEGs without the need for paint programs or other graphics viewers.

Method 2: Load Each Eye Individually

- 1 Click in one of the 'eyes' of the Stereo Viewer window, then choose Load Eye from the menu.



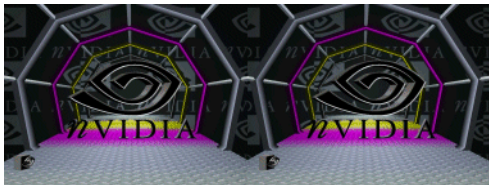
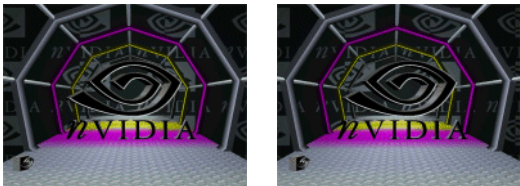
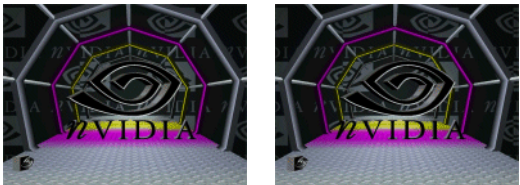
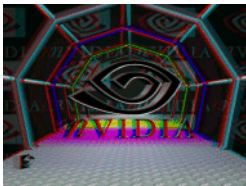
If left/right "black eyes" do not appear, resize the Viewer window.

- 2 Locate the file that corresponds to the 'eye' you clicked (left or right), select it, then click Open.
- 3 Repeat steps **a** and **b** for the other eye view.

Viewing the File in 3D Stereo

- 1 Click View > Stereo View to see the full-screen stereo display of the image.
Hot Key—Ctrl+V
- 2 When finished viewing, press the **ESC** key to return to the windowed view.

Summary of How to View Different File Types

Type of Image	How to View
JPS, PNS, or H3D Image  <i>Sample filename—NVStereo.jps or NVStereo.h3d</i>	Just open the file. The Stereo Viewer places the left side of the image in the left eye position and the right side of the image in the right eye position.
Set of Left and Right JPEGs or PNGs—Method A  <i>Sample filename NVStereo_l.jpg</i> <i>Sample filename NVStereo_r.jpg</i>	If the filenames for the left and right eyes are identical except for the 'l' and 'r' designation right before the extension, then open one of the files with the Stereo Viewer. The Viewer opens both files and places the 'l' file in the left eye position and the 'r' file in the right eye position.
Set of Left and Right JPEGs or PNGs—Method B  <i>Sample filename NVStereoleft.jpg</i> <i>Sample filename NVStereoright.jpg</i>	You can place any two JPEG or PNG files in the left and right eye positions one at a time. For each eye view, right click in the corresponding Viewer window, choose Load Eye from the menu, then select the file you want to use for that eye view.
Anaglyph JPEG  <i>Sample filename—NVStereoanaglyph.jpg</i>	Just open the file. Instead of opening another graphics application, you can use the Stereo Viewer as a graphics viewer for JPEGs. Since the left and right eye views are identical, the image does not have stereo properties unless it is an anaglyph.

Reversing Left and Right Page Flipped Images

Page flipped images created by the NVIDIA stereo image capture utility will display correctly. Images obtained from other sources, however, may be designed for cross-eyed viewing and will not display correctly. In this case, the left and right images must be switched. To do this:

Open the stereo image, then from the main menu click View->Swap Eyes.

Hot Key—Ctrl+W

The left and right images will switch positions. This effects the display of the current image only, not the image file itself.

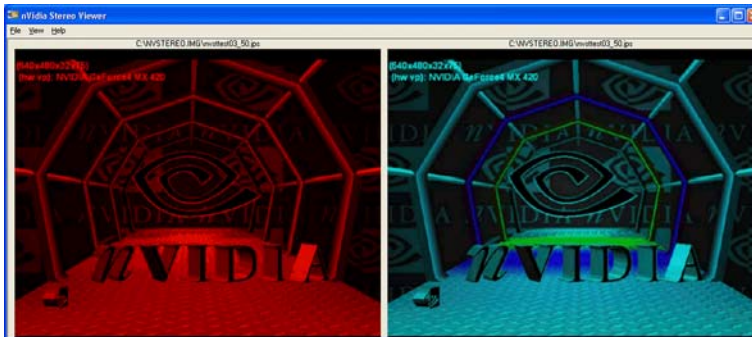
Note: The stereo viewer cannot reverse the display of JPEG images. However, anaglyph displays of JPS, PNS, or H3D images *can* be reversed.

Viewing Page Flipped Images as Anaglyphs

To view a JPS file as an anaglyph—

- 1 Open the file.
- 2 Switch the display type using any of the following methods:
 - From the main menu, click View->Switch Display Type.
 - Press the hot keys **Ctrl+T**
 - From the main menu, click View->Options, then in the Display Settings section of the the Options page choose **Anaglyph** and click **OK** or **Apply**.

The viewer display changes from page flipped to anaglyph.



- 3 Click View->Stereo View to view the full-screen anaglyph stereo image.

Hot Key—Ctrl+V

Note: You can convert the page flipped file to an anaglyph JPEG. While viewing the image in full-screen anaglyph stereo mode, save the image as an anaglyph JPEG using the stereo capture utility (**Alt+F1**).

Setting Resolution and Gamma

The Stereo Viewer application contains additional viewing functions.

Changing Display Settings

From the main menu, click View > Options

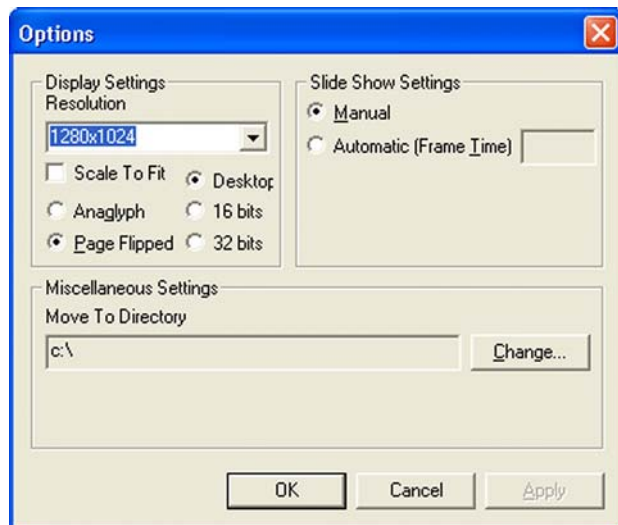


Figure 4.4 Stereo Viewer Options Page

- **To change the display resolution**

Under Display Settings click the arrow button, then choose from the list of available display options, then click **OK**.

- **To change color depth**

Click the Desktop radio button to use your desktop color depth setting, or click either the 16 bits or 32 bits radio button.

- **To adjust the display to fill your screen, check the Scale to Fit check box.**

Adjusting the Brightness

To accommodate different monitor and lighting conditions,

- press **Ctrl+G** to increase the gamma (brightness) of the stereo display.
- press **Shift+G** to decrease the gamma (brightness) of the stereo display.

Viewing a Set of Images as a Slide Show

You can view a set of stereo images in either automatic or manual sequence.

1 Choose Automatic or Manual viewing:

- a** From the main menu, click View > Options.
- b** In the Slide Show Settings section, choose **Manual** or **Automatic**, then click **OK**.

If you choose Automatic, enter the length of time (in seconds) to display each frame.

2 Locate the images to view.

- a** From the main menu, click View > Slide Show

Hot Key—**Ctrl+S**.

The Slide Show Files window appears.

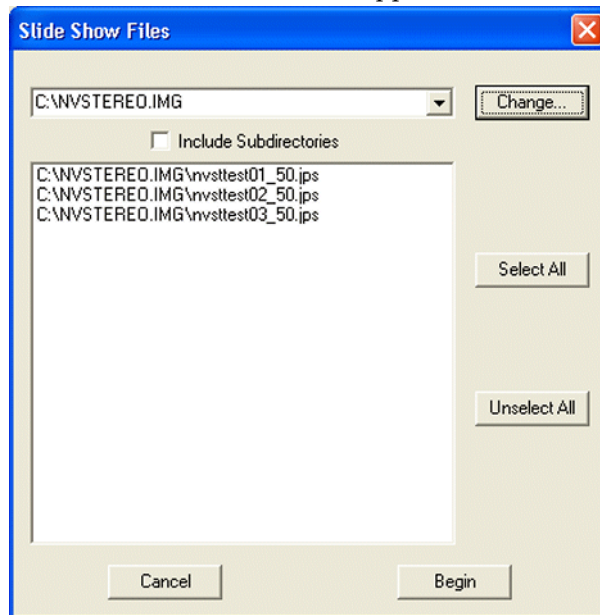


Figure 4.5 Stereo Viewer Slide Show - Files Selection

- b** To view another directory, either

- edit the entry in the directory box using the keyboard, or
- click the drop down arrow and choose from the list of previously accessed directories, or
- click the Change button, select a different directory where the files are located, then click **OK**.

3 From the list of files, choose the files to be displayed in the slide show.

4 Click **Begin** to start the slide show.

The images will appear in full-screen stereo view.

If you chose Manual viewing, use the following hot keys to switch images:

- Next image, exit after the last image: **Space bar**, or **left mouse button**.
- Next image, repeat the cycle after the last image: **Right arrow**, or **page down key**.
- Previous image: **Left arrow**, **page up key**, or **right mouse button**.

Moving the Image Files

Sometimes filenames do not give a good indication of the subject matter, making it difficult to organize files. The Move function allows you to view the image and then immediately move the file to a specified folder.

1 Set up the destination folder.

a From the main menu, click View > Options...

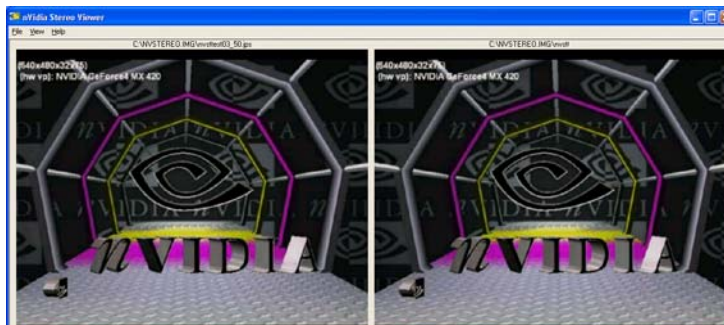
b From the Miscellaneous Settings section in the Options window, click **Change**, then use the Browser window to select the destination location for the file(s).

c Click **OK** in the Browse for Folders window, then click **OK** in the Options window

2 Open the stereo image to view it, using File > Open Stereo Image.

Hot Key—Ctrl+O

Both left and right images will be displayed in the Viewer window.



3 Move the file to the destination folder.

Click View->Move Image

Hot Key—Ctrl+M

The file is now stored in the new folder.

Summary of Stereo Viewer Hot Keys

You can also press **F1** or click Help>About to see a list of the hot keys.

Hot Keys Enabled in Windowed View

These hot keys work in the Viewer windowed view only.

Function	Hot Key
Open Stereo Image	Ctrl+O
Display Image in Stereo	Ctrl+V
Toggle Display Type Between Page Flip and Anaglyph	Ctrl+T
Set Up the Slide Show	Ctrl+S

Hot Keys Enabled in Full-Screen Stereo View

These hot keys work in the full-screen stereo view only.

Function	Hot Key
Increase Gamma	Ctrl+G
Decrease Gamma	Shift+G
Go to next slideshow image	[Space bar]
Cycle to next slideshow image	Right-arrow / [Pg Dn]
Go to previous image	Left arrow / [Pg Up]
Quit Viewer	[Esc]

Hot Keys Always Enabled

These hot keys work in any view.

Function	Hot Key
Switch Left and Right Images	Ctrl+W
Move the Image File	Ctrl+M

TIPS AND TROUBLESHOOTING

Refer to this chapter for ideas on how to maximize the stereo quality, or for help if you have difficulty using the NVIDIA 3D Stereo Driver. This chapter covers the following topics:

- “Stereo Viewing Tips” on page 41 lists suggestions to help maximize the stereo quality of your games.
- “Troubleshooting” on page 44 lists suggestions to help you successfully play games in stereo.
- “Stereo Viewer” on page 49 list suggestions to help you successfully use the Stereo Viewer.

Stereo Viewing Tips

Viewing Practices that Effect Stereo Quality

Stereo Separation

A recommended starting point is 30%, but always adjust the separation to a comfortable level. You can increase it over time as your eyes get used to stereo viewing.

Viewing Distance

Maintain a distance no closer than 2 to 2.5 feet away from the monitor. Viewing from too close a distance can cause too much strain on your eyes, and can reduce stereo quality.

Viewing Angle

Keep your eyes parallel to the screen. The imaginary line connecting your eyes should be parallel to the horizontal level of the screen.

The stereo effect is based on side-to-side—or horizontal—displacement of each image. If you tilt your head side-to-side, your eyes no longer see the displacement as horizontal, and the stereo effect is diminished or even eliminated. While your brain may adjust to this viewing, it must work harder, resulting in eye strain and fatigue.

Viewing Time

Take regular breaks. As with any time spent looking at a computer screen, it is good practice to give your eyes a rest after a period of time. At a minimum, rest for 5 minutes after every hour of stereo viewing.

Viewing with Prescription Glasses

If you normally wear glasses when viewing a computer screen, keep them on during stereo viewing. You can put on most stereo eyewear over your regular glasses.

The sharper the image on the screen, the better the stereo quality.

System and Game Settings that Effect Stereo Quality

Refresh Rate

Set your monitor to the highest refresh rate possible, preferably 120 Hz or higher. The refresh rate for each eye should be higher than 40–60 Hz in order for flicker to be imperceptible. Any perceived flicker degrades the image quality and can lead to eye strain and fatigue.

Display Lighting

The amount of light reaching each eye is cut in half, and causes the screen to appear darker under stereo viewing. To compensate, be sure to set the gamma setting in the Stereo Properties page to an appropriate level. Adjusting the brightness and contrast settings of your game can also reduce screen persistence and improve stereo quality.

Game Cursor / Cross-hair Sights

If you are using the NVIDIA 3D laser sights, be sure to turn off the sight that the game provides. The game sight is usually positioned at screen depth, and interferes with useful viewing of the NVIDIA laser sight.

Ambient Lighting

The intensity of surrounding lighting can effect stereo quality and comfort. Lighting conditions that improve stereo viewing vary from one person to the next, so experiment with brighter or darker room lighting to find what works best for you.

System Speed

Because the graphics system must generate twice the number of images, you might notice a decrease in game performance in slower systems. To improve game performance, reduce the monitor resolution for your game.

Don't worry about losing display quality. The display quality at any given resolution actually improves when viewed in stereo.

System Memory

Because the graphics system must generate twice the number of images, you might not be able to play games in stereo on systems with low memory. There are a few things you can do to minimize the amount of memory used by the 3D stereo process.

- Reduce the resolution.
- Reduce the bit depth.
- Adjust the settings in the Stereo Compatibility page as follows:
 - a Click the **Stereo Compatibility** tree item from the slide-out tray.

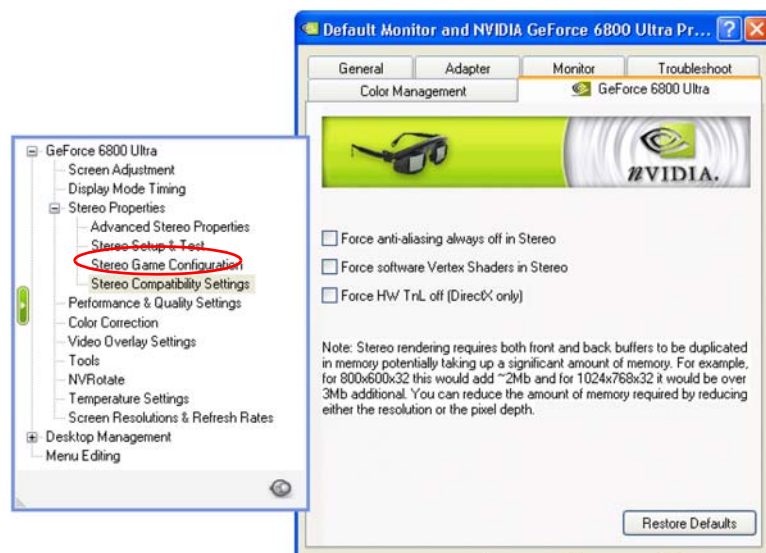


Figure 5.1 Stereo Compatibility Page

- b If the game closes and returns you to the desktop when you attempt to play it in stereo, make sure the **Force anti-aliasing always off in Stereo** check box is checked.
- c If the game has little or no depth or separation in stereo, check the **Force HW TnL off** check box.

Hardware Vertex Shaders

The NVIDIA 3D driver supports hardware vertex shaders. In the rare event that hardware vertex shaders aren't working in 3D stereo, you can choose to use software vertex shaders by checking the **Force software Vertex Shaders in Stereo** check box from the Stereo Compatibility page (see Figure 5.1).

Troubleshooting

Game Playing

Problem: No Stereo

- **Possible Cause: Stereo not enabled**
 - Make sure stereo is enabled.
Under Stereo Properties, click either the **Enabled** or **Enabled by Hot Key** radio button, then click **OK** or **Apply**.
 - Make sure hot keys are set up.
Click the **Advanced Stereo Properties** tree item in the slide-out panel, then verify the hot keys are defined. NVIDIA recommends using **Ctrl+T** for Toggle stereo on/off, **Ctrl+F3** for Less Stereo Separation, **Ctrl+F4** for More Stereo Separation, **Alt+F1** for Save Image, **Ctrl+G** for Increase Gamma, and **Alt+G** for Decrease Gamma.
 - Turn stereo On.
While playing the game, press **Ctrl+T** to toggle stereo on and off.
- **Possible Cause: Stereo separation too small**
 - Increase the stereo separation.
Press **Ctrl+F4** while in the game. Alternately, under Stereo Properties, move the Stereo Separation slide bar to a higher setting—towards Advanced—then click **OK** or **Apply**.
- **Possible Cause: Problem with hardware installation**
 - Check to make sure the eyewear is connected and operating. Some eyewear have an on/off switch, or operate on batteries.
The view through the eyewear should darken when stereo is turned on.
 - Refer to the instructions for your stereoscopic viewing hardware.
- **Possible Cause: Problem with driver installation**
 - Check driver documentation.
- **Possible Cause: Game is not in full-screen mode**
 - Set the game to play in full-screen (not windowed) mode.

- **Possible Cause: Game is not configured for Direct3D or OpenGL**
 - Set the game to play using Direct3D or OpenGL hardware rendering. Do not use software rendering.
 - Games which do not use Direct3D or OpenGL are not supported by the NVIDIA 3D Stereo Driver.

Problem: Image Not Clear

- **Possible Cause: Eyes not adjusted**

Your eyes may take some time to adjust to stereo viewing.

- **Possible Cause: Too much stereo separation**

Decrease the stereo separation.

Press **Ctrl+F3** while in the game. Alternatively, in the Stereo Properties page, move the Stereo Separation slide bar to a lower setting—towards Beginner—then click **OK** or **Apply**.

- **Possible Cause: Display mode not optimal**

Adjust the stereo refresh rate.

- 1 Click the **Stereo Setup & Test** tree item from the slide-out tray, then select the Bit Depth and move the Resolution slide bar to correspond to the game display mode.
- 2 Set the Stereo Refresh Rate slide bar to 120 Hz, then press **Launch Test Application**.
- 3 If the stereo image looks OK, press **F6**, then press the (+) key to test using a higher refresh rate.
- 4 Continue testing until an acceptable display is achieved at the highest refresh rate that your monitor can handle.

- **Possible Cause: Game configuration—no settings exist for any version of the game**

You can verify this by checking the Game Name list in the Stereo Game Configuration page.

If your game is not listed, use the hot keys as defined under Stereo Game Configuration > Configure Hot Keys to create various stereo settings while viewing the game.

Refer to Table 3.2, “Stereo Configuration Hot Key Functions” on page 26, and Table 3.1, “Stereo Improvement Suggestions” on page 25.

- **Possible Cause: Game configuration—no settings exist for your game version**

You can verify this by finding your game in the Game Name list in the Stereo Game Configuration page, then clicking **Advanced Settings**.

If no ID key exists for your version of the game, refer to [“Assigning Configurations to Games” on page 28](#) for instructions on how to use the configurations of the listed ID for your game.

- **Possible Cause: Game configuration—settings exist but are not optimal**

If stereo configurations exist for your game, but the stereo image is still not clear, you may need to adjust the configuration settings further.

Use the hot keys as defined under Stereo Game Configurations > Configure Hot Keys to adjust various stereo settings while viewing the game.

Refer to [Table 3.2, “Stereo Configuration Hot Key Functions” on page 26](#), and [Table 3.1, “Stereo Improvement Suggestions” on page 25](#).

- **Possible Cause: Eyewear Hardware Not Set Up Properly or Eyewear Driver Support not Installed Properly**

Eyewear with Left/Right Hardware Switch

Some eyewear must be manually set so that the left and right lenses correspond to the respective left and right screen images. If set incorrectly, stereo images may be difficult to see. To verify whether your stereo eyewear is switching correctly, launch the medical image test.

- **If the image consists of a small square hole that is cut out of a larger square—**

Your eyewear left/right setup is configured incorrectly. You can confirm this by pressing **Ctrl+W**. The medical image should now display properly—as a small square in front of a larger square.

You will have to switch your eyewear setting when playing games. Refer to your eyewear documentation for instructions.

- **If you cannot see a stereo image—**

Press **Ctrl+W**. If the image can now be seen as a small square in front of the larger square, you will have to switch your eyewear setting when playing games. Refer to your eyewear documentation for instructions.

Eyewear without Left/Right Hardware Switch

Eyewear that does not have a manual switch for left/right orientation is completely controlled by the NVIDIA driver to ensure left/right consistency with the screen image—provided the driver is configured properly. To verify, launch the medical image test.

- If the image consists of a small square hole that is cut out of a larger square—
The driver is configured incorrectly. You can confirm this by pressing **Ctrl+W**. The medical image should now display properly—as a small square in front of the larger square.
Obtain the latest stereo drivers recommended by the stereo hardware manufacturer, and reinstall the drivers.
- If you cannot see a stereo image—
Press **Ctrl+W**. If the image can now be seen as a small square in front of the larger square, obtain the latest stereo drivers recommended by the stereo hardware manufacturer, and reinstall the drivers.

- **Possible Cause: Eyewear lenses are the wrong color (anaglyph viewing)**

The default anaglyph configuration is for standard left-eye-red and right-eye-blue glasses. If the colors are reversed or different colors are used in your glasses, customize the anaglyph settings as follows:

- Click the Advanced Stereo Properties tree item from the slide-out tray, then click **Anaglyph Stereo**.

The Anaglyph page appears.

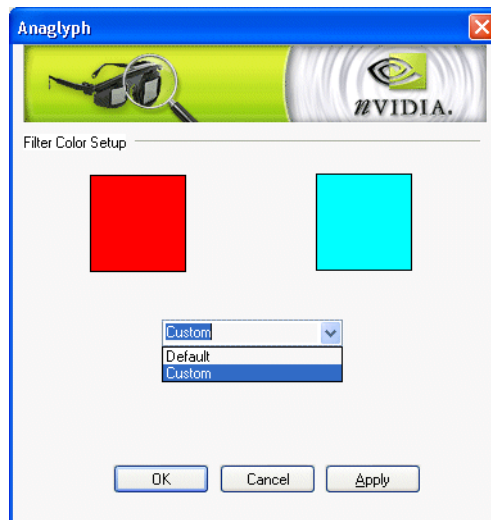


Figure 5.2 Anaglyph Setup Page

- In the Anaglyph page, click the drop down menu arrow, then select **Custom**.
- Click the left or right color box corresponding to the left or right lens of your glasses

The Color Setup page appears

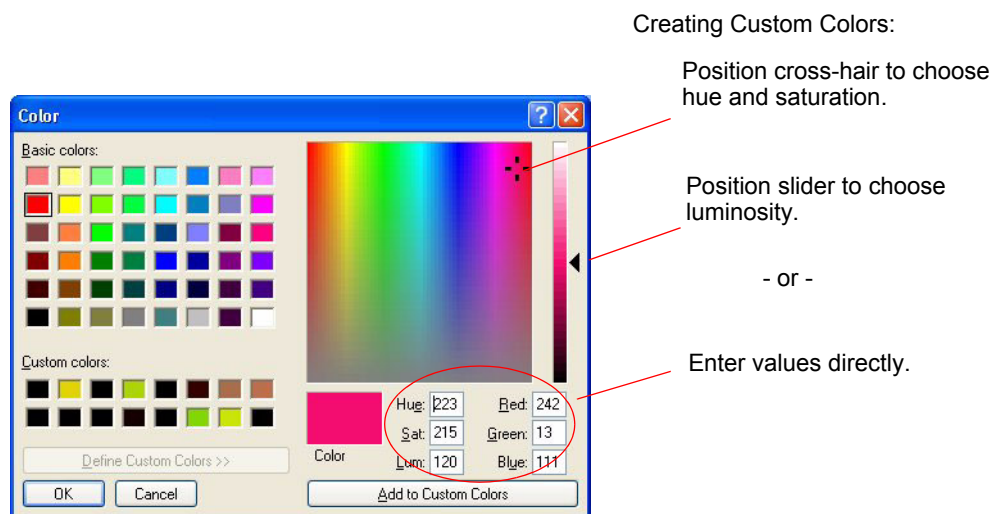


Figure 5.3 Color Setup Page

- d Click a Basic Color or a Custom Color, then click **OK**.

Problem: Eyestrain / Headache

- **Possible Cause: Too much stereo separation**

- Decrease the stereo separation.

Press **Ctl+F3** while in the game. Alternatively, in the Stereo Properties control panel, move the Stereo Separation slide bar to a lower setting—towards Beginner—then click **OK** or **Apply**.

- **Possible Cause: Too much flicker**

Increase the stereo refresh rate.

- 1 Click the **Stereo Setup & Test** tree item from the slide-out tray, then select the Bit Depth and move the Resolution slide bar to correspond to the game display mode.
- 2 Set the Stereo Refresh Rate slide bar to 120 Hz, then press **Launch Test Application**.
- 3 If the stereo image looks OK, press **F6**, then press the (+) key to test using a higher refresh rate.
- 4 Continue testing until an acceptable display is achieved at the highest refresh rate that your monitor can handle.

 **WARNING!**

If symptoms persist, discontinue viewing in stereo and consult a physician.

Problem: No Laser Sight

- **Possible Cause: Laser sight not enabled**

- Enable the laser sight.

Click the **Advanced Stereo Properties** tree item from the slide-out tray, then select **On for Configured Games** in the Laser Sight section.

- **Possible Cause: Stereo not enabled**

- Turn stereo On.

While playing the game, press **Ctrl+T** to toggle stereo on and off.

- **Possible Cause: Transparency set too high**

- Decrease the laser transparency.

Click the **Advanced Stereo Properties** tree item from the slide-out tray, then move the Transparency slide bar to a lower setting, towards the left.

Stereo Viewer

Problem: Stereo Image Not Clear

- **Possible Cause: Side by side images are set up for “cross-eyed” viewing**

- Reverse the images.

While viewing the image, press **Ctrl+W**, or from the Stereo Viewer window click **View > Swap Eyes**.

Problem: Image Not in Stereo

- **Possible Cause: Image is a single image JPEG or PNG file.**

- Use a JPS or PNS image instead.

- **Possible Cause: Image is a a side-by side JPEG or PNG file.**

- Rename the file using a **.jps** extension instead of **.jpg**, or using a **.pns** extension instead of **.png**.