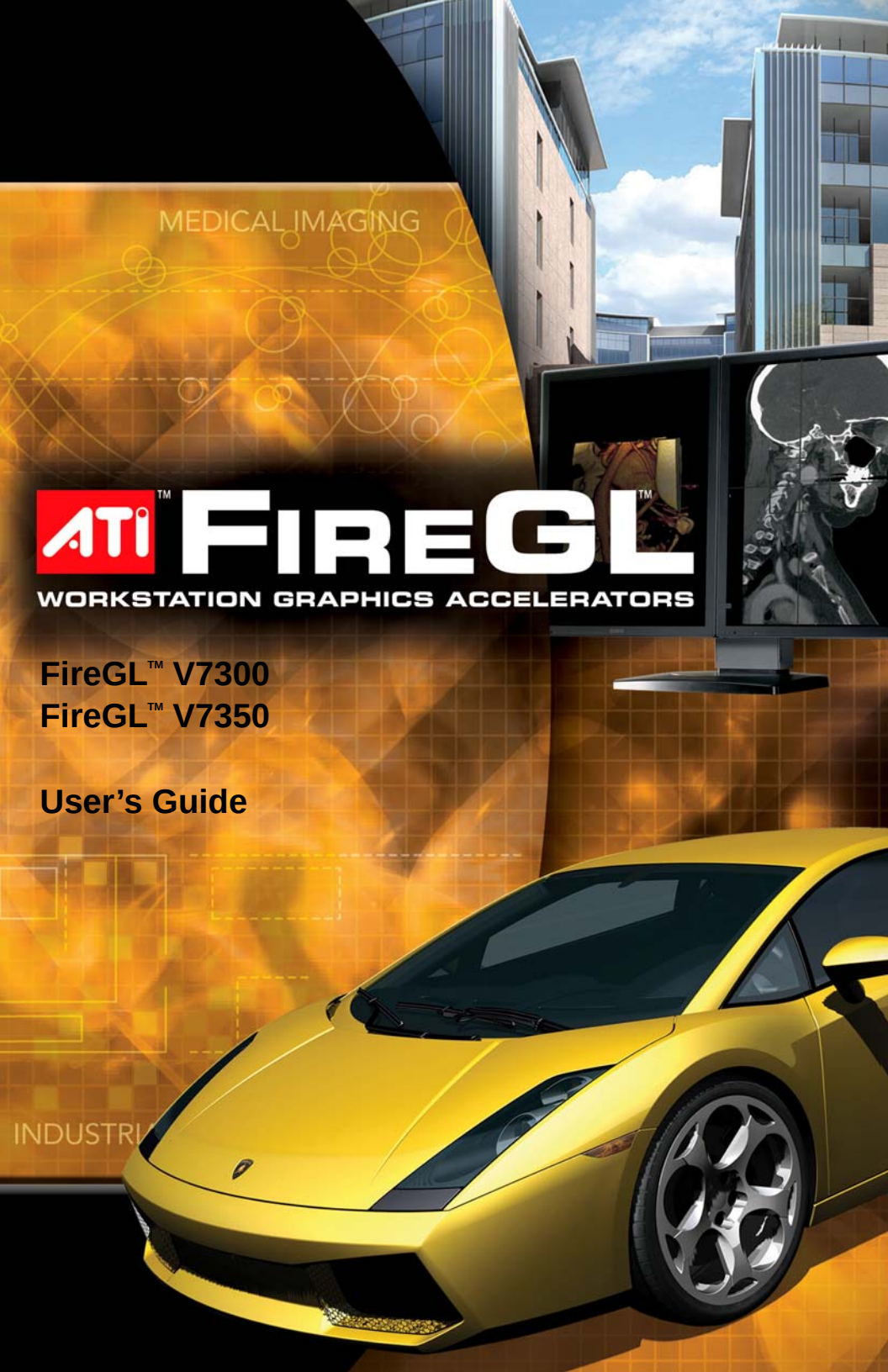


# FireGL™ V7300
# FireGL™ V7350

## User's Guide

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## Documentation Updates

ATI is constantly improving its product and associated documentation. To maximize the value of your ATI product, you should ensure that you have the latest documentation. ATI's documentation contains helpful installation/configuration tips and other valuable feature information.

## IMPORTANT SAFETY INSTRUCTIONS

- **Read Instructions** - All the safety and operating instructions should be read before the product is operated.
- **Retain Instructions** - The safety and operating instructions should be retained for future reference.
- **Heed Warnings** - All warnings on the product and the operating instructions should be adhered to.
- **Compatibility** - This option card is for use only with IBM AT or compatible UL Listed personal computers that have Installation Instructions detailing user installation of card cage accessories.
- **Grounding** - For continued protection against risk of electric shock and fire, this accessory should be installed only in products equipped with a three-wire grounding plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace the obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.
- **Secure Attachment** - All card securement pins shall be completely tightened as to provide continuous bonding between the option card and the PC chassis.
- **Lightning** - For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet, and disconnect the antenna or cable system. This will prevent damage to the product due to lightning and power-line surges.
- **Power Lines** - An outside antenna system should not be located in the vicinity of overhead power lines or other light or power circuits, or where it can fall into such power lines or circuits.
- **Antenna Installation** - When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or circuits, as contact with them may be fatal.

**Note:** This graphics card is for use only with compatible UL Listed personal computers that have Installation Instructions detailing user installation of card cage accessories.

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CHAPTER 1:

# Getting Started

Your ATI FireGL™ card is an advanced workstation 3D graphics card based on a high-bandwidth, parallel pipeline geometry and rendering architecture. The card delivers workstation-class performance to designers, engineers, and animators, and runs the latest OpenGL® and Microsoft® DirectX® applications.

## FireGL™ Features

Features of your FireGL™ workstation graphics card include:

- ATI FireGL™ Graphic Processor Unit (GPU) with Avivo™ technology.
- Scalable ultra-threaded architecture with fast dynamic branching and high performance parallel processing.
- Native high bandwidth PCI Express™ X16 lane support.
- 128-bit full floating point precession.

### *ATI Avivo™ Workstation Technology*

- True 64-bit per pixel floating point High Dynamic Range (HDR) rendering support.
- High fidelity display engine capable of producing over one trillion colors.
- Advanced support for 8-bit, 10-bit, and 16-bit per RGB color component.

### *Display Output*

- Dual DVI-I outputs supports any combination of digital and analog displays.
- Independent resolution and refresh rate selection with multi-monitor configurations.
- Two Dual-Link outputs, capable of ultra-high resolutions up to 3840 x 2400.

- Ideal for 30-inch Apple® Cinema HD Displays and 9 Megapixel monitors.
- Stereoscopic 3D output connector with quad buffer support.
- Dual VGA analog support (DVI-I-to-VGA adapter included).
- Component Video (YPrPb) output (adapter included).

# System Requirements

Make sure you meet the following system requirements before installing your FireGL™ card.

| | |
|---|---|
| **Hardware** | • Intel® Pentium® 4/Xeon®; AMD Athlon® 64/K7/XP or compatible.<br>• 512 MB or more for best performance.<br>• Motherboard with available X16 lane PCI Express™ slot and correct chipset driver.<br>• Optical drive for installation software (CD-ROM or DVD-ROM drive).<br>• 450 watt or greater power supply (recommended).<br>• Auxiliary power cable with standard six-pin connector. |
| **Operating System** | • Windows® 2000 with Service Pack 1 (or higher).<br>• Windows® XP Home or Pro with Service Pack 1 (or higher).<br>• Linux® XFree86 4.X.0. |
| **Monitor** | • High-resolution MultiSync or multi-frequency monitors or other VGA monitors.<br>• Digital flat-panel displays or digital CRT displays. |

# Before You Begin

Before you begin installing your new graphics card, please do the following.

## Record Your Serial and Part Numbers

The serial number and 102 part number on the graphics card are required for registration. They are located on a sticker on the back of the card.

Write these numbers down before installing your new ATI product.

**Serial and Part Numbers**

| | |
|---|---|
| 1 | Serial number (S/N) |
| 2 | 102 part number (P/N) |

## Uninstall Previous Graphics Card Drivers

To ensure the successful installation of your new FireGL™ card, you must uninstall the drivers for the existing graphics card before removing it from your computer.

### *To uninstall previous drivers*

With your current graphics card still in your computer:

1. Close all applications that are currently running.
2. Navigate to the **Control Panel** and select **Add/Remove Programs.**

3 Select your current graphics card drivers and select **Add/Remove.** The wizard will help you remove your current display drivers.

**Note:** If the previously installed graphics card has any additional software installed, it should also be removed at this point.

4 Turn off your system and remove the old graphics card.

# Quick Installation

Experienced users and system administrators can follow these brief instructions for installing the FireGL™ card in the shortest possible time.

Detailed hardware and software installation instructions are given in the next two sections.

### *To perform a quick installation*

1 Uninstall the drivers and software for your old graphics card if you have not already done so.

**Note:** If you are using a motherboard containing an on-board graphics solution and do not intend to use it as part of a multiple-monitor setup, disable it.

2 Shut down and disconnect your computer system.

3 Remove any previously installed card.

4 Install your new FireGL™ card.

5 Reassemble and connect your computer system.

6 Install the FireGL™ drivers and configuration software from the ATI Installation CD-ROM by doing one of the following:

- Run through the automatic **ATISETUP** utility; or
- **Start > Run > X:\SETUP.EXE** (where **X** is the drive letter of your CD-ROM drive).

CHAPTER 2:

# Installing Hardware

This chapter will guide you through the physical installation of your FireGL™ card.

## Detailed Installation

The following instructions will take you step by step through the installation of your new FireGL™.

### *Installing the graphics card*

1. Turn off the computer, monitor, and other peripheral devices.
2. Unplug the computer's power cord and disconnect all cables from the back of your computer.

> ⓘ **WARNING** - Wait approximately 20 seconds after unplugging the power cord before disconnecting a peripheral or removing a component from the motherboard to avoid possible damage to the motherboard.

3. Remove the computer cover.

   If necessary, consult your computer's manual for help in removing the cover.

> ⓘ **WARNING** - Remember to discharge your body's static electricity by touching the power supply or the metal surface of the computer chassis.

4. Unscrew or unfasten and remove any existing graphics card from your computer.

   **Note:** If your computer has an on-board graphics capability, you may need to disable it on the motherboard. For more information, see your computer documentation.

5 Locate the appropriate slot and, if necessary, remove the metal back-plate cover.

6 Align your ATI graphics card with the slot and press it in firmly until the card is fully seated.

7 Connect the power cable to the 6-pin power connection on the graphics card.

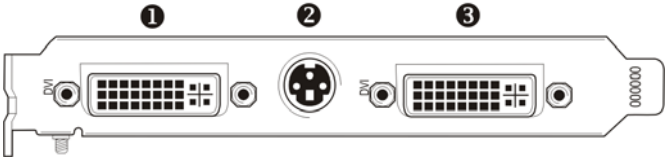
8 Screw in or fasten the graphics card securely. Make sure the cables are not interfering with anything inside the computer (for example, a cooling fan) and replace the computer cover.

9 Reconnect any cables you have disconnected and plug in the computer's power cord.

10 Turn on the monitor, and then your computer.

## Connecting Display Devices

The following connections are available:

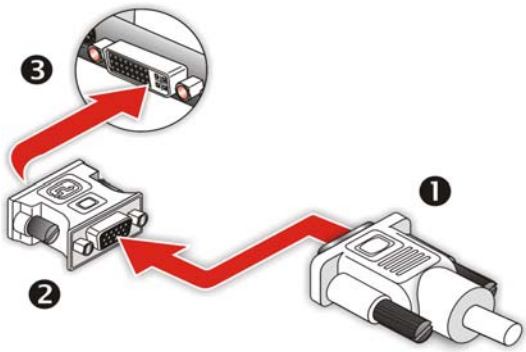



**FireGL™ Baseplate Connections**

| | |
|---|---|
| ❶ | DVI-I Connection (Supports dual-link output and HD Component Adapter) |
| ❷ | Stereographics Connection |
| ❸ | DVI-I Connection (Supports dual-link output) |

Your FireGL™ card can connect one or two monitors, either DFP/digital CRT or analog VGA. It can also connect a stereographics device.

You will need to use an adapter to connect analog VGA devices to the DVI-I connections.




**Using a VGA-to-DVI-I Adaptor**

| | |
|---|---|
| ❶ | VGA Monitor Connector |
| ❷ | VGA-to-DVI-I Adaptor |
| ❸ | DVI-I Connection |

Make sure all cables are securely connected before turning on your system.

# Display Configurations

Your FireGL™ graphics card provides dual display functionality as well as quad-buffered stereographics. The following table lists the different ways you can connect displays to your card.

| Display Configuration | Connector(s) Used | Comments |
|---|---|---|
| **Single DFP display** | DVI-I connector | DFP - digital flat panel display. |
| **Single CRT display** | VGA connector with VGA-to-DVI-I adapter | CRT- cathode ray tube analog display.<br>The DVI-I connection can support a CRT display using the VGA-to-DVI-I adapter. |
| **Quad-buffered stereographics device** | Quad-buffered stereographics | A monitor must be connected for quad-buffered stereographics to function. |

| Display Configuration | Connector(s) Used | Comments |
|---|---|---|
| **DFP display + Quad-buffered stereographics device** | DVI-I connector + Quad-buffered stereographics | |
| **CRT display + Quad-buffered stereographics device** | VGA connector with VGA-to-DVI-I adapter + Quad-buffered stereographics | |
| **DFP display + DFP display** | DVI-I connector + DVI-I connector | |
| **CRT display + HDTV display** | DVI-I-to-VGA adapter + HDTV cable (YPrPr) with HDTV Component Adapter | |
| **DFP display + HDTV display** | DVI-I connector + HDTV cable (YPbPr) with HDTV Component Adapter | HDTV adapter should be attached to DVI-I that is farthest from the motherboard. |
| **CRT display + DFP display** | VGA connector with VGA-to-DVI-I adapter + DVI-I connector | |
| **CRT display + CRT display** | VGA connector with VGA-to-DVI-I adapter + VGA connector with VGA-to-DVI-I adapter | |
| **DFP display + DFP display + Quad-buffered stereographics device** | DVI-I connector + DVI-I connector + Quad-buffered stereographics | Check driver release notes for limitations on the use of stereographics. |

| Display Configuration | Connector(s) Used | Comments |
|---|---|---|
| **CRT display + DFP display + Quad-buffered stereographics device** | VGA connector with VGA-to-DVI-I adapter + DVI-I connector + Quad-buffered stereographics | Check driver release notes for limitations on the use of stereographics. |
| **CRT display + CRT display + Quad-buffered stereographics device** | VGA connector with VGA-to-DVI-I adapter + VGA connector with VGA-to-DVI-I adapter + Quad-buffered stereographics | Check driver release notes for limitations on the use of stereographics. |

## Turning on the System

ⓘ **WARNING** - Turn on your monitor before you turn on your computer. Failure to do so could damage your monitor.

If you have properly installed your graphics card, operating system messages will appear once the boot procedure is finished.

Your monitor will be running in a basic video mode. Higher refresh rates are not available at this stage of the installation. Once you have installed the FireGL™ drivers and software, you can use the Display Properties control panel to adjust the video settings and configure multiple monitors.

CHAPTER 3:

# Installing Software

This chapter will guide you through the installation of the drivers and software associated with your FireGL™.

## HydraVision™ Multi-monitor Management

The HydraVision™ multi-monitor and desktop management software will install automatically with the Express driver installation of the ATISETUP utility.

> ⓘ If you do not want to install HydraVision™, select the Custom driver installation and clear the HydraVision™ check box.

For more information consult the HydraVision™ user's guide included on the ATI Installation CD-ROM.

## Installing Drivers and Software in Windows®

You will need to install the FireGL™ drivers and software in the following cases:

- After you have installed the card in your system.
- After you have reinstalled or upgraded your operating system.

This procedure applies to Windows® XP and Windows® 2000.

> ⓘ Linux drivers and installation instructions are available from **ati.com/support**

## Software Installation Prerequisites

To install or remove the drivers, you must have administrator rights or be logged on as a user with administrator rights.

Your operating system must be installed and running before you can install the FireGL™ drivers. You must also have Service Pack 1 (or higher) for Windows® XP.

Make sure your monitor cable is properly attached before you begin.

> **Note:** The installation dialog will display in English if your operating system's language is not supported.

### *To install ATI drivers and software*

1. Start your system. When the **Found New Hardware Wizard** comes up, click **Cancel**. When the **System Settings Change** window asks you to restart your computer, click **No**.
2. Run the **ATISETUP** utility. The **ATISETUP** utility will start automatically if you insert the ATI Installation CD-ROM into your CD-ROM drive after the operating system has started. If your CD-ROM auto-run is not enabled or the **ATISETUP** utility does not start automatically:
   a) Click the **Start** button in the task bar.
   b) Click **Run**.
   c) Select **SETUP.EXE** from the root directory of the ATI Installation CD-ROM.
   d) Click **OK**.
3. Click **Install** under Software Install.
4. Click **Next**.
5. Click **Yes** to the license agreement. ATI Easy Install will start the Installation Wizard.
6. Follow the wizard's on-screen instructions to complete the installation.

> ⓘ The Express installation option is recommended. The HydraVision™ multi-monitor and desktop management software will automatically be installed, along with the ATI driver, by selecting this option. Not all software components are installed using the Express installation. Custom installation allows you to select individual software components for installation.

7 When the Setup complete message appears, select **Yes, I want to restart my computer now** and click **Finish**.

# Monitor Configuration

Once the drivers and software have been installed, you can configure your monitor.

> **Warning** - Choosing a refresh rate unsupported by your monitor may damage your monitor. Consult your monitor's documentation if necessary.

### *To configure your primary display*

1. Navigate to the **Control Panel** and choose **Display**, or right-click on the desktop and choose **Properties**.
2. Choose the **Settings** tab and select the screen resolution and color depth that best suit your requirements and your monitor's performance.
3. Click **Advanced** and select the **Monitor** tab.
4. Choose a refresh rate from the drop-down list.
5. Click **OK** to return to the desktop.

### *To set up a multi-monitor display*

1. From the **Start menu** click **Control Panel**, then **Display**. Click the **Settings** tab to access the basic multi-monitor configuration settings.

   **Note:** ATI software provides many additional configuration features that can be accessed by clicking the **Advanced** button from the **Display Properties > Settings** tab.

2. Select the **Monitor** icon identified by the number **2**.
3. Click **Extend my Windows desktop onto this monitor**.
4. Set the **Screen Resolution** and **Color Quality** as appropriate for the second monitor. Click **Apply** or **OK** to apply these new values.
   - Refer to your Windows® online help and documentation for further information on using the **Settings** tab.
5. Repeat steps 2 through 4 for each additional monitor beyond 2.

**Note:** When you use multiple monitors with your FireGL™ card, one monitor will always be **Primary**. Any additional monitors will be designated as **Secondary**.

## Clone Display Mode

When two displays are connected and only one display is enabled, you can clone (copy the image of) your Primary display onto a Secondary display on the fly, without rebooting.

**Note:** Before you can clone the Primary display, only one display can be enabled through the Windows® **Display Properties** dialog, under **Settings**. This one display will automatically become the Primary display by default. For more information, consult your Windows® documentation. A second display must be connected, however, it cannot be enabled through this same dialog.

### *To clone your Primary monitor*

1. Click the buttons on the ATI Displays tab to clone the Primary Monitor:
   - The ATI Displays tab shows you that only one display is enabled, which is the Primary Display. Clicking the red enable/disable button for the Secondary display enables it and also creates a clone image of the Primary display onto the Secondary display. The Primary display will show the primary button recessed, and the clone display will show the clone button recessed.
2. Click **OK** or **Apply** to save the changes.

## Span Display Mode

When two displays are connected and enabled, you can span your Primary display onto a Secondary display on the fly, without rebooting.

**Note:** Before you can span the Primary display, the primary and secondary displays must be enabled.

### *To span your Primary monitor*

1. If necessary, enable the secondary display.

- Click Start > Settings > Control Panel > Display > Advanced button > ATI Displays tab.
- Click the red enable/disable button to enable the Secondary display.

2 Click the to span the desktop horizontally

or

Click the to span the desktop vertically.

3 Click **OK** or **Apply** to save the changes.

# Reinstalling Drivers

You can install new drivers or reinstall existing drivers if there was a Windows® conflict.

Reinstall the drivers at any time using the **ATISETUP** utility located on the ATI Installation CD-ROM. The **ATISETUP** utility will start automatically if you insert the ATI Installation CD-ROM into your optical drive after the operating system has started.

### *To manually reinstall drivers*

If your CD-ROM auto-run is not enabled and the **ATISETUP** utility does not start automatically, follow these steps.

1 In the Windows® task bar, click **Start**.

2 From the **Start** menu, select **Run.**

3 Browse to **SETUP.EXE** on the root directory of the ATI Installation CD-ROM.

4 Click **OK.**

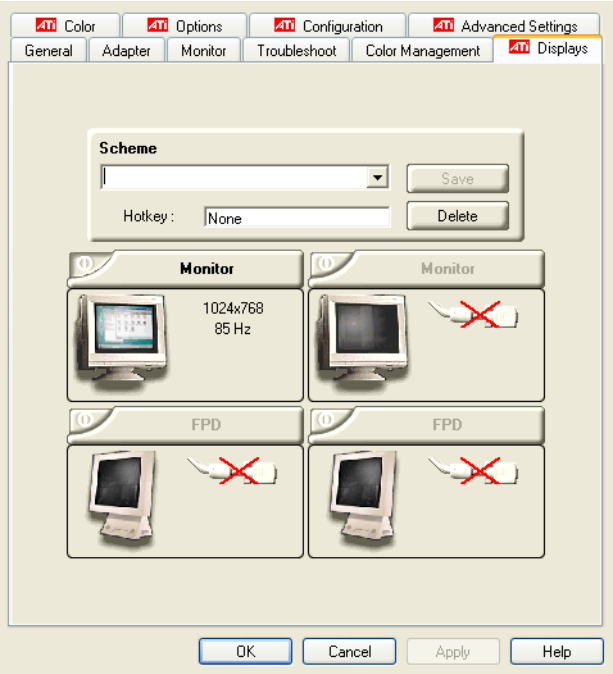
CHAPTER 4:

# Display Properties

This chapter describes how to use the advanced display, multiple-monitor, and 3D graphics features in ATI's Display Properties options.

## ATI Displays Tab

The ATI Displays tab provides control over multiple-monitor features. Here you can enable/disable display devices and swap the assignment of **Primary** and **Secondary** displays.




**The Displays Tab**

| ATI Displays Tab | |
|---|---|
| **Scheme** | Displays the drop-down list of available display-device configurations that have previously been created. New configurations can be entered here and then saved using the **Save** button. |
| **Hotkey** | Associates a hotkey with a scheme. To input the hotkey, highlight the field and press the appropriate key combination on your keyboard. |
| **Display Configuration button** | These are the buttons that contain the name of the devices that can be connected to your graphics card. Clicking on any of these buttons opens further options to refine your display on that device.<br>Only the type of devices supported by your graphic card will be displayed as valid options.<br>If the text on the button is greyed out, that device is not currently connected to your graphics card. |
| **Save button** | Saves display-device configuration schemes. |
| **Delete button** | Deletes display-device configuration schemes. |
| **Display buttons** | Enables or disables a display device; they also indicate whether a device is enabled or disabled. |

### *To enable or disable a display*

If the enable/disable button is green, it indicates the device is enabled. If it is red, it indicates the device is disabled. If the button is greyed out, the device is not an option. For example, if there is only one monitor connected, all buttons will be grey.

1. Click the enable/disable button for the display device you want to enable/disable.
2. Click **OK** or **Apply** to save the changes.

### *To save a display-device scheme*

Display-device selections can be saved as a scheme for quick recall.

1. Click the enable/disable button for the display devices you want to have active.
2. Type a name into the **Scheme** drop-down list field.

3 Click **Save** to save the scheme.

## Dynamic Display Reassignment

You can change the assignment of your Primary and Secondary display on the fly, without rebooting. If you have more than one display device available and have the proper adapters or connectors, you can plug it in to your FireGL™ graphics card in order to view or extend your desktop display to that device.

> **Note:** Before you can change the assignment of the Primary display, at least one Secondary display and the Extended Desktop mode must be enabled. Extended Desktop mode is enabled through the Windows® **Display Property** dialog, under **Settings**. For more information, consult your Windows® documentation.

### *To assign your Primary monitor*

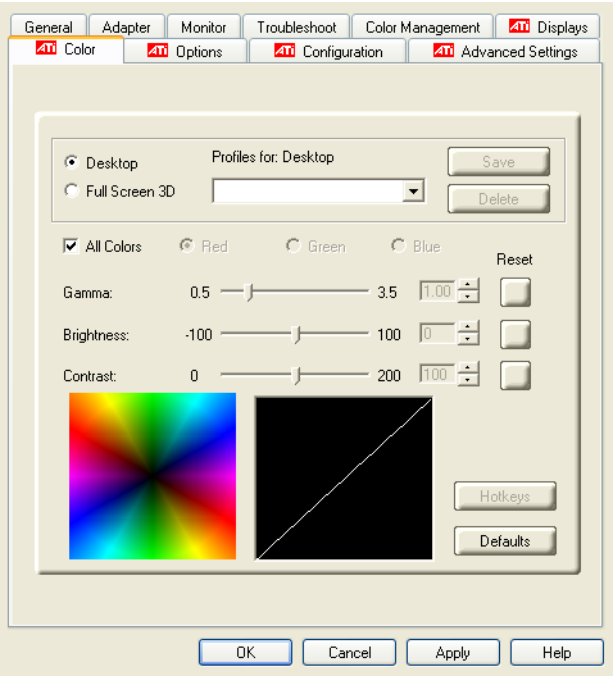
1 Click the buttons to assign the Primary monitor:

- Clicking the button will reassign the Primary and Secondary monitors. Clicking the button creates a clone or mirror image of the Primary display onto the Secondary display.

2 Click **OK** or **Apply** to save the changes.

# ATI Color Tab

The ATI Color tab allows you to configure Gamma, Brightness, and Contrast color settings for both your desktop and full screen 3D environments. You can also save settings to a color profile for easy recall. In addition, you can assign unique hotkey combinations that allow you to adjust Gamma, Brightness, and Contrast color settings within your full-screen 3D applications.




**The Color Tab**

| ATI Color Tab | |
|---|---|
| **Desktop radio button** | Select **Desktop** to configure your desktop color settings. |
| **Full Screen 3D radio button** | Select **Full Screen 3D** to configure the color settings for your 3D applications. Note that the configured settings will only be apparent within a full-screen 3D application environment. |
| **Profiles for** | Indicates whether the profiles in the drop-down list are for your Desktop or a full-screen 3D environment. |
| **Profiles drop-down list** | Lists all of the Desktop or Full Screen 3D profiles that you have saved. Selecting a profile from the list loads those custom color settings for the relevant environment. To create a new profile, simply type in a name and click **Save**. |

| ATI Color Tab | |
|---|---|
| **Save button** | Saves your current color settings to a Desktop or Full Screen 3D profile, using the name you specified in the list box. To restore these settings later, simply select the Profile name from the list and click **Apply** or **OK**. |
| **Delete button** | Deletes the profile that is selected in the Profiles list box. |
| **All Colors checkbox** | Adjusts the Gamma, Brightness or Contrast for Red, Green, and Blue simultaneously. Note that any individual color settings in effect are lost if **All Colors** is selected; the color settings revert back to the last-known All Colors settings. |
| **Red, Green, and Blue radio buttons** | Selects the active color component (Red, Green, or Blue) whose values will be adjusted by the Gamma, Brightness, and Contrast sliders. Note that any individual color settings made are lost if you subsequently select **All Colors**. |
| **Gamma slider** | Increases or decreases the gamma correction of your Desktop or full-screen 3D application. Changing the gamma alters the curvature of the color curve. |
| **Brightness slider** | Increases or decreases the color brightness of your Desktop or full-screen 3D application. Changing the brightness adjusts the vertical position of the color curve. |
| **Contrast slide** | Increases or decreases the color contrast of your Desktop or full-screen 3D application. Changing the contrast adjusts the slope of the color curve. |
| **Reset buttons** | Restores an individual slider setting to its default value. Click **Apply** or **OK** to save. |
| **Color preview box** | The color image indicates visually how the Gamma, Brightness and Contrast sliders affect the final color settings of your display device. In Desktop mode, clicking on this with your mouse pointer will change the image. |
| **Hotkeys button** | Opens the **Color Hotkeys Settings** dialog. There you can assign hotkeys for adjusting your color settings within a full-screen 3D application environment. To activate this button, you must select the **Full Screen 3D** radio button. |
| **Defaults button** | Restores all of the color settings to the default values. Click **Apply** or **OK** to save. |
| **Color Curve box** | The color curve indicates mathematically how the **Gamma**, **Brightness** and **Contrast** sliders affect the final color settings of your display device. |

### *To create a Desktop or Full Screen 3D profile*

1. Choose either the **Desktop** or **Full Screen 3D** radio button, as desired.
2. Adjust the **Gamma**, **Brightness**, and **Contrast** sliders to the desired settings, either individually or using the **All Colors** checkbox.
3. Type a profile name in the Profile list box.
4. Click **Save**.

### *To apply the settings for a specific Desktop profile*

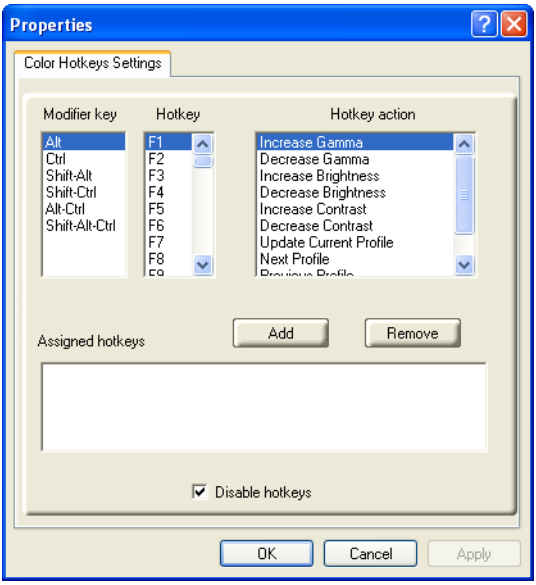
1. Choose the **Desktop** radio button.
2. Select the profile name from the drop-down list box.
3. Click **Apply** or **OK**.

### *To apply the settings for a Full Screen 3D profile*

1. Choose the **Full Screen 3D** radio button.
2. Select the profile name from the drop-down list box.
3. Click **Apply** or **OK**.
4. Start your 3D application in full-screen mode.

## Hotkeys

Some 3D applications automatically load their own color settings rather than those set through the ATI Color tab. To use custom settings, you can preconfigure hotkey combinations to either adjust the individual color properties or apply profiles you have created, once the 3D application is running.




**The Color Hotkeys Settings dialog**

### *To access the Color Hotkeys Settings dialog*

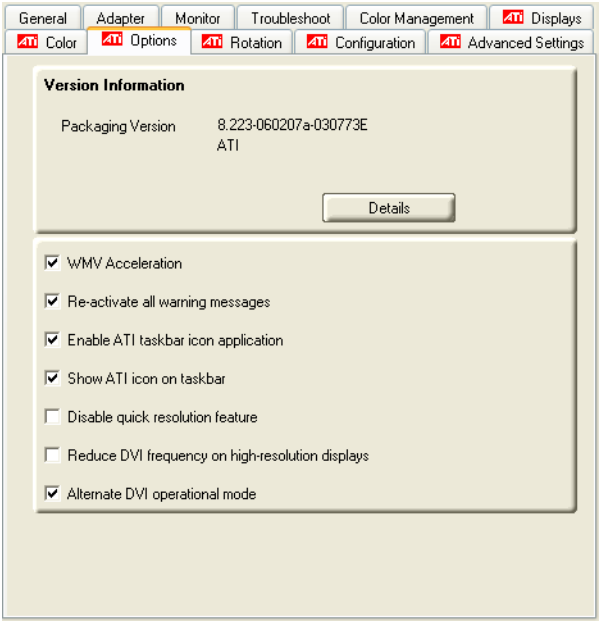
1. Select the **Full Screen 3D** radio button.
2. Click the **Hotkeys** button to access the Color Hotkeys Settings dialog.

The easiest way to apply your own color settings from within a full screen 3D application is to create a Full Screen 3D profile and save it, assign hotkeys for the “Load Current Profile” action through the Hotkeys dialog, make sure that the profile you prefer is selected from the drop-down list box, and click **OK**. Once inside the 3D application, use the hotkeys to trigger the profile.

Some 3D applications allow you to switch easily between full-screen mode and windowed mode and do not load their own color settings. In windowed mode, you can make slider adjustments or select a different profile on the Color tab, then switch back to full-screen mode to see the effects immediately.

# ATI Options Tab

The ATI Options tab provides detailed driver information and access to your graphics card's version information and specifications. You can also enable or disable the ATI taskbar icon from this dialog.




**The Options Tab**

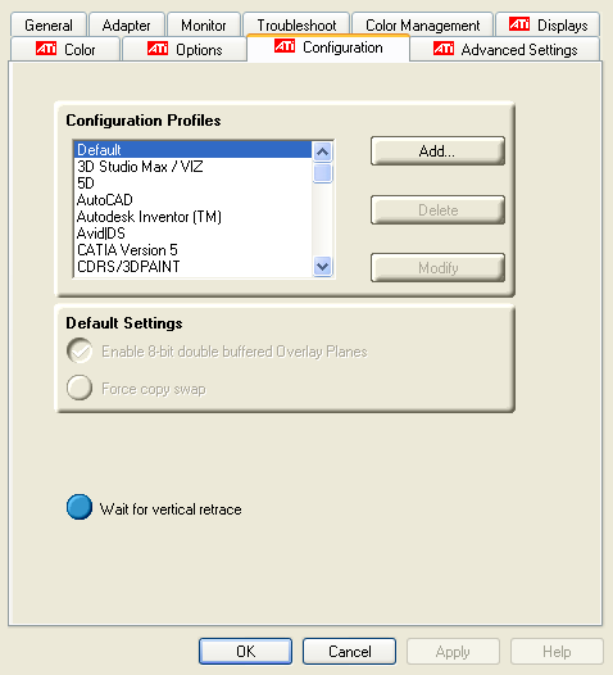
| ATI Options Tab | |
|---|---|
| **WMV Acceleration** | When enabled, improves the performance of .WMV format video files. |
| **Reactivate all warning messages** | Reactivates any disabled graphics warning messages. |

| ATI Options Tab | |
|---|---|
| **Enable ATI taskbar icon application** | Enables/disables the ATI taskbar applications and removes the ATI icon from your system tray. |
| **Show ATI icon on taskbar** | Removes/replaces the ATI icon from the system tray without disabling the ATI icon applications. |
| **Disable quick resolution feature** | The quick resolution feature is accessible by left-clicking the ATI icon in the system tray. Checking this option disables this feature. |
| **Reduce DVI frequency on high-resolution** | Resolves display corruption or no image at high resolutions (for example 1280x1024 @75Hz) using a digital DVI display. This setting has no effect when using a DVI-I-to-VGA adapter. |
| **Alternate DVI operational mode** | Use this option if you are experiencing display corruption on your DVI flat panel display. |

# ATI Configuration Tab

The Configuration Tab enables you to customize display profiles for individual applications. Typically, you would change these settings for one or more of the following reasons:

- Diagnostic purposes.
- Fine-tuning a specific application/system configuration.
- Specific settings recommended by your hardware or software documentation.
- Tuning your application/system environment for best performance and memory usage.




**The Configuration Tab**

### *Activating a configuration profile*

The **Configuration Profiles** listbox displays a number of common applications whose optimal configuration profile are factory-set by default.

To activate a particular profile, select the application name from the list and click **Apply**. This will add the information to the necessary Windows registry settings. If prompted, restart Windows.

If you subsequently experience problems with your application, or if you want to try to optimize the performance of your system on specific applications, modify your configuration settings accordingly.

### *Adding a new application profile*

Click the **Add** button in the Configuration Profiles section and enter the name of the new application for which you want to set the configuration parameters.

### *Modifying the configuration parameters*

To change the configuration settings of a specific application, select the name of that application from the **Configuration Profiles** listbox. Click the **Modify** button. Now select or clear the rest of the configuration controls on this tabbed dialog to obtain the desired display parameters for the selected application.

To remove the selected configuration profile completely, select the name of the application from the **Configuration Profiles** listbox click **Delete**.

**Note:** You cannot delete the factory-set configuration profiles.

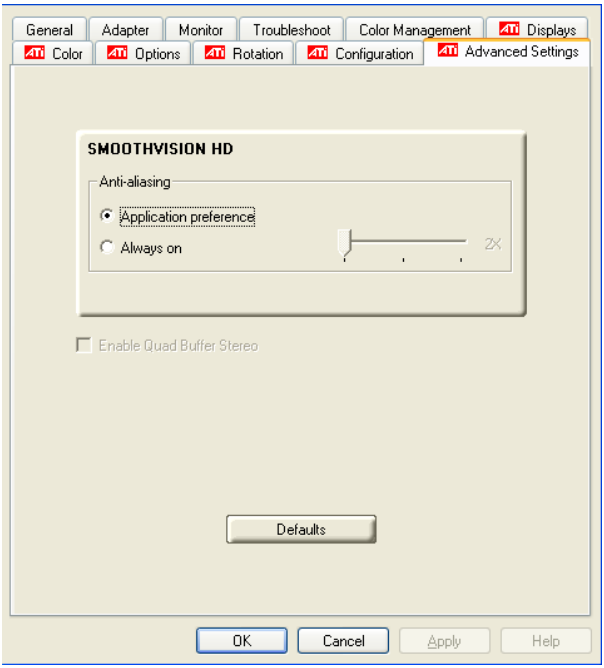
Click the **Apply** or **OK** button to enable your **Configuration** settings.

| Configuration Settings | |
|---|---|
| **Enable 8-Bit double-buffered Overlay Planes** | A default setting that uses 8 bits of each 32-bit frame buffer pixel as double-buffered overlay planes. |
| **Force copy swap** | A default setting that forces blit copy from the back-to-front buffer. This copies pixels quickly from memory to the screen, reducing flicker and increasing the frame rate. Note that OpenGL® buffer swaps are implemented using a back-to-front buffer instead of a screen flip. |
| **Wait for vertical retrace** | The buffer swap is ‘synched’ to the refresh rate of the monitor. Enabling this will lower the frame rate but reduce visual artifacts such as tearing. Disabling allows your application to run at the highest possible frame rate, regardless of the monitor’s refresh rate, which is typically less than the frame rate at which the application will run. |

# ATI Advanced Settings Tab

The Advanced Settings tab enables you to apply ATI’s SMOOTHVISION™ technology for full-scene anti-aliasing, and to utilize stereo shutter glasses for visualizing immersive 3D-stereo display (only available for those FireGL™ cards equipped with a stereo video connector).

SMOOTHVISION™ improves image quality by removing jagged edges (anti-aliasing) from 3D images, resulting in smoother, more natural looking objects.




**The Advanced Settings Tabs**

### *How to Use SMOOTHVISION™*

The **Application preference** setting provides OpenGL® and Direct 3D® applications with the ability to enable anti-aliasing automatically. If an application does not utilize an anti-aliasing setting, it is disabled. This option results in high-quality images at the price of a negligible reduction in the application's performance.

When **Always on** is enabled, you can apply anti-aliasing using different sample patterns and sample points such as 2X or 4X. Moving the slider to the right increases sampling to provide the most realistic 3D image, at the cost of overall 3D performance.

> **Note:** The **Always on** setting overrides an application's anti-aliasing setting.

### *How to Use Stereo Glasses with Your FireGL™ Card*

The **Enable Quad Buffer Stereo** option works in conjunction with the stereographics connection on your FireGL™ card. Enabling this feature while using compatible stereo glasses and applicable software provides an immersive 3D-stereo display.

CHAPTER 5:

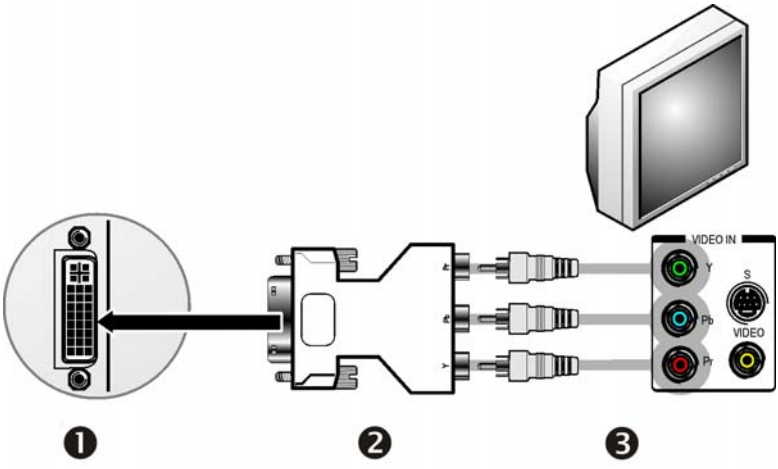
# ATI HDTV Component Video Adapter

Give presentations, watch movies, and browse the internet using your High Definition Television (HDTV). The ATI HDTV Component Video Adapter converts standard DVI-I video output to component video suitable for use with most HDTVs.

## Installing Your ATI HDTV Component Video Adapter

> ⓘ You must have a monitor attached to your computer **before** installing the ATI HDTV Component Video Adapter.

1. Shut down your computer, and then disconnect your monitor.
2. Plug the ATI HDTV Component Video Adapter into the DVI-I connector on your FireGL™ card, and tighten the thumbscrews.
3. Using the appropriate cables, connect the ATI HDTV Component Video Adapter's outputs to your HDTV's video inputs.




| | |
|---|---|
| **1** | DVI-I connection |
| **2** | HDTV Component Adapter |
| **3** | HDTV Video Inputs |

4. Turn on your component input device, and then set it to YPbPr input (see your HDTV or component input device manual for further instructions).
5. Turn on your workstation. Your TV will not display anything until Windows starts; this may take several minutes.
6. To return to your CRT monitor display, shut down your computer, re-connect the CRT monitor, and then restart your computer.

## Setting the ATI HDTV Component Video Adapter DIP Switches

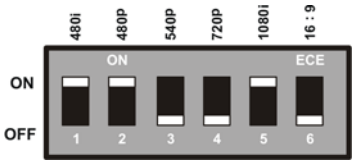
Configure the DIP switches to set the appropriate display mode and aspect ratio. This sets the modes which appear when you select **Show all Modes** in the ATI Control Panel as described in See “Using Your ATI HDTV Component Video Adapter”.

## Display Modes

- DIP switch 3 is always OFF (540p is not supported)
- Set all DIP switches ON that correspond to the modes that your component input device supports; for further details, consult the manual for your component video input device.

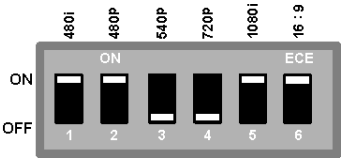
The six DIP switches on the ATI HDTV Component Video Adapter enable four, standard HDTV video modes: 480i, 480p, 720p,and 1080i. The default setting is 480i or 480p, depending upon your component input device. In the example below, 480i, 480p, and 1080i are supported.

Use a small, flat-head screwdriver to set the switches - the up position is ON, and the down position if OFF. Set the switches ON for all modes that your HDTV or component input device supports.




## Aspect Ratio

If your display supports 16:9 aspect ratio, set DIP switch 6 (16:9) ON. This switch toggles between 4:3 and 16:9 - OFF is 4:3.




In the above example, the component input display supports 480i, 480p, 1080i, and 16:9.

# Using Your ATI HDTV Component Video Adapter

Use the HDTV Component Video Adapter to watch DVD movies on your High Definition Television.

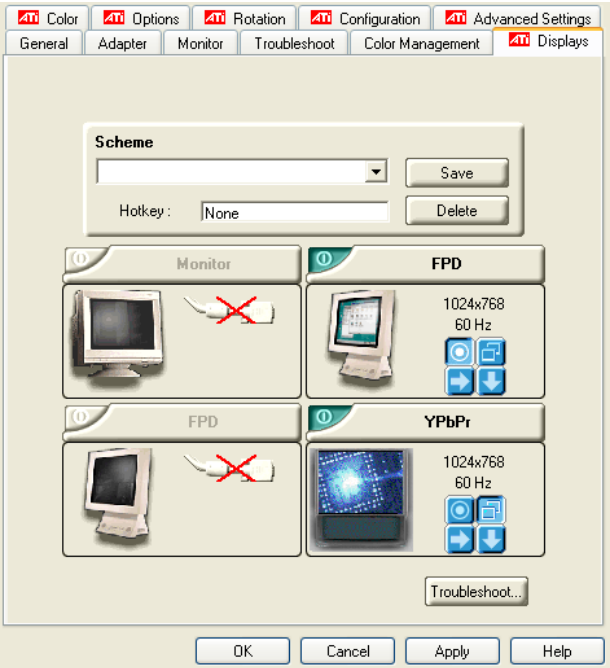
For maximum performance when you watch DVD movies on your HDTV, you should use the mode and screen resolution that provide the best viewing results for your TV, and use those settings exclusively.

### *To change HDTV display settings*

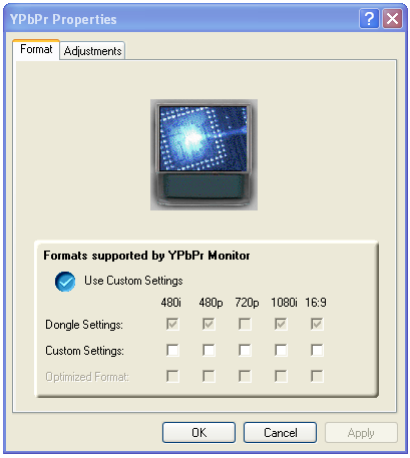
1. Click the Windows **Start** button, point at **Settings**, and then click **Control Panel**.
2. Double click the **Displays** icon, click the **Settings** tab, and use the **Screen resolution** slider to select the desired resolution.

   **Note:** If the selected resolution is not related to a timing, the system will reduce the resolution to the closest supported timing.

3. Click the **Advanced** button, then click the **ATI Displays** tab.
4. Click the **YPbPr** button.




**Note:** The **YPbPr Properties** page opens. The DIP switch settings of the Component Video Adapter are shown as selected in Dongle Settings.




> ⓘ To override the DIP switch settings, click Custom Settings button and select the desired modes.

5 Click **OK**.

6 Click the **Advanced** button.

7 Click the **Adapter** tab, then click the **List All Modes** button.

8 Select a desired resolution.

9 Select a desired mode:

- 60Hz = Progressive.
- 30Hz = Interlaced

**Note:** YPbPr is only available with the 30Hz or 60HZ settings.

CHAPTER 6:

# Reference

This chapter offers troubleshooting tips and provides customer-care, warranty, and compliance information.

## Troubleshooting

The following troubleshooting tips may help if you experience problems. ATI's documentation contains helpful installation/configuration tips and other valuable feature information. Please contact your dealer for more advanced troubleshooting information.

More troubleshooting information can be found on the ATI Web site. Please visit **ati.com** and select Customer Care.

## General Problems

| Problem | Possible Solution |
|---|---|
| **Computer Does Not Boot-Up Properly** | • Verify that the installation instructions were properly followed.<br>• Check that the card is properly installed in your system and connected to your monitor.<br>• If you have problems during start-up, restart your computer in **Safe Mode**.<br>While starting Windows® 2000 and Windows® XP, press and hold **F8** until you see the Windows® Advanced Options Menu. Use the arrow keys to select **Safe Mode**, and press **Enter**.<br>• Check the system configuration utility of your operating system for the interrupt assignments.<br>• Make sure that the auxilary power cable is attached to the graphics card.<br>• Contact ATI's Customer Care or your local technical support. |
| **No Display** | • Check that the card is seated properly in its expansion slot.<br>• Ensure that the monitor cable is securely fastened to the card.<br>• Make sure that the monitor and computer are plugged in and receiving power.<br>• If necessary, disable any built-in graphics capabilities on your mother board. For more information, consult your computer's manual or manufacturer. (Note: some manufacturers do not allow the built-in graphics to be disabled or to become the secondary display.)<br>• Make sure that you selected the appropriate monitor when you installed your enhanced driver.<br>• Make sure that the auxilary power cable is attached to the graphics card. |

| Problem | Possible Solution |
|---|---|
| **Screen Defects Appear** | • Check if your monitor supports the resolution, horizontal (kHz) and vertical (Hz) refresh rates as required by the graphics card.<br>• Check your current resolution, refresh rate, and color depth settings in the **Settings** and **Monitor** tabs in your **Display Properties** dialog.<br>• Make sure that the display resolution and refresh rate settings you have selected are supported by the monitor you have connected.<br><br>**Warning!** Ensure that both video card and monitor support resolution and refresh rates you select. Incompatible resolution/refresh rate selection may result in monitor damage. Refer to your monitor's documentation for recommended resolutions and refresh rates. |
| **Off-Center Screen Image, Odd Colors or No Picture** | • Try adjusting the brightness, sharpness, contrast, and color balance controls of your monitor.<br>• Try adjusting the centering and positioning controls of your monitor to position the picture on the screen. **Note:** The **Screen Position** settings in **Display Properties > Advanced > Displays > Adjustments** tune the position of the picture on the screen via the video signal.<br>• Set the monitor's RGB inputs (and sync switches, if this option is available) to 75 Ohms, with the sync set to external.<br>• DFP monitor users: Make sure that the DVI plug of your monitor data cable is digital-only (DVI-D) - but not integrated analog/digital (DVI-I). Refer to your monitor's documentation and contact your supplier or the manufacturer of the DFP monitor for information on how to obtain a suitable data cable plug. |
| **Operating System Warns that Video Card Isn't Properly Configured** | • Make sure that the display resolution and refresh rate settings you have selected are supported by the monitor you have connected.<br>• Check the driver installation and make sure that all software is correctly loaded corresponding to your operating system and applications.<br>• Reinstall the ATI drivers for your FireGL™ card. |

| Problem | Possible Solution |
|---|---|
| **Stereo Glasses Not Working** | • Your stereo glasses must be connected to the card when you start your computer.<br>• Select a refresh rate of 120 Hz in the **Monitor** tab available from **Display Properties** > **Advanced**.<br>• Enable the **Quad Buffer Stereo** option in the **Advanced Settings** tab of the **Display Properties**. |
| **Bus Address or Interrupt Conflicts** | • It is necessary to ensure that the I/O and memory addresses reserved for the graphics board are not used by other hardware devices.<br>• The integrated on-board VGA controller of your FireGL™ card uses the following addresses (hex):<br>**I/O Address:**<br>Standard VGA I/O: 3B0-3DF<br>**Memory Addresses**:<br>Video RAM: A000-BFFF<br>Video ROM: C000-C7FF<br>**Note:** You cannot change the addresses of your FireGL™ card. In case of an address conflict, try to modify the I/O address of the add-on card that causes the conflict.<br>• To support the special graphics processor on the FireGL™ card, the system BIOS should automatically assign a system interrupt to the slot where the card is installed. However, there may be problems if your graphics card does not receive an interrupt or a system interrupt is used for more than one device. In case of problems check the system configuration utility of your operating system for the interrupt assignments. |

# Customer Care

If you require further assistance with your product, the following Customer Care options are available to you:

| Service | Access | Additional Info |
|---|---|---|
| **Online** | ati.com/online/customercare | • Always available.<br>• Complimentary. |

| Service | Access | Additional Info |
|---|---|---|
| **Telephone US & Canada** | 1-866-284-2093 | • English: 5:30AM - 7:00PM EST<br>• Monday to Friday<br>• Complimentary for registered users.<br>• Toll-free. |
| **Telephone Europe** | +49-1803-347345 | • English: 10:30 - 00:00 GMT<br>• French/German: 10:30 - 19:00 GMT<br>• Portuguese/Spanish: 12:00 - 20:30 GMT<br>• Monday to Friday<br>• Complimentary for registered users.<br>• International and local toll charges to Germany will apply. |
| **Telephone Argentina** | +0800-333-5277 | • Portuguese/Spanish: 7:00AM - 3:30PM EST<br>• English: 7:00AM - 7:00PM<br>• Monday to Friday<br>• Toll-free |
| **Telephone Brazil** | +0800-891-9068 | • Portuguese/Spanish: 7:00AM - 3:30PM EST<br>• English: 7:00AM - 7:00PM<br>• Monday to Friday<br>• Toll-free |
| **Telephone Mexico** | +001800-514-3276 | • Portuguese/Spanish: 7:00AM - 3:30PM EST<br>• English: 7:00AM - 7:00PM<br>• Monday to Friday<br>• Toll-free |
| **Telephone Other Latin American Countries** | +1-905-882-3277 | • Portuguese/Spanish: 7:00AM - 3:30PM EST<br>• English: 7:00AM - 7:00PM<br>• Monday to Friday<br>• Complimentary<br>• International and local toll charges to Canada will apply. |

| Service | Access | Additional Info |
|---|---|---|
| **Mail** | ATI TECHNOLOGIES INC.<br>Attention: Customer Care<br>1 Commerce Valley Drive East<br>Markham, Ontario<br>Canada L3T 7X6 | • Complimentary. |

## Disclaimer

ATI Customer Care will work to resolve your issue and help you to get your product up and running. If your issue is not resolved, our technicians will determine whether the difficulty you are experiencing is the result of the product, whether your product contains a defect, and whether your product should be returned to ATI for warranty service.

- ATI Customer Care is unable to assist with refunds, returns, or exchange-specific inquiries. If resolving the problem being experienced is critical to your decision to keep the product, it is your responsibility to ensure that you know and are within the period of time your reseller will allow for refunds, returns, or exchange.
- ATI is not responsible for any expense incurred accessing Customer Care. It is expected that customers will review the expense associated with the available support options and will choose the method that best meets their needs and budget.
- ATI Customer Care reserves the right to limit support options for products that are not registered or are at End of Life.

# Warranty Information

## Hardware Warranty Service Statement

ATI Technologies Inc. warrants to the original purchaser of the hardware that the product is in good working condition, according to its specifications at the time of shipment, for a period of three years from the date of original purchase.

Should the product, in ATI's opinion, malfunction within the warranty period, ATI will, at its discretion, repair or replace the product upon receipt with an equivalent. Any replaced parts become the property of ATI. This warranty does not apply to the software component of the installation, usage not in accordance with product specifications and instructions, natural or personal disaster, or unauthorized alterations, repairs, or modifications.

Proof of purchase may be required, if doubt exists regarding warranty eligibility. Late model products are assumed to be under warranty. ATI accepts originals, photocopies and faxes as proof of purchase when required

## Warranty Service

For warranty service instructions visit:

ati.com/online/warranty or contact one of our Customer Service Representatives using one of the aforementioned means.

- Before shipping any unit for repair, obtain an RMA number for warranty service.
- When shipping your product, pack it securely, show the RMA and serial number of the product on the outside, and ship prepaid and insured.
- ATI will not be held liable for damage or loss to the product in shipment.
- Standard warranty service consists of repair upon receipt.
- ATI reserves the right to replace the product with a serviced product at their sole discretion at any time.
- You are responsible for the cost of shipping the product to ATI. ATI plays the cost of returning the product to you.

Products which are repaired under warranty are guaranteed for the remainder of the original warranty period. Repairing or exchanging a product does not start a new warranty period. If, at the time of repair, a product is already “out of warranty” or within the last 90 days of the warranty period, ATI will guarantee the repair for the full 90 days. All other terms and conditions of the original warranty apply.

## Limitations

- This warranty is valid only if the online Product Warranty Registration form at:
  ati.com/online/registration
  is successfully submitted within 30 days of purchase of said product.
- All warranties for this product, expressed or implied, will expire three (3) years* from date of original purchase.
- All accompanying cables and accessories are warranted for 90 days.
- No warranties for this product, expressed or implied, shall extend to any person who purchases the product in a used condition.
- The liability of ATI in respect of any defective product will be limited to the repair or replacement of such product. ATI may use new or equivalent-to-new replacement parts. Defective product will be sent in for repair or replacement only. ATI makes no other representations or warranties as to fitness for a particular purpose, merchantability or otherwise in respect of the product. No other representations, warranties or conditions, shall be implied by statute or otherwise. In no event shall ATI be responsible or liable for any damages, including but not limited to the loss of revenue or profit, arising:
- From the use of the product, as a result of any event, circumstance, action or abuse beyond the control of ATI; whether such damages be direct, indirect, consequential, special or otherwise and whether such damages are incurred by the person to whom this warranty extends or a third party
- From the loss of use of the product, as a result of any event, circumstance, action or abuse beyond the control of ATI; whether such damages be direct, indirect, consequential, special or otherwise and whether such damages are incurred by the person to whom this warranty extends or a third party.
- Unauthorized repairs to an ATI board level product will void the warranty offered by ATI Technologies. ATI reserves the right to refuse to service any product which has been altered, modified, or repaired by non-ATI service personnel.

# Additional Accessories

Additional and replacement cables, installation CD-ROMs, manuals, and other accessories for ATI products can be purchased from the online ATI store at:

**ati.com/online/accessories**

# Compliance Information

This section details the compliance information for this product.

## FCC Compliance Information

This FireGL™ product complies with FCC Rules part 15. Operation is subject to the following two conditions

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The use of shielded cables for connection of the monitor to the graphics card is required to ensure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

## Industry Canada Compliance Statement

ICES-003 This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la Classe B est conforme à la norme NMB-003 du Canada.

For further compliance information:

ATI Research Inc.
4 Mount Royal Ave.
Marlborough, MA
01752-1976
USA
508-303-3900

## CE Compliance Information

EMC Directive 89/336/EEC and amendments 91/263/EEC, 92/31/EEC and 93/68/EEC, Class B Digital Device EN 55022:2003/CISPR 22 Class B, Limits and Methods of Measurement of Radio Interference Characteristics Information Technology Equipment.

EN 55024:1998/CISPR 24:1997 +A1:2001 +A2:2003, Immunity of Information Technology Equipment (ITE), including EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6

## Informations de conformité de la CE

Directive EMC 89/336/CEE et amendements 92/31/CEE et 93/68/CEE, pour dispositif numérique de Classe B.

EN 55022:2003/CISPR 22:1997, - Classe B - Limites et méthodes de mesure des caractéristiques d'interférences radiophoniques, Matériel des technologies de l'information.

EN 55024:1998/CISPR 24:1997 +A1:2001 +A2:2003, Norme sur l'immunité de matériel des technologies de l'information, et comprenant EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6

## Electrical Safety

73/23/EEC - The Low Voltage Directive

IEC 60950-1:2001, IEC 60950:1999, 3rd Edition - Safety of Information Technology Equipment

BS EN60950-1:2002, BS EN60950:2000, 3rd Edition UL 60950-1:2003, UL 60950:2000, 3rd Edition CAN/CSA C22.2 No. 60950-1:2002, CAN/CSA C22.2 No. 60950-00, 3rd Edition (2000)

To meet UL safety requirements, the computer’s maximum room temperature should not exceed 40º C.

c UL US
LISTED
I.T.E. ACCESSORY
2N37
E154871

## VCCI Class B ITE Compliance Information

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

## MIC Certification Information

이 기기는 가정용으로 전자파적합등록을 한 기기로서
주거지역에서는 물론 모든지역에서 사용할 수 있습니다.

## BSMI Certification Information

CNS 13438，C6357，B 類 — 資訊科技設備

## Waste Electrical and Electronic Equipment (WEEE) Directive Compliance

This product was manufactured by ATI Technologies Inc.

# Glossary

### 2D

Acronym for “two dimensional,” a term applied to computer graphics that are “flat.” Typical desktop applications such as word processors, spreadsheet programs, or other programs that manipulate print or simple graphics (such as pictures or line art) are generally considered to be operating within a 2D environment, even when they include simple three dimensional elements, such as buttons.

### *3D*

Acronym for “three dimensional,” referring to computer graphics that appear to have volume and depth. Various modeling processes take the representation of a three dimensional object provided by the computer program and render it by using various lighting components, applying textures, and setting layers of transparency or opacity as required in order to produce a realistic representation of a three-dimensional object on a two-dimensional display.

### *AGP*

The Accelerated Graphics Port (AGP) is a slot on the computer motherboard designed specifically for 3D graphics cards. AGP runs 3D images much more smoothly and quickly than was previously possible with PCI video cards; AGP runs at several times the bus speed of PCI and employs sideband addressing, so multiple data transfers between the graphics processor and the computer can take place concurrently. AGP is currently being phased out in favour of PCI Express™ (PCIe) on PC systems.

### *Alpha Blending*

Alpha blending is used in 3D graphics to create transparent or opaque effects for surfaces such as glass and water. Alpha is a transparency value, so the lower the value, the more transparent the image looks. It is also used in animations to produce such things as fading effects, where one image gradually fades into another.

### *Anisotropic Filtering*

A technique that preserves the surface details of an object as it recedes into the distance by utilizing and blending together the object's texture maps. This makes 3D objects appear more realistic as the detail of their surface texture is retained in a smooth, seamless fashion on the sections that move or fade away into the background.

### *Anti-aliasing*

A method that smooths out the jagged edges of a curved object. A black curved line on a white background displayed on a computer screen will have some jaggedness along its edges due to the inherent limitations of using discrete pixels to display the image. Anti-aliasing smooths out this jaggedness by filling in the white spaces between the jagged edges with varying shades of grey.

### *Aspect Ratio*

The proportions of a display are expressed as a ratio of its width and height. Common ratios include 4:3 for TVs and CRTs, 5:4 for LCDs, and 16:9 for widescreen displays.

### *Back Buffer*

A type of offscreen memory used to provide smooth video and 2D graphics acceleration. This technique uses two frame buffers, so the process is often referred to as "double-buffering." While the contents of one buffer are displayed, a second buffer, called the "back" buffer, holds the frame being worked on. In this way, users will only see complete, smooth frames displayed onscreen.

### *Bilinear Filtering*

This filtering method reduces the blockiness caused when zooming into a 3D surface that is at a right angle to the viewer. A newspaper photo examined closely enough will show that the picture is made up of tiny dots. If the photo was enlarged it would start to look "blocky" and less distinct. This is also a problem for computer-generated images, especially for surface details.

### *Bit Depth*

Refers to the number of data bits required to store color information about a pixel. Larger bit depth means a greater range of color information is capable of being encoded into each pixel. For example, 1 binary bit of memory can only encode to either “0” or “1.” So a graphical bit depth of 1 means that the display can only show two colors, the black and white of a monochrome display. Four-bit color depth is capable of displaying 16 colors because there are only 16 different combinations of 4 bits (“0000”, “0001”, “0010”... to “1111”). Sixteen-bit color is capable of reproducing 65,536 colors, 24-bit color can display up to 16,777,216 individual colors, and 30-bit color can display up to one billion individual colors.

### *Bitmap*

A bitmap is a graphic or character representation composed of individual pixels, arranged horizontally in rows. A monochrome bitmap uses one bit per pixel (bpp). Color bitmaps may use up to 32bpp, depending on the color depth selected.

### *Brightness*

The amount of white or black that is applied to all colors onscreen. By making the screen “brighter” you are adding more white to it. This should not be confused with luminosity, which measures the actual light level emitted from the computer display.

### *Buffer*

A name referring to portions of on-board video memory. One large buffer is always used to display images to the screen; this is the “display buffer.” The rest of offscreen memory is typically used by applications as back buffers, z-buffers, and texture buffers.

### *Color Component*

Three color components—Red, Green, and Blue—combine in various intensities to determine the color of each pixel on the screen. The values of each color component are graphically represented by a corresponding color curve.

### *Color Correction*

Correct discrepancies between the real color value and the way a screen displays it. Color discrepancies can be caused by a variety of sources, including the lighting conditions in the work area and gradual shifts in color over time on monitors or flat panel displays.

### *Color Curve*

A color curve represents all possible intensity values (from 0 to 255) for a color component (Red, Green or Blue). For each color curve, the horizontal axis represents the input value (the color value a program wants to display), while the vertical axis represents the output value (the color value that the display driver will write to the screen). A value of 0 (in the lower left corner) represents the complete absence of that particular color, while a value of 255 (in the upper right corner) represents the “full” strength for that color.

### *Control Point*

A control point is a user-created point on the color curve. Users can change the color of the screen by moving the control points with a mouse.

### *CRT*

Acronym for “cathode ray tube”, which is the main component of computer monitors and TVs. Color CRTs use three separate electron beams fired through a shadow mask and onto the back of the glass screen. The electron beams activate separate red, green, and blue values in various strengths in order to produce a colored image.

### *Direct 3D®*

Part of Microsoft®’s DirectX API designed for rendering 3D graphics on Windows® systems. It provides software developers with low-level access to functions on graphics cards, providing the type of performance necessary for intensive 3D applications such as games.

### *Dithering*

A computer graphics technique that takes advantage of the human eye's tendency to mix two colors that are adjacent to each other to produce smooth boundary transitions. Dithering adds intermediate color values between two or more boundaries, producing smoother, more natural look to 2D images or 3D objects.

### *Dot pitch*

Dot pitch specifies the sharpness of a monitor's display. It is measured in millimeters (mm) and is the distance between the individual phosphor sub-pixels in a CRT display or cells of the same color within an LCD display. The smaller the number, the sharper the image. The most common dot pitches for monitors range from .24 mm to .31 mm. Also, if a monitor with a .24 mm dot pitch is set to its highest possible resolution, the pixel size will equal the dot pitch. If the monitor is set to lower resolutions, the pixels will be comprised of multiple dots.

### *DVI*

Acronym for "Digital Video Interface," a standard video connection used on many current computer displays. There are three types of DVI connections: DVI-A (analog), DVI-D (digital), and DVI-I (integrated, capable of either analog or digital). It supports high-bandwidth video signals over 160 Hz, so it is most often used for high-resolution displays.

### *Flat Shading*

A lighting technique that shades each polygon of a 3D object based on where the source of the light is and the angle of the polygon in relation to it. It enables relatively fast rendering of 3D objects, although it can make those objects appear "faceted" as each visible polygon is set to a particular color value, and consequently does not produce as realistic an effect as obtained when using Gouraud shading.

### *Fog*

Term used to describe the blending of an object using a fixed color as objects are made to appear more distant from the viewer.

### *Frame Buffer*

The portion of the memory buffer on the graphics card used to store the image being displayed. All rendering processes have been accomplished by this stage and this buffer contains only a one-to-one relationship of the data to be relayed to the display.

### *Frames Per Second*

In terms of 3D graphics, refers to the rate at which the graphic processor can render new screens per second. Higher rates equals better, more naturalistic performance for such things as games set in a 3D environment. Sometimes abbreviated to “fps.”

### *Gamma*

Sometimes confused with brightness, gamma actually refers to the correction that is applied to any display device in order to produce more gradual increases or decreases in the perceived brightness for that device. A change in gamma produces a non-linear change in the color curve, ensuring that perceived changes in color and intensity are consistently applied.

### *Gouraud Shading*

A shading method used to produce a smooth lighting effect across a 3D object. A specific color is used at each vertex of a triangle or polygon and interpolated across the entire face.

### *GPU*

GPU is an acronym for “Graphics Processing Unit. The GPU powers the operations of a graphics card including support for 2D/3D and video.

### *HDCP*

HDCP is an acronym for “High-Bandwidth Digital Copy Protection.” It is a form of digital rights management designed to protect copyright of signals being transported across DVI or HDMI™ connections. Several international regulatory bodies have recommended its incorporation into high-definition display and playback devices.

### *Hue*

Refers to a specific color within the visible spectrum of light, defined by its dominant wavelength. A light wave with a central tendency within the range of 565-590 nm is visible as yellow. In the standard RGB color space used by most computer displays, hue refers to a coordinate of the color as described by its red, green, and blue values, minus any additional brightness or saturation values for that color.

### *HydraVision™*

HydraVision™ is ATI's multi-monitor management software, enabling users to manage the display of multiple windows and applications across two or more adjacent monitors. It also includes a range of productivity features designed to effectively manage applications in this environment.

### *HyperZ™ HD*

HyperZ™ HD includes a number of different technologies aimed at optimizing memory-bandwidth efficiency, particularly with respect to Z-buffer operations. The Z-Buffer, sometimes also called the Depth Buffer, stores information used to determine the placement of objects in a 3D environment with respect to the viewpoint of the observer. Reading and updating this buffer typically consumes more memory than any other part of the 3D rendering process, making it a major performance bottleneck. HyperZ™ HD technology reduces the memory bandwidth consumed by the Z-Buffer, thereby increasing performance while also making the 3D environment more realistic.

### *Keyframe Interpolation*

This feature is also known as "morphing." In an animation, a start and end point are picked as the key frames. In a 3D rendering, the start point could have a character with a neutral expression, and the end point could have that same character smiling. Additional frames are interpolated (inserted) between the two keyframes in order that "morphs" (transforms) the image so that there is a smooth transition between the key frames.

### *KTX Buffer Region Extension*

This OpenGL® programming term refers to a feature that rapidly updates portions of the display of 3D modelling applications that change very quickly, or have been moved or occluded. It does this by optimizing the storage of buffer regions in the graphics card's memory buffer. Other applications are typically not adversely affected when this is enabled.

### *Lighting*

In 3D computer graphics, refers to aspects and quality of the virtual light source being used to make an object visible. Lighting can strongly affect the "mood" of a scene. For example, a "harsh" light could be a bare lightbulb that is glaringly bright on the objects closest to it while casting strong shadows in the background. A "softer" light would be more diffuse and not cast shadows, such as you would get outdoors on a typical overcast day.

### *Mipmapping*

The most memory-intensive aspect of 3D graphics are the textures that give an object its realism (like wood, marble, leather, and cloth). Because objects in real life become less detailed as they move farther away from the viewer, 3D programmers simulate this by using less detailed, lower resolution texture maps on distant objects. These texture maps are merely scaled down versions of the main texture map used when the object is up close, and they use less memory.

### *Offscreen Memory*

An area of memory used to preload images so that they can be quickly drawn to the screen. Offscreen memory refers to all of the remaining video memory not taken up by the front buffer, which holds the contents of the display screen currently visible.

### *OpenGL®*

Short for “Open Graphics Library,” this is an industry standard for cross-platform 3D graphics development. It consists of a large number of functions that can be called upon in various programs, such as games, CAD, and virtual-reality systems, to produce complex 3D objects from simpler, more “primitive” building blocks. Implementations currently exist under Windows®, Mac OS® X, and various forms of Unix, including Linux®.

### *PCI*

Acronym for “Peripheral Component Interconnect”, which is the specification for a type of computer bus used for attaching computer peripherals to a computer’s motherboard. PCI encompasses both integrated motherboard components (such as built-in graphical processors) and peripherals that fit into an expansion card slot, such as a separate graphics card. PCI replaced the older ISA and VESA bus standards, and was itself superseded by the AGP standard for the main graphics card bus.

### *PCI Express™ (PCIe)*

The successor standard to the PCI and AGP bus standards, with a significantly faster serial communications system, further opening up bandwidth for more communications between such peripherals as graphics cards and the computer’s CPU. PCIe cards can come in several physical configurations, the fastest currently being X16, which is typically used for graphic cards, and X1, typically used for other peripherals, such as separate multimedia cards.

### *Pipeline*

In relation to computer graphic processors, refers to the number of separate arithmetic units available for rendering the output on a display. In general, more pipelines available on a graphical processor means there are more 3D rendering capabilities available, increasing overall 3D performance.

### *Pixel*

All computer images are made up of tiny dots. Each individual dot is called a pixel, a word created from the term “picture element.” A pixel is the smallest indivisible unit of a digital image and can be only a single color. The size of the pixel depends on how the display resolution has been set. The smallest size a pixel can be is determined by the display’s dot pitch, which is measured in millimeters (mm).

### *Refresh Rate*

Also referred to as “vertical refresh rate.” This is the rate at which a monitor or television can redraw the screen from top to bottom. NTSC television systems have a refresh rate of approximately 60 Hz whereas computer displays typically have refresh rates of 75 Hz or more. At refresh rates of 70 Hz and lower, screen flicker is often noticeable.

### *Rendering*

Rendering refers to the final drawing stages where the 2D image that appears on a display is derived from its 3D descriptions. What appears on the display may look three dimensional, but it is really just a 2D grid of pixels designed to appear that way.

### *Resolution*

The resolution of any display is the number of pixels that can be depicted on screen as specified by the number of horizontal rows against the number of vertical columns. The default VGA resolution of many video cards is capable of displaying 640 rows of pixels by 480 columns. The typical resolution of current displays is set to higher values, such as 1024x768 (XGA), 1280x1024 (SXGA), or 1600x1200 (UXGA).

### *Saturation*

Refers to the intensity of a specific hue (color). A highly saturated hue is vivid and intense, whereas a less saturated hue appears more grey. A completely unsaturated color is grey. In terms of the RGB color model, a fully saturated color exists when you have 100% brightness in one of the three channels (say, red) and 0% in the two others (green and blue). Conversely, a fully desaturated color is one where all of the color values are the same. Saturation can therefore be thought of as the relative difference between the values of the channels.

### *Shadow Mask*

In CRT monitors, the shadow mask is a metal plate full of tiny holes that is attached to the inside of the glass screen. It focuses the beams from the electron guns at the back of the CRT. The distance between these holes is called the dot pitch.

### *SmartShader™ HD*

SmartShader™ HD contains advanced vertex and pixel-shading capabilities. A shader is a small program that runs on the GPU and describes how an image should be rendered. Vertex shaders manipulate the individual polygons that make up 3D objects, and pixel shaders operate on the individual pixels that fill in these polygons to create a visible image. SmartShader™ HD is designed to alleviate the resource constraints of earlier shader hardware, paving the way for more complex, detailed, and realistic shader effects in applications requiring high-performance 3D rendering.

### *SmoothVision™ HD*

SmoothVision™ HD incorporates improved anti-aliasing, anisotropic filtering and 3Dc™ compression features designed to further enhance image quality. Anti-aliasing performance is improved, providing better overall detail and image quality. The enhanced anisotropic filtering ensures sharper and clearer pictures at higher frame rates, and the new 3Dc™ compression technology makes it possible to display higher polygon counts for 3D rendered objects.

### *Specular Highlight*

The bright, usually small, intense light reflected from a 3D surface with a high refraction value. From the intensity and spread of this highlight users can differentiate between a “hard,” smooth surface, such as metal or porcelain, or a “soft,” textured surface, such as fabric or skin.

### *Texel*

Short for “texture element,” the 3D equivalent of a pixel, describing the base unit of the surface of a 3D object, such as a sphere; for a 2D object, such as a circle, the base unit is a pixel.

### *Texture Mapping*

In computer graphics, two-dimensional textured surfaces are referred to as texture maps. Texture mapping is the process by which a two-dimensional surface gets wrapped around a three-dimensional object so that the 3D object takes on the same texture qualities. For example, if you take a 2D textured surface that looks like cloth and wrap it around a 3D sphere, the sphere will now appear to have a cloth-like surface.

### *Texture Preference*

Texture Preference is a feature enabling the user to select the texture quality level for the surface of a 3D object. Selecting the highest quality possible will provide the most realism, although it may also have some impact on the performance of any 3D intensive application.

### *Trilinear Filtering*

A sampling method used to produce realistic-looking 3D objects. Trilinear filtering averages one of the bilinear filter mipmap levels along with the standard mipmap samples.

### *Vertex Shader*

Three-dimensional objects displayed on a screen are rendered using polygons, each of which is made up of intersecting triangles. A vertex is a corner of a triangle where it connects to another triangle, and each vertex carries a considerable amount of information describing its coordinates in 3D space, as well as its weight, color, texture coordinates, fog, and point size data. A vertex shader is a graphics processing function that manipulates these values, producing such things as more realistic lighting effects, improved complex textures such as hair and fur, and more accurate surface deformations such as waves rippling in a pool or the stretching and wrinkling of a character's clothes as he or she moves.

### *VGA Connector*

A type of graphics connector, sometimes also called an analog connector. It is the most common type of video connector available, consisting of 15-pins set in three rows. The "VGA" is an acronym for "Video Graphics Array," which is also the name for the video resolution mode of 640x480 pixels, the lowest standard resolution supported by virtually all video cards.

### *Z-buffer*

The portion of video memory that keeps track of which onscreen elements can be viewed and which are hidden behind other objects. In the case of a 3D image, it keeps track of which elements are occluded by the foreground in relation to the user's perspective, or by another 3D object.

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