ATI FireMV 2400/ATI FirePro 2450

User Guide

Part Number: 137-50054-30

Trademarks

Disclaimer

Important Safety Instructions

Note: This product is for use only with compatible UL-listed personal computers that have installation instructions detailing user installation of this class of product.

Read all instructions before beginning installation. All safety and installation instructions should be read before the product is installed or operated.
Retain all instructions. Safety, installation, and operating instructions should be retained for future reference.
Heed all warnings. All warnings regarding the product and its operating instructions should be obeyed.
Use appropriate grounding.

> **Caution:**
> For continued protection against the risk of electric shock and fire, install this accessory only in products equipped with a three-wire grounding plug, a plug having a third (grounding) pin. This is a safety feature. Do not remove the grounding pin of a three-pin plug.

Attach product securely. All product-securing screws or fasteners should be completely tightened in order to provide continuous bonding between the product and the PC chassis, as appropriate.
For cards with TV tuners:
- **Ground outdoor antenna appropriately.**

> **Caution:**
> Since an outdoor antenna or cable system may be connected to the product, be sure that the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Article 810 of the *National Electrical Code, ANSI/NFPA 70* and the *Canadian Electrical Code, Section 54* provide useful information.

- **Unplug system during storms or prolonged disuse.**

> **Caution:**
> 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 help prevent damage to the product from power-line surges.

- **Install outdoor antenna system away from power lines.**

> **Warning:**
> 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.

> **Caution:**
> 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.

Note to CATV System Installer

This reminder is provided to call the CATV systems installer's attention to Section 820-40 of the NEC, which provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building as close to the point of cable entry as is practical.

Contents

Chapter 1

Getting Started

Before you begin installing your new ATI FireMV 2400/ATI FirePro 2450 graphics accelerator, please make sure you have the proper system requirements and have completed the required preinstallation tasks as outlined in this chapter.

System Requirements

Table 1–1 ATI FireMV 2400/ATI FirePro 2450 System Requirements

Hardware	• AMD Athlon™/AMD Opteron™ or Intel®Pentium® 4/Xeon® processor.
	• 128 MB of system memory; 256 MB or more recommended for best performance.
	• Motherboard with available bus connection slot as applicable to the interface on the ATI FireMV/ATI FirePro product you have purchased:
	  • x16 lane PCI Express®
	  • x1 PCI Express
	  • PCI
	• CD-ROM or DVD-ROM drive for installation software.

Operating System	• 32- or 64-bit Windows Vista®. • 32- or 64-bit Windows® XP Home or Pro with Service Pack 1 (or higher). • 32- or 64-bit Linux® Xfree86 4.x.0.
Monitor	• High-resolution MultiSync or multi-frequency display or other VGA display. • DVI digital flat-panel (DFP) display or digital CRT display.

Performing a Quick Installation

Experienced users and system administrators can follow these brief instructions for installing this ATI FireMV/ATI FirePro product.

Other users should refer to the detailed installation instructions, starting with Hardware Installation on page 5.

1. Uninstall the drivers and software for any installed graphics card(s).

   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 display, disable it.

2. Shut down and disconnect your computer system.

3. Remove any installed graphics card(s).

4. Install your new ATI FireMV/ATI FirePro graphics card.

5. Reassemble and connect your computer system.

6. Install the ATI FireMV/ATI FirePro drivers and configuration software from the ATI Installation disc.

Before You Begin

Before you begin installing your new ATI FireMV 2400/ATI FirePro 2450 graphics card, please perform the following tasks.

Graphics Card Bus Types

Your graphics card connects to the motherboard through a bus slot, the most common types of which are shown in the following figure:

Figure 1–1 Common Graphics Card Bus Types
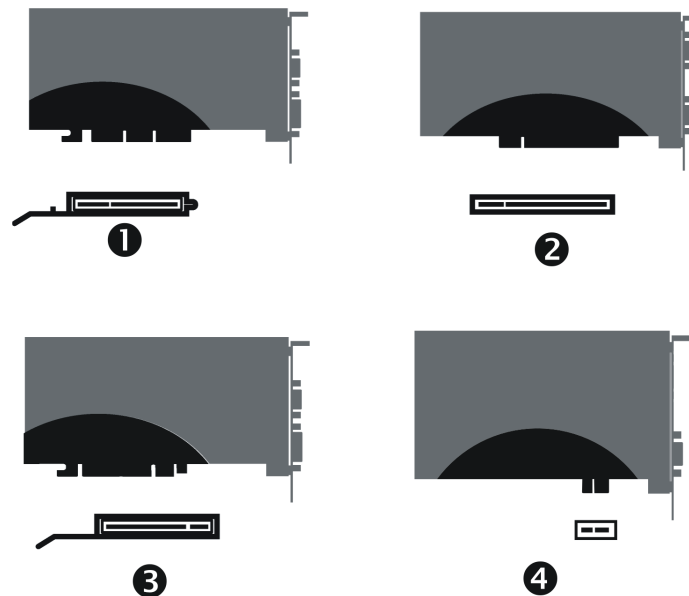
1	AGP card connector and motherboard slot
2	PCI card connector and motherboard slot
3	PCI Express (PCIe®) x16 card connector and motherboard slot
4	PCIe x1 card connector and motherboard slot

Make sure you have an available bus slot on your motherboard for the type of ATI FireMV/ATI FirePro graphics card you have purchased before beginning your installation.

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Recording Serial Numbers

The serial number and 102 part number on the graphics card are required for product registration. They are located on a white sticker on the back of the graphics card and are shown in boldface and underlined in the illustration below.

Record these numbers in the space provided below and retain for future use.

1. Remove the graphics card from packing.
2. Locate the white label on the back of the graphics card.
3. Record the serial number and 102 part number.

Figure 1–2 Typical Serial Number and 102 Part Number Arrangement

S/N (01)0072741548020 (21) **000000 000000**

P/N **1028360100** 057805 MADE IN CHINA

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

Uninstalling Previous Drivers in Windows XP

Follow these steps to uninstall the existing graphics card driver in Windows XP in preparation for installation of a new card.

1. With the current graphics card still in the computer, close all open applications.
2. On the Windows taskbar, click **Start ▷ Control Panel** and then double-click **Add or Remove Programs**.
3. Select the current graphics card driver and then click **Add/Remove**.
   The wizard will appear and help remove the current display drivers.
4. Turn off the system after the driver has been removed.

   Note: If the previously installed graphics card has any additional software installed, this software may also need to be removed before restarting the computer. For example, DVD Player or Multimedia applications.

Uninstalling Previous Drivers in Windows Vista

Follow these steps to uninstall the existing graphics card driver in Windows Vista in preparation for installation of a new card.

1. With the current graphics card still in the computer, close all open applications.

2. Click **Start ▷ Control Panel**. Double-click **Programs and Features** and then select the graphics card driver from the list of software programs.

3. Double-click **Hardware and Sound** and then double-click **Device Manager**.

4. Expand **Display Adapter** and then right-click the driver for the graphics card you are replacing.

5. In the shortcut menu that appears, click **Install**.
   The driver for the old graphics card is uninstalled.

6. Turn off the system.

Chapter 2

Hardware Installation

This chapter details how to install the ATI FireMV/ATI FirePro graphics card into your computer.

Installing a Graphics Card

Make sure you have completed the preinstallation steps outlined in Getting Started on page 1.

Please read all installation instructions completely before you begin.

1. Turn off your computer, monitor(s), and other peripheral devices.

2. Unplug the computer's power cord and disconnect all cables from the back of the computer.

   Caution:
   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 cover to your computer's case.

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

   Caution:
   Static electricity can seriously damage computer components. Discharge your body's static electricity by touching the power supply or the metal surface of the computer chassis before you touch any components inside your computer's case to avoid damaging them.

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

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

5. Locate the appropriate slot and, if necessary, remove the metal back-plate cover. Make sure all internal cables are clear of the slot.

6. Align your ATI FireMV/ATI FirePro graphics card with the slot and press it in firmly until the card is fully seated. You may need to hold open a locking tab on the slot with your finger when you seat the card.

7. Screw in or fasten the graphics card securely.

8. Make sure no internal cables are interfering with anything inside the computer (for example, a cooling fan) and replace the computer cover.

9. Reconnect any cables that were disconnected during installation and plug in the computer's power cord.

10. Turn on the monitor, and then your computer.

If you have properly installed your graphics card, operating system messages will appear and the boot procedure will proceed.

Your monitor will be running in a basic (VGA) video mode. Higher refresh rates are not available at this stage of the installation. Once you have installed the ATI FireMV/ATI FirePro drivers and software, you can use ATI Catalyst™ Control Center to adjust your video settings and configure multiple monitors.

Proceed to install the software and drivers for your ATI FireMV/ATI FirePro graphics card.

Baseplate Connections

The following figures show the display connections available on your graphics card.

Note: Baseplates may not appear exactly as depicted.

Figure 2–1 ATI FireMV 2400/ATI FirePro 2450 Baseplate Connections
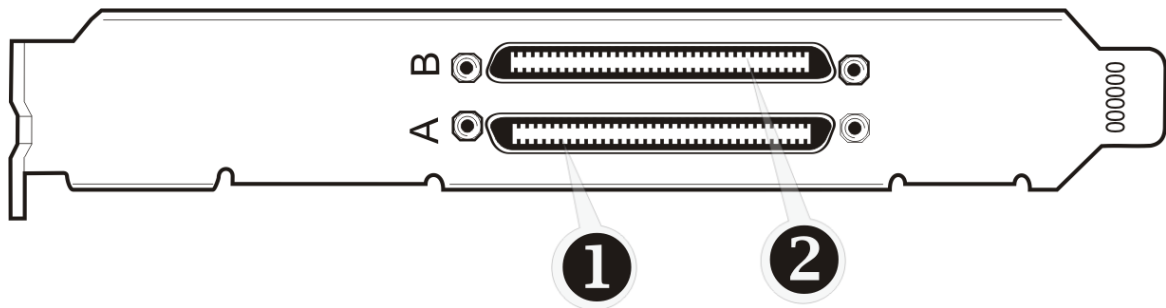
1	VHDCI (Very High Density Connector Interface) Connection A
2	VHDCI Connection B

VHDCI Cable

Your ATI FireMV 2400/ATI FirePro 2450 card is designed for use with a pair of VHDCI (Very High Density Connector Interface) cables, each of which provides support for two monitors. The type of monitors supported depends on the cable or adapters used.

Figure 2–2 ATI FireMV 2400/ATI FirePro 2450 Cables/Connectors
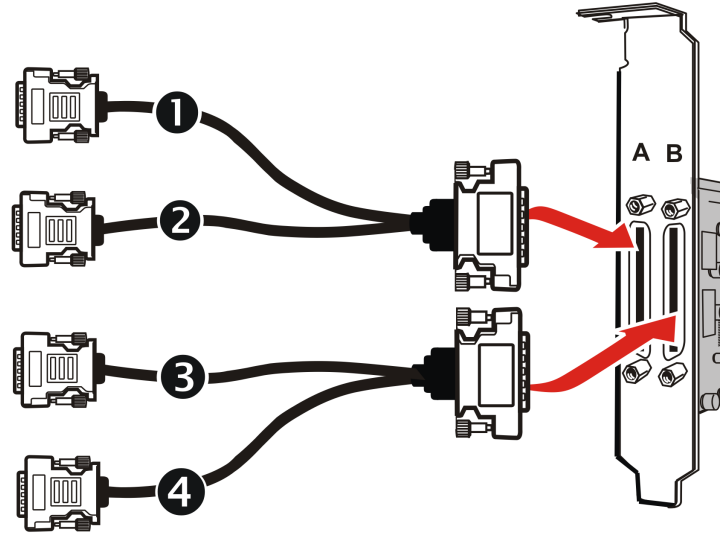
1	Primary DVI-I Connector on VHDCI A
2	Secondary DVI-I Connector on VHDCI A
3	Primary DVI-I Connector on VHDCI B
4	Secondary DVI-I Connector on VHDCI B

Note: Each VHDCI cable has two connections: a primary and a secondary. If you are using a single display, make sure you connect it to the primary connection. A single display will not function properly if it is connected to the secondary connection.

A VHDCI cable's DVI connectors can be attached to VGA monitors using a VGA-to-DVI adapter.

Figure 2–3 VHDCI Cable Connections
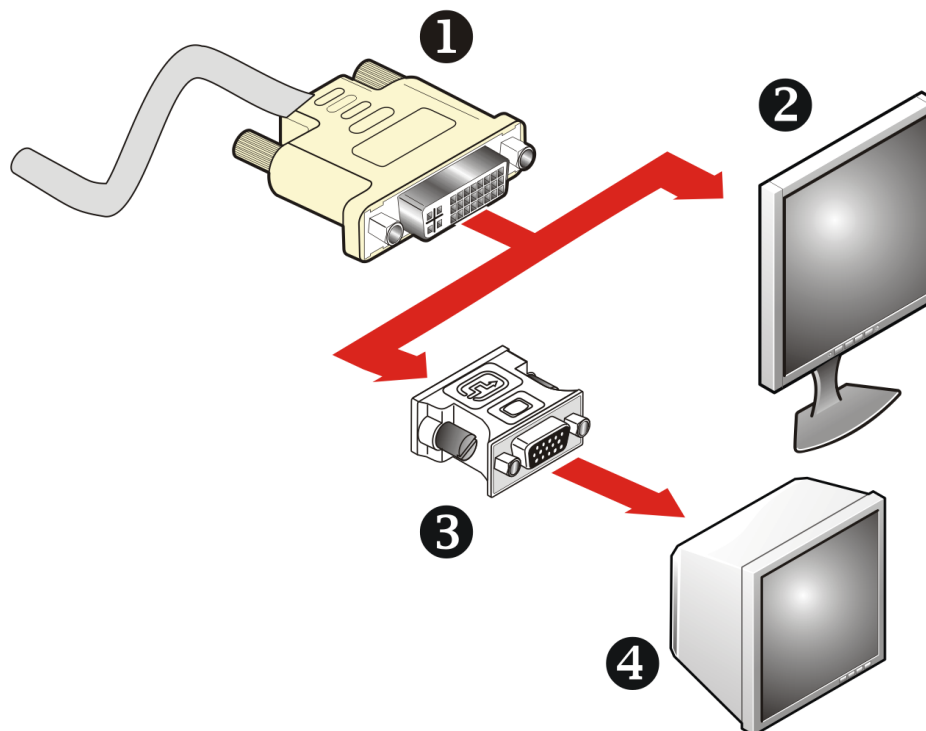
1	DVI-I Connector on VHDCI Cable
2	Digital (DVI) Display
3	VGA-to-DVI Adapter
4	Analog (VGA) Monitor

> **Note:** For instructions on attaching adapters, please refer to Using Adapters on page 8.

Using Adapters

Your ATI FireMV/ATI FirePro graphics card includes adapters to enable you to attach display types other than those included on the baseplate or cables.

Use the following procedure to attach a display using an adapter.

1. Turn off your computer and monitor.
2. Plug the adapter into the connection from your ATI FireMV/ATI FirePro graphics card and tighten the thumbscrews (if there are any).
3. Connect your display's cable to the adapter and tighten the thumbscrews (if there are any).
4. Turn on your monitor first, then your computer.

Use the ATI Catalyst Control Center to configure the new monitor.

Display Configurations

Your ATI FireMV 2400/ATI FirePro 2450 graphics card provides quad-display functionality through four DVI connections on two VHDCI cables.

> **Note:** Up to 10 monitors may be supported using multiple graphics cards; for more information, consult the ATI Catalyst Control Center online help.

The following table lists the different ways you can connect displays to your card:

Display Configuration	Connector(s) Used
DFP (digital flat-panel) display	DVI connector
VGA display	VGA connector with VGA-to-DVI adapter

Chapter 3

Drivers and Software Installation

This chapter describes the installation of the drivers and software associated with your ATI FireMV/ATI FirePro graphics card.

ATI Drivers and Software

Drivers are small but important programs that enable an operating system to communicate with a piece of hardware, such as a graphics card.

When you install a new graphics card, you must also install the driver and configuration software the card requires to function properly.

You also need to install (or reinstall) your ATI FireMV/ATI FirePro drivers when you have reinstalled or upgraded your operating system or when you install updated drivers from ATI's Web site.

> **Note:** When reinstalling drivers, always uninstall any previous drivers that are on your system, even if they are for the same graphics card. Always start "fresh."

Microsoft .NET Framework

ATI Catalyst Control Center requires Microsoft .NET Framework 2.0 to function. If you install your ATI software using a product's installation CD, Microsoft .NET Framework 2.0 will be installed automatically. If you download and install ATI software from the Internet, however, Microsoft .NET Framework 2.0 will **not** be installed. If it is not already on your system, you must download and install Microsoft .NET Framework 2.0 from Microsoft's Web site **before** you install ATI Catalyst Control Center.

You can check to see if Microsoft .NET Framework 2.0 is installed on your system by looking for it in the Add and Remove Programs dialog.

Linux Drivers

Linux drivers are not included on the installation CD-ROM. Linux drivers and software are available from the ATI Web site at ati.amd.com/support.

Installing ATI Drivers and Software in Windows XP

In order to install the drivers and software necessary for your ATI FireMV 2400/ATI FirePro 2450 graphics card to function properly, the following must be true:

- Your graphics card must be physically installed in your computer.
- Your operating system must be installed and operational; you must have at least Windows XP Service Pack 1 installed.

- You must log in as a user with administrator rights.

1. Turn on your monitor and then turn on your computer. Wait for your operating system to boot up. When the Found New Hardware dialog appears, click **Cancel**. If the System Settings Change dialog asks if you want to restart your computer, click **No**.

2. Run the Setup utility. The Setup utility may start automatically if you insert the ATI Installation CD-ROM into your CD-ROM or DVD-ROM drive after the operating system has started. If your CD-ROM auto-run feature is not enabled or the Setup utility is not on a CD-ROM (because it was downloaded from the Internet, for example):

   a. In the Windows task bar, click **Start**.
   The Start Menu opens.

   b. Click **Run**.
   The Run dialog appears.

   c. Select **Browse** and select `atisetup.exe` from the root directory of the ATI Installation CD-ROM or the folder in which you have placed the driver.
   `atisetup.exe` *appears in the **Open** field of the Run dialog.*

   d. Click **OK**.

3. In the Software Install dialog, click **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:

   ➪ Select **Express** to install typical drivers and software.

   ➪ Select **Custom** to choose individual software components for installation.

   Note: The Custom installation option is recommended for advanced users only.

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

8. After the system reboots, the Found New Hardware dialog may display the **Digital Signature Not Found** message. Click **Yes** or **Continue** to complete the driver installation.

Proceed to configure your video settings and connect additional monitors, if necessary.

Installing ATI Drivers and Software in Windows Vista

In order to install the drivers and software necessary for your ATI FireMV 2400/ATI FirePro 2450 graphics card to function properly, the following must be true:

- Your graphics card must be physically installed in your computer.
- Your operating system must be installed and operational.

- You must log in as a user with administrator rights.

1. Turn on your monitor and then turn on your computer. Wait for your operating system to boot up. You may receive a warning that the graphics driver failed to install. Close this dialog.

2. Run the Setup utility. The Setup utility may start automatically if you insert the ATI Installation CD-ROM into your CD-ROM or DVD-ROM drive after the operating system has started. If your CD-ROM auto-run feature is not enabled or the Setup utility is not on a CD-ROM (because it was downloaded from the Internet, for example):

   a. In the task bar, click the **Start** (Windows icon) button.
      The Start Menu opens.

   b. Select **All Programs ▷ Accessories ▷ Run**.
      The Run dialog appears.

   c. Select **Browse** and select `setup.exe` from the root directory of the ATI Installation CD-ROM or the folder in which you have saved the driver download.
      `setup.exe` *appears in the **Open** field of the Run dialog.*

   d. Click **OK**.
      Note: The User Account Control dialog may appear; if so, click **Continue**. The ATI Catalyst Install Manager dialog may prompt you to close all open applications; if so, do so.

3. In the Software Install dialog, click **Install**.

4. Click **Next**.
   ATI Easy Install will start the Installation Wizard.

5. Follow the wizard's on-screen instructions to complete the installation:

   ➪ Select **Express** to install typical drivers and software.

   ➪ Select **Custom** to choose individual software components for installation.

   Note: The Custom installation option is recommended for advanced users only.

6. Click **Yes** to the license agreement.

7. When installation is complete, select **View Log** to review installation details. Click **Finish** when are done; you will be prompted to reboot your computer.
   Your computer will reboot.

Proceed to configure your video settings and connect additional monitors, if necessary.

HydraVision Multi-monitor Software

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

Note: 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 or the online help available through the ATI Catalyst Control Center.

Chapter 4

Basic Display Configuration

This chapter contains basic procedures for configuring your displays.

Configuring a Display with ATI Catalyst Control Center

A monitor must be connected to your computer to be configured.

Use the following procedure to configure a display in
ATI Catalyst Control Center's Advanced view.

> **Note:** A simplified version of this procedure is available through the
> ATI Catalyst Control Center Basic view using the **Setup my display
> configuration** option on the Easy Setup Wizards Tab.

1. Open ATI Catalyst Control Center in the Advanced view.

   > **Note:** For more information, see Starting the ATI Catalyst Control
   > Center Software on page 17.

2. Select the **Displays Manager** aspect.

3. To select a primary monitor, right-click the numbered monitor icon you
   wish and choose **Primary**.

4. To enable a monitor that is connected but disabled, right-click the numbered
   monitor icon you wish and choose **Enable**

5. To configure the display properties of a monitor, left-click the numbered
   monitor icon you wish to configure (if it is not already selected) and select
   values for the **Desktop Area** (resolution), **Color Quality**, and **Refresh Rate**
   from the drop-down menus that best suit your requirements and your
   monitor's performance.

Caution:
Choosing a refresh rate that your monitor does not support may damage your monitor. Consult your monitor's documentation, if necessary.

6. To extend your Windows desktop from a primary onto a secondary display,
   right-click on the icon in the **Desktop 2** area and choose the appropriate
   option.

   ➪ Choose **Clone desktop...** to mirror the display on **Desktop 1**.

   ➪ Choose **Stretch desktop...** to extend the display across both desktops
   (horizontally or vertically).

7. Click **Apply** to apply your selections or **OK** to apply your selections and close
   ATI Catalyst Control Center.

Configuring a Display with Catalyst Control Panel

Before configuring a secondary display, make sure you have configured your primary display. Your monitor must be connected to your computer to be configured.

> **Note:** When you use multiple monitors with your card, one monitor will always be designated Primary; additional monitors will be designated Secondary.

Use the following procedure to configure a display with Control Panel.

1. In Windows:

   ➪ Navigate to the **Control Panel** and choose **Display**, or

   ➪ Right-click on the desktop and choose **Properties**.

   The Display Properties dialog appears.

2. Click the **Settings** tab to access the basic multi-monitor configuration settings.

   > **Note:** ATI software provides many additional configuration features.

3. Select the monitor icon identified by the appropriate number (for example, **1** for the primary display, **2** for a secondary display).

4. When configuring a secondary display, select the **Extend my Windows desktop onto this monitor** option to enable the Windows desktop to "stretch" across the primary and secondary monitor(s).

5. Select values for the **Screen Resolution** and **Color Quality** that best suit your requirements and your monitor's performance.

6. Click **Advanced**.

   The Advanced Display Properties dialog appears.

7. Choose a refresh rate from the **Screen Refresh Rate** drop-down menu in the Monitor Settings section.

   > **Caution:**
   >
   > Choosing a refresh rate that your monitor does not support may damage your monitor. Consult your monitor's documentation, if necessary.

8. Click **OK** to close the Advanced Display Properties dialog, and then click **OK** to close the Display Properties dialog.

> **Note:** Refer to Windows help and documentation for further information on using the Display Properties dialog.

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Chapter 5

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ATI Catalyst Control Center

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This chapter introduces the ATI Catalyst Control Center, a graphical user application that provides access to the display features of the graphics card.

ATI Catalyst Control Center Overview

The ATI Catalyst Control Center software provides access to the display features of the graphics card. Use the software to fine-tune graphics settings, enable or disable connected display devices, and change the orientation of the desktop. Many features display previews of the changes before they are applied.

The following configurations are available:

Basic View	A simplified view of the features that includes wizards to quickly make changes.
Advanced View	A powerful interface that enables complete configuration of the feature set of the graphics card.
Custom View	A customized view so that desired features can be accessed quickly.

For information on the individual features of the software, access the comprehensive in-program help system (see Accessing ATI Catalyst Control Center Help on page 18 or visit the AMD Customer Care Web site at ati.amd.com/support/).

Starting the ATI Catalyst Control Center Software

The following table shows the ways you can start the ATI Catalyst Control Center software:

Table 5–1 ATI Catalyst Control Center Access Routes

Access Route	Instructions
Windows Desktop	1. Right-click anywhere on the desktop. 2. From the shortcut menu that appears, click **ATI CATALYST(TM) Control Center**.
Windows Start Menu	1. Click **Start** on the Windows task bar. 2. Select **All Programs ▷ Catalyst Control Center**.
Windows System Tray	1. Right-click the ATI icon in the Windows System Tray. 2. From the short menu, select **ATI Catalyst Control Center**.
Desktop Shortcut	When you first installed the ATI Catalyst Control Center, the setup wizard provided you with the option of placing a shortcut on the desktop. If you chose this option, you can double-click the **ATI Catalyst Control Center** desktop shortcut.
Predefined Hot Keys	You can define your own hot key sequence by using the ATI Catalyst Control Center Hotkey Manager.

Accessing ATI Catalyst Control Center Help

ATI Catalyst Control Center Help provides information on the features and concepts of your ATI FireMV/ATI FirePro graphics card. You can also use the ATI Catalyst Control Center Help feature to access usage information, generate a problem report, and get software version information for your graphics card.

1. Open ATI Catalyst Control Center in the Advanced view.

2. Choose one of the following options:

   ⇨ Press the **F1** key at any time to get specific help on the currently displayed information.

   ⇨ From the ATI Catalyst Control Center Dashboard, choose **Help ▷ Help Contents** to browse the entire help contents.

   ⇨ From the ATI Catalyst Control Center Dashboard, choose **Help ▷ Search Help** to search the help contents for a specific term.

   ⇨ To access AMD's Web site, from the ATI Catalyst Control Center Dashboard, choose **Help ▷ Go to ATI.com**.

Chapter 6

Catalyst Control Panel

This topic describes the software associated with the ATI FireMV/ATI FirePro graphics card when you are using the Control Panel. For information on using ATI Catalyst Control Center, please refer to ATI Catalyst Control Center on page 17

Accessing the Catalyst Control Panel

The Catalyst Software Suite installs the ATI display tabs into the Windows **Display Properties** dialog. These tabs are accessed through the **Advanced** button located on the **Settings** tab.

To access the **Display Properties** dialog, right-click on the desktop or navigate through the Windows Control Panel, which is located in the Start menu.

Figure 6–1 Windows Display Properties Settings Tab
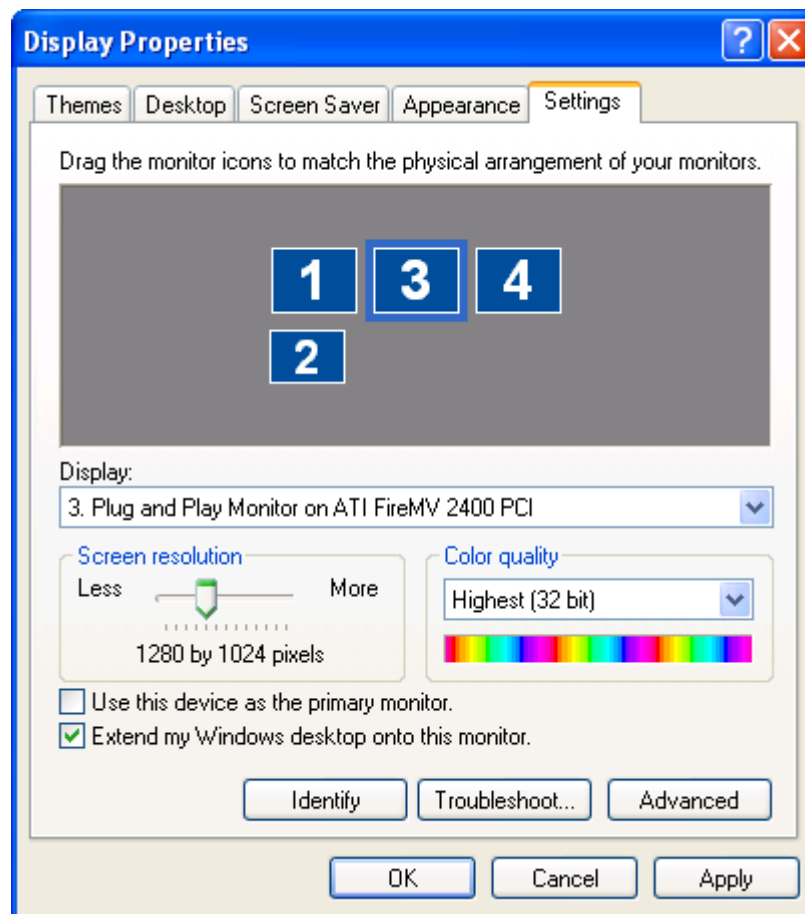
ATI Displays Tab

The ATI Displays tab provides settings to enable specific display (or multiple display) features.

ATI Displays

The ATI Displays tab provides control over multi-monitor features. Here you can enable/disable display devices and swap the assignment of Primary and Secondary displays.
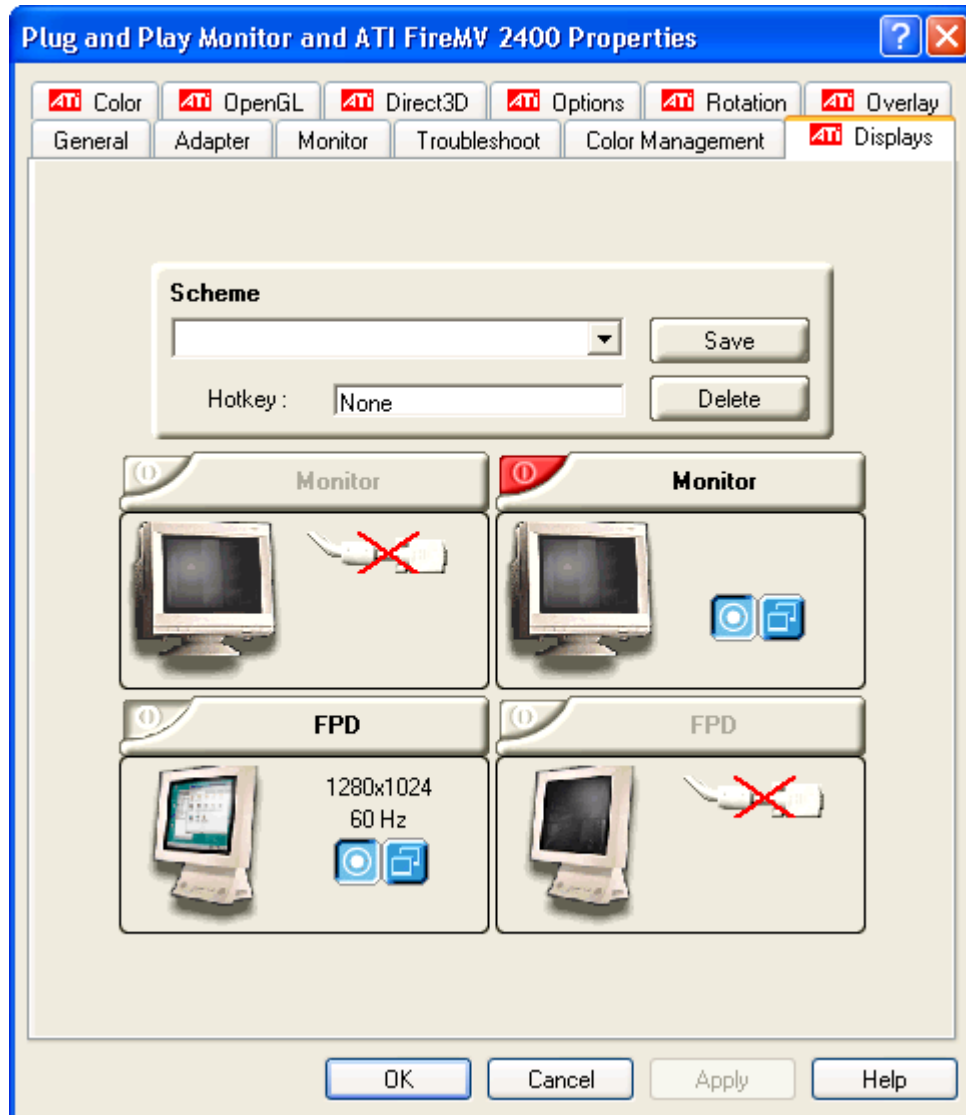
Table 6–1 ATI Displays Tab

Option	Description
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 buttons	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. Only the type of devices supported by your graphic card will be displayed as valid options. If the text on the button is greyed out, that device is not currently connected to your graphics card.
Primary/Clone buttons	The green buttons that appear beside the display images can be used to assign primary and secondary status (for extended desktops) or primary and clone status (for cloned desktops).
Save button	Saves display-device configuration schemes.
Enable/Disable buttons	If an enable/disable button is green, it indicates the device is enabled. If it is red, it indicates the device is connected to the system but disabled. If the button is greyed out, the device is not an option. If there is only one monitor connected, all buttons will be grey (you cannot disable the only display).
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.

Enabling or Disabling a Display

If an enable/disable button is green, it indicates the device is enabled. If it is red, it indicates the device is connected to the system but disabled. If the button is greyed out, the device is not an option. If there is only one monitor connected, all buttons will be grey (you cannot disable the only display).

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

Saving 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 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 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.

ATI Color Tab

The Color Tab provides access to fine color settings and preset color schemes.

ATI Color

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.
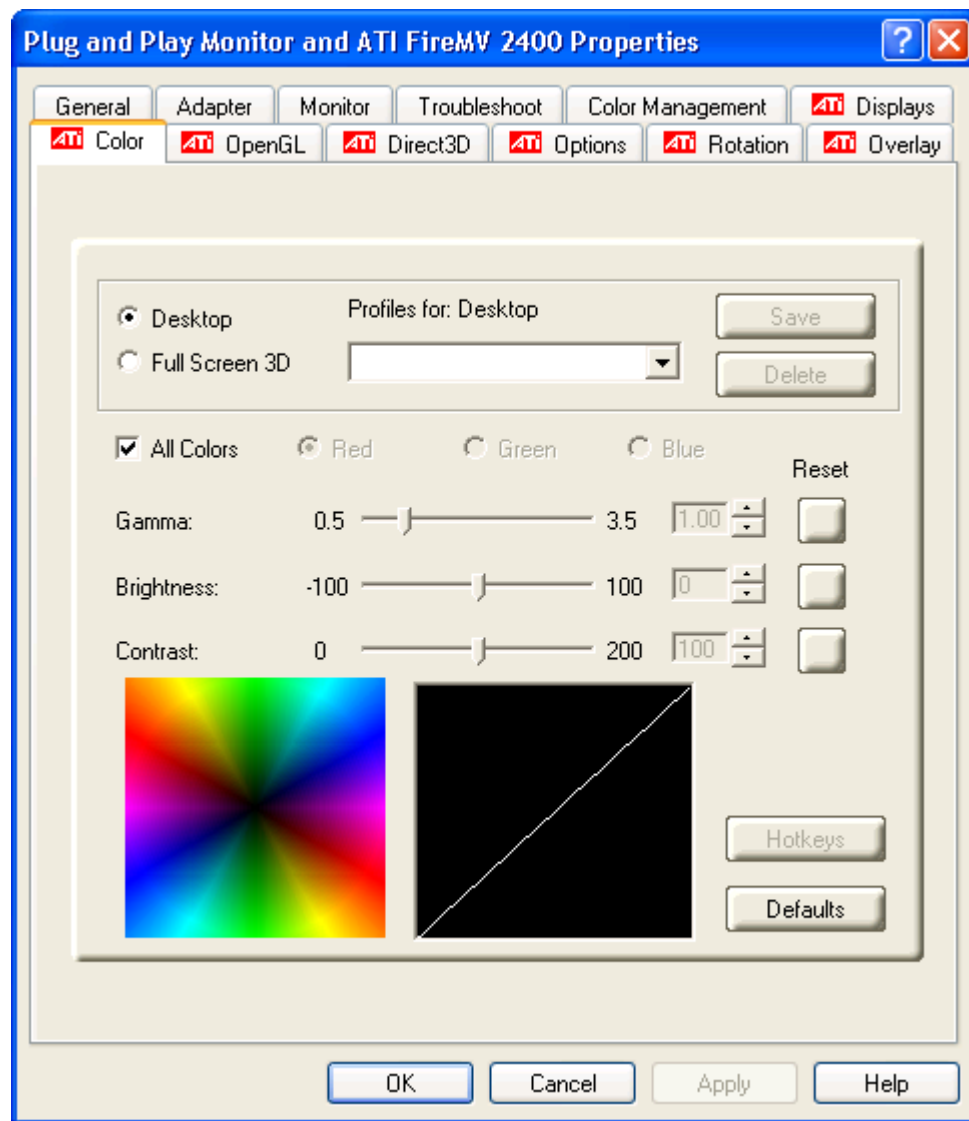
Table 6–2 ATI Color Tab

Option	Description
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.

Option	Description
Save button	Saves your current color settings to a Desktop or Full Screen 3D profile, using the name you specified in the Profiles 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 check box	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 default color settings.
Color Curve box	Graphically depicts changes to the color settings.

Creating 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** check box.
3. Type a profile name in the Profiles list box.
4. Click **Save**.

Applying 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**.

Applying 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**.

Hotkeys

Color 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.
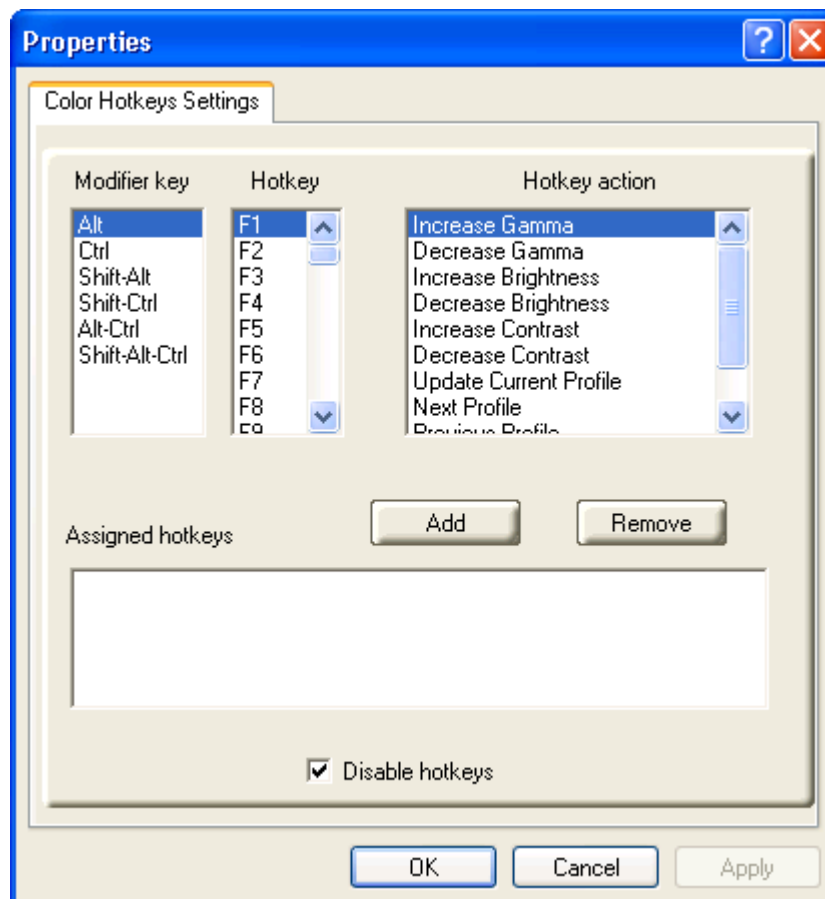
Note: If you do not plan to use hotkeys, select the **Disable hotkeys** check box so as to not accidentally activate them.

Accessing the Color Hotkeys Settings Dialog

For the steps used to assign hot keys, refer to Assigning Color Hotkeys on page 26.

The easiest way to apply your own color settings from within a full screen 3D application is to:

1. Create a Full Screen 3D profile and save it.
2. Assign hotkeys for the "Load Current Profile" action through the Color Hotkeys Settings dialog.
3. Make sure that the profile you prefer is selected from the drop-down list box, and click **OK**.
4. 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.

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

Assigning Color Hotkeys

When assigning hotkeys, be careful that the key combinations you choose do not conflict with those of other applications in which you might want to use them. The Color Hotkeys Settings dialog only checks for duplications within the Color tab itself, insofar as it allows a hotkey combination to be assigned only once.

> **Note:** If you do not plan to use hotkeys, select the **Disable hotkeys** check box so as to not accidentally activate them.

1. In the Color Hotkeys Settings dialog, select a modifier key from the **Modifier Key** list.
2. Select a hotkey from the **Hotkey** list.
3. Select the action you want from the **Hotkey Action** list.
4. Click **Add** to create the hotkey combination.
   > **Note:** Only one hotkey combination can be assigned to each action; if you assign a new combination for an action, it will overwrite an existing one.

   *This combination will appear in the **Assigned Hotkeys** text box.*

Removing Color Hotkey Assignments

1. In the Color Hotkeys Settings dialog, select a hotkey combination from the **Assigned Hotkey** text box.

2. Click **Remove**.

> **Note:** Only one hotkey combination can be assigned to each action; if you assign a new combination for an action, it will overwrite an existing one automatically.

ATI OpenGL Tab

The OpenGL tab provides access to OpenGL® settings.

ATI OpenGL

The ATI OpenGL tab allows you to configure 3D OpenGL settings, including anti-aliasing and anisotropic filtering.
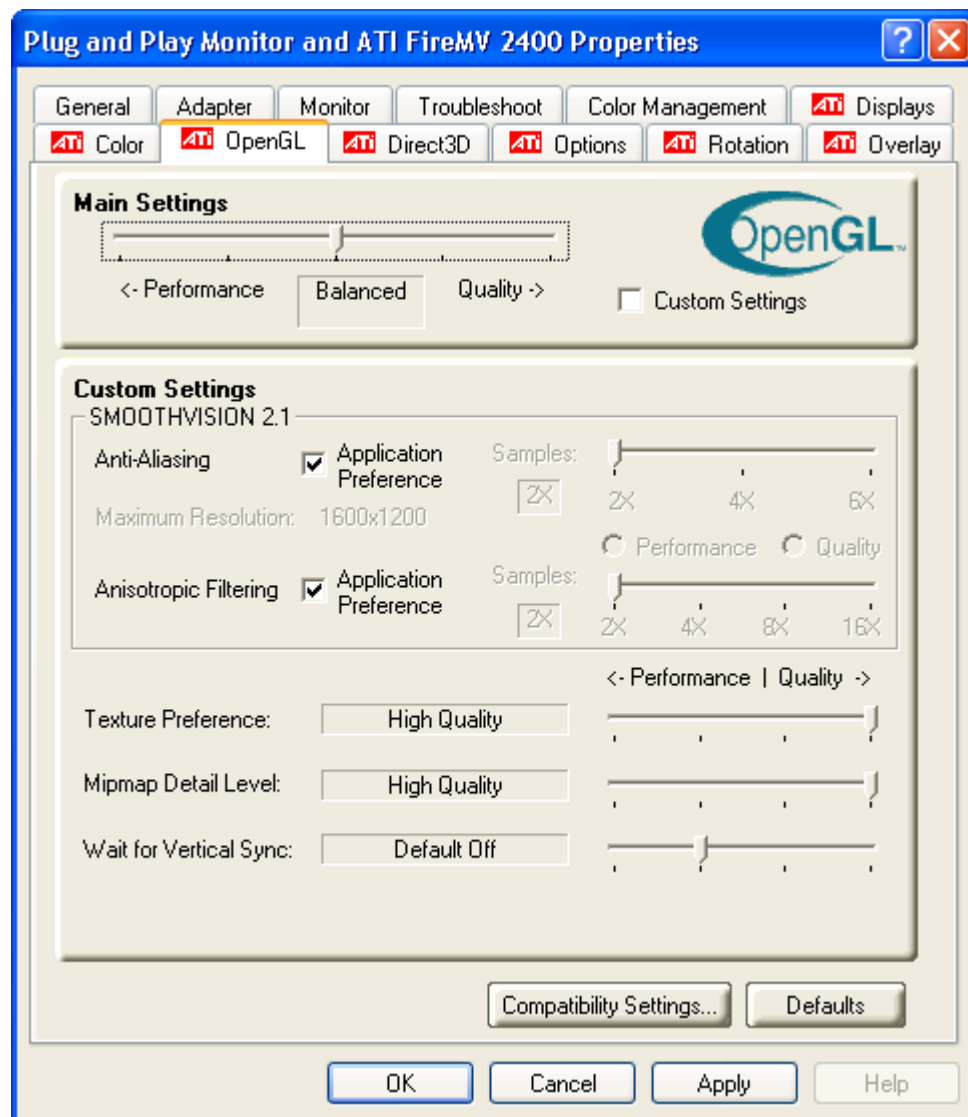
Table 6–3 ATI OpenGL Tab

Option	Description
Performance/Quality slider	Controls the overall performance/image quality of your graphic application. Moving the slider to the left will maximize application performance, while moving the slider to the right will maximize image quality.
Custom Settings check box	When **Custom Settings** is selected, the Performance/Quality slider is disabled and custom settings are enabled. Using custom settings is recommended for advanced users only.
SmoothVision™ Anti-aliasing	SmoothVision (Anti-aliasing) improves image quality by removing jagged edges from 3D images, resulting in smoother, more natural-looking objects. Anti-aliasing can be applied using different sample patterns and sample points, such as 2× or 4×. Moving this slider to the right increases sampling to provide the most realistic 3D image.
	Select the **Application Preference** check box to allow 3D applications to choose the level of anti-aliasing.
	Clear the **Application Preference** check box to customize the anti-aliasing level.
SmoothVision Anisotropic Filtering	Anisotropic filtering uses a texture filtering technique that blends multiple texture samples together. The number of samples taken when anisotropic filtering is performed can vary. By moving this slider to the right, as the number of samples taken increases, the quality of the final image increases significantly. 16× provides extremely detailed, crisp-looking images as a result of the largest number of texture samples possible. Selecting the **Application Preference** check box will result in high-quality images, with a negligible reduction in the application's performance.
	Select the **Application Preference** check box to allow 3D applications to choose the level of anisotropic filtering.
	Clear the **Application Preference** check box to customize the anisotropic filtering level.
Texture Preference slider	Choose between quality and performance textures for your applications. Moving the slider to the right delivers the highest quality experience. Moving the slider to the left emphasizes a high-performance solution while still providing good visuals.

Option	Description
Mipmap Detail Level slider	Choose the texture quality of the mipmaps the application will use. Moving the slider to the right selects a higher quality base mipmap, delivering the highest quality application experience. Moving the slider to the left selects a lower quality mipmap, delivering the highest application performance.
Wait for Vertical Sync slider	Controls whether the vertical sync is always on, always off, or controlled by the application.
Compatibility Settings button	Opens the OpenGL Compatability Settings dialog, where users can adjust the Z-buffer depth and triple buffering options. Use the **Force Z-buffer depth** radio buttons to select a Z-buffer depth of 24 or 16 bits, or disable this option. Use the **Triple Buffering** radio buttons to enable or disable this option. Click the **Defaults** button to return to the default settings.
Defaults button	Click the **Defaults** button to return to the default settings.

ATI Direct3D Tab

The Direct3D tab provides access to Direct 3D® settings.

ATI Direct3D

The ATI Direct3D tab allows you to configure Direct 3D settings, including anti-aliasing and anisotropic filtering.
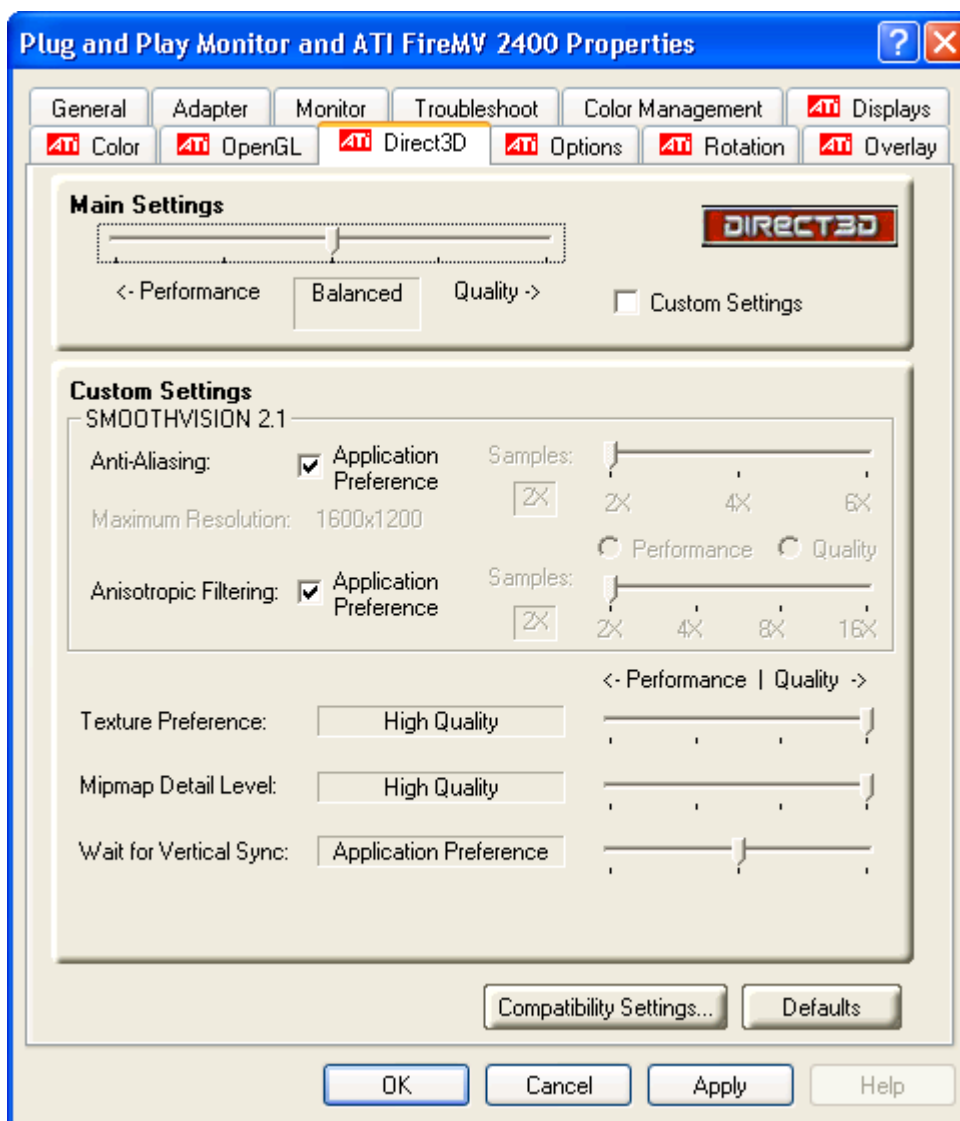
Table 6–4 ATI Direct3D Tab

Option	Description
Performance/Quality slider	Controls the overall performance/image quality of your graphic application. Moving the slider to the left will maximize application performance, while moving the slider to the right will maximize image quality.
Custom Settings check box	When **Custom Settings** is selected, the Performance/Quality slider is disabled and custom settings are enabled. Using custom settings is recommended for advanced users only.
SmoothVision Anti-aliasing	SmoothVision (Anti-aliasing) improves image quality by removing jagged edges from 3D images, resulting in smoother, more natural-looking objects. Anti-aliasing can be applied using different sample patterns and sample points, such as 2X or 4X. Moving this slider to the right increases sampling to provide the most realistic 3D image. Select the **Application Preference** check box to allow 3D applications to choose the level of anti-aliasing. Deselect the **Application Preference** check box to customize the anti-aliasing.
SmoothVision Anisotropic Filtering	Anisotropic filtering uses a texture filtering technique that blends multiple texture samples together. The number of samples taken when anisotropic filtering is performed can vary. By moving this slider to the right, as the number of samples taken increases, the quality of the final image increases significantly. $16\times$ provides extremely detailed, crisp-looking images as a result of the largest number of texture samples possible. Selecting the **Application Preference** check box will result in high-quality images, with a negligible reduction in the application's performance. Select the **Application Preference** check box to allow 3D applications to choose the level of anisotropic filtering. Clear the **Application Preference** check box to customize the anisotropic filtering level.
Texture Preference slider	Choose between quality and performance textures for your applications. Moving the slider to the right delivers the highest quality experience. Moving the slider to the left emphasizes a high-performance solution while still providing good visuals.

Option	Description
Mipmap Detail Level slider	Choose the texture quality of the mipmaps the application will use. Moving the slider to the right selects a higher quality base mipmap, delivering the highest quality application experience. Moving the slider to the left selects a lower quality mipmap, delivering the highest application performance.
Wait for Vertical Sync slider	Controls whether the vertical sync is always on, always off, or controlled by the application.
Compatibility Settings button	Opens the Direct3D Compatability Settings dialog, where users can adjust the DXT texture and alternate pixel options.
	Use the **Support DXT texture formats** radio buttons to enable or disable this option. There are some applications that can only support a limited number of texture formats. By selecting **Disabled**, the driver will not support DXT texture formats, thus reducing the number of texture formats supported.
	Use the **Alternate pixel center** radio buttons to enable or disable this option. This may eliminate problems with some Direct 3D games that display vertical and horizontal lines around textures, or text that appears incorrect. However, this setting should only be used if you are experiencing the symptoms mentioned, as it may cause problems with other games.
	Click the **Defaults** button to return to the default compatibility settings.
Defaults button	Click the **Defaults** button to return to the default settings.

ATI Options Tab

The Options tab provides basic information about the graphics card and software driver and provides a number of additional options.

ATI Options

The ATI Options tab provides detailed driver information and access to your graphics card's version information and specifications.
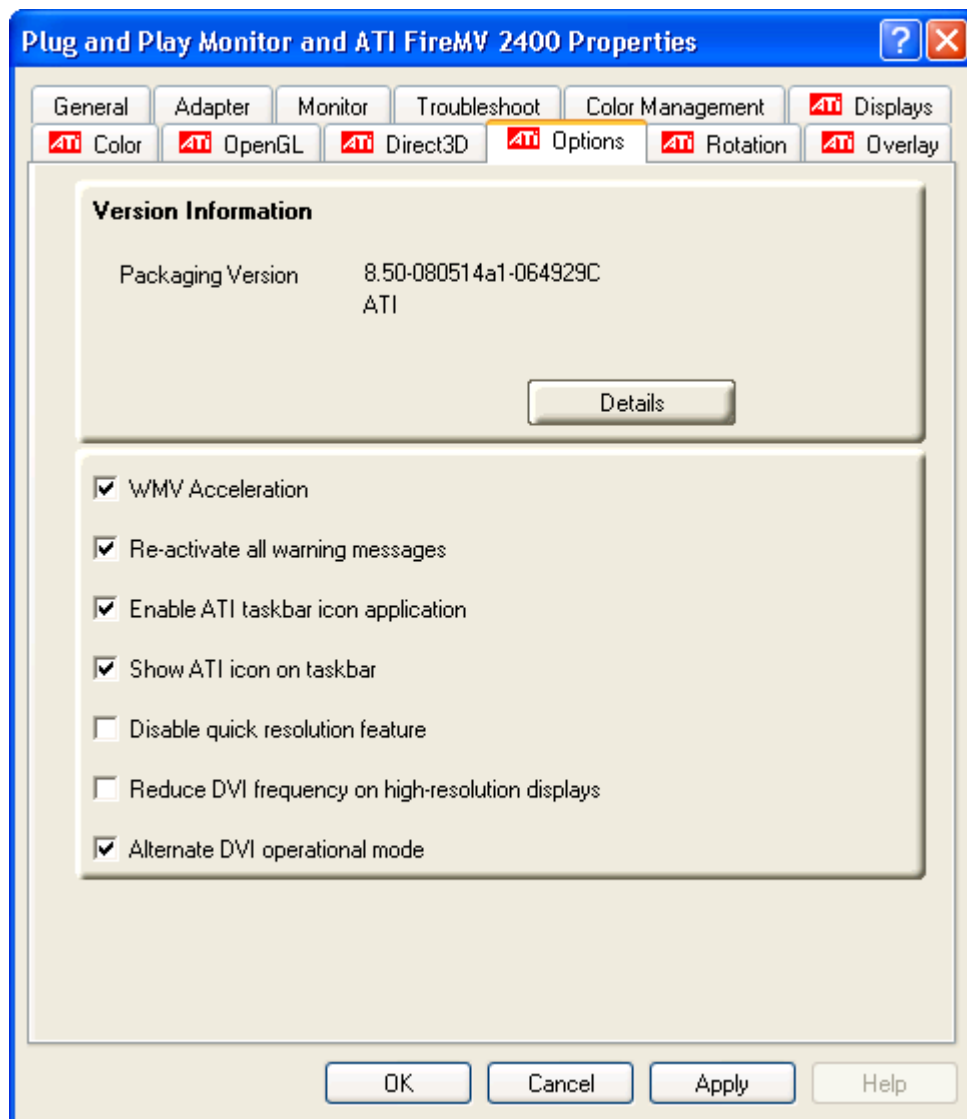
Table 6–5 ATI Options Tab

Option	Description
Details button	Opens a dialog that shows more detailed hardware and software version information.
WMV Acceleration	When enabled, improves the performance of .WMV format video files.
Re-activate all warning messages	Reactivates any disabled graphics warning messages.
Enable ATI taskbar icon application	Enables/disables the ATI taskbar applications and removes the ATI icon from your system tray.

Option	Description
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 displays	Resolves display corruption or no image at high resolutions (for example 1280×1024 @ 75 Hz) 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 Rotation Tab

The Rotation tab provides access to screen rotation settings.

ATI Rotation

Use the ATI Rotation tab to rotate the image on your display up to 180 degrees. This feature is useful when using a flat panel display that can be physically rotated to different positions.
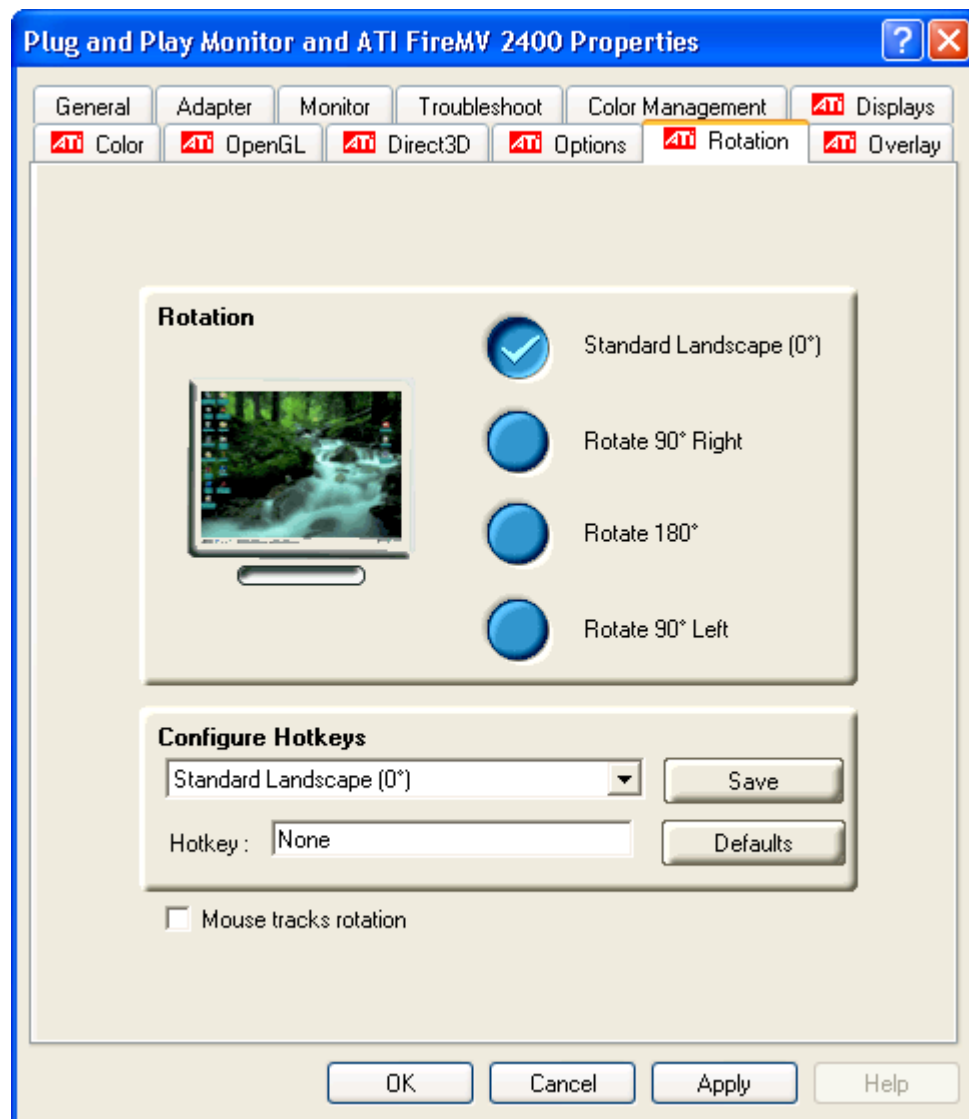
Table 6–6 ATI Rotation Tab

Option	Description
Rotation buttons	Rotates the display by the preset amount.
Configure Hotkeys	Choose a rotation action from the drop-down list, and associate it with a hotkey in the **Hotkey** field. Click **Save** to save your hotkey configuration or **Defaults** to return to the default settings.
Mouse tracks rotation check box	Select **Mouse tracks rotation** to rotate the mouse pointer to match the display image settings. Clear this check box to move the mouse pointer move relative to the Standard Landscape view regardless of display rotation.

Rotating a Display

If you have more than one display connected, make sure you have selected the display you wish to rotate in the **Settings** tab of the Windows Display Properties dialog before performing this procedure.

1. In the Rotation tab, select one of the four rotation settings by clicking the appropriate button.
2. Optionally, select the **Mouse tracks rotation** check box to have the mouse pointer match the display image.
3. Click **OK** or **Apply**.

Hotkeys

Rotation Hotkeys

Hotkeys can be assigned to quickly rotate the image on your display without having to access the Windows Display Properties dialog.

Assigning Rotation Hotkeys

When assigning hotkeys, be careful that the key combinations you choose do not conflict with those of other applications in which you might want to use them. The ATI Rotation tab only checks for duplications within the Rotation tab itself, insofar as it allows a hotkey combination to be assigned only once.

1. Select the required rotation setting from the **Configure HotKeys** drop-down list.
2. Click on the **Hotkey** field and press the appropriate key combination on your keyboard.
3. Click **Save** to save the hotkey combination.

   Note: Only one hotkey combination can be assigned to each action; if you assign a new combination for an action, it will overwrite an existing one.

ATI Overlay Tab

The Overlay tab provides access to video overlay settings such as brightness and contrast.

ATI Overlay

Video overlay allows for the viewing of streaming video on your PC. However, there is only one video overlay, which is only available on the Primary display. The video overlay controls are automatically activated during playback of any video file type that supports overlay adjustments.

Move the sliders to the right to increase the values of the various options, and to the left to decrease them.
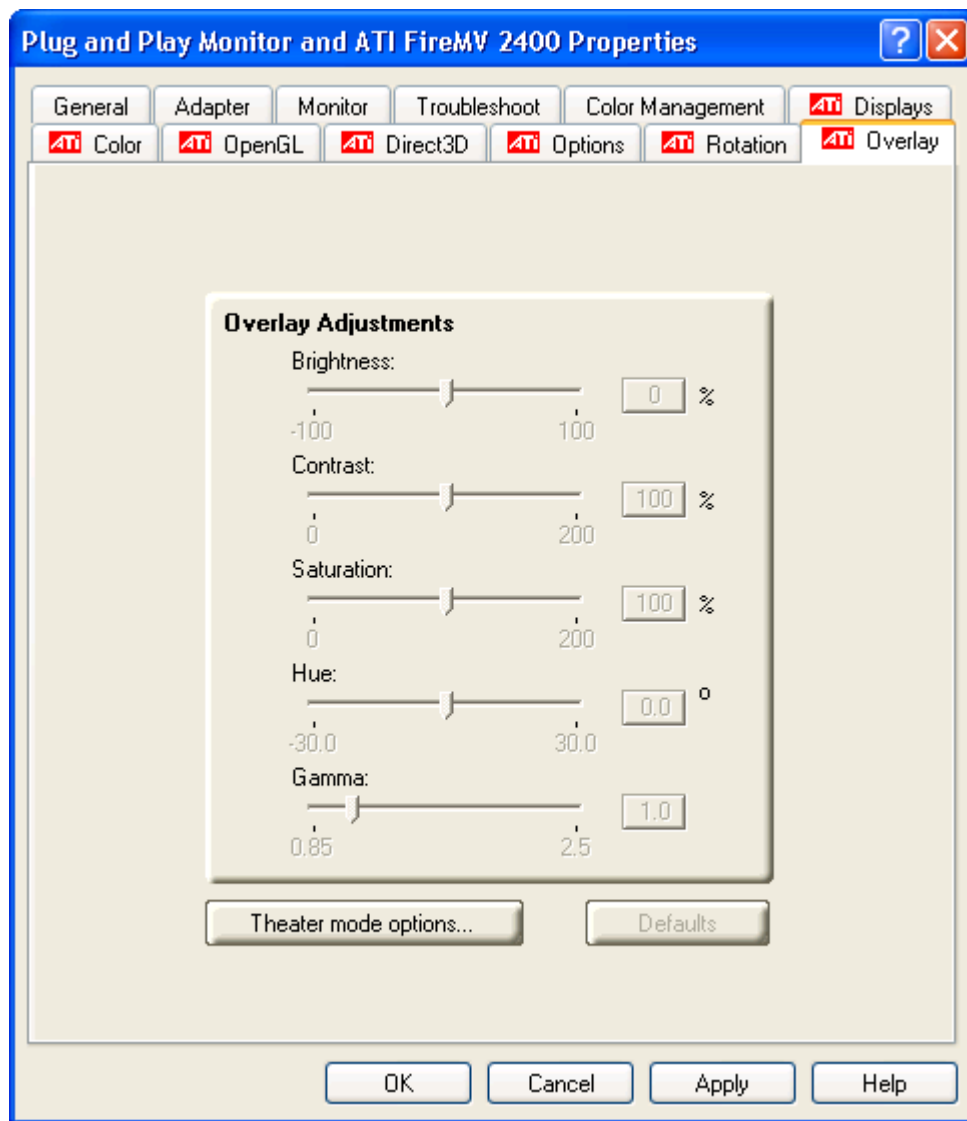
Table 6–7 ATI Overlay Tab

Option	Description
Brightness slider	Adjusts the brightness of the video image.
Contrast slider	Adjusts the contrast in the video image.
Saturation slider	Adjusts the vividness of the color in the video image. Sliding it all the way to the left removes all color and produces a black and white picture.
Hue slider	Adjusts the pureness or tint of the red, green, and blue components of the color in the video image.
Gamma slider	Adjusts the overall intensity of the video image.
Theatre Mode options button	Accesses Theater Mode overlay settings. These overlay settings are only available in dual-controller Clone mode, and not in single-display or extended desktop configurations.
Defaults button	Resets overlay settings to default values.

Theater Mode Settings

Theater Mode options are available under the following conditions only:

- Your ATI graphics accelerator has dual controllers to support Primary and Secondary (Clone) displays.
- Your ATI video adapter has dual display functionality by providing a standard VGA connector and a digital flat panel connector such as the DVI-I connector or to a TV using the TV Out connector.

In either of these cases, you can access Theater Mode options if more than one display is connected.

Note: These settings apply to video content viewed when you are in dual-controller Clone mode, and not single-display or extended desktop configurations.

Table 6–8 ATI Overlay Theater Mode Options

Option	Description
Standard	Video content is displayed on your Primary display only.
Theater Mode	Video content is displayed on your Primary and Secondary displays. Video content displayed on your Secondary display(s) is always in full screen mode. Note: your computer must be set for 16-bit color depth or higher to use this mode.
Same on all	Video content is displayed on your Primary and Secondary display in exactly the same manner. For example, all displays will show video output in full screen mode.
Theater Mode Settings	These settings are only available when Theater Mode is selected.
Set aspect ratio to	**Same as source video**: The aspect ratio of the source video is maintained for full screen display. Note: this option may result in black bars on either the horizontal or vertical sides of the video display. **Full Screen Video**: The source video is scaled so that your display is showing full screen. Note: if the source video contains horizontal black bars, as some DVD movies do, the full screen video will also contain black bars.
Display device aspect ratio	**4:3 (Standard TV)**: Select this option if the aspect ratio of the display device showing full screen video has the standard 4:3 aspect ratio (standard TVs and monitors). **16:9 (Widescreen)**: Select this option if the aspect ratio of the display device is showing full screen video has a 16:9 aspect ratio (widescreen TVs and displays).

Chapter 7

Reference

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

Workstation Card Troubleshooting

The following troubleshooting tips may help if you experience problems.

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

Computer does not boot up properly.

Verify that the installation instructions were properly followed. In particular, if external power is required, make sure that the external power cable (or cables) is properly connected.

Check that the card is properly installed in your system and connected to your monitor.

If you have problems during start-up, restart your computer in Safe Mode. While starting Windows XP, press and hold **F8** until you see the Advanced Options Menu. Use the arrow keys to select **Safe Mode**, and press **Enter**.
Check the system configuration utility of your operating system for the interrupt assignments.

Contact ATI's Customer Care or your local technical support.

There is no display.

Make sure the card is seated properly in its slot. If external power is required, make sure that the external power cable (or cables) is properly connected to the card.

Make sure that the monitor cable is securely fastened to the card.

Make sure that the monitor and computer are plugged in and receiving power.

If necessary, disable any built-in graphics capabilities on your motherboard. 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.

Make sure that you selected the appropriate monitor when you installed your enhanced driver.

Make sure that the display resolution and refresh rate settings you have selected are supported by the monitor you have connected.

There are screen defects.

Make sure your monitor supports the resolution and horizontal (kHz) and vertical (Hz) refresh rates as required by the graphics card. Check your current resolution, refresh rate, and color depth settings in the Settings and Monitor tabs in your Display Properties dialog.

Caution:
Ensure that both the graphics card and monitor support the 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.

The screen image is off-center or there are odd colors.

Try adjusting the brightness, sharpness, contrast, and color balance controls of your monitor.

Try adjusting the centering and positioning controls of your monitor to position the picture on the screen.

Set the monitor's RGB inputs (and sync switches, if this option is available) to 75 Ohms, with the sync set to external.

DFP monitor users: Make sure that the DVI plug of your monitor data cable is digital-only (DVI-D), 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.

The operating system warns that the graphics 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.

Check the driver installation and make sure that all software is correctly loaded corresponding to your operating system and applications.

Reinstall the drivers for your graphics card.

Stereo glasses are not working properly.

Make sure your stereo glasses are connected to the graphics card when you start your computer.

Make sure you select a refresh rate of 120 Hz.

Enable the **Quad Buffer Stereo** option.

There are bus address or interrupt conflicts.

Make sure that the I/O and memory addresses reserved for the graphics board are not used by other hardware devices. The integrated on-board VGA controller of your ATI FireMV/ATI FirePro card uses the following addresses (hex):

- **I/O Address:** Standard VGA I/O: 3B0-3DF
- **Memory Addresses:** Video RAM: A000-BFFF, Video ROM: C000-C7FF

You cannot change the addresses of your ATI FireMV/ATI FirePro card. In case of an address conflict, try to modify the I/O address of the add-on card that causes the conflict.

To support the special graphics processor on the ATI FireMV/ATI FirePro 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.

Workstation Customer Care

If you experience difficulties with your ATI FireMV/ATI FirePro product, you can contact AMD Customer Care in the following ways.

Web

The AMD Customer Care Web site has number of helpful resources, including a knowledgebase of FAQs and the ATI FireGL™/ATI FireMV™/ATI FirePro™ Web Ticket Submission Page.

The Web site is complimentary and available at all times. The address is support.ati.com.

E-mail

Customer Care is available by e-mail at tech.support@amd.com. E-mails must have "workstation-support" in the subject line. This service is complimentary for registered users.

Telephone

Country	Telephone Number	Language/Times	Notes
US/Canada East Coast	1-866-284-2093	English: 9:00AM - 5:30PM EST (Mon-Thu) 9:00AM - 3:00PM EST (Fri)	Complimentary for registered users. Toll-free.
US/Canada West Coast	408-749-2005	English: 2:30PM - 5:00PM PST (Mon-Thu) 12:00PM - 4:00PM PST (Fri)	Extended hours for West Coast customers; East Coast toll-free number also available. Complimentary for registered users. International and local toll charges to California will apply.
United Kingdom	+44 (0)1276-803299	English: 10:30 - 17:00 CET (Mon-Fri)	Complimentary for registered users. International and local toll charges to the U.K. will apply.
France	0800-908-621	French/English: 10:30 - 17:00 CET (Mon-Fri)	Complimentary for registered users. Toll-free.
Italy	800-877-224	Italian/English: 10:30 - 17:00 CET (Mon-Fri)	Complimentary for registered users. Toll-free.
Germany	+49 (0)89-4505-3199	German/English: 10:30 - 17:00 CET (Mon-Fri)	Complimentary for registered users. International and local toll charges to Germany will apply.

Country	Telephone Number	Language/Times	Notes
Argentina	+0800-333-5277	Portuguese/Spanish: 7:00AM - 3:30PM EST (Mon-Fri) English: 7:00AM - 7:00PM (Mon-Fri)	Complimentary for registered users. Toll-free.
Brazil	+0800-891-9068	Portuguese/Spanish: 7:00AM - 3:30PM EST (Mon-Fri) English: 7:00AM - 7:00PM (Mon-Fri)	Complimentary for registered users. Toll-free.
Mexico	+001800-514-3276	Portuguese/Spanish: 7:00AM - 3:30PM EST (Mon-Fri) English: 7:00AM - 7:00PM (Mon-Fri)	Complimentary for registered users. Toll-free.
Other Latin American Countries	+1-905-882-3277	Portuguese/Spanish: 7:00AM - 3:30PM EST (Mon-Fri) English: 7:00AM - 7:00PM (Mon-Fri)	Complimentary for registered users. International and local toll charges to Canada will apply.

Note: Customer Care telephone support lines are closed for regional statutory holidays.

Surface Mail

Advanced Micro Devices Inc.
Attention: Customer Care
1 Commerce Valley Drive East
Markham, Ontario
L3T 7V9 CANADA

This service is complimentary.

Disclaimer

AMD 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 AMD for warranty service.

AMD 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.

AMD 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.

AMD Customer Care reserves the right to limit support options for products that are not registered or are at End of Life.

Workstation Warranty Service

For warranty service instructions visit amd.ati.com or contact one of our Customer Service Representatives.

Shipping

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.

AMD will not be held liable for damage or loss to the product in shipment.

Standard warranty service consists of repair upon receipt.

AMD 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 AMD. AMD pays 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, AMD 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 amd.ati.com 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 AMD in respect of any defective product will be limited to the repair or replacement of such product. AMD may use new or equivalent-to-new replacement parts. Defective product will be sent in for repair or replacement only. AMD 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 AMD 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 AMD; 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 AMD; 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 AMD board level product will void the warranty offered by AMD Technologies. AMD reserves the right to refuse to service any product which has been altered, modified, or repaired by non-AMD service personnel.

Additional Accessories

Additional and replacement cables, installation CDs, manuals, and other accessories for ATI products can be purchased from the online ATI store at ati.amd.com/online/accessories.

International Compliance Information

This section details the worldwide compliance information for this product, which is manufactured to be compliant in the regions where it is sold.

> **Caution:**
>
> Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Compliance Information

This product complies with FCC Rules Part 15. Operation is subject to the following 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 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.

Complies with FCC 15.107, 15.109, 15.111, and 15.117.

For further compliance information:

Advanced Micro Devices, Inc.
62 Forest Street
Marlborough, MA 01752
USA Tel: 508-303-3900

Industry Canada Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003 and with BETS-7, Section 3.6.

Cet appareil numérique de la Classe B est conforme à la norme NMB-003 du Canada, et NTMR-7, Section 3.6.

CE Compliance Information

EMC Directive 2004/108/EC

CISPR 22:2006/EN 55022:2006—Class B: Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment.

CISPR 24:1997/EN 55024:1998—Information Technology Equipment—Immunity Characteristics—Limits and Methods of Measurements

Electrical Safety

Europe: The Low Voltage Directive—2006/95/EC

- EN 60950-1—Safety of Information Technology Equipment

USA/Canada:

- UL 60950-1 (Information Technology Equipment—Safety—Part 1: General Requirements)
- CSA C22.2 No. 60950-1 (Information Technology Equipment—Safety—Part 1: General Requirements)

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

Waste Electrical and Electronic Equipment (WEEE) Directive Compliance

This product was manufactured by Advanced Micro Devices, Inc.

VCCI Class B ITE Compliance Information

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"Class B" Equipment (Household purpose info/telecommunications equipment)

As this equipment has undergone EMC registration for household purpose, this product can be used in any area including residential area.

BSMI Certification Information

CNS 13438，C6357，B類 — 資訊科技設備

Appendix A

Glossary - Workstation Products

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 favor of PCI Express™ (PCIe).

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.

ATI Catalyst Control Center

ATI Catalyst Control Center (CCC) is a graphical user application providing access to the display features contained within the installed ATI hardware and software. CCC can be used to fine-tune various graphics settings, enable or disable connected display devices, change the orientation of a desktop, and much more.

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.

DisplayPort™

DisplayPort is a digital display standard that became a VESA-approved standard in May 2006. HDMI™ is aimed primarily at the consumer electronic market, but DisplayPort was designed with computer displays in mind. It is scalable and extensible in terms of pixel depth and resolution, designed to work as a comprehensive solution both for PCs and notebooks, which currently use different signaling standards (DVI and LVDS). DisplayPort is designed as a long-term comprehensive replacement for VGA, providing a cost-effective, scalable, industry standard which will consolidate external (box-to-box) and internal (LCD panel) display connections.

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.

HDMI

HDMI is an acronym for "High Definition Multimedia Interface." It is a 19-pin connector used for transferring combined digital audio and video. HDMI supports standard, enhanced, and high-definition digital video signals, and is

designed for use with VCRs, DVD players, personal computers, and set-top boxes. A DVI adapter can be used to transfer the video signal to an HDMI-capable display, although audio must be transferred from a different route, as DVI output does not support audio.

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. 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.