



Radeon[®] X1950 Pro

CrossFire[™]

Getting Started Guide

P/N 137-41210-10

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Apparatus Claims of U.S. Patent Nos. 4,631,603; 4,819,098; 4,907,093; 5,315,448; and 6,516,132.
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Documentation Updates

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



IMPORTANT SAFETY INSTRUCTIONS

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

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

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CHAPTER 1:

Getting Started

Congratulations on the purchase of your Radeon® X1950 Pro card. The CrossFire™ Getting Started Guide will help you to successfully install your new graphics card and associated software, and enable CrossFire™.

System Requirements

Hardware	<ul style="list-style-type: none"> • Intel® Pentium® 4 or AMD Athlon®. • 512MB of system memory; 1GB or more for best performance. • Optical drive for installation software (CD-ROM or DVD-ROM drive). • Specialized PCI Express® 450 watt or greater power supply recommended. Consult your computer system manual to ensure the power supply is designed to accommodate a high-end graphics card with a peak dissipation above 75 watts.
Operating System	<ul style="list-style-type: none"> • Windows® XP with Service Pack 2 (SP2). • Windows® XP Professional x64 Edition. • Windows® 2000. • Windows® Vista Ready.
Monitor	<ul style="list-style-type: none"> • High-resolution MultiSync or multi-frequency monitors or any other type of VGA monitor. • Digital flat-panel (DFP) displays or digital CRT display.
CrossFire™ Compatibility	<p>If you are planning on using this graphics card as part of a CrossFire™ system, the following is required:</p> <ul style="list-style-type: none"> • A CrossFire™ certified motherboard with two (2) PCI Express® X16 slots and correct PCIe™ chipset driver. (See ati.com/crossfire for a list of CrossFire™ certified motherboards.) • A second Radeon® X1950 Pro graphics card • Two CrossFire™ Bridge Interconnects. <p>More information on the requirements for each of these components can be found within the CrossFire™ FAQ.</p>

External Connections

- DVI-I output.
- 15-pin VGA.
- S-Video.

Uninstall Previous Graphics Card Drivers

To ensure the successful installation of your new Radeon® X1950 Pro card, you must uninstall the drivers for the existing graphics card before removing it from your computer.

To uninstall previous drivers

With your current graphics card still in your computer:

- 1 Close all applications that are currently running.
- 2 Navigate to the **Control Panel** and select **Add/Remove Programs**.
- 3 Select your current graphics card drivers and select **Add/Remove**. The wizard will help you remove your current display drivers.

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

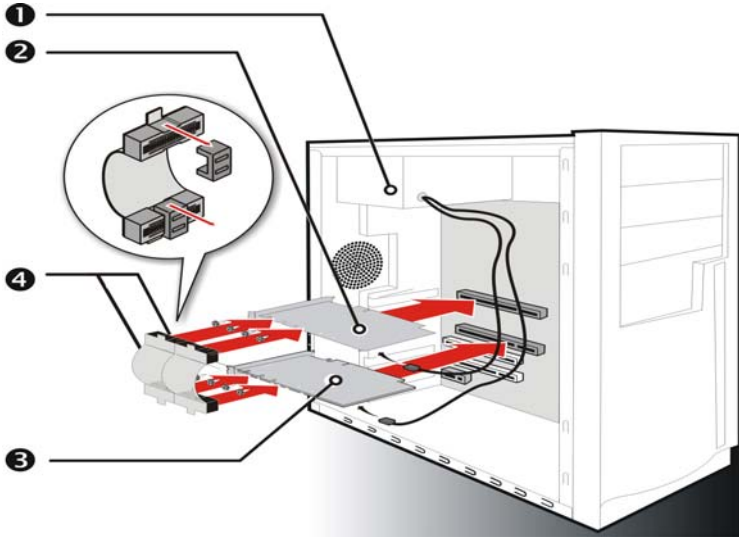
- 4 Turn off your system and remove the old graphics card.

CHAPTER 2:

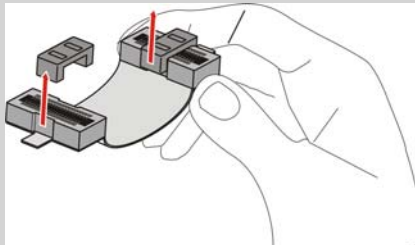
Installing CrossFire™ Graphics Cards

The following set of instructions assumes that one Radeon® X1950 Pro graphics card has already been successfully installed in the primary slot (slot zero), and that the secondary slot (slot one) is empty. If you have not already done so, see the Getting Started Guide that came with the graphics card for installation instructions.

- ⓘ Consult your system builder or OEM to ensure that your system has an adequate power supply. A 450 watt or greater power supply is recommended. PCI Express® compatible system comes with a specialized 12V graphics card power connector.



-
- 1 450 Watt (or greater) Power Supply
-
- 2 Radeon® X1950 Pro Graphics Card
-
- 3 Radeon® X1950 Pro Graphics Card
-
- 4 2 CrossFire™ -Bridge Interconnects
-



WARNING: Always handle the CrossFire™ Bridge Interconnects by the connector only. Do not push or pull on the flexible circuit cable.

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

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

- 3 Remove the computer cover.

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

ⓘ **WARNING** - Discharge your body's static electricity by touching the power supply or the metal surface of the computer chassis. Otherwise, you may damage your system.

- 4 Unscrew or unfasten and remove any non-CrossFire™ supported graphics card from your computer.
- 5 Locate the PCI Express® slots on the motherboard. If necessary, remove the metal backplate cover from the case housing.
- 6 Align your Radeon® X1950 Pro graphics card in the secondary PCIe slot next to the primary Radeon® X1950 Pro graphics card and press firmly until the card is fully seated.

Installing the CrossFire™ Bridge Interconnects

ⓘ **WARNING** - Always handle the CrossFire™ Bridge Interconnects by the connector only. Do not push or pull on the flexible circuit cable.

- 1 Remove protection tags from the connectors at each end of the CrossFire™ Bridge Interconnect.

- 2 Press one end of the CrossFire™ Bridge Interconnect onto one of the connections on one of the graphics cards.
- 3 Press the opposite end of the CrossFire™ bridge interconnect onto corresponding connection of the second graphics card.

Repeat the above steps to connect the second CrossFire™ Bridge Interconnect to the graphics cards.

- 4 Screw in or fasten the graphics card securely. Make sure the cables are not interfering with anything inside the computer (for example, a cooling fan) and replace the computer cover.
- 5 Replace the computer cover.
- 6 Reconnect any cables you have disconnected and plug in the computer's power cord.
- 7 Connect the monitor to the Radeon® X1950 Pro graphics card in the primary PCIe slot. Turn on the monitor, and then your computer.

Display Configurations

Display support is only available through one display device when CrossFire™ is active. This arrangement ensures the highest possible performance. When CrossFire™ is active other display devices connected to the other DVI or VGA connections on both graphics cards are rendered inactive.

If additional displays are required when CrossFire™ is active, please use either SurroundView™ (for more information see the SurroundView™ manual) or an additional PCI graphics card.

CHAPTER 3:

Installing Software and Drivers

This chapter will guide you through the installation of the drivers and software associated with your Radeon® X1950 Pro graphics card.

Windows® New Hardware Found

Windows® may start the **Add New Hardware Wizard** to install the Standard VGA Driver. To correctly install your new hardware:

- **Cancel** the Wizard if you are using Windows® XP, and proceed to **Installing the Catalyst™ Software Suite**.
- If the **Add New Hardware Wizard** does not appear, proceed to **Installing the Catalyst™ Software Suite**.

Installing the Catalyst™ Software Suite

ATI's Catalyst™ Software Suite provides software required to enjoy all the features of your ATI graphics card. The Catalyst™ Software Suite has several distinct software elements, including:

- Driver
- Catalyst™ Control Center
- HydraVision™ (not included in the *Express* Install)
- Remote Wonder™ Software
- SurroundView™

To install the Catalyst™ software suite

Note: Optical drive refers to any drive capable of reading CD-ROM media.

- 1 Insert the ATI Installation CD-ROM into your optical drive.
If Windows® runs the CD-ROM automatically, proceed to step 5.
- 2 Click **Start > Run**.
- 3 Type the following: D:\ATISSETUP
(If D is not your optical drive, substitute the correct drive letter.)
- 4 Click **OK**.
- 5 Click **Install** under Software Install.
- 6 Click **Next** and click **Yes** to the license agreement.
- 7 Click **ATI Easy Install** to begin the Installation Wizard.

Not all software components are installed using the Express installation. Custom installation allows you to select individual software components for installation.

CHAPTER 4:

Enabling CrossFire™

To take full advantage of running dual graphics cards, you must enable CrossFire™ and configure it in the Catalyst™ Control Center. Launching Catalyst™ Control Center

Launch Catalyst™ Control Center from one of the following access points:

- Windows® Start Menu
- Windows® System Tray
- Desktop shortcuts
- Predefined hot keys

Launching Catalyst™ Control Center Using the Start Menu

From the Windows® task bar, click **Start**:

- Click to **Programs** > **Catalyst™ Control Center** > **ATI Catalyst™ Control Center**.

Other Quick Launch Access Points

Launching Catalyst™ Control Center Using the System Tray

- 1 Right-click the ATI icon in the Windows® System Tray.
- 2 Select Catalyst™ Control Center from the popup menu.

Launching Catalyst™ Control Center Using the Desktop Shortcut

When you first installed Catalyst™ Control Center the setup wizard provided you with the option of placing a shortcut on the desktop.

- Double-click the Catalyst™ Control Center desktop shortcut.

Launching Catalyst™ Control Center Using Hot Keys

- You can press the predefined combination of keys **Ctrl+Alt+C** to launch Catalyst™ Control Center, or you can define your own hot key sequence by using the Catalyst™ Control Center's Hotkey Manager.

Enable CrossFire™

- 1 From the Tree View pane, click **CrossFire™** in Advanced View.
- 2 Click **Enable CrossFire™**.

When CrossFire™ is successfully enabled all display devices, except the one used by CrossFire™, will be disabled.

Note: CrossFire™ Higher Quality anti-aliasing can be adjusted in the Catalyst™ Control Center 3D settings aspect.

CHAPTER 5:

Welcome to CrossFire™

ATI CrossFire™ is the ultimate multi-GPU performance gaming platform, using ATI CrossFire™ ready motherboards and ATI graphics cards.

CrossFire™ Overview

This section provides an overview of the main features and configurations for CrossFire™. These topics will be covered in more detail in other chapters of this manual.

Allowable Radeon® X1950 Pro CrossFire™ System Components

The basic requirements of a Radeon® X1950 Pro CrossFire™ system are:

- Two Radeon® X1950 Pro CrossFire™ graphics cards.
- A CrossFire™ Ready motherboard.

For an up-to-date listing of CrossFire™ certified motherboards see:

ati.com/crossfire.

CrossFire™ Rendering Modes

A CrossFire™ system has four possible display modes:

- SuperTiling
- Scissor Mode
- Alternate Frame Rendering
- Super Anti-aliasing.

The first three are performance-oriented modes, while Super Anti-aliasing is a quality-oriented mode. Each mode uses a different method for dividing the workload required to render a 3D image across multiple GPUs. Only one mode can be in operation at any given time.

The ATI Catalyst™ display driver will automatically select the best of the three performance modes when a 3D application is started, without requiring user intervention. The user can also choose to improve image quality by selecting the new Super Anti-aliasing modes in the Catalyst™ Control Center.

For more information on CrossFire™ Rendering Modes and the Catalyst™ Control Center, see the Radeon® X1950 Pro User's Guide.

CHAPTER 6:

CrossFire™ FAQ

The following are frequently asked questions about CrossFire™.

For the latest information, please consult the CrossFire™ Web site at:

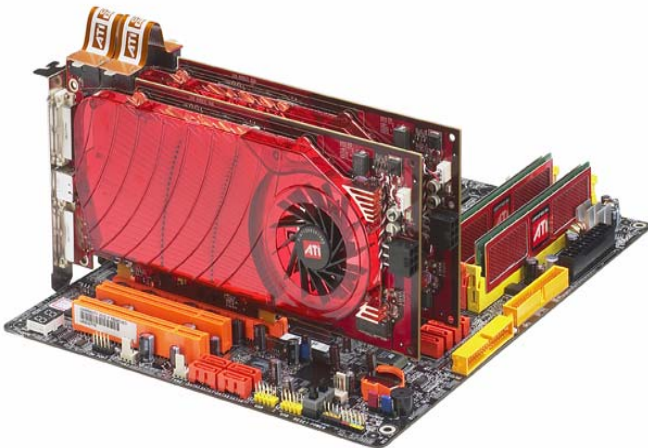
ati.com/crossfire

1 What combination of products are required to build a working CrossFire™ system based on the Radeon® X1950 Pro?

Two components are required:

- Two Radeon® X1950 Pro graphics cards.
- Two CrossFire™ Bridge Interconnects.
- A CrossFire™ Ready motherboard with two PCIe™ x16 slots.

More information on the requirements for each of these components can be found within this FAQ.



Radeon® X1950 Pro CrossFire™ using CrossFire™ Bridge Interconnect Cables

2 What motherboards support CrossFire™?

Motherboards from other manufactures will be certified as CrossFire™ Ready when they become available. For a comprehensive list of qualified motherboards, please consult the CrossFire™ Web site at:

ati.com/crossfire

3 Are there specific CMOS motherboard settings for CrossFire™?

On some motherboards, the CMOS may be set by default to support only a single PCI Express® x16 slot. Ensure that both PCIe™ x16 slots are enabled in the CMOS.

4 Are there any software settings required for a Radeon® X1950 Pro CrossFire™ to work?

When all of the hardware and software has been properly set up and installed, you can access the CrossFire™ aspect in Catalyst™ Control Center:

To access and enable CrossFire™ in Catalyst™ Control Center, do the following:

- In Advanced View, click **CrossFire™** and check the **Enable CrossFire™** box.

When CrossFire™ is successfully enabled, all display devices except the one used by CrossFire™ will be disabled. Multiple monitors/displays that are disabled when CrossFire™ is enabled reappear after CrossFire™ is disabled.

If you installed your Radeon® X1950 Pro cards in the primary and secondary PCIe™ slots and enabled CrossFire™, when you restart your computer CrossFire™ will automatically be enabled. Otherwise, you must again enable CrossFire™ upon restart.

Note: In order to enable CrossFire™, the two Radeon® X1950 Pro cards must be connected together using two CrossFire™ Bridge Interconnects.

5 How are the graphics cards connected on a CrossFire™ system?

Two Radeon® X1950 Pro cards are connected by two CrossFire™ Bridge Interconnects, connecting the custom DVO ports on each card together. To see where the DVO ports are located on the Radeon® X1950 Pro cards, see the picture of the Radeon® X1950 Pro CrossFire™ implementation.



CrossFire™ Bridge Interconnect Cable

6 Which games/applications work with CrossFire™?

CrossFire™ works with all 3D games and applications. If Catalyst™ A.I. is enabled in the Catalyst™ Control Center software, the optimal rendering mode available for the application is automatically selected.

7 Is a driver profile required to make CrossFire™ work?

No. CrossFire™ is enabled by default for all 3D games and applications.

8 What are the rendering modes, and what are their specific advantages?

The following dynamic rendering modes are available:

- **SuperTiling** - CrossFire™ renders alternate 32x32 pixel squares in a fine-grained checkerboard pattern. This configuration increases image-rendering quality, as each card processes half of the complex 3D objects in the pixel squares.
- **Scissor Mode** - each graphics card renders up to half of the display, either vertically or horizontally depending on the game or application.

- **Alternate Frame Rendering** - the two graphics cards are used to render alternate frames of the display. This configuration increases the detail of the 3D objects each card can render, as each card handles half of the total number of frames.

The features above are performance features settings automatically selected by ATI's Catalyst™ Control Center.

You can instead enable Super Anti-aliasing, which is a display quality mode selectable using Catalyst™ Control Center.

- **Super Anti-aliasing** - improves image quality by combining the results of full-screen anti-aliasing across two graphics cards in a CrossFire™ configuration. The two graphics cards work on different anti-aliasing patterns within each frame.

9 What happens if you pair two CrossFire™ graphics cards with different architectures?

In order for CrossFire™ to work, the Radeon® X1950 Pro graphics card must be paired with another Radeon® X1950 Pro graphics card.

10 On what basis are different rendering modes chosen?

When Catalyst™ A.I. is enabled in Catalyst™ Control Center, it determines the optimal rendering mode to use, based on the application or game being used. The default rendering mode is dependant on both the hardware configuration and the application being run; typically it will be either Scissor or SuperTiling mode. If Catalyst™ A.I. is not enabled, any Direct 3D® applications that are running on a system based on graphics cards with 16-pipeline graphics processors will use SuperTiling Mode.

11 What type of performance improvement is expected?

Performance enhancements experienced on a CrossFire™ system depend on the application or game being used. Performance improvements can be increased up to 100%, and the latest graphics-intensive programs will generally see over 80% performance improvement at high resolutions and image-quality modes.

12 How many independent displays can be connected to a CrossFire™ system?

While CrossFire™ is designed for optimal use on a single display, it is possible to drive multiple monitors using a CrossFire™ system when CrossFire™ is not enabled. On a standard CrossFire™ system, it is possible to drive four separate sets of monitors and still have one of those displays as a dedicated CrossFire™ display. If the motherboard contains an integrated video connection and SurroundView™ is enabled, more displays can be added.

Additional troubleshooting tips are covered in the Reference chapter.

CHAPTER 7:

Reference

This chapter provides information on troubleshooting, where to get additional accessories, and how to register your product, plus warranty and compliance information.

Troubleshooting

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

General Troubleshooting

Problem	Possible Solution
Computer Does Not Boot-Up Properly	<ul style="list-style-type: none">• Verify that the installation instructions were properly followed.• 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 Windows® 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.

General Troubleshooting

Problem	Possible Solution
No Display	<ul style="list-style-type: none"> • Check that the card is seated properly in its expansion slot. • Ensure that the monitor cable is securely fastened to the card. • Make sure that the monitor and computer are plugged in and receiving power. • Make sure that you selected the appropriate monitor when you installed your enhanced driver.
Screen Defects Appear	<ul style="list-style-type: none"> • Check if your monitor supports the resolution, 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. <p>Warning! Ensure that both video card and monitor support resolution and refresh rates you select. Incompatible resolution/refresh rate selection may result in monitor damage. Refer to your monitor's documentation for recommended resolutions and refresh rates.</p>
Off-Center Screen Image, Odd Colors or No Picture	<ul style="list-style-type: none"> • 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. • Digital Flat Panel (DFP) monitor users: refer to your monitor's documentation for the appropriate cable and connector to plug into the DVI-I connector on the graphics card.
Operating System Warns that Video Card Isn't Properly Configured	<ul style="list-style-type: none"> • Check the driver installation and make sure that all software is correctly loaded corresponding to your operating system and applications. • Remove and re-install the ATI drivers for your Radeon® X1950 Pro card.

CrossFire™-Specific Troubleshooting

Problem	Possible Solution
CrossFire™ is Not Functioning	<p>In order for CrossFire™ to function, the CrossFire™ Bridge Interconnects must correctly connect the CrossFire™ graphics cards.</p> <ol style="list-style-type: none"> 1. Connect one end of the CrossFire™ Bridge Interconnect to the internal VMO connection on one of the cards. 2. Connect the other end of the CrossFire™ Bridge Interconnect to the corresponding internal VMO connection of the other card. 3. Repeat Steps 1 and 2 to connect the second CrossFire™ Bridge Interconnect. 4. Connect the DVI-I connector to your monitor.
“Before CrossFire™ can be enabled, you need to close the 3D application or video playback that is currently running.”	<p>You cannot enable CrossFire™ in the Catalyst™ Control Center if a 3D application, game, or video playback, such as a DVD movie, is running.</p> <p>Close all open 3D applications, games, and movie player applications then enable CrossFire™.</p>
CrossFire™ Aspect in Catalyst™ Control Center is Not Displayed	<p>Ensure the CrossFire™ Bridge Interconnects have been correctly attached. The CrossFire™ aspect is only available when the two Radeon® X1950 Pro graphics cards have been correctly installed and connected together.</p>
“CrossFire™ Is Currently Unavailable.”	<p>This error occurred because CrossFire™ did not correctly detect your graphics hardware or there is a problem with the software.</p> <ul style="list-style-type: none"> • Check the graphics cards are installed correctly. • Check the interconnects are installed correctly. • Close all running 3D applications. • Re-install the Catalyst™ Control Center. <p>For information on installing the software see the Getting Started Guide that came with your graphics card.</p>

CrossFire™-Specific Troubleshooting

Problem	Possible Solution
Screen Rotation Function Does Not Work or is Unavailable	Screen rotation is not an available feature on CrossFire™ systems.
Video displays flicker during system startup	This is a normal as CrossFire™ starts up.
CrossFire™ starts in software mode	This is a normal when starting up for the first time after installing two Radeon® X1950 Pro graphics cards if neither card is installed in the primary PCI Express® slot. You can change the CrossFire™ mode in the Catalyst™ Control Center.

HDTV/HDTV Adapter Troubleshooting

Problem	Possible Solution
The colors on my TV display are incorrect	<ul style="list-style-type: none"> • Ensure that the connections between the Component Video Adapter and your HDTV are correct (Y=Green, Pb=Blue, Pr=Red).
There is no display on my TV	<ul style="list-style-type: none"> • Your TV will not display anything until Windows starts; this may take several minutes. • Set your TV to YPbPr input. • Ensure that the HDTV Component Video Adapter is properly connected, then restart your computer.
DVDs will not play in 720p or 1080i modes	<ul style="list-style-type: none"> • Copy-protected DVDs restrict playback to 480i and 480p modes.
I can't see the entire display	<ul style="list-style-type: none"> • If your component input device supports it, try 720p mode.
The display appears tilted	<ul style="list-style-type: none"> • Consult your HDTV user's manual.

Additional Accessories

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

ati.com/online/accessories

Compliance Information

This section details the compliance information for this product.

FCC Compliance Information

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

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

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

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

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

Industry Canada Compliance Statement

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

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

For further compliance information:

ATI Research Inc.
62 Forest Street.
Marlborough, MA
01752
USA
508-303-3900

CE Compliance Information

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

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

Informations de conformité de la CE

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

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

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

Free Manuals Download Website

<http://myh66.com>

<http://usermanuals.us>

<http://www.somanuals.com>

<http://www.4manuals.cc>

<http://www.manual-lib.com>

<http://www.404manual.com>

<http://www.luxmanual.com>

<http://aubethermostatmanual.com>

Golf course search by state

<http://golfingnear.com>

Email search by domain

<http://emailbydomain.com>

Auto manuals search

<http://auto.somanuals.com>

TV manuals search

<http://tv.somanuals.com>