



# ATI Radeon HD 4770

User Guide

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## 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.



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# Chapter 1

## Installation

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For support, you will need to record the serial number and the part number for the card before installation.

### Installation Overview

The installation of the card has slightly different procedures depending on whether you are replacing an existing card or installing a graphics card in a PC for the first time. This section briefly describes the high-level steps for both cases.

### Replacing an Existing Card

If you are replacing an existing graphics card, you need to:

1. Start the computer and then uninstall the old graphics driver.
2. Turn off the computer and then remove the old card.
3. Install the new card and then connect the monitor.
4. Start the computer and then install the new drivers and software.
5. Restart the computer.

### First Card for this PC

If this is the first graphics card for this PC, you need to:

1. With the computer off, install the new card and then connect the monitor.
2. Start the computer and then install the new drivers and software.
3. Restart the computer.

## Record the Serial and Part Numbers

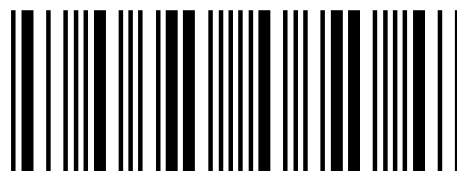
Write down the serial number and part number before installing. The serial number and 102 part number on the graphics card are required for registration and free support. They are located on a sticker on the back of the card.

The emphasized numbers in bold are required for registration and free support.

Figure 1–1 Sample Serial and Part Numbers



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



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

## Uninstalling the Old Driver (Windows® XP)

Follow these steps to uninstall the existing graphics card driver 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 the Old Driver (Windows Vista®)

Follow these steps to uninstall the existing graphics card driver 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**.
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 **Uninstall**.  
*The driver for the old graphics card is uninstalled.*
6. Turn off the system.

## Installing the Graphics Card

**Note:** Make sure that your system has an adequate power supply.

1. Make sure the computer, monitor, and other peripheral devices are off.
2. Unplug the computer power cord and disconnect the monitor cable from the back panel of the computer.

**Caution:**

To avoid possible damage to the motherboard, wait approximately 20 seconds after unplugging the power cord before disconnecting a peripheral or removing a component from the motherboard.

3. Remove the computer cover.

**Caution:**

Remember to discharge your body's static electricity by touching the power supply case or the metal surface of the computer chassis.

**Tip:** If necessary, consult the computer manual for help removing the cover.

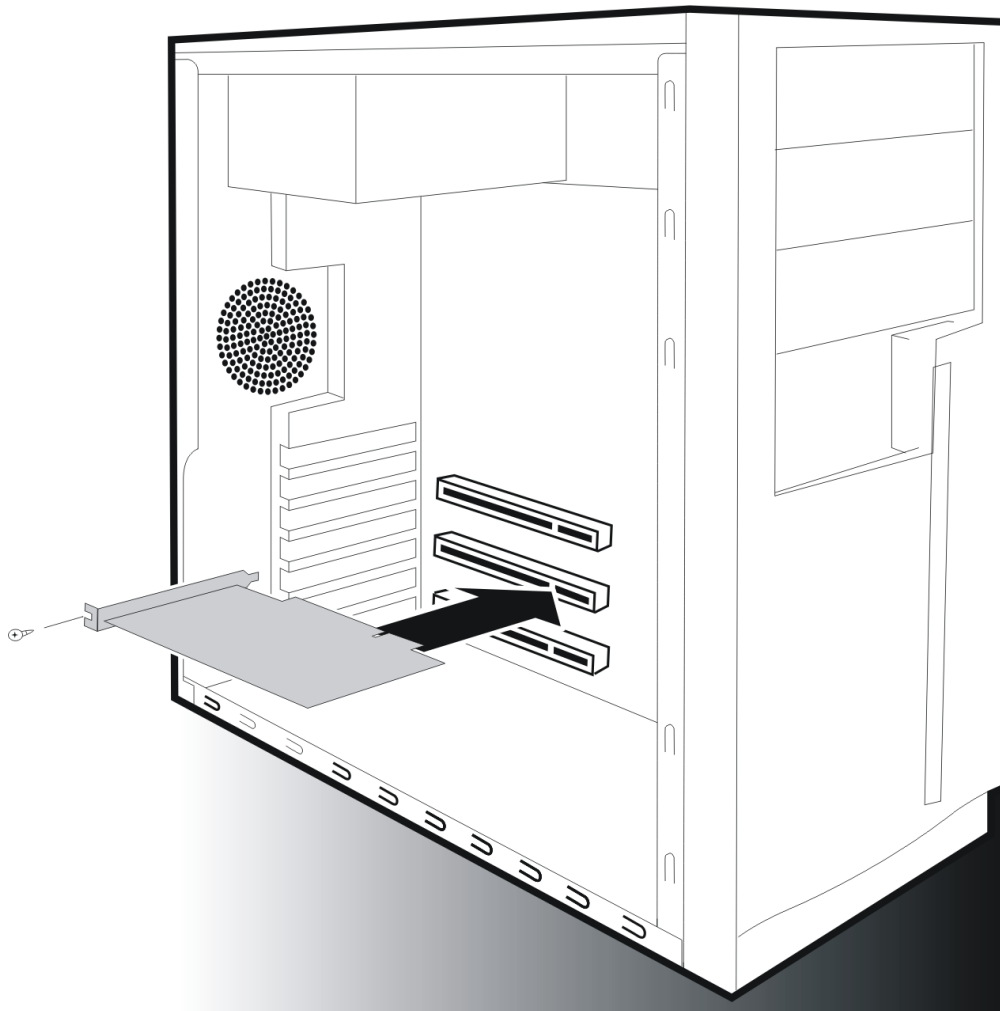
4. Remove any existing graphics cards from the computer.

**Warning:**

Some graphics cards can get hot while operating. Wait approximately five minutes after turning off the computer before touching the card.

5. Locate the appropriate bus slot on the motherboard. If necessary, remove the corresponding back panel cover.
6. Align the new graphics card in the bus slot and press firmly until the card is fully seated.

Figure 1–2 Graphics Card Installation



7. Fasten the graphics card securely to the back panel.
8. Make sure the cables are not interfering with anything inside the computer (for example, a cooling fan) and then replace the computer cover.
9. Reconnect any cables you have disconnected and plug in the computer power cord.

10. Turn on the monitor and then the computer.

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The computer should start normally and the software must be installed next.

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## Installing the ATI Catalyst™ Software Suite (Windows OS)

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

**Note:** The installation dialog displays in English if the operating system's language is not supported.

Software is provided to both operate and take advantage of all the features of the graphics card. Software includes:

- The graphics card drivers.
- ATI Catalyst™ Control Center software.
- HydraVision™ software (included in the custom install).
- SurroundView™ software (included in the custom install).
- ATI Avivo™ video converter software (included in the custom install).

1. Insert the Software and Documentation CD.

**Note:** If the install wizard does not start, navigate to the CD drive and double-click ATISSETUP.exe.

2. From the menu that appears, click **Software Install**.

3. Follow the on-screen instructions. When prompted, select either **Express** or **Custom**.

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

**Tip:** If the installer fails to install the driver, or you have a software conflict, you can download the latest software from [ati.amd.com/support/driver.html](http://ati.amd.com/support/driver.html) and then install it.

# Display Configuration

This section describes how to configure the display and lists the available display connections.

## Configure the Display (Optional)

If you are not experiencing any troubles with the display, no adjustments are necessary.

1. Right-click on the desktop and, in the shortcut that appears, click **Properties**.  
*The **Display Properties** dialog appears.*
2. Click the **Settings** tab and then select the screen resolution and color depth that best suit your requirements and the display's performance.
3. Click **Advanced** and then select the **Monitor** tab.
4. Choose a refresh rate from the drop-down list.

### Caution:

Choosing a refresh rate unsupported by the display may damage it. Consult the display's documentation if necessary.

5. Click **OK**.  
*Once you have configured the main display you can configure any other displays that are connected.*
6. To configure another display, do the following:
  - a. Right-click on the desktop and, in the shortcut that appears, click **Properties**.  
**Note:** The ATI Catalyst Control Center software can also enable and configure multiple monitors.
  - b. To access the basic multi-monitor configuration settings, click the **Settings** tab.
  - c. Select the monitor icon identified by the number 2.  
**Note:** When using multiple monitors with the graphics card, one monitor will always be the primary display, additional monitors will be designated as secondary.
  - d. Click **Extend my Windows desktop onto this monitor**.
  - e. Set the Screen Resolution and Color Quality as appropriate for the second monitor.

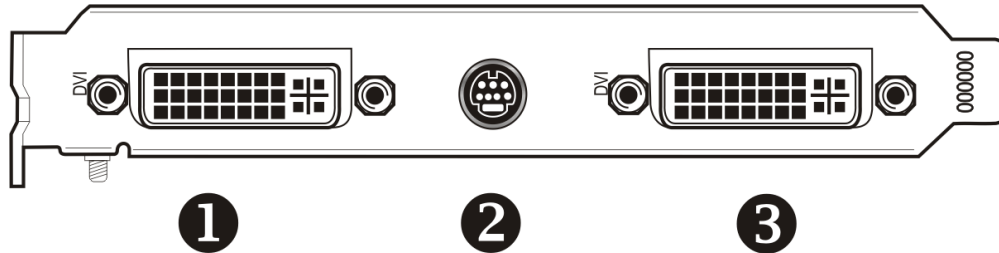
f. Click **OK**.

## Baseplate Connections

The following figure shows the display connections available on your ATI Radeon HD 4770 graphics card.

**Note:** Baseplate may not appear exactly as depicted.

Figure 1–3 ATI Radeon HD 4770 Baseplate Connections



1	DVI-I Connection (Supports dual-link output)
2	7-Pin S-Video Connection
3	DVI-I Connection (Supports dual-link output)

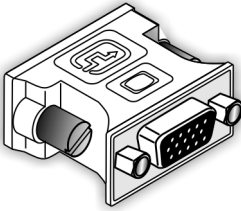
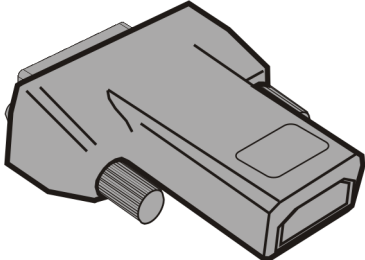
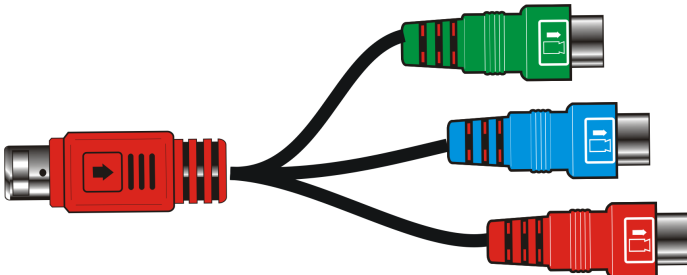

## Display Configurations

The following table lists the different ways you can connect displays to your ATI Radeon HD 4770 graphics card.

Display Configuration	Connection Used	Comments
DFP display	DVI-I connection	DFP (digital flat-panel) digital display.
CRT (VGA) display	DVI-I connection with DVI-I-to-VGA adapter	CRT (cathode ray tube) analog display.
TV	7-pin S-Video connection	

## Display Adapters

The following illustrates the adapters you can use to connect the graphics card to other display devices not directly supported by the connection types available on the graphics card.

Adapter	Description
	DVI-to-VGA adapter (included)
	DVI-to-HDMI™ (included)
	7-pin HDTV output cable (included)
	DisplayPort-to-DVI adapter (optional)

# Chapter 2

## ATI CrossFireX™ Technology

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**Note:** These features only available for ATI Radeon HD 4770 graphics cards with ATI CrossFireX connections.

### ATI CrossFireX Introduction

ATI CrossFireX technology harnesses two or more GPUs (graphics processing units) to be used in a single computer to run up to two displays, creating a high-performance gaming platform. Typically, setup involves two or more graphics cards, but with the appropriate motherboard, the technology can use a single card and the built-in GPU of the motherboard. ATI CrossFireX works with all 3D games and applications.

**Note:** The ATI Catalyst Control Center software contains a different ATI CrossFireX user interface for each configuration type and automatically loads the appropriate one when a valid ATI CrossFireX configuration is detected in the system.

If ATI Catalyst™ A.I. is enabled in the ATI Catalyst Control Center software, the optimal rendering mode available for the application is automatically selected.

### Installing ATI CrossFireX Graphics Cards

These instructions assume that a PCIe® graphics card has already been successfully installed in the secondary slot (slot one), and that the primary slot (slot zero) is empty.

**Note:** Consult your system builder or OEM to ensure that your system has an adequate power supply. For more information, see [System Requirements](#).

For an up-to-date listing of ATI CrossFireX certified motherboards, see [ati.amd.com/products/certification](http://ati.amd.com/products/certification)

1. Make sure the computer, monitor, and other peripheral devices are off.

2. Unplug the computer power cord and disconnect the monitor cable from the back panel of the computer.

**Caution:**

To avoid possible damage to the motherboard, wait approximately 20 seconds after unplugging the power cord before disconnecting a peripheral or removing a component from the motherboard.

3. Remove the computer cover.  
If necessary, consult the computer manual for help removing the cover.

**Caution:**

Remember to discharge your body's static electricity by touching the power supply case or the metal surface of the computer chassis.

4. Remove any unneeded graphics cards from the computer.

**Warning:**

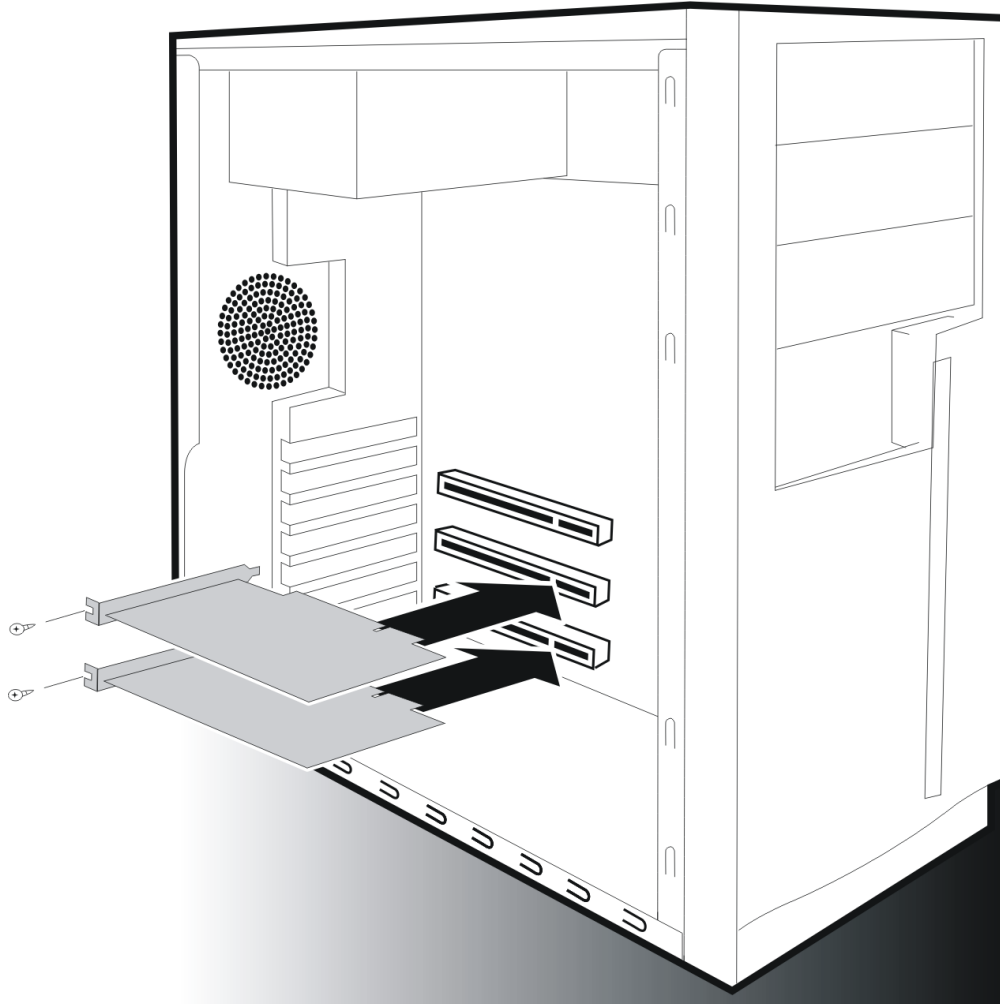
Some graphics cards can get hot while operating. Wait approximately five minutes after turning off the computer before touching the card.

5. Locate the PCIe slots on the motherboard. If necessary, remove the corresponding back panel cover.



6. Align the new graphics card in the secondary PCIe slot next to the existing graphics card and press firmly until the card is fully seated.

Figure 2-1 ATI CrossFireX Installation



7. Fasten the graphics cards securely to the back panel.
8. Make sure the cables are not interfering with anything inside the computer (for example, a cooling fan) and then replace the computer cover.
9. Reconnect any cables you have disconnected and plug in the computer power cord.
10. Turn on the monitor and then the computer.

Enable ATI CrossFireX in ATI Catalyst Control Center as described in the next topic.

## EnablingATI CrossFireX

1. From the Graphics Settings tree, click **CrossFire™**.

2. From the **Graphics Adapter** list, select the graphics card that acts as the Master VPU.
3. Select the **Enable CrossFire™** check box.

# Chapter 3

## Reference

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The following section offers troubleshooting tips and provides customer care, warranty, and compliance information.

### System Requirements

#### Hardware

Minimum requirements are:

- Motherboard with one PCIe ×16 lane graphics slot.
- AMD Athlon™ or Intel® Pentium® 4 CPU.
- 1 GB RAM.
- CD-ROM or DVD-ROM drive for installing software.
- A 400 watt or better power supply.
- Certified power supplies are strongly recommended; for a list of certified power supplies, see [ati.amd.com/certifiedpsu](http://ati.amd.com/certifiedpsu).

#### ATI CrossFireX Requirements

Minimum requirements for ATI CrossFireX configuration using the ATI Radeon HD 4770 graphics card:

- ATI CrossFireX-certified motherboard. For an up-to-date listing of ATI CrossFireX certified motherboards, see [ati.amd.com/products/certification](http://ati.amd.com/products/certification).
- A second ATI CrossFireX graphics card compatible with the ATI Radeon HD 4770.
- For two card setup, a PCIe 475 watt or higher power supply.

- For an up-to-date listing of certified power supplies, see [ati.amd.com/certifiedpsu](http://ati.amd.com/certifiedpsu).
- Certified system cases with good airflow and cooling are recommended. For list of certified cases, see [ati.amd.com/certifiedcases](http://ati.amd.com/certifiedcases).

## Using ATI Catalyst Control Center

### ATI Catalyst Control Center Overview

The ATI Catalyst Control Center software provides access to the display features of your ATI Radeon HD 4770 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](#) or visit the AMD Customer Care Web site at <http://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 3–1 ATI Catalyst Control Center Access Routes

Access Route	Instructions
Windows Desktop	<ol style="list-style-type: none"> <li>1. Right-click anywhere on the desktop.</li> <li>2. From the shortcut menu that appears, click <b>ATI CATALYST(TM) Control Center</b>.</li> </ol>
Windows Start Menu	<ol style="list-style-type: none"> <li>1. Click <b>Start</b> on the Windows task bar.</li> <li>2. Select <b>All Programs</b> ▶ <b>Catalyst Control Center</b>.</li> </ol>
Windows System Tray	<ol style="list-style-type: none"> <li>1. Right-click the ATI icon in the Windows System Tray.</li> <li>2. From the short menu, select <b>ATI Catalyst Control Center</b>.</li> </ol>
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 <b>ATI Catalyst Control Center</b> 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 Radeon HD 4770 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 details.

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**.

## Searching the Help

1. Click **Help** in the Dashboard.
2. Click **Search Help**.
3. Enter the word(s) you wish to search for in the search box of the ATI Catalyst Control Center Help.
4. Click **Go**.

# Troubleshooting

## Graphics Card Installation Troubleshooting

For more advanced troubleshooting information, contact AMD Customer Care for ATI products at [ati.amd.com](http://ati.amd.com).

The graphics card doesn't fit any of the motherboard slots.

The graphics card needs to be exchanged for one with a bus that matches the motherboard.

The computer beeps and the boot process stops.

Make certain that the graphics card is properly connected to the internal power supply and the motherboard.

No display on power up.

This may be an SBIOS issue. Replace the old card and then try these possible solutions:

1. Check the motherboard manufacturer's Web site for an SBIOS update.
2. Turn off the on-board video.

The computer does not boot up properly.

Verify that the installation instructions were followed correctly.

Make certain that the graphics card is properly connected to the power supply and the motherboard.

If using Windows operating system, restart your computer in Safe Mode. For information on Safe Mode, consult the Windows documentation.

Check the system configuration utility for interrupt assignments.

The computer boots up but there is no display.

Verify that the monitor is connected properly to the computer and a power supply.

If your motherboard has on-board graphics capabilities, you may need to disable them. Consult your motherboard documentation for more information.

**Note:** Some manufacturers do not allow the on-board graphics to be disabled or to become the secondary display.

During software installation on a PC with the Windows Vista OS, the screen goes blank

The software is still installing. Wait 20–30 minutes to make sure the software has finished installing and then restart the computer.

## Troubleshooting ATI CrossFireX

The following are suggested solutions for common ATI CrossFireX troubleshooting issues.

### Change Motherboard BIOS Settings

Some motherboards may have a system BIOS option to switch between single and dual PCIe slot support. The default setting may be single slot support. Refer to the motherboard's manual for information to enable dual PCIe slot support.

For more information see the ATI CrossFireX Web page at [ati.amd.com/crossfire](http://ati.amd.com/crossfire).

### Use Graphics Cards with Different Amounts of Memory

In some ATI CrossFireX configurations, graphics cards with different amounts of memory can be used; however, restarting your computer is required after enabling ATI CrossFireX. This will cause ATI CrossFireX to reduce the amount of memory on the card with the most amount of memory to match the memory size of the graphics card with the least amount of memory.

Clicking **OK** to the memory mismatch error message will restart your computer.

**Note:** When disabling ATI CrossFireX you will be given the option to restart your computer to restore the original graphics memory size or continue with the reduced memory size.

### Card Reversal Recommended

A recommendation message to reverse the graphics card positions may appear if the primary graphics card is not installed into the primary PCIe slot. Although ATI CrossFireX can be enabled, performance may be improved by reversing the graphics cards in the computer.

See your motherboard's manual to determine which is the primary PCIe slot.

### 3D Client is Active

You will not be able to start ATI CrossFireX if a 3D application, game, or video playback, such as a DVD movie, is running.

Close all open 3D applications, games, and movie player applications, and then enable ATI CrossFireX.

## ATI CrossFireX is Currently Unavailable

This error has occurred because ATI CrossFireX did not correctly detect your graphics hardware or there is a problem with the software.

- Check that the graphics cards are installed correctly.
- Check that the interconnect cable is installed correctly.
- Close all running 3D applications.
- Re-install the ATI Catalyst Control Center and drivers.

## Screen Rotation is Unavailable or Does Not Work

Screen rotation is not an available feature on ATI CrossFireX systems.

## Video Displays Flicker During System Startup

This is normal during ATI CrossFireX start-up.

## ATI CrossFireX Starts in Software Mode

This is normal when starting up for the first time after installing two ATI CrossFireX graphics cards if neither card is installed in the primary PCI Express® slot. You can change the ATI CrossFireX mode in the ATI Catalyst Control Center.

## ATI CrossFireX Disabled After Swapping/Moving Cards

If you change the ATI CrossFireX configuration by moving the graphics cards to different slots on the motherboard, disable ATI CrossFireX and restore factory default settings in ATI Catalyst Control Center first. Once the cards have been swapped, enable ATI CrossFireX. This ensures the new configuration is detected by the computer.

## HDTV/HDTV Adapter Troubleshooting

The following troubleshooting tips may help if you experience problems with HDTV.

More troubleshooting information can be found on the AMD Web site. Please visit [ati.amd.com](http://ati.amd.com) and select Customer Care.

The colors on the TV display are incorrect.

Ensure that the connections between the component video adapter and the HDTV are correct.

There is no display on the TV.

The TV will not display anything until Windows starts; this may take several minutes.



Make sure the TV is set to YPbPr input.

Also, make sure that the HDTV component video adapter is properly connected.

DVDs will not play in high-quality modes.

Copy-protected DVDs restrict playback to 480i and 480p modes.

The entire display is not visible.

If the component input device supports it, try 720p mode.

The display appears tilted.

Consult the HDTV documentation.

The CRT display is green.

The system is in component output mode. Restart the computer with only the CRT monitor connected.

## Customer Care

For detailed instructions on how to use your product, refer to the documentation included on the installation CD.

To activate Customer Care, you must register your product at [ati.amd.com/online/registration](http://ati.amd.com/online/registration).

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

Service	Availability	Language	Access
Online or mail	24 hours a day	English, French, Spanish	<a href="http://ati.amd.com/support/">http://ati.amd.com/support/</a> or Attention: Customer Care Advanced Micro Devices, Inc., 1 Commerce Valley Drive East, Markham, Ontario, Canada L3T 7X6
Telephone US & Canada	Monday to Thursday: 9:00 a.m. to 5:30 p.m. Friday: 9:00 a.m. to 3:00 p.m.  <b>Note:</b> AMD reserves the right to change hours of support. For more information, please refer to <a href="http://ati.amd.com/support/terms/">ati.amd.com/support/terms/</a> .	English	1-877-284-1566 (toll-free) or 1-905-882-2626 (Canada)  (International and/or local toll charges to Canada will apply).

AMD Customer Care for Graphics Products 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 is under warranty.

- 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 reaching end of life.

## 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 and 15.109.

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.

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

## CE Compliance Information

EMC Directive 2004/108/EC

CISPR 22:2008-09/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

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

## KCC Certification Information

**B급기기(가정용 방송통신기기)**

이 기기는 가정용(B급)으로 전자파적합등록을 한 기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

"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

CNS13438 (96 年版)

