



---

# RADEON® X800 MAC EDITION

## User's Guide

P/N 137-40818-10



Copyright © 2004, ATI Technologies Inc. All rights reserved.

ATI and ATI product and product feature names are trademarks and/or registered trademarks of ATI Technologies Inc. All other company and/or product names are trademarks and/or registered trademarks of their respective owners. Features, performance and specifications are subject to change without notice. Product may not be exactly as shown in diagrams.

Reproduction of this manual, or parts thereof, in any form, without the express written permission of ATI Technologies Inc. is strictly prohibited.

### **Disclaimer**

While every precaution has been taken in the preparation of this document, ATI Technologies Inc. assumes no liability with respect to the operation or use of ATI hardware, software or other products and documentation described herein, for any act or omission of ATI concerning such products or this documentation, for any interruption of service, loss or interruption of business, loss of anticipatory profits, or for punitive, incidental or consequential damages in connection with the furnishing, performance, or use of the ATI hardware, software, or other products and documentation provided herein.

ATI Technologies Inc. reserves the right to make changes without further notice to a product or system described herein to improve reliability, function or design. With respect to ATI products which this document relates, ATI disclaims all express or implied warranties regarding such products, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose, and non-infringement.

# Table of Contents

<b>Introduction</b> .....	<b>1</b>
<i>System Requirements</i>	1
<i>External Connections</i>	1
Related Documentation	2
Multimedia Features	2
Viewing 3D Graphics	2
TV Out Support	3
<b>ATI Displays Control Panel</b> .....	<b>4</b>
Introduction	4
<i>Open the ATI Displays control panel using Mac OS® X</i>	4
<i>ATI Displays Control Panel</i>	5
<i>ATI Displays Preferences</i>	6
Advanced Display Options	6
<i>VERSAVISION™ Tab</i>	7
<i>Display Control Tab</i>	8
<i>Advanced DFP Tab</i>	9
ATI HELP	9
Using DVD and QuickTime® Playback	10
Using Digital Flat Panel (DVI)	10
<b>Specifications</b> .....	<b>12</b>
Video Mode Table	12
<i>Digital Flat Panel</i>	13
Compliance Information	14
<i>FCC Compliance Information</i>	14
<i>Industry Canada Compliance Statement</i>	14
<b>Glossary</b> .....	<b>15</b>
<b>Index</b> .....	<b>21</b>

## CHAPTER 1:

# Introduction

The RADEON® X800 MAC EDITION represents the next generation in 3D and video acceleration for your Power Macintosh® computer. It includes flexible dual-display support for multiple combinations of CRT and Digital Flat Panel monitors. Your new graphics accelerator provides:

- Flexible dual-display support enabling many combinations utilizing DVI and ADC connectors, with or without VGA adapters, for analog and digital displays.
- OpenGL® accelerator providing superior 3D rendering performance and advanced imaging and filtering techniques.
- Industry leading DVD acceleration for High Bitrate, low CPU usage, playback of the latest movies at any resolution.
- QuickTime® playback accelerator for full screen, full motion, DVD quality video.

## System Requirements

<b>Hardware</b>	<ul style="list-style-type: none"><li>• A Power Macintosh® G5 computer with an AGP 8X (AGP PRO) expansion slot.</li><li>• QuickTime® 6 or higher.</li><li>• Minimum 512MB of system memory.</li></ul>
<b>Operating System</b>	<ul style="list-style-type: none"><li>• Mac OS® X version 10.3.5 or higher.</li></ul>
<b>Monitor</b>	<ul style="list-style-type: none"><li>• Compatible display devices: DVI or ADC style digital flat panel or VGA display (using the supplied DVI-to-VGA adapter).</li></ul>

## External Connections

- DVI-I output.
- ADC output.

Note: Future references to Mac OS® X in this manual are intended to be generic and inclusive of their respective versions of the Macintosh® operating systems.

## Related Documentation

The README file summarizes the latest product revisions. Click the README icon on the installation disk to open this file.

Help is available directly in ATI Displays.

## Multimedia Features

Your RADEON® X800 MAC EDITION turns your Mac computer into a 3D and 2D graphics powerhouse. You can use your new graphics accelerator card to:

- Enjoy true-color 32-bit 2D or 3D graphics up to 2560 x 2048.
- Watch full screen, full motion, DVD quality video using the Apple® DVD Player or QuickTime® playback acceleration.
- Output your Mac's display to digital flat panels and digital projectors.
- Output to analog displays and projectors.

The following information describes these features in more detail and suggests ways you can optimize your machine to get the most out of your new card.

## Viewing 3D Graphics

RADEON® X800 MAC EDITION's 3D Acceleration features supports the following advanced 3D graphics capabilities:

- 16 pixel pipeline architecture.
- 256 bit memory interface.
- Hardware accelerated vertex and pixel shaders.
- 76 billion texture pixels per second fill rate.
- 713 million vertices per second transform rate.
- 32 GB/Sec memory bandwidth.
- Full Scene Multi Sample Antialiasing.
- Bilinear, Trilinear, and Anisotropic filtering.

In addition, the RADEON® X800 MAC EDITION brings new and exciting graphics technologies to the Macintosh® platform:

**SMOOTHVISION™ HD** is an antialiasing solution that raises the bar for image quality using programmable multi-sampling methods to post-process graphics before they are displayed.

**SMARTSHADER™ HD** is a new technology allows specialized high precision graphics programs to be run on the RADEON® X800 MAC EDITION VPU rather than the system processor. Developers can easily create amazing new graphics effects while maintaining a high level of performance.

**HYPERSAMPLE™ HD** makes Z-buffer bandwidth usage more efficient by decreasing the amount of information sent to the frame buffer at higher resolutions than ever before.

RADEON® X800 MAC EDITION only displays 3D graphics in thousands and millions of colors. When you set your display to 256 colors, this will affect Finder™, OpenGL®, Quartz® Extreme, and QuickTime® acceleration.

## TV Out Support

The RADEON® X800 MAC EDITION supports TV Out by using the optional Apple® G5 TV-Out Adapter. For more information see your local Apple® reseller.

## CHAPTER 2:

# ATI Displays Control Panel

## Introduction

The ATI Displays control panel provides access to the advanced features that the RADEON® X800 MAC EDITION has to offer.

### Open the ATI Displays control panel using Mac OS® X

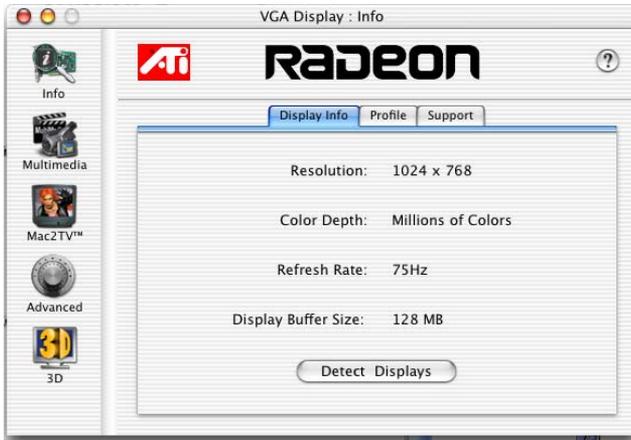
- 1 Open the **Apple® System Preferences**.
- 2 Click the **ATI Displays** icon.

or

- 1 Click the **Hard Disk** icon.
- 2 Click **Applications** folder.
- 3 Click **Utilities** folder.
- 4 Click **ATI Utilities** folder.
- 5 Double-click **ATI Displays**.

For detailed instructions on how to set up and use these features, please refer to ATI Help, which can be accessed through the ATI Displays control panel.

## ATI Displays Control Panel



**Display Info** dialog shows the current display settings of the specific monitor ATI Displays is running on.

**Detect Displays** button detects all connected displays. This feature is useful when a second VGA monitor is connected to your graphics adapter. Detect Displays removes the need to restart your computer.

**Note:** Your display will momentarily go blank while all connected devices are being detected.

The **Profile** dialog presents information on the specific RADEON® graphics card and video driver installed in your computer. Even if ATI Displays cannot identify your ATI product it will still provide display configuration, driver version and other related information. A warning dialog will display if no ATI product is installed in your computer.

The **Support** dialog provides an internet link to ATI Technologies' web site.

Click **Create Apple® System Profiler Report** button to generate a detailed report of the computer's installed hardware and software.

## ATI Displays Preferences



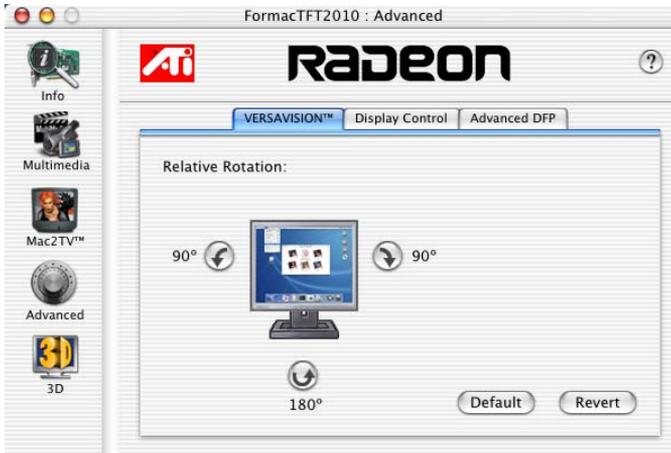
From the ATI Displays drop down menu you can set the Preferences for the ATI Displays control panel. Here you can configure how the ATI Displays control panel starts and exits.

## Advanced Display Options

Advanced adds even more functionality, giving you complete control over your display.

To access the Advanced feature open the ATI Displays control panel and click the **ADVANCED** button.

## VERSAVISION™ Tab



VERSAVISION™ allows you to rotate your display while maintaining the full feature set of other ATI 2D and 3D technologies. ATI's hardware accelerated display rotation and scaling technology allows for rotation left or right by 90 degrees or turn it upside down to a full 180 degree rotation.

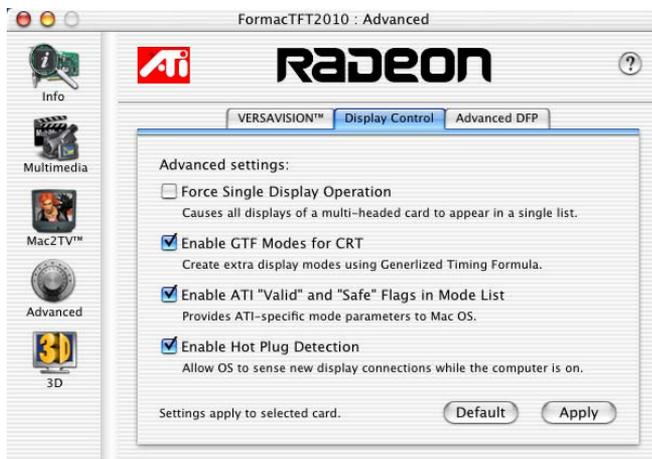
**Relative Rotation** allows you to rotate the contents of your display. Hovering the mouse cursor over a direction button will show you a preview of the change. Clicking the desired rotation button will cause the display to refresh and rotate.

Full 3D support is maintained regardless of rotation selected.

**Default** button disables Relative Rotation.

**Revert** button undoes all changes and sets everything to the original state or last known good setting.

## Display Control Tab



**Force Single Display Operation**, when using a dual display video card, causes all display modes to appear as a single list of supported resolutions in the Apple® Displays Properties.

Only one display is on when this feature is enabled. The default setting is Disabled.

**Enable GTF Modes for CRT** provides a list of all available modes for your monitor based on the Generalized Timing Formula standard. This feature is enabled by default.

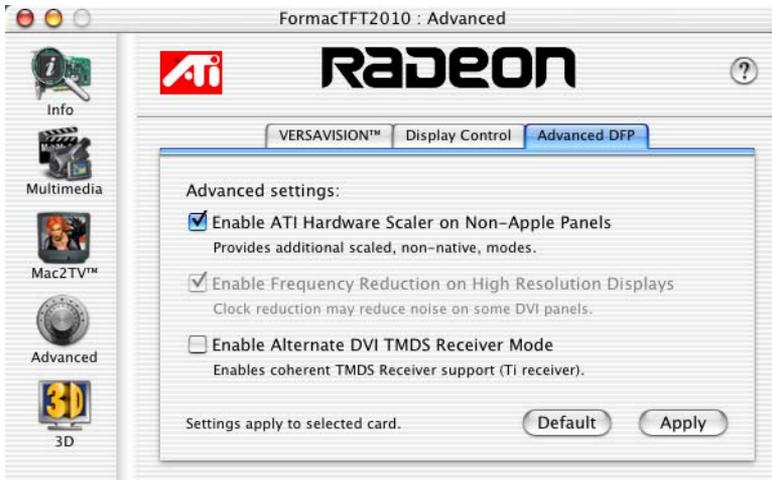
**Enable ATI "Valid" and "Safe" flags in mode list**, when enabled, allows the video card to determine which video modes are valid and safe.

**Enable Hot Plug Detection** allows the operating system to automatically detect when a display is connected to the computer and allows the use of "Detect Displays" button for other devices. This removes the need to restart the computer after attaching a secondary display.

**Default** button undoes all changes and sets everything to the factory default settings.

**Apply** button causes all the selected options to be enabled at one time.

## Advanced DFP Tab



**Note:** The features on this tab are intended to support Digital Flat Panels (DFP) only.

**Enable ATI Hardware Scaler on non-Apple panels** can be used with flat panels with fixed resolutions. Enabled, this feature allows you to change video modes using the ATI Scaler.

**Enable frequency reduction on high resolution displays** may correct problems concerning jitter or dot crawl.

**Enable Alternate DVI TMDS Receiver Mode** corrects problems such as noise or blank screens on some flat panels.

**Default** button undoes all changes and sets everything back to the original factory settings.

**Apply** button enables all the selected options at one time.

## ATI HELP

ATI HELP is an additional source of information when you are using the ATI Displays control panel. To access the ATI HELP, click on the  icon on the ATI Displays control panel.

## Using DVD and QuickTime® Playback

The RADEON® X800 MAC EDITION's QuickTime® playback acceleration allows you to stretch even the smallest movies to full screen size without compromising frame rate or image quality. RADEON® X800 MAC EDITION's hardware scaler maintains the original quality of your DVD or QuickTime® movie when scaling to a larger size – even full screen.

When playing movies in thousands or millions of colors, the ATI card utilizes the 3D engine's capabilities to scale and accelerate playback. When scaling video, the RADEON® X800 MAC EDITION uses special hardware techniques (bilinear filtering) to enhance the video quality instead of just repeating pixels.

## Using Digital Flat Panel (DVI)

RADEON® X800 MAC EDITION's DVI support feature allows you to output your computer's display to your DVI digital flat panel, providing you with:

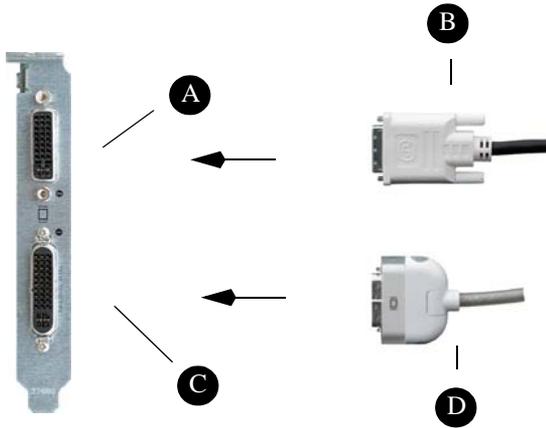
- Crisper, clearer images.
- A true flat screen.
- Virtually no eye strain from prolonged viewing.

### ***Using RADEON® X800 MAC EDITION DVI Connector***

Your RADEON® X800 MAC EDITION includes support for DVI allowing you to connect to a digital flat panel display.

### ***To output your computer's display to a DVI digital flat panel***

- 1 Looking at the back of your Mac, locate your ATI Graphics Accelerator.
- 2 Attach one end of your DVI cable to the DVI connector on your RADEON® X800 MAC EDITION and the other end to the DVI connector on your DVI flat panel.



A DVI Monitor Port

B DVI Connector

C ADC monitor port

D ADC Connector

- 3 Turn on your DVI flat panel and your Mac.

**Note:** The DVI connector is hot swappable. You no longer need to shut down your computer before attaching a digital flat panel.

## CHAPTER 3:

# Specifications

## Video Mode Table

The video mode table below lists the color depth capabilities for the supported resolutions on your RADEON® X800 MAC EDITION.

Please consult your monitor's specifications to determine which resolutions are available with your display.

Supported Modes	
Display Resolution	Maximum Refresh
640 x 480	200
720 x 480	200
800 x 600	200
832 x 624	75
1024 x 768	200
1152 x 864	200
1152 x 870	75
1280 X 960	200
1280 x 1024	150
1600 x 900	150
1600 X 1024	150
1600 X 1200	120
1792 X 1344	75
1856 X 1392	75
1920 X 1080	120

<b>Supported Modes</b>	
<b>Display Resolution</b>	<b>Maximum Refresh</b>
1920 X 1200	100
1920 X 1440	90
2048 X 1152	100
2048 X 1280	100
2048 X 1536	85

The minimum refresh rate for the above modes is 60Hz.

## Digital Flat Panel

<b>Connection Type</b>	<b>Resolution</b>	<b>Example Product</b>
Single-Link (one DVI or ADC)	1920 X1200*	Apple 23" Cinema HD
Dual-Link (one DVI)	2560 X 1600	Apple 30" Cinema HD
Single-Link (one DVI low refresh rate)	3840 X 2400	IBM T221

\*Using a reduced blanking interval compatible with Apple®'s Cinema HD ADC Display. This timing is not compatible with VESA's 1920 x 1200 resolution when attached to an ADC connector.

# 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, and
- This device must accept any interference received, including interference that may cause undesired operation.

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

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

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

## Industry Canada Compliance Statement

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

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

For further compliance information:

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

## CHAPTER 5:

# Glossary

### ***Alpha Blending***

When an image has an alpha value for each pixel, this tells how much to blend the colors from the image with the background colors. The lower the alpha values the more transparent the image looks.

### ***Anti-aliasing***

Method used to remove the jaggedness of an image. When anti-aliasing is used, the edges of an image appear smooth and usually somewhat blurry.

### ***Anisotropic Filtering***

This filtering technique uses a rectangular filtering pattern to render smoother, crisper images.

### ***Aspect Ratio***

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

### ***Back Buffer***

A type of **offscreen memory** used to provide smooth video and 2D graphics acceleration. This technique uses two frame buffers, often referred to as “double-buffering”. While one buffer is being displayed, a second buffer of the same size, the “back” buffer, holds the frame being worked on.

Once a new frame is ready in the back buffer it is copied to the front buffer - the display screen. In this way, you will only see complete, smooth frames, and not the operations performed on them.

In order to increase performance, all memory used for back buffers are on your ATI graphics accelerator card.

## ***Bilinear Filtering***

When texture mapping is performed an image can become very “blocky” or “pixelated” when the texture is viewed close up. Bilinear filtering samples four texture pixels, takes the weighted average of these pixels and applies the average of these “texels”. This blended color is used to provide a smoother looking texture.

## ***Bitmap***

A bitmap is a graphics 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 32-bpp, depending on the number of colors desired.

## ***Buffers***

Your ATI accelerator card includes on-board memory which is used in a number of ways. Buffers are portions of this memory used as temporary storage on your card. One large buffer is always used to display the screen you see; this is the “display buffer”. The rest of **offscreen** memory is used by applications as **back buffers**, **z-buffers**, and texture buffers.

## ***Color Depth***

Color depth is the number of color shades available on your display. The color depth of your monitor usually includes; 256 colors (8-bpp), Thousands of colors (16-bpp), and Millions of colors (32-bpp), and is also measured in bits per pixel (bpp).

**Note:** The ATI 3D Accelerator only functions in Thousands and Millions of colors modes.

## ***Fog***

The blending of an object with a fixed color as objects or pixels increase distance away from the viewer.

## ***Frame Buffer***

Memory buffer used to store the image being displayed.

## ***Gouraud Shading***

One of the more sophisticated shading methods used to produce a smooth lighting effect across a 3D object. A specific color is used at each vertice of a triangle or polygon, and interpolated across the entire face.

## ***HYPER Z™ HD***

HYPER Z™ HD includes a number of different technologies aimed at optimizing memory bandwidth efficiency, particularly with respect to Z-buffer operations.

To render a 3D image properly, it is necessary to know the distance of every rendered object from the viewpoint. This distance is stored in a special buffer called a Z-Buffer or Depth Buffer, and is used to determine which objects should be drawn in front of other objects.

Reading and updating the Z-Buffer typically consumes more memory bandwidth than any other part of the 3D rendering process, making it a major performance bottleneck. HYPER Z™ HD technology reduces the memory bandwidth consumed by the Z-Buffer, thereby increasing performance.

## ***MIP Map***

Multum In Parvum (Latin) means “many in one.” It is a method of increasing quality of a texture map by storing multiple resolutions of the same image and dynamically switching between them depending on the size and depth of the object being textured.

## ***Offscreen Memory***

An area of memory used to preload and place images so that they can be quickly drawn on the screen. Offscreen memory refers to all the memory on your ATI accelerator card that is not taken up by the front buffer, which holds the display screen that you see.

## ***Pixel, Pel***

Picture element. Smallest addressable area of the computer screen. Pixels on computer displays are square; pixels on NTSC televisions have a 4:3 aspect ratio.

## ***Refresh Rate***

Also referred to as “vertical refresh rate”. 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 (but only draw one-half of the video frame in one pass); computer displays typically have refresh rates of 75 Hz or more. At a refresh rate of 70 Hz and lower, screen flicker is often noticeable.

### **SMARTSHADER™ HD**

SMARTSHADER™ HD encompasses the advanced vertex and pixel shading capabilities of the RADEON® X800 MAC EDITION.

A shader is a small program that runs on the VPU 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. Both types of shaders can be used to create an infinite range of visual effects resulting in more complex, detailed, and realistic shader effects in games.

### **SMOOTHVISION™ HD**

SMOOTHVISION™ HD represents the latest image quality enhancement techniques implemented in the RADEON® X800 MAC EDITION. It excels at bringing out the fine details in rendered images while removing common artifacts that detract from their quality and realism.

SMOOTHVISION™ HD uses improved antialiasing, improved anisotropic filtering, and ATI's 3Dc™ compression technology.

### ***Specular Highlight***

The bright, usually small, intense light reflected from a 3-D surface with a high refraction value.

### ***Texture Mapping***

Mapping, or placing, an image onto an object. Images of realistic surfaces are placed on 3D models to create a richer and more complex visual effect.

### ***Trilinear Filtering***

Sampling method used to produce the most realistic looking 3D objects. Trilinear filtering averages one of the bilinear filter MIP Map levels along with the standard MIP Map samples.

### **VERSAVISION™**

ATI's hardware accelerated display rotation and scaling technology. Any desktop can now be rotated 90 degrees left or right, or even 180 degrees, while maintaining the full feature set of other ATI 2D and 3D technologies, such as SMOOTHVISION™. VERSAVISION™ works with single or multiple displays.

**Z-buffer**

A z-buffer is an area of off-screen memory used to hold “depth” information. For each dot, or pixel, in the display buffer, there is a corresponding dot in the z-buffer which holds the depth (z) value for the display pixel. The depth data helps the ATI accelerator card decide what 3D objects are in front of other 3D objects.

The larger the 3D window, the larger the z-buffer is in memory.



# Index

## Numerics

3D Graphics 2

## A

ADVANCED DISPLAY OPTIONS 6

Alpha Blending 15

Anisotropic Filtering 15

Anti-aliasing 15

Apple ® System Profiler Report 5

Aspect Ratio 15

ATI Displays 4

ATI Displays Control Panel 5

ATI Displays Preferences 6

ATI Guide

*accessing* 9

*description* 9

ATI HELP 9

## B

Back Buffer 15

Bilinear Filtering 16

Bitmap 16

Buffers 16

## C

Color Depth 16

Control Panel 4

Create Apple ® System Profiler Report 5

## D

Detect Displays 5

Display Control Tab 8

Display Info 5

## E

Enable ATI "Valid" and "Safe" 8

Enable GTF Modes for CRT 8

Enable Hot Plug Detection 8

External Connections 1

## F

Fog 16

Force Single Display Operation 8

Frame Buffer 16

## G

Glossary 15

Gouraud Shading 16

Graphic Card

*features 2*

**H**

HYPER Z™ 3, 17

**M**

MIP Map 17

Monitor Resolution

*2D video mode table 12*

Multimedia Features 2

**O**

Offscreen Memory 17

Open the ATI Displays 4

**P**

Pixel, Pel 17

Profile dialog 5

**R**

Refresh Rate 17

Related Documentation 2

Relative Rotation 7

**S**

SMARTSHADER™ 3

SMOOTHVISION™ 3, 18

Software

*ATI Guide 9*

Specular Highlight 18

Support dialog 5

Supported Modes 12

System Requirements 1

**T**

Texture Mapping 18

Trilinear Filtering 18

**U**

Using DVD and QuickTime® Playback 10

**V**

VERSAVISION™ 7, 18

Video Card

*features 2*

Viewing 3D Graphics 2

**Z**

Z-buffer 19