
Righteous 3D® II
User's Manual



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Introduction

Thank you for entering the generational leap beyond in PC graphics—three-dimensional graphics with the Righteous 3D® II. It's a dedicated 3D accelerator that operates transparently with existing 2D graphics accelerators and delivers true arcade 3D graphics performance. Designed for the serious game player who demands the highest performance for games, Righteous 3D II delivers "Righteous Results."

Righteous 3D II is multimedia-ready for your Pentium PCI-based system. It installs into an available PCI slot and connects via a cable to your VGA graphics accelerator. Righteous 3D II is available in configurations of 8MB or 12MB of EDO DRAM memory.

Based on 3Dfx Interactive Voodoo2 Graphics,™ Righteous 3D II's triple 64-bit memory architecture provides direct access to the frame buffer and texture memory. This advanced design uses dual texture-processing units, each of which can apply texture to an object in a single pass.

In addition, two Righteous 3D II's of the same memory configuration can be connected together to accelerate the next generation of games. When connected by an internal cable, the cards automatically enter Scanline Interleave (SLI) mode and work simultaneously on each frame of animation, which provides an impressive increase in performance.

Care has been taken to ensure that Righteous 3D II will provide you with years of trouble-free operation. We believe you'll be pleased with your purchase.

About This Manual

While Righteous 3D II is designed to be easy to install, we recommend that you refer to your computer's reference manual when terminology or installation steps are unfamiliar to you.

Section 1: Hardware Installation

How to properly install the Righteous 3D II.

Section 2: Software Installation

How to install the Righteous 3D II drivers and software.

Section 3: Technical Information

Help to ensure that Righteous 3D II is operating properly.

Appendix A: Technical Specifications

Righteous 3D II's technical specifications.

Appendix B: Direct3D

Information on the Direct3D feature of Righteous 3D II.

Before You Begin

This manual will familiarize you with the features, installation and use of your Righteous 3D II. There are several symbols and conventions used throughout this manual to help draw your attention to a feature or to focus on important information:



When you see the Magnifying Glass, it refers to something you should take a closer look at before proceeding further.



When you see the Exclamation Mark, it gives important information on avoiding damage.

Common Names

2D	Two Dimensional
3D	Three Dimensional
DDC	Display Data Channel
DRAM	Dynamic Random Access Memory
EDO	Extended Data Out
FBI	Frame Buffer Interface
PCI	Peripheral Component Interconnect
SLI	Scanline Interleaving
TMU	Texture Mapping Unit
VGA	Video Graphics Array

Section

1

Hardware Installation

Whether you are a beginner or experienced user, Righteous 3D II's simplified design allows you to get up and running quickly. Installation is simple and all configuration settings are under software control. This section gives you help on how to properly install the Righteous 3D II and how to connect two Righteous 3D II's to utilize the Scanline Interleave feature.



STATIC!
Before handling the Righteous 3D II, be properly grounded by touching the power supply housing.

Installing Righteous 3D II

1. Turn off the power to your computer and remove the computer cover.
2. Select a PCI slot next to your VGA graphics accelerator. Most computers accommodate both PCI and ISA slots. The PCI slots are usually the smaller slots (see the example). Please refer to your computer's reference manual for more information.

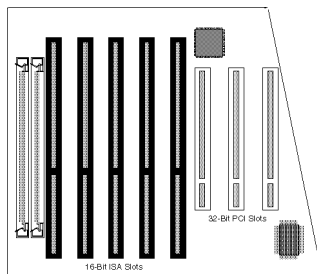


Figure 1.1: PCI Slots

3. Remove the rear slot cover bracket if it is present and save the screw.
4. Now remove the Righteous 3D II from its antistatic packaging.
5. Carefully hold Righteous 3D II by the top edges and lower it into the PCI expansion slot. Ensure that Righteous 3D II seats firmly into the slot.
6. Secure Righteous 3D II in place by fastening its metal bracket with the screw you saved.

7. Connect your monitor cable to the top 15-pin connector (blue) on the Righteous 3D II.
8. Connect one end of the VGA pass through cable to the bottom 15-pin connector on the Righteous 3D II.
9. Connect the other end of the VGA pass-through cable to the 15-pin connector on your VGA graphics accelerator.

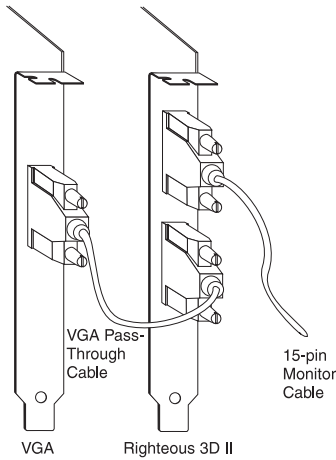


Figure 1.2: Righteous 3D II Cable Connections

10. Replace the cover of the computer.

You are now ready to install the Righteous 3D II software drivers. Refer to Section 2: Software Installation.

Righteous 3D II Diagram

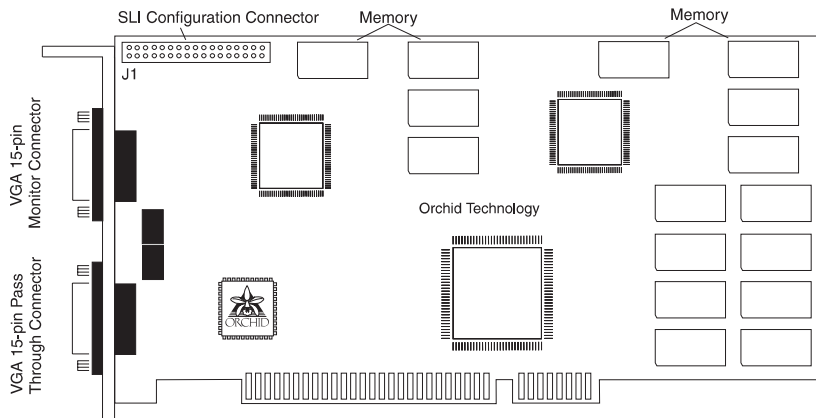


Figure 1.3: Righteous 3D II Diagram

NOTES:

- ❑ 15-pin VGA DDC connector (see Appendix A). Supports all popular standard VGA and multi-frequency monitors.
- ❑ 15-pin VGA pass through connector (see Appendix A). Works with your existing graphics card, including your system board and AGP based card.
- ❑ Memory - 8MB EDO DRAM. (Righteous 3D II is also available with 12MB of EDO DRAM.) The additional memory is added to the back of the card.
 - 8 MB : 4MB for FBI + (2 by 2) TMUs
 - 12MB : 4MB for FBI + (4 by 2) TMUs
- ❑ J1 - SLI Configuration Connector (see Appendix A). The SLI configuration cable is included.

Scanline Interleave (SLI) Feature

Two Righteous 3D II's of the same memory configuration can be connected together to double the texture fill-rate and enable resolutions up to 1024x768. When connected by the supplied SLI configuration cable, the cards automatically enter SLI mode and work simultaneously on each frame of animation.

Connecting two Righteous 3D II's

The following instructions assume that you have already installed one Righteous 3D II card.

1. Select a PCI slot next to the Righteous 3D II installed.
2. Carefully hold the second Righteous 3D II by the top edges and lower it into the PCI expansion slot. Ensure that it seats firmly into the slot.
3. Connect each end of the SLI configuration cable to the 34-pin SLI configuration connector on each card.
4. Connect the VGA pass-through cable and monitor cable to one of the Righteous 3D II cards.



The Righteous 3D II drivers will auto-detect which card your monitor is plugged into and drive it properly.

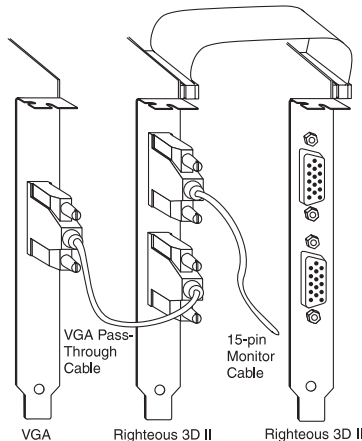


Figure 1.4:
Righteous 3D II
SLI Configuration

Section

2

Software Installation Overview

Once you complete the hardware installation, you can begin the Righteous 3D II drivers and software installation. Righteous 3D II comes with awesome 3D titles for your enjoyment. This section gives you the installation procedures for Windows 95 and DOS.



This manual presumes you are already familiar with the basics of Microsoft Windows. Please refer to the Microsoft manual when terminology or installation steps are unfamiliar to you.

Windows 95

Driver Installation

1. Start Microsoft Windows 95. The New Hardware Found screen appears.
2. Insert the Righteous 3D II CD into your CD-ROM drive.
3. From the New Hardware Found screen, select the "Driver From Disk Provided by Hardware Manufacturer" option. Click on OK.
4. Type in the driver location: D:\WIN95 (where D is the CD-ROM drive letter). Click on OK.
5. Windows 95 copies the Righteous 3D II drivers to your hard drive.

Software Installation

The Righteous 3D II CD-ROM is configured to automatically launch the software installation program.

1. Start Microsoft Windows 95.
2. Insert the Righteous 3D II CD into your CD-ROM drive. The following screen appears:



When the AutoPlay check box is enabled, this program will automatically launch when you insert the CD into your CD-ROM drive.

Figure 2.1: Software Installation Screen

NOTE: A pre-existing hardware installation may prevent the software installation program from launching automatically. If this occurs, run D:\SETUP.EXE (where D is the CD-ROM drive letter). Click on OK.

3. Before selecting any Direct3D game application or demo, you *must* install the DirectX software first. NOTE: It is highly recommended that you install the version of DirectX provided with Righteous 3D II.
4. Click on DirectX and follow the instructions on the screen.
5. After the DirectX software is installed, you will be prompted to restart the system for the changes to take effect.
6. After your system restarts, the Righteous 3D II software installation program is automatically launched.

7. You can make another selection or click on Exit to close the Righteous 3D II Software Installation program and return to the Windows 95 desktop.

User's Manual

Click on the User's Manual button and the program will install the Adobe Acrobat Reader, if not already installed, or it will launch the user's manual. After installing the Adobe Acrobat Reader, click on the User's Manual button again to launch the manual.

Final Reality

A benchmark utility that will test the effectiveness of your system in processing and rendering 3D images. Click on the Final Reality button to enable a series of tests.

Games Demo

Click on this button to play demos that truly take advantage of Righteous 3D II's arcade 3D graphics performance.

Windows 95

Configuring Your Righteous 3D II

The Righteous 3D II Display Properties screen allows you to configure the refresh rate, gamma correction and displays driver information and the hardware configuration.

1. From the Windows 95 desktop, click on the Start button, select Settings, then select Control Panel.
2. From the Control Panel group, double-click on Display. The Display Properties screen appears.
3. From the Display Properties screen, click on the Righteous 3D II Setup tab. The following screen appears:



Figure 2.2: Software Configuration Screen

4. Make your selections from the available options. When you are finished, click on OK or Apply to save your settings.

Information

This selection displays information on the Righteous 3D II driver, the 3D API drivers and your monitor type.



For optimal performance, set the refresh rate as high as your monitor will support.

Refresh Rates

This selection allows you to select the refresh rates for the supported Direct3D resolutions. Resolutions available are: 512x386, 640x400, 640x480, 800x600, 960x720 (12MB only), and 1024x768. Before selecting the refresh rate, verify that your monitor is capable of supporting the setting.

NOTES:

- 👉 Righteous 3D II supports 3D game resolutions up to 800x600 with Z-buffering and up to 1024x768 without Z-buffering.
- 👉 SLI mode (two cards) supports up to 1024x768 with Z-buffering.
- 👉 The resolution supported is determined by the game. Z-Buffering is not selectable. It is a function that can only be used by game developers.

Gamma Correction

The Gamma Correction selection allows you to adjust the brightness of your display. You can change the value of the Gamma for an individual channel (Red, Green or Blue). For example, to set the Gamma for Red, move the scroll bar up or down to adjust the Gamma value.

To test the Gamma value, click on the Test Settings button to view the new Gamma value applied in 3D mode. To return to the Righteous 3D II Display Properties screen, press the ESC key.

Test Settings

Click on the Test Settings button to view the Gamma Correction settings configured.

Hardware Configuration

Select Hardware Configuration to display the SLI configuration, number of FBI's (Frame Buffer Interface), total frame buffer memory, number of texture map units and amount of texture memory. Click on the Hardware Configuration button to display the following screen:

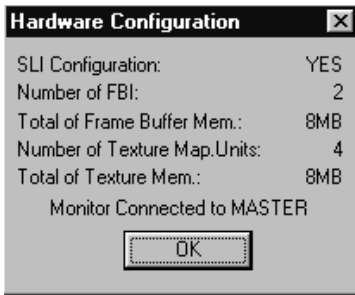


Figure 2.3: Hardware Configuration Screen

Advanced Features

Click on the Advanced Features button to access features that will enhance the Righteous 3D II's performance.



Figure 2.4: Advanced Configuration Screen

Do Not sync buffer swaps to monitor refresh rate - when this box is checked, Direct3D and Glide applications will not synchronize buffer swaps with the vertical retrace signal of your monitor. The rendering performance may increase, however visual tearing may occur.

Force advanced texture filtering for Glide apps - when this box is checked, Glide will turn on Advanced Filtering mode. This will improve the quality of the MIPMapped graphics with a slight hit to performance.

Force trilinear texture filtering for D3D apps - when this box is checked, Direct3D will turn on Trilinear mode. This will improve the quality of MIPMapped graphics with no hit to performance.

Limit texture memory for Glide apps - when this box is checked, TMU memory will be 2MB for Glide games. Some Glide games may not work correctly with 4MB of texture memory.

Force triple color buffering for Glide apps - when this box is checked, Glide will turn on Triple Color Buffering. This will improve the color quality of the MIPMapped graphics with a slight hit to performance.



*Direct3D and
Glide support
can be turned
on simulta-
neously.*

Direct3D

Click on the Direct3D button to turn on Direct3D support for your monitor refresh rates.

Glide

Click on the Glide button to turn on Glide support for your monitor refresh rates.

Default Settings

Click on the Default Settings button to restore the default settings.

Online Manual

This selection will give you access to the Righteous 3D II's online user's manual.

Orchid Contacts

Click on this button to display information on how to contact us.

Section

3

Technical Information Overview

Orchid Technology is known for its responsiveness to its customers. This section gives you a list of helpful tips for troubleshooting your Righteous 3D II. You're also given information on how to contact Technical Support and how to receive advice and support via our online services.

Troubleshooting Righteous 3D II

To help you diagnose problems you may have with the Righteous 3D II, we've presented the following helpful hints in a symptom and solution format. This format serves a twofold purpose:

You may be able to fix your problem . . .

or

if these steps don't help you solve your problem, they will most certainly give you a better handle on what to tell Technical Support once you contact them.

Operation

Symptom	Solution
Computer doesn't power-up or respond when turned on.	<ol style="list-style-type: none">(1) Verify that your computer and monitor are plugged in. Check the power cables.(2) Make sure the Righteous 3D II is properly installed in the slot. The edge connector must be inserted all the way into the expansion slot.
The Righteous 3D II Setup tab doesn't appear in the Display Properties Sheet.	<p>The driver may not have been installed correctly. Check the Windows 95 Device Manager list for the Righteous 3D II. Follow the steps below:</p> <ol style="list-style-type: none">1) From the Windows 95 desktop, click on Settings, then click on Control Panel.2) From the Control Panel, click on the System icon.3) From the System Properties, click on the Device Manager tab.4) Check for "Righteous 3D II" listed under the Sound, Video, & Game Controller category.5) If "Righteous 3D II" is not listed, check for "PCI Multimedia Video Device" listed under the Other Devices category. If it is listed, go to Step 8.6) If "PCI Multimedia Video Device" is listed, remove it and restart your system.7) Refer to the Windows 95 Driver installation instructions in Section 2.8) If "Righteous 3D II" is listed, click on it, then click on Properties.9) Click on Change Driver, then click on the Have Disk option. Type in the driver location: D:\WIN95. Click on OK.10) Follow the instructions on the screen to complete the driver installation.

Table 3.1: Operation Troubleshooting

Display

Symptom	Solution
Computer seems to boot up properly but there's no display.	<ol style="list-style-type: none">(1) Check the power cable to your monitor.(2) Your monitor cable may not be fastened securely and properly. Check both the connection at the monitor and at the Righteous 3D II card.(3) Verify that the VGA pass through cable is connected properly between your VGA accelerator card and the Righteous 3D II.(4) It's possible that your monitor cable is not the correct type for the Righteous 3D II. See Appendix A for the proper pin-out information to determine if your cable is correct.(5) Hook up your monitor directly to your VGA accelerator card to determine if the problem is possibly with Righteous 3D II or the overlay cable.

Table 3.2: Display Troubleshooting

Support and Information Services

Orchid offers a variety of support and information services to help you get the most from your product. The following services are available:

- ▲ Technical Support
- ▲ Electronic Bulletin Board Service (BBS)
- ▲ Return Materials Authorization (RMA)
- ▲ Fax-On-Demand
- ▲ World Wide Web
- ▲ Customer Service

Refer to Table A-1 for details on these services.

Technical Support

If you need technical assistance, our Technical Support Engineers will be glad to help you. You can contact us via telephone, fax or BBS. Before calling Technical Support please have the following information ready:

- The model name and serial number of your Orchid product.
- Your computer information such as CPU type, operating system, amount of installed memory and other peripherals installed in your computer.
- The version number of the Orchid product driver.
- Try to call from the location of your computer.

NOTE: For Return Material Authorization purposes, please keep a copy of your product receipt.

Service	Hours	Country	Telephone Number
Technical Support - Live phone help from Technical Support Engineers	M-F: 7:00am to 5:00pm (PST)	USA UK	(510) 661-3000 (510) 651-6982 (Fax) +44 (1256) 844899 +44 (1256) 364222 (Fax)
Electronic Bulletin Board Service (BBS) - Information on software upgrades, new releases and other helpful information	24 hours a day 7 days a week "	USA UK	(510) 651-6837 14400 baud rate, Parity=N, Data Bits=8, Stop Bits=1 YMODEM and ZMODEM (recommended file transfer protocols) +44 (1256) 363373
RMA (Return Materials Authorization) - Return products for repair	M-F: 8:00am to 4:45pm (PST)	USA	(510) 661-3030 (510) 683-0543 (Fax)
Fax-On-Demand - Automated system for product literature, technical bulletins and other helpful information	24 hours a day 7 days a week	USA	(510) 661-3199
World Wide Web - Product information, technical support, press releases and other helpful information	24 hours a day 7 days a week "	USA Europe	http://www.orchid.com
Customer Service - Order Orchid and Micronics products	M-F: 8:00am to 5:00pm	USA UK Taiwan	(800) 577-0977 (510) 651-3666 (Fax) +44 (1256) 479 898 +44 (1256) 364222 (Fax) +886 2 918 5005 +886 2 911 5472 (Fax)

Figure 3.1: Support and Information Services

Appendix

Technical Specifications

A

This appendix provides the technical specifications and features for Righteous 3D II.

Configuration

Righteous 3D II - 8MB or 12MB EDO DRAM
Triple 64-bit memory architecture

Video Chipset:

3Dfx Interactive Voodoo2 Graphics™

Bus Interface:

PCI 2.1 Compliant

Card Size:

8" x 4.5"

Minimum System Requirements:*

Pentium PCI based system
Available PCI expansion slot
VGA Display Adapter
VGA Compatible Monitor
16MB of System Memory
CD-ROM Drive
MS-DOS 6.0 or later
(Windows 95 required for Direct3D support)

*Some software games may require additional resources

Connectors:

DB-15 analog VGA w/ DDC support
DB-15 VGA pass through connector

Temperature:

Operating: from 0 to 50 degrees C
Storage: from -30 to 60 degrees C

Humidity:

Operating: from 15% to 90%
Storage: from 10% to 95%

Connector Pin-Out Specifications

The connector pin-outs on the Righteous 3D II are the same as the standard 15-pin D-shell connector pin-outs. NOTE: The Royal Blue color indicates that power is available on pin 9 in accordance with the DDC standard.

The 15-pin VGA pass through connector on the Righteous 3D II is used for output from your VGA graphics accelerator (refer to Figure 1.2). The pin-outs for both connectors are as follows:

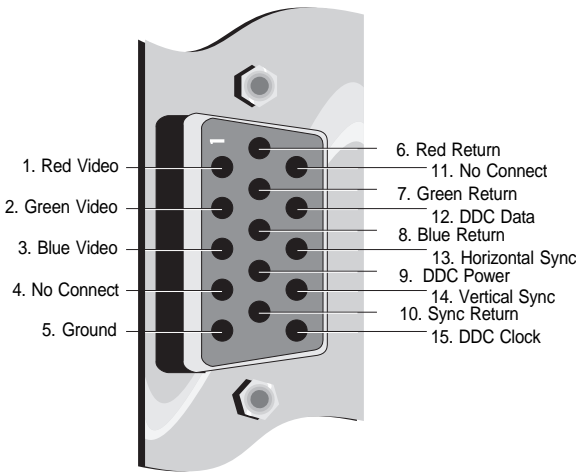


Figure A.1: Connector Pin-Outs

SLI Connector Pin-Outs

The SLI support for Righteous 3D II is accomplished by connecting two cards together with an internal cable to 34-pin SLI connector. This connector is located at the upper left corner of the Righteous 3D II (see Figure 1.1).

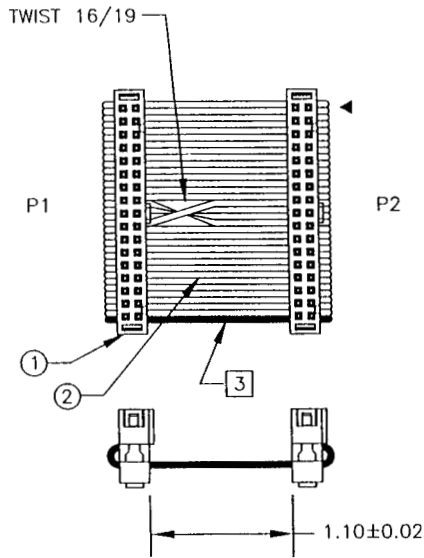


Figure A.2: 34-pin Flat Ribbon Cable

Pin Assignments	
P1	P2
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	22
23	23
24	24
25	25
26	26
27	27
28	28
29	29
30	30
31	31
32	32
33	33
34	34

Figure A.3: SLI Connector Pin-outs

Direct3D™ Overview

B

Direct3D is the next generation of real-time, interactive 3D technology for use on the desktop and the Internet. You can experience more compelling and powerful 3D graphics on the Internet and when using games, education and business applications. Direct3D improves Windows 95 game quality and performance to rival arcade machines.

Direct3D is a complete set of real-time 3D graphics services that deliver fast software-based rendering of the full 3D rendering pipeline (transformations, lighting, and rasterization), transparent access to hardware acceleration and a comprehensive, next-generation 3D solution for your PC. Direct3D provides access to advanced graphics capabilities of 3D hardware accelerators including z-buffering, anti-aliasing, alpha blending, mip mapping, atmospheric effects and perspective correct texture mapping.

Tight integration with DirectX and ActiveX technologies allows Direct3D to deliver next-generation 3D graphics capabilities including video mapping and hardware 3D rendering in 2D overlay planes. Direct3D also integrates with DirectDraw to provide 2D drawing and texture services for 3D rendering.

3D Graphics Glossary

Alpha-Blending - Technique for adding transparency information for translucent objects.

Alpha Buffer - An extra channel to hold transparency information; pixels become quad values (RGBA).

Anti-Aliasing - Subpixel interpolation, which makes the edges appear to have better resolution.

Atmospheric Effect - The result of adding one more layer of reality, such as fog and depth cueing, to an image.

Bi-linear Filtering - A method of anti-aliasing texture maps that averages four adjacent pixels.

Bi-linear MIP Mapping - A texture-mapping process combining bi-linear filtering and MIP mapping.

Blending - Combining two or more images by adding them on a pixel-by-pixel basis.

Decal Texturing - The process of applying a texture to a surface without lighting.

Depth Cueing - The lowering of intensity as objects move away from the viewpoint.

Direct3D - Microsoft's low-level primitive-based 3D API. It includes optional control for low-level transformations, lighting and rasterization.

Dithering - A technique for achieving 24-bit quality in 8-bit or 16-bit frame buffers.

Double Buffering - A method of using two buffers, one for display and the other for rendering. When the new frame is rendered, the two buffers are switched.

Fog - Blending an object with a fixed color as its pixels increase in distance away from the viewer.

Gouraud Shading - Rendering a polygon through linear interpolation using a specified color at each vertex.

MIP Mapping - A method of increasing the quality of a texture map by applying different-resolution texture maps for different objects in the same image, depending on their size and depth.

Perspective Correction - The process of adding realistic convergence to three-dimensional objects as they move away from the viewpoint.

Point-Sampled Texture Mapping - Texture mapping based on a one-to-one relationship between texels on a rendered polygon and a texture map.

Rasterization - Translating an image into pixels.

Rendering - The stage of the 3D pipeline that creates a 2D display from a set of 3D polygons fed from the geometry engine.

Scanline Interleaving (SLI) - Doubles the 3D performance and enables resolutions up to 1024x768. This is accomplished by connecting two Righteous 3D II's of the same configuration together with an internal cable. The cards automatically enter Scanline Interleave (SLI) mode and every odd line of the image is rendered by one, the even line is rendered by the other card.

Texture Filtering - Removing aliasing artifacts, such as sparkles and blockiness, through interpolation of stored texture images.

Texture Mapping - Wrapping textures around objects to add realism or to reduce complexity.

Z-Buffering - A process of removing hidden surfaces using the depth value stored in the Z-buffer.

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FCC NOTICE

Righteous 3D II
Certified compliant with FCC Class B limits, part 15
To meet FCC requirements, shielded cables are required
to connect the unit to a Class B certified device

“This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.”

This equipment generates and uses radio frequency energy and, if not installed and used properly in strict accordance with the manufacturer’s instructions, may cause interference to radio or television reception.

This device has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. Only equipment (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this product.

If this equipment causes interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

1. Reorient the receiving antenna.
2. Relocate the computer with respect to the receiver.
3. Move the computer away from the receiver.
4. Plug the computer into an outlet which resides on a different circuit breaker than the receiver.
5. If necessary, consult your dealer, or an experienced radio or television technician for additional suggestions.

You may find the booklet **How To Identify and Resolve Radio-TV Interference Problems** helpful. It was prepared by the Federal Communications Commission and is available from the U.S. Government Printing Office, Washington, DC 20402. Refer to stock number: 004-000-00345-4.

Orchid Technology is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

Operation with non-certified equipment is likely to result in interference to radio and TV reception. The user must use shielded interface cables in order to maintain the product within FCC compliance.

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