EDGE® 3D On-line User's Guide

Fast Track to Diamond Technical Support

If you want to get on the Diamond Multimedia Systems, Inc. mailing list, please be sure to fill out the product registration card and mail it in today. If you need help, you can contact us by phone or e-mail at the numbers below to get help - fast!

Phone	(408) 325-7110
FAX	(408) 325-7171
BBS	(408) 325-7080 (14.4 KBps, 8 bits, no parity, 1 stop)
	(408) 325-7175 (28.8 KBps, 8 bits, no parity, 1 stop)

Mail
Diamond Multimedia Systems, Inc.
Attn.: Technical Support
2880 Junction Avenue
San Jose, CA   95134

CompuServe
GO   DIAMOND
To open an account, contact
CompuServe Customer Service at (800) 848-8990

America Online
Keyword DIAMOND
To open an account, contact America
Online Customer Service at (703) 893-6288

The Microsoft Network
GO DIAMONDONLINE

Click on either of the shortcut buttons below to directly access our web page and FTP site.   Both of these sites are best viewed with Microsoft Internet Explorer!

FTP	ftp.diamondmm.com
Worldwide Web	www.diamondmm.com
Product Support Email	75300.3673@compuserve.com
	diamondts@aol.com
Sales Information	sales4u@diamondmm.com
Developer relations	developer@diamondmm.com

Technical Support will need to know the name of the product before they can help you.

This will help us to determine if you need a disk or ROM upgrade, as well as diagnose problems more quickly. The version number can be found on the CD-ROM label.

There are several things we may need to know, such as what make of motherboard you have or what system BIOS you are using.

Try to answer what happened, using specific software/hardware. Be as detailed as possible, recording any error messages you may have encountered.

The Diamond EDGE 3D Multimedia Accelerator

Congratulations on purchasing the Diamond EDGE® 3D Multimedia Accelerator! You now own the state of the art in integrated multimedia solutions. The Diamond EDGE 3D is a single slot PCI, Plug and Play solution featuring:

◆ All-in-one board design
◆ Accelerated 3D graphics
◆ High-fidelity wavetable audio
◆ Digital video playback
◆ Software MPEG playback
◆ Two SEGA Saturn Game Ports
◆ Digital joystick port
◆ Plays SEGA Saturn PC games
◆ Accelerated True Color 2D graphics
◆ Displays over 1 billion colors
◆ Extended graphics modes including 1600x1200, 1280x1024, 1152 x 864, 1024x768
◆ 50 stereo digital audio channels at 16-bit 50 KHz
◆ Audio playback at 16 Hz to 50 KHz
◆ General MIDI compatible
◆ Backed by a 5 year warranty, unlimited technical support, and 24 hour BBS supporting up to 28.8 KBps modem connections
◆ PCI bus design
◆ Designed for Windows 95

Diamond EDGE 3D Installation

Because the EDGE®3D is an integrated multimedia accelerator and not just a single function device such as a graphics accelerator or sound card, there are several steps to installing the EDGE 3D into your PC:

Step 1.   Install Windows 95 if you haven't already.

Step 2.   Reboot your computer in MS-DOS mode.

Step 3.   Run the SYSCHCK program from the EDGE 3D CD-ROM. SYSCHK will query your computer to detect and correct any motherboard BIOS Plug and Play issues. Please refer to the Troubleshooting section of this guide for more information on possible Plug and Play BIOS issues you may encounter. SYSCHK will then perform the following tasks:

- ◆   Install NVINST.SYS into your Config.Sys file.

- ◆   Replace your Windows 95 VGA driver.

Step 4.   Power down the computer and install the EDGE 3D card

Step 5.   Reboot Windows 95.

Note: Since EDGE 3D is the first card of it's kind, you may have to give special attention to older PCI-based systems. In order to minimize any difficulties you might experience, please follow these directions very carefully.

Step 6.   Insert the EDGE 3D CD-ROM into your CD-ROM drive.   When Windows 95 loads , the EDGE 3D Installation Wizard will run automatically.

Note: All of the following items must be installed for the entire suite of EDGE 3D features to be enabled:

- ◆   DirectX Drivers
- ◆   InControl Tools 95
- ◆   Video display driver
- ◆   Multimedia/Sound driver
- ◆   MPU-401 DOS Shell driver
- ◆   Joystick driver
- ◆   Diamond Media Rack (audio applications suite)

The Diamond Setup Wizard will prompt you for each of the necessary steps for a complete and painless EDGE 3D installation. Each of the wizard's steps are outlined below.

Step **1.**   Hardware check.   The Diamond Setup Wizard examines your computer to see what Diamond hardware you have installed. This may take a few minutes.

Step **2.**   Once Diamond Setup Wizard has identified your hardware, you will be prompted to select the installation directory for EDGE 3D drivers and software. The default choice is C:\Program Files\Diamond.

Step **3.**   Next you are prompted to choose a Minimum, Full, or Custom installation.

- ◆   Minimal: EDGE Video driver, DOS audio mixer, EDGE installation Wizard and EDGE Help File.
- ◆   Full: Everything
- ◆   Custom: Choose which of the EDGE 3D drivers and support software you want to install.

Step **1.**   Clicking NEXT will install the drivers you have chosen.   Depending on the speed of your computer, this may take a few minutes.   When the primary drivers have been copied to your hard drive, you are prompted to install Supplemental Programs.   Click NEXT to continue.

Step **2.**   The first Supplemental software Diamond Setup Wizard installs is the MediaRack audio utilities.   Press OK to begin MediaRack installation.   For more information on MediaRack, click here{bmc   SHORTCUT.BMP}   A "Setup Completed Successfully" message will   appear when you are finished.

Step **3.**   Next, Diamond Setup Wizard installs DirectVideo drivers. This is done automatically.

Step **4.**   Next, Diamond Setup Wizard installs Intel Interactive Indeo. Click Next to begin.   You will next be prompted to choose between a Windows 95 System installation and a Windows NT system installation.   Choose Windows   95 and click NEXT.

Step **5.**   Next, Diamond Setup Wizard installs Microsoft Internet Explorer 2.0.   Click yes to continue or no if you are already using Internet Explorer 2.0.   Click here for more information on Internet Explorer 2.0{bmc   SHORTCUT.BMP}

Step **6.**   Next, Diamond Setup Wizard launches the EDGE 3D Wizard.   Click NEXT to continue.

Step **7.**   The next screen prompts you to set enable <u>MIDI</u>and joystick support for DOS games under Windows 95.You can also set your MIDI memory address under DOS.   Click the next button to continue.

Step **8.**   The EDGE 3D Wizard will install the EDGE 3D video card driver for you.   Open your Display Control   Panel to configure screen resolution and color depth.   When the EDGE 3D Wizard finishes, you will be prompted to   restart Windows 95.   Choose No.   Continue with your installation.

Step **9.**   You will need to manually install EDGE 3D   audio\multimedia and joystick drivers.

Step **10.**   To install EDGE 3D audio\multimedia and joystick drivers, double-click on the Add New Hardware control panel.

- ◆ Click Next.
- ◆ When asked if you want Windows to search for new hardware, select No, then click Next.
- ◆ From the list of devices, select Sound, video, and game controllers, then click Next.
- ◆ From the list of Manufacturers, select Diamond Multimedia. Then click the Have Disk button.
- ◆ Navigate to the EDGE\NV directory.   Choose the NV1MM.INF file and click OK.   Windows 95 will copy the necessary drivers.
- ◆ Click Finish.
- ◆ Repeat the process to install the MPU-401 in a DOS Shell driver.
- ◆ From the list of devices, select Sound, video, and game controllers, then click Next.
- ◆ From the list of Manufacturers, select Diamond Multimedia. Then click the Have Disk button.
- ◆ Navigate to the EDGE\NV directory.   Choose the NVMPU401.INF file and click OK.   Windows 95 will copy the necessary drivers.
- ◆ Click Finish.
- ◆ Repeat the process to install the Joystick driver.
- ◆ From the list of devices, select Sound, video, and game controllers, then click Next.
- ◆ From the list of Manufacturers, select Microsoft. Choose Gameport joystick from the list of Models.   Click the NEXT button to continue.   You may be prompted to copy files from your Windows 95 CD-ROM.   Click to finish to complete joystick installation.

Congratulations, you have finished installing your EDGE 3D board!   You are now   ready for the ultimate Windows 95 gaming and multimedia experience.   Have fun!

SEGA Saturn Cable and Bracket Assembly

The EDGE® 3D board comes with two SEGA Saturn brackets. The bracket is used to hold the connectors for the SEGA Saturn Gamepads, so you can play SEGA Saturn games right on your PC. There is a bracket attached to the EDGE 3D board, and there is an extra bracket with two connectors.

Installation

Step 1.   Identify a vacant bracket space on the back of your PC, where you will install the SEGA Saturn Cable and Bracket Assembly.

Step 2.   Follow the expansion slot to the end closest to the outside of the computer. You will find there is a metal or plastic cover on the expansion slot, where the bracket will be attached. The slot cover will be attached by at least one screw. Unscrew the expansion slot cover. Place the screws and slot cover in a container, so they do not get lost.

Step 3.   Seat the SEGA 3D bracket in place where the expansion cover was located. Make sure the connectors point in toward the center of the computer.

Step 4.   Secure the bracket with the same screw you removed when you removed the expansion slot cover in step #2.

Step 5.   Use the supplied ribbon cables to connect EDGE 3D to the SEGA bracket. Connect Port A on the EDGE 3D to Port A on the SEGA Bracket and Port B on the EDGE 3D to Port B on the SEGA bracket. Match the red line on each cable so that it lines up with the Pin 1 marking on each of the ports.

Note: There's no software set up necessary.

Connecting Your Joystick to EDGE 3D

EDGE 3D also uses a new and innovative digital joystick port. Looking at it, you'll notice that it looks more like a network or phone port, and less like a   traditional joystick port. However, you can still easily connect your analog joystick to the EDGE 3D and reap the awards of a digital connection.

Step 1.   Connect the RJ-45 connector (the connector that looks like a big phone jack) into the joystick port on the EDGE card.

Step 2.   Connect the serial connector on your joystick to the serial port on the EDGE 3D joystick cable.

That's all you have to do. You've already setup Windows 95 to work with your joystick.

Connecting Your CD-ROM Drive Audio to EDGE 3D

Locate the Mitsumi CD connector on the Diamond EDGE® 3D card. This is located in the center of the EDGE 3D board toward the back. Connect your CD-ROM audio cable to the appropriate connector and the other end to audio output connector on the back of the CD-ROM drive, just like you would to any ordinary sound card.

No software changes are necessary.

Finishing Touches

You are now finished with all of the hardware installation steps. All that is left, with the hardware installation, is to reassemble your computer.

Step 1. Carefully put the cover on your computer. Make sure if you removed screws when you took the cover off, you also secure the cover in place with those same screws.

Step 2. Carefully reconnect all cables to the back of your computer, making sure to reattach them to their proper connections. If you labeled the cables when you removed them, follow your labels to reconnect them properly.

Connecting the Diamond EDGE 3D Card to Another Sound Card

There are several different ways to use your EDGE® 3D card in tandem with either another sound card or a Diamond TeleCommander telephony board. Depending on your system configuration, you can set it up any of the following three ways.

◆ If you are using powered speakers, connect them to the line-out jack on the bottom of EDGE 3D. Using a standard audio plug, insert one end into the line-in connector on the EDGE 3D card (that's the jack on the bottom of the card's backplane) and insert the other end into the line-out connector on your sound card. Make sure that any mixer or other audio software that you use in Windows 95 is set up to talk to EDGE 3D. To do that, open the Multimedia Control Panel and choose the Audio tab. Under the options for Playback make sure that the device listed is NVidia NV1 Wave Playback and under Recording the listed device is NVidia NV1 Wave Record.

◆ If you are using non-powered speakers, connect those to the speaker-out jack of your sound card. Using a standard audio plug, insert one end into the line-in connector on your sound card and insert the other end into the line-out connector on EDGE 3D. But, you can still use EDGE 3D as your primary sound source. Make sure that any mixer or other audio software that you use in Windows 95 is set up to talk to EDGE 3D. To do that, open the Multimedia Control Panel and choose the Audio tab. Under the options for Playback make sure that the device listed is NVidia NV1 Wave Playback and under Recording the listed device is NVidia NV1 Wave Record.

◆ If you are using a Diamond TeleCommander telephony card, you should use it as the central sound source. To setup, connect your speakers to the speaker port on the Telecommander. Using a standard stereo plug, insert one end into the line-in connector on your Telecommander card and insert the other end into the line-out connector on EDGE 3D. Make sure that any mixer or other audio software that you use in Windows 95 is set up to talk to EDGE 3D. To do that, open the Multimedia Control Panel and choose the Audio tab. Under the options for Playback and Record, make sure that the device listed is the Diamond Telecommander.

EDGE 3D® Technical Specifications

System:	IBM PC/AT, 486, compatibles, and Pentium (PCI only)
Bus:	PCI (Intel PCI 2.0 compliant)
Connectors:	VGA standard DB-15 pin (female) monitor connector
Modes Available:	This board is available in the following versions:

- ◆ 1MB DRAM installed, upgradeable to 2MB DRAM
- ◆ 2MB DRAM installed and fully populated
- ◆ 2MB VRAM installed to 4MB VRAM
- ◆ 4MB VRAM fully populated

Monitors:	Compatible with all standard Variable Frequency Analog compatible monitors, VGA compatible fixed frequency monitors.
Dimensions:	VRAM: 7.463" W x 4.20 H
	DRAM: 7.008" W x 4.20" H
Warranty:	5 Years limited warranty. See details in Appendix A.

Programming Information

VESA SuperVGA BIOS Modes Supported:

Mode #	Graphics Mode	Mode #	Graphics Mode, Mode #, Text Mode
100h	640 x 400 x 256	101h	640 x 480 x 256
102h	800 x 600 x 16	103h	800 x 600 x 256

Troubleshooting

Because EDGE® 3D is an exciting and innovative new technology, you may encounter some inconsistencies with older PCI systems during installation and operation of the card. This Troubleshooting guide should be used a resource if you encounter any of the difficulties listed below.

The following is a list of possible error messages given at the end of the EDGE 3D Install system test.

◆ PCI to PCI bridge chip. If INSTALL finds a PCI to PCI bridge then it warns the user that they should place the EDGE 3D card on the first PCI slots to improve performance.

◆ Compaq Presario or Prolinea computer with a motherboard BIOS date of 03/01/95 or earlier. This BIOS does not allocate an interrupt to the EDGE 3D card and the user must upgrade the motherboard BIOS before running EDGE 3D on this computer.

◆ AMI BIOS with a date of 12/15/93. This BIOS does not support multifunction PCI devices. If you attempt to use the EDGE 3D , you will get a blank screen. Upgrade the motherboard BIOS before installing the card.

◆ Award BIOS dated January, 1995 or earlier and Phoenix BIOS 1.0x motherboard BIOS. This BIOS does not allocate an interrupt to the EDGE 3D board. To repair this, go into the BIOS setup and manually allocate an interrupt to the EDGE 3D card. Without doing this, EDGE 3D will hang in the Windows 95 splash screen. Please consult your system manual for more information on making changes to your BIOS.

◆ Phoenix BIOS 4.02 motherboard BIOS. This BIOS does not support multifunction PCI devices. To repair this, go into the BIOS setup and manually allocate an interrupt to the EDGE 3D card. Without doing this, EDGE 3D will hang in the Windows 95 splash screen. Please consult your system manual for more information on making changes to your BIOS.

Below is a list of difficulties you may find while running EDGE 3D. Solutions are also listed below.

Problem: Sony 17fs monitor loses synch intermittently when restarting Windows 95.

Solution: Power the monitor off, then on, to regain synch.

Problem: Running Doom in DOS full-screen mode may cause a system hang in some systems equipped with SoundBlaster cards.

Solution: Boot to a Windows 95 command prompt or restarting your computer in DOS mode.

                  Microsoft provides an updated VGA driver which works around this problem. The driver can be found on the Windows 95 CD in the Supplementary Drivers directory.

Problem: Audio Mixer does not control output; MIDI sounds bad; Preferred device listed in Windows 95 multimedia control panel is incorrect.

Solution: Applications written for Windows 3.x that do not make generic calls to the MCI device handlers for .WAV and .MID output can produce these results. Remove or disable third-party sound card drivers for Windows 95.

Problem: Screen savers launch while running games, your joystick or SEGA gamepad does not respond.

Solution: Disable the Windows 95 screen saver when using any application that uses a joystick or SEGA game pad.

Problem: Quicktime 2.0.1 player does not use preferred multimedia device.

Solution: Remove the SoundBlaster drivers from the system.

Problem: Some games using UNIVBE (Universal VESA BIOS Extension) incorrectly identify EDGE 3D card. Some games automatically default to use the UNIVBE driver.

Solution:
                  EDGE 3D is now supported by UNIVBE 5.2 or later.   This support provides you with more games at high resolution in MSDOS.   To order UNIVBE 5.2 or later please contact SciTech Software at:

                  SciTech Software, Inc.
                  5 Governors Lane, Suite D
                  Chico, CA 95926 USA

                  Phone: 800-486-4823 or 916-894-8400
                  Fax: 916-894-9069

                  Web: www.scitech.com

Problem: Using Bus Logic SCSI card with EDGE 3D, both the SCSI card and EDGE 3D's MIDI sound driver use the same memory address space, I/O=330h, your system may hang.

Solution: Reset MIDI I/O port address using the Resource tab in the properties page for the Diamond Plug and Play MPU-401.

General Questions

This section does not pretend to be the absolute authority concerning your system's configuration, or its interaction with the EDGE 3D. It presumes that you are familiar with your PC and its configuration. You should have your system's technical reference guides handy, or have your dealer assist you.

Question: How do I know what my card is?
Answer: You can determine what Diamond video product you have by looking at the upper right corner of the card. The name of the card should be printed in there. Another way is to look at the sign-on message at system boot up. It will display the name and model of the card on your screen.

Question: How do I get the latest drivers for the EDGE 3D?
Answer: Dial our Bulletin Board System, at (408) 325-7080 or (408) 325-7175, to download them, or call Technical Support.

This section will assist you if you have difficulty in your installation or need some help in diagnosing your system configuration with the EDGE 3D. There are a couple of good reasons why this section is important to read thoroughly. First, it will help you spot trouble areas and solve them BEFORE you have to call technical support. Secondly, this section may help you isolate the problem and as a result, technical support should be able to assist you more efficiently and effectively.

For Each of These Solutions You Should Remember the Following:

◆ When there are several possible solutions given, you may need to try each solution one at a time, rebooting the machine for each correction, until your EDGE 3D works properly.

◆ Do not remove any peripherals from your computer while the machine is on.

◆ If you do have a problem, there may be instances where you are directed to remove another hardware adapter, change a firmware or software setting, or make other changes to your system. This will help to isolate the compatibility conflict. If your system responds successfully, you will know where the conflict occurs.

1. Verify that only one display adapter is installed in your system. If your computer has built-in video on the motherboard, disable it.

2. Remove your EDGE 3D from its expansion slot and clean the edge connector with a soft eraser or clean dry cloth to remove any foreign matter such as natural oil from your hands. Do not rub the edge connector too hard.

3. Remove your EDGE 3D from its expansion slot and make sure the socketed chips are seated firmly in their sockets. Should you need to remove a socketed chip, use a chip puller designed for that purpose. If you are not experienced, please seek assistance from your dealer.

4. Try the EDGE 3D in another machine. If the EDGE 3D works in another computer, there is a conflict between your system's configuration and the EDGE 3D. You can isolate the problem further by reconfiguring your system until you can find the cause of the problem.

5. Check other cards in your system that might be using the same addressing space (e.g. network cards).

6. Try booting from a standard DOS disk. Sometimes Terminate and Stay Resident (TSR) programs get loaded into memory. Because TSR programs require various interrupts to function, some of them may conflict with the EDGE 3D. To temporarily avoid loading them boot from a standard DOS diskette. If the EDGE 3D works after booting from a diskette, chances are a TSR caused the problem.

Question: When I boot the computer the display is not black. It is a different color, such as blue.
Answer: Check the monitor connection. Generally blue, or other color screens are related to improper connections between the video card and monitor.

Installation Questions

Question: I booted up my PC and nothing happens - I do not get video. The EDGE 3D seems to boot up then the system hangs up. When I boot my machine I get 1 long beep and 2 short beeps.
Answer: 1. Make sure the EDGE 3D is seated properly in its expansion slot and that the monitor cable is securely fastened to the EDGE 3D.
2. Make sure your monitor cable has the proper pinout configuration. It should be able to work with a standard IBM VGA analog graphics adapter. Check your monitor cable's pinouts with the pinout information given in this chapter.

Question: My EDGE 3D loses synchronization when I run a graphics application.

Answer:	1.	Check your manual for monitor settings.
	2.	Check your manual which came with the monitor and confirm that the graphics mode you are trying to operate is supported.
	3.	Check to see if your monitor is getting power. You should double check the electrical cable and the power switch.
	4.	Try installing the EDGE 3D in a different slot.
	5.	Disable any video shadowing in your PC CMOS setup. It may conflict with VGA settings.

Utility Program Questions

Question: I am using a high resolution multi-frequency monitor. The vertical refresh rate is set for 1024x768 at 70Hz. When going into Windows or other graphics applications, my display size shrinks quite a bit on the screen.

Answer: Use a slower vertical refresh rate. Your vertical refresh rate may be set too high for the monitor to support it. Your monitor may be compensating for the high frequency rate by reducing the screen size.

Question: My Screen flickers in graphic modes.

Answer: Your monitor may not support a "flicker free" vertical refresh rate at the graphics resolution at which your monitor is operating. Check your monitor specifications and run the utility again to insure your monitor is properly setup. You may need to use the CUSTOM monitor option.

Windows 95 Questions

Question: Does Windows really support 24 bit color?

Answer: Windows 95 can. Windows is actually set up to operate with only a handful of colors (20 to be exact), but video drivers will extend its capabilities. The EDGE 3D Windows 95 drivers support 1 billion colors in Windows 95 programs capable of displaying true color.

Question: When I run Windows the screen shrinks considerably, leaving a wide black border around the edge of the screen.

Answer: The EDGE 3D will output consistent signals to conform to video standards such as the VESA (Video Electronics Standards Association) specifications. This includes "flicker free" refresh rates such as 70 or 72 Hz. The screen shrinking problem tends to be most common among 14 and 15 inch monitors that use automatic resizing to adjust the screen. At the higher refresh rates, some of these monitors do not resize the screen properly. The higher the refresh rate, the smaller the screen shrinks. There is no easy answer for this problem. To avoid it, use a lower refresh rate, or if possible, resize the monitor manually with its adjustments.

Network Questions

Question: My network card does not work with the EDGE 3D.

Answer: You may have a memory addressing conflict. Try to find a memory location which does not conflict with the IBM video memory address at A000-C7FF

Contacting Technical Support

If you could not find an answer to your problem after going through the Troubleshooting section, you should contact Diamond's Technical Support staff. A list of phone numbers and other information to contact us On-line is available at the front of this manual.

Before You Call

Please remember that the Technical Support staff is here to help you get your EDGE 3D Multimedia Accelerator running smoothly. So when you call, please have the following information handy:

Proper name of the product: When you don't know the product's name, the Technical Support representative may have to ask you several questions to find out what it is you have. This can be time consuming for you. The name of the product is displayed during system boot.

The BIOS and PCB version of the product: This helps us to determine if you need a BIOS upgrade, as well as diagnose problems more quickly. The BIOS version is displayed during system boot, and is also noted on the ROM BIOS label on the graphics card.

The EDGE 3D software driver version: Like the BIOS, the Utilities and Drivers disk has programs we update from time to time. You may need the update, or we may be able to understand where the problem lies a little easier by knowing what Motherboard make, BIOS version and chipset: Who makes your motherboard? Which system BIOS are you using and what is the date of the BIOS? What type of chipset does your motherboard use?

Speed and type of your computer: Tell us the processor type (i.e. 486 or Pentium) and its speed.

Manufacturer and model of monitor: Just like computers, there are hundreds of various monitors in use today. Let us know what you are using. Also, PLEASE NOTE WHICH MODES ARE SUPPORTED BY YOUR MONITOR AS WELL AS THE

HORIZONTAL AND VERTICAL TIMINGS SUPPORTED. This information can usually be found in the monitor manual.

Contents of your AUTOEXEC.BAT and CONFIG.SYS files: Get a printout of the files handy or write them down. Almost every caller will get asked to read back the contents of these files, or to answer questions about them.

A list of installed hardware peripherals in your machine: Have a list handy of the make, type, and models of other peripherals you are using, as well as any memory, I/O or IRQ information you can get.

A detailed description of problem: Try to answer what happened, using what software/hardware. Be as detailed as possible.

Returning A Product

If you have contacted our Technical Support staff and we determine that you will need to return your product to us for warranty repair service, you will receive an RMA (Return Material Authorization) number. The following information will assist you in your warranty return:

Basic Steps to Follow:

Step 1.   Call the Technical Support staff to receive an RMA #.

Step 2.   Package the product and return it to us with a proof of purchase, a receipt, a bill of sale, etc. Write the RMA # on outside of box where it is easily readable, and include a written note of the information we requested when you called the Technical Support staff (e.g. system configuration information, AUTOEXEC.BAT and CONFIG.SYS information, etc.). Whenever possible, ship it to us in the container it came in. And always remember to include your name and return address.

Step 3.   We ask that you do not personally bring a defective product to us unless you observe the following: Package it as you would for regular shipping (see #2 above) and deliver it to our receptionist. Once your product is received it will be processed with other returned products. Without proper packaging it will get damaged. We will not accept it without proper packaging.

Note: If you come in to drop off a product, it will be processed and returned as a normal RMA. Do not expect to be given a replacement product while you wait.

Things you should know before you call us for an RMA #:

Step 1.   Warranty Repair: Diamond will repair or replace (at our option) free of charge, products which are under warranty. We require you to furnish us a receipt, or similar bill of sale to determine if the product is under warranty. If you do not supply an adequate proof of purchase with the product you will be charged an out of warranty repair fee, determined by what was done to the product, plus labor costs.

Step 2.   Shipping: For products under warranty, you must pay shipping charges to us, we will pay the shipping charges back. We do not provide express, or next day shipment of products. You will be required to pay for any next day shipping, or special handling you require.

Step 3.   Cross Shipments: We do not ship replacement products to you before we receive a defective product from you. This is normally called a "cross shipment." There are several reasons for this policy, including the fact that it is impossible to determine if the product is a warranty repair candidate (since we do not have the board here to check first). For instance, boards which may have been damaged due to negligence or non-authorized modification are no longer covered under our warranty.

Step 4.   Updates and Upgrades: We will determine if your product requires a software or hardware update when you call us. If it requires an update due to a compatibility problem we fixed, you will get the update free of charge. If the update was created to provide further enhancements to the product, or to upgrade the product, there will be a slight fee to cover our costs. We believe you should have our latest version of our product whenever practical or possible and will maintain an update or upgrade path for you.

Step 5.   RMA Numbers: If you return a product to us without first receiving an RMA number from our Technical Support staff, we will return it. We cannot accept any returns for repair without prior approval, or proof of purchase information.

Trademarks, Copyright & Warranty

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In the interest of continued product development, Diamond Multimedia Systems reserves the right to make improvements in this manual and the products it describes at any time, without notice or obligation.

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San Jose, CA 95134

Diamond EDGE 3D® 2000/3000 Series Warranty

Your Diamond EDGE 3D 2000/3000 Series comes with a five-year hardware warranty. Diamond Multimedia Systems, Inc., (Diamond) warrants this Diamond EDGE 3D against defects in material and workmanship for a period of five years from the date of purchase from Diamond or an authorized Diamond agent. This warranty applies only to the original purchaser of the Diamond EDGE 3D and is not transferable. This warranty does not cover any incompatibilities due to the user's computer, hardware, software or any other related system configuration in which the Diamond EDGE 3D interfaces. Proof of purchase will be required before any warranty consideration by Diamond occurs.

This warranty does not cover any damage caused by negligence, non-authorized modifications, or parts installed without prior written permission from Diamond.

This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, nor as a result of service to the product by anyone other than by Diamond.

DIAMOND IS NOT RESPONSIBLE FOR ANY LOST PROFITS, LOST SAVINGS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF, OR INABILITY TO USE, THIS PRODUCT. THIS INCLUDES DAMAGE TO PROPERTY AND, TO THE EXTENT PERMITTED BY LAW, DAMAGES FOR PERSONAL INJURY. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Some states do not allow limitation of implied warranties, or exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to you. This warranty gives you specific legal rights. You may have other rights which may vary from state to state.

This warranty applies only to this product, and is governed by the laws of the State of California.

FCC Notice

This device complies with Part 15 of the FCC Rules. This device also complies with CE Certification pursuant to EN55002 IEC 801-2, 1991. 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 and television reception. It has been type tested and found to comply with the limits for a Class B computing device, pursuant to Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. If this equipment does cause 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 of the following measures:

◆ Reorient the receiving antenna

◆ Relocate the computer with respect to the receiver

◆ Move the computer away from the receiver

◆ Plug the computer into a different outlet so that computer and receiver are on different branch circuits

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: How to Identify and Resolve Radio and TV Interference Problems.

This booklet is available from the

U.S. Government Printing Office,
Washington DC 20402, Stock No. 004-000-00345-4.

To meet FCC requirements: ''SHIELDED CABLE(S) and POWER CORDS MUST BE USED TO CONNECT THE DEVICE TO A PERSONAL COMPUTER OR OTHER CLASS B DEVICE ACCORDING TO FCC 15.838D.'' ANY CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE COULD VOID THE USERS AUTHORITY TO OPERATE THIS EQUIPMENT.

The use of shielded speakers is also required for FCC compliance

3D Dictionary

Ray Tracing - The process of computing a 3D scene using a lighting model that sends light rays out from every light source in the scene and intersects it with every object in the scene. Actually, in ray tracing you back trace the rays from every pixel in the display or window and keep track of intersections with 3D objects until it reaches a light when you have exhausted all lights in the scene you have the resulting color.

Shading - The process of rendering 3D objects by converting them to pixels from a polygonal representation.

Modeling - As used in 3D graphics, modeling refers to various numerical techniques for approximating the real world. Some examples are 3D graphics engineers model lighting affects with the Phong Lighting model. Phong lighting models specular high lights using $\cos^n(N . L)$. They model sea waves with differential calculus tricks. They model 3D objects with polygons. ETC......

3D scene - Collection of 3D primitives including vectors (lines), polygons and surfaces.

Vertex - A 3D point which gives position information usually represented by x,y,z

Homogeneous Vertex - A Vertex represented by x,y,z,w. For normal 3D vertexes, the w component is 1.0.

Triangle - A polygon with 3 vertexes.

Quadrilateral - A polygon with 4 vertexes.

Triangle Strip - A series of triangles which share common vertexes.

Quad Mesh - A series of quadrilaterals which share vertexes.

3D Primitive - A 3D vector (line), triangle, quad, triangle strip, quad mesh or polygon.

Freeform Surface - A 3D surface that can easily be deformed by the user or application. Freeform surfaces are usually defined by a spline function.

NURB (NonRational B Spline) - A freeform surface defined by a quad mesh called the control points.

Geometric Pipeline - The series of steps that takes a 3D primitive from one coordinate system to a display or window. The steps are usually named as follows: World Transform -> Lighting -> Camera Transform -> Clip to View Frustum -> Projection Transform -> Viewport Transform -> Viewport Clipping -> Rasterization

Camera - 3D computer graphics model a real world camera. The camera model defines a lens and a projection plane. This works exactly the same way as a real world camera. You can think of the camera model in a computer as having a lens. The lens as characteristics like field of view. Field of view is simply the amount of 3D space covered by the lens just like in a real camera. The projection plane is a complex name for the 2D film in a camera.

Projection   plane - A 2D coordinate system used for the final 3D objects. The projection plane is exactly analogous to the film in a camera. The 3D objects are "projected" onto the 2D viewport which can be a display or a window.   Projection is real simple, it is just removal of the Z portion of the 3D vertex in some fashion.

Phong Lighting, Phong Illumination - Numerical formula which approximates real world lights. In the Phong lighting model, lights can be one of three types: ambient, diffuse, or specular. Graphics APIs take the Phong lighting model and create ambient lights, point lights, directional light, and local lights. Ambient lights contribute intensity to all objects in the 3D scene with equal uniformity. Ambient lights do not create shadows. Point lights spread light intensity out in a spherical shape.   The light falls on objects which are directly facing the light. A good example of a point light is a filament in a light bulb. Directional lights model lights located at infinity. Directional lights are used to model the Sun. The light as a direction and it illuminates all objects in the scene from one direction. Local lights create specular high lights. A good example of a specular high light is the reflection on a waxed Apple. Ambient, point, and directional lights do not create high lights but local lights do.

Attentuation - The intensity of a light source falls off as the inverse of the square of the distance from the light

source.   This means that the father away you are from a light, the more dim (or less bright) the light is.   This is pretty obvious.   Attentuation reduces the intensity of a light by the square of the distance between the light source and the object being illuminated.

Fog - Fog effects model real world fog.   The farther the object is from the eye, the greater the fog affect is.   Modelling fog is as simple as obscuring polygons farther from the eye position.

Wireframe - Displaying 3D objects using vectors

Flat Shading, Constant Color Shading - Displaying 3D objects using polygons that are one solid color.   The color of each polygon in the scene is determined by the color information at the first vertex of the polygon.

Gouraud Shading, Color Interpolation Shading - Displaying 3D objects using color interpolation.   Color interpolation   is fast because it only involves an addition which is easy to implement in hardware.   Gouraud shading "washes" out specular high lights so you can't get waxy or plastic type objects to look correct.

Phong Shading - In Phong Shading, the Phong Lighting calculation takes place for every pixel in the polygon.   Do not confuse Phong Shading and Phong Lighting.   Phong lighting is used to model real world lights but Phong Shading is the process of performing the light calculation for every pixel.

Texture Mapping - Texture mapping is the process of applying a 2D bitmap to a 3D polygon.   The biggest problem with texture mapping is aliasing and perspective correction.   Perspective correction is the process of removing the perspective portion of the 2D projection from a pixel.   Perspective correction involves a divide per pixel and divides are typically very slow.   Aliasing occurs in texture mapping because you must do a lookup into the 2D bitmap.   There are various methods to overcome the aliasing of texture mapping.   One simple method is to average the pixels in the 2D bitmap.   This "averaging" technique is called bilinear interpolation.   Another method of correcting aliasing is to use mip-mapping.   These methods are called filtering techniques.   Filtering techniques remove the "jaggies" from texture mapping to produce softer edges and color fidelity.

Point Sample Texture Mapping - The 2D texture bitmap is used as a look up table.   The look up color is written into the window or display.

Bilinear Interpolation Texture Mapping - Look up the color in the 2D bitmap just like with point sample then average the texture map look up by actually doing multiple look ups and averaging them together.   The final averaged color is written into the window or display.

Mip Mapping Texture Mapping - Prefilter the 2D bitmap to create a pyramid of 2D bitmaps.   Look up the pixel color in the pyramid of 2D bitmaps and then average the cube of colors around the look up.   The averaging process is called trilinear interpolation.

Interpolation - Linearly compute a new value by using two known values.   Interpolation in a table is used in statistics to produce those "in between" values.

Procedural Shading - At each pixel a function is called to compute the color of the pixel.   Phong Shading is a type of procedural shading method where Phong lighting is invoked for every pixel.   Texture mapping is another.   Procedural shading is used extensively in the high end desktop publishing market.   Disney used it on their million dollar SGIs to do the affects in Alladin, Beauty and the Beast, and other   animated   films.

Blending, Transparency, Translucency - Blending is the process of "blending" two colors together.   That is it.   It really is that simple.   Blending involves taking two different colors which may be part of 2 different bitmaps and combining them together   in some fashion.   For 3D graphics, blending is used to combine two images where one image is a 3D rendered scene and the other is a 2D background.

Transparency, Translucency - Transparency is used in the CAD/CAM market.   The actual process of doing transparency uses the same hardware as blending.   BUT transparency as referred to in CAD/CAM application usually means making some polygons transparent and others opaque.   A good example of this is the view of an engine where the outside of the engine is transparent and the inside is opaque and you can see how the engine works.   You can see the pistons moving up and down just like in a cut away view except with transparency you can actually see the outer layer of the engine.   Transparency is also used for glass and see through objects in the CAD/CAM market.

For More Technical 3D information Click Here

InControl Tools 95

Diamond's new InControl Tools 95 productivity software for Windows 95 is seamlessly integrated into the Windows 95 operating system and accessible via the display control panel or by right-clicking your desktop and choosing properties.   InControl Tools 95 puts users in control of their computing environment with such new features as resolution and color-depth switching on-the-fly, and pop-up menus featuring helpful tools.   These tools are customizable and include the ability to switch to pre-defined resolutions and color depths, make changes to the expanded desktop, and pan and zoom. Using the left-mouse button, InControl Tools 95 also gives users the ability to launch the Windows 95 Start Menu from anywhere on the desktop, providing easy Start Menu access no matter the size of your virtual desktop.

InControl Tools 95 Features:

Click here for InControl Tools95 Help

InControl Tools95 Features

- Real Time Pan and Zoom
- Monitor Frequency Selection
- Auto Detection of Plug and Play Monitors (DDC)
- Resolution-Switching On-The-Fly
- Programmable Hotkeys
- Control of DPMS Power Settings (Screen Saver, Standby, Off)
- Video Screen Saver
- Associate Applications with Specific Resolutions
- Color Correction and Calibration
- Custom Icon Font Size and Style
- Custom Cursor Color and Size
- DPI Calibration
- Extensive On-line Help

Microsoft DirectX Drivers

The latest multimedia technology for Windows 95 is the DirectX family of multimedia drivers. There is one DirectX driver for each of the multimedia components you might find under Windows 95.   Draw, Video, Sound, Input, and eventually 3D.   EDGE® 3D is the only PC peripheral available that   simultaneously supports all four of these Windows 95 performance enhancements. Below is a brief discussion of each of the DirectX components and how EDGE 3D uses them to provide the premier Windows 95 multimedia experience.   DirectX drivers are automatically installed as part of the EDGE 3D installation routine, so you don`t have to worry about installing   DirectX.   Just sit back and enjoy the ride!

DirectDraw
DirectVideo
DirectSound
DirectInput

DirectDraw

- DirectDraw is used to take advantage of hardware acceleration for draw functions under Windows 95.
- Managed direct application level access to the frame buffer.
- Managed access to off-screen video memory.
- Page flipping.
- A fully defined color keying mechanism.
- DirectDraw is fully integrated with Microsoft Windows GDI so that GDI can render into any surface that DirectDraw can render into. The first set of DirectDraw applications that use page flipping do so in full-screen mode. DirectVideo uses DirectDraw for surface management and video decompression and display.
- The NVIDIA DirectDraw HAL driver provides front buffer, back buffer, and off screen video memory surface management. It also provides the following set of hardware-accelerated features:
- Synchronous or asynchronous hardware page flipping.
- Synchronous or asynchronous bitblit from screen to screen or from CPU to screen support for SRCCOPY, NOTSRCCOPY, SRCPAINT, SRCAND, SRCINVERT, DSTINVERT, MERGEPAINT, NOTSR-CERASE, and SRCERASE raster operations with MIRRORUPDOWN support.
- Source RGB color keying from screen to screen and from CPU to screen.
- Solid color rectangle fill with support for the BLACKNESS, WHITENESS, PATCOPY, and PATINVERT raster operations.
- Arithmetic and integral RGB stretch and shrink support from CPU to screen or screen to screen.
- Accelerated FOURCC decompression of these pixel formats: IF09, YVU9, IV32, IV31, YV12, and NVID with stretch and shrink.
- Additional features provided by the NVIDIA HAL driver include:
    - A locking mechanism for synchronizing access to video memory by software

DirectVideo

- Speed up decompression time by enabling color space conversion in hardware.
- Eliminate tearing (the nasty double-image effect that has become synonymous with PC-video playback)
- Stretch the image to higher resolutions to take advantage of any filtering the hardware provides.

DirectSound

- The Microsoft DirectSound APIs provide high-fidelity, low-latency sound and sound mixing, allowing realistic sound effects for Windows-based games. DirectSound allows direct access to the hardware sound channel of an audio card. It does this by "virtualizing" the direct memory access (DMA) buffer, enabling direct access to on-card audio buffers or emulating this for sound cards.
- A game can store different sounds into different memory buffers using DirectSound. These buffers can be mixed and played without the latency problems associated with Windows 3.x.
- DirectSound is an audio buffer manager. An application can employ Direct-Sound to create DirectSoundBuffer objects. These objects represent audio streams that can be written into directly. A DirectSoundBuffer object may be any of the formats currently supported by the Waveout APIs, including mono or stereo; 8 or 16 bits; and 8, 11, 22, or 44 kHz.
- The NV1 hardware accelerates hardware secondary buffers of all types, formats, and frequencies. NV1 latency is less than 10ms and provides hardware mixing for up to 32 audio channels.

DirectInput

- Microsoft DirectInput frees developers from worrying about which input devices to support, and allows hardware manufacturers to develop new designs without achieving industry acceptance beforehand. Games need a method to communicate with an input device. For the PC, the analog joystick has been the standard by default for more than a decade and has not been improved because the analog joystick method does not permit innovations in input device design. DirectInput solves these problems.
- DirectInput allows Windows 95 to support a more diverse range of devices as they become available. This allows manufacturers to develop new designs without having to worry about compatibility with existing games.
- NV1 supports a digital game port that, when used with the NVIDIA Direct-Input driver, makes all existing PC joysticks digital, which eliminates the need to poll the game port. In addition, there are NV1 DirectInput drivers for two Sega Saturn digital game pads (two axes, nine buttons), two Sega Saturn mission sticks (Arcade joystick with three axes and nine buttons), and two Sega Saturn Arcade Racers (one axis, nine buttons).
- You can configure NVIDIA˙s digital game port and Sega Saturn controllers using the Start-Settings-Control Panel-Joystick properties.

Upgrading EDGE Memory

DRAM
VRAM

EDGE Card Layout

Click here to see where to connect to EDGE 3D®!

Click to see how EDGE 3D connects to speakers, CD-ROM drives and SEGA Gamepads.

Click on the part of the EDGE 3D card that you   want to know more about.   This is a VRAM card.   DRAM cards are also available and are exactly   the same except for their memory type and the shape of their add-on memory modules.
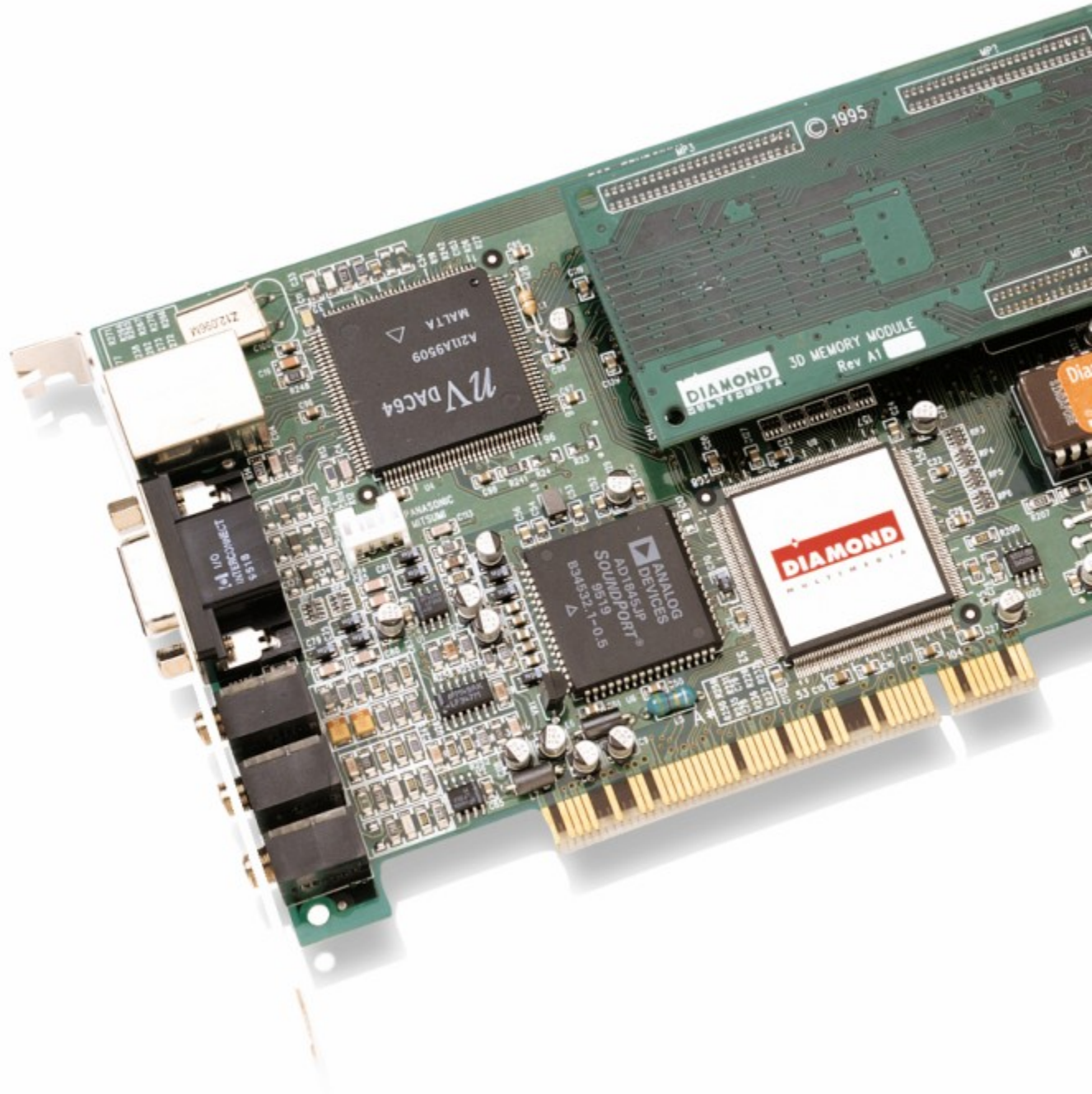
Backplane

Here is a view of the backplane of your EDGE® 3D board.   The backplane is the area that faces out the back of your computer. This is where you connect different devices to your EDGE 3D board.   Click on a port to find out what it connects to.
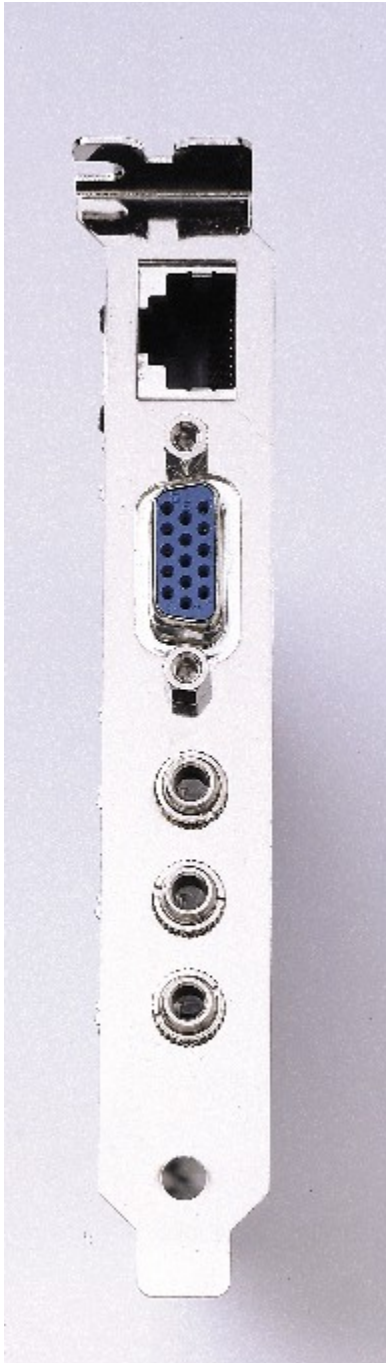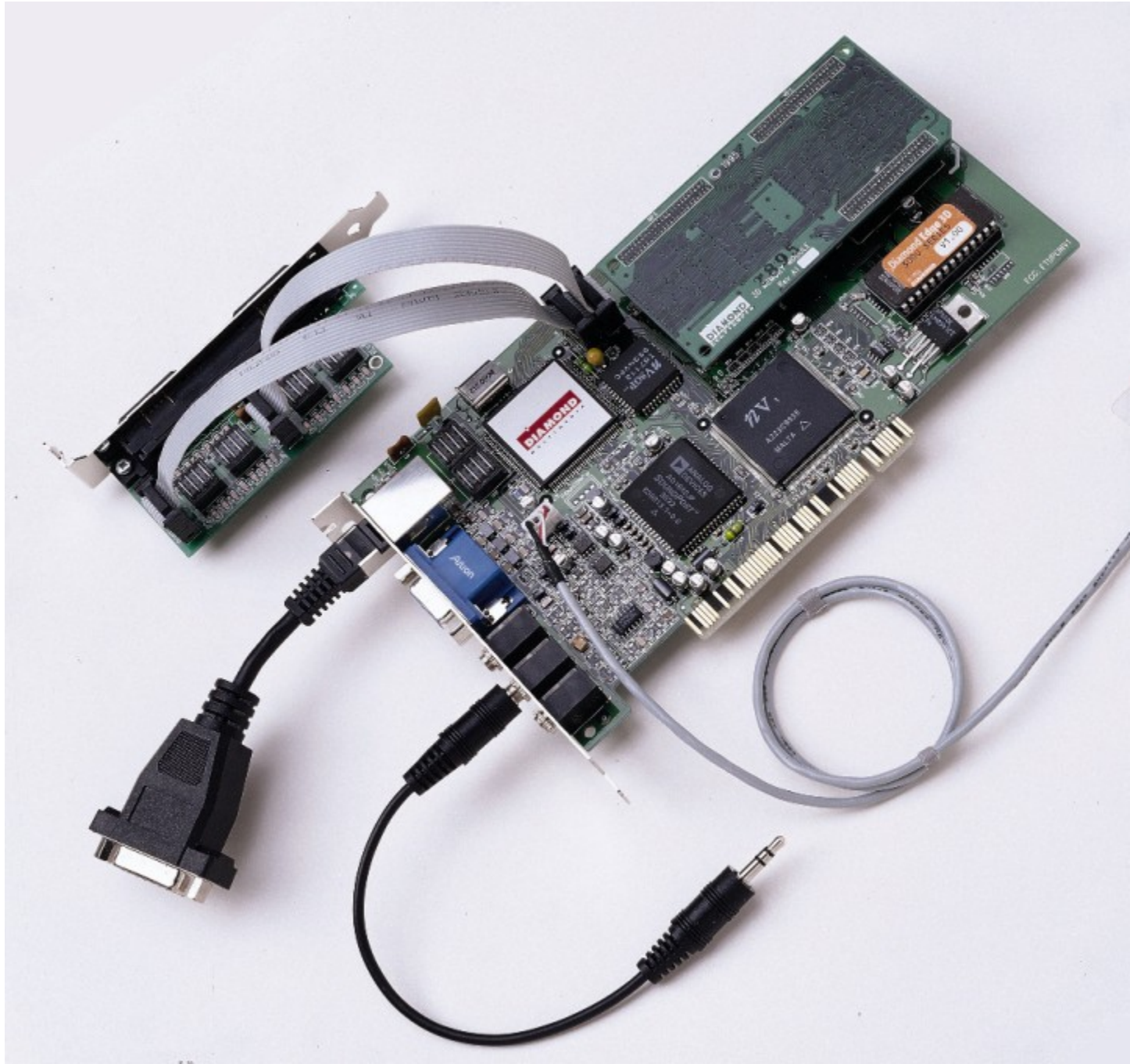
Edge Connections

In keeping with its innovative multi-function abilities, EDGE® 3D can connect to a   host of multimedia peripherals.   These include:

      Powered Speakers
      CD-ROM Drives
      SEGA Gamepads (Essential for playing Virtua Fighter!)
      Joysticks

Please click on the picture below to find out which connection is which!

Joystick Connector

This is the world's first digital joystick port, designed to take advantage of the next generation of high-performance digital joysticks.   By using the provided adapter cable, you can connect any standard joystick to EDGE® 3D and reap the benefits of faster, smoother game operation.

You can also use the adapter cable for MIDI connections.

SEGA Gamepad Connector

Connect your SEGA Gampads here .   Click here for more information on installing SEGA Gamepads.

CD-ROM

Use the provided cable to connect the audio port on your CD-ROM drive to this connector.

Audio Connection

The audio in port can be used to accept input from external audio devices, such as CD-ROM drives and other sound cards.   Particularly if you play older DOS games, you should leave your old sound card installed and connect its line-out port to EDGE 3D's audio in port for complete audio support.

BIOS chip

The BIOS chip contains basic software that identifies EDGE 3D to your computer and to Windows 95.   When you start your computer and you see a blue stripe along the top of your screen that says EDGE 3D, that information comes directly from the BIOS chip.

Edge® 3D Audio

MediaRack
Wave Table
MIDI
MPU401 for DOS
Connecting EDGE 3D to Another Sound Card

Wave Table

For the most realistic sounding games and high-fidelity multimedia, you need a wave table sound card.   Rather than imitating sound the way non wave table sound boards do, wave tables contain recorded samples of real instruments, much like a synthesizer.   These same samples are used   whether you are playing the latest Windows 95 games or composing your own MIDI masterpiece.

For better wave table performance, EDGE 3D uses downloadable wavetables that are stored in your computer's memory rather than being stored on your hard drive as wave table samples often are.   Having the wave tables stored in memory provides for much faster access to the wave tables and better, smoother audio performance.

Technical Note: When you install EDGE 3D for the first time, you'll be given the choice of installing a 1MB or 6MB wave table. Only choose   the 6MB wave table   if you have 16MB or more memory installed in your computer.   If you do install the 6MB option and experience sluggish or slowed performance, adding more memory will solve your problem.

MIDI

EDGE 3D supports 32 voices and 50 channels of digital audio.   That's enough channels for every instrument in an orchestra have it's own channel.

MPU 401 for DOS

Although EDGE 3D is a Windows 95 product, there are still a lot of DOS games that demand to be played.   In order to better support gaming in a DOS environment, EDGE 3D supports MPU-4-01 support in a Windows 95 DOS session or DOS "box". Any DOS-based game that supports General-MIDI as a sound option and that can run in a DOS session can take advantage of this.   Using this feature,   DOS games can take advantage of EDGE 3D's state-of-the-art audio capabilities.

MPU-401 DOS capabilities are installed as part of the normal installation process.   If you skipped that portion of the installation or chose not to add MPU-401 for DOS support, you can do it now by opening the Windows 95 Control Panel, and starting the Add New Hardware Wizard.

For more information, please see the section on EDGE 3D Installation

DRAM

DRAM Memory Upgrade Installation Instructions

A DRAM Memory Module can easily be added to expand the memory on your graphic accelerator from 1MB to 2MB of DRAM.

Installing the DRAM Memory Module

- With the power off, remove your computer's cover and find your Diamond graphics card.
- Remove the bracket screw holding the graphics card, and carefully remove the card by firmly grasping the top edge of the card and pulling upward.
- Lay the graphics card on a flat, non-conductive surface, chip side up.
- Remove the upgrade memory from the anti-static container.
- RAM Chip Orientation: Each RAM chip has a small round circle at one corner. You will be lining up the small circle at the corner of the RAM chip with the beveled edge on the empty RAM chip socket.
- After you have lined up the RAM chip, check to see that the small metal pins on the RAM chip line up with the tiny grooves in the socket.
- Place the RAM Chip into the Socket: Once you have lined up everything, gently place the RAM chip into the socket. Do not push in the chip until you are sure everything is lined up correctly.
- Press the Chip in: When you have determined that the chip has been correctly positioned, press the chip into the socket, firmly and evenly, until it is seated down into the socket.
- Once you have completed installing the RAM, re-install your graphics card according to your manual.
- When you boot your system, you should see the new RAM amount displayed with the graphics card sign-on message. If this is incorrect, carefully remove the RAM and follow these steps again. If you still experience problems, call Diamond Technical Support at (408) 325-7070

WARNING!
Once you have installed the DRAM Expansion Module, do not attempt to remove it.   The pins are seated very tightly and you could easily damage the circuit board.

VRAM

VRAM Memory Upgrade Installation Instructions

The VRAM Memory Module can easily be added to expand the memory on your graphic accelerator from 2MB to 4MB of VRAM. This module is a circuit board with either four 256x16 or eight 128x8 surface mount VRAM chips.   The module attaches to the VRAM at connectors MP1 through MP3.

Installing the VRAM Memory Module

- Please turn off your system and ground yourself by touching the bare metal of the system's power supply case
- to dissipate static electricity.

- Remove the EDGE 3D card from your computer.

- On the EDGE 3D card, locate connectors MP1, MP2, and MP3, as well as the Memory Module
- Orientation Mark.   Also note the locations of these connectors and the orientation mark on the VRAM Memory Module.

- Carefully match the orientation marks of the Stealth 64   Video VRAM and the VRAM Memory module.   Next, align
- the two rows of pins on the VRAM Memory module with the two rows of sockets, MP1 and MP2 in the EDGE 3D
- VRAM header-connector.   Finally, align the pins on the VRAM Memory module with the sockets on the
- EDGE 3D at MP3.

- NOTE: The chips on the VRAM Memory module face the chips on the EDGE 3D.   Be very
- careful to align the pins correctly with the connectors before going on to step 5. (See warning below.)

- Carefully press the two cards together so that they seat smoothly and completely into the header-connectors.   Inspect carefully for bent or misaligned pins.

- Reinstall the EDGE 3Dadapter into your computer.

WARNING!
Once you have installed the VRAM Expansion Module, do not attempt to remove it.   The pins are seated very tightly and you could easily damage the circuit board.

MediaRack

Media Rack is an all encompassing suite of audio applets that will let you harness the power of EDGE® 3D's audio engine. Designed to look and operate just like your home stereo system.

To launch Media Rack and Explore it yourself, please click here:

For MediaRack Help, please click here:

Extras

[WAV Files](#)
[MPEG Files](#)
[Microsoft Internet Explorer](#)

WAV Files

Your EDGE® 3D CD-ROM contains several WAV files that you can use to demonstrate EDGE 3D's awesome audio capability.

These are the WAV files available on the CD-ROM.

Click on the WAV files you would like to hear.   This help file assumes your CD-ROM drive is assigned to the letter D.   If not, the following file will not play when you click the buttons to the right. To play the files run Windows 95 media player and manually load the MPEG files from the EDGE 3D CD-ROM.

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Note: the numbers – 22 and 44 – that appear after the title refer to the sampling rate of each file, 22KHz and 44Khz respectively.   44Khz files have better audio resolution, but they are also larger files and take up more hard disk space

MPEG Files

Your EDGE® 3D CD-ROM contains several MPEG files that you can use to demonstrate EDGE 3D's video and MPEG playback capabilities.

These are the MPEG files available on the CD-ROM. This help file assumes your CD-ROM drive is assigned to the letter D.   If not, the following file will not play when you click the buttons to the left.   To play the files run Windows 95 media player and manually load the MPEG files from the EDGE 3D CD-ROM.

Click on the MPEG files you would like to hear   (You need to install MPEG drivers for these files to play properly .   MPEG drivers are installed as part of EDGE 3D's installation process.   Click here for more information on EDGE 3D installation.

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{button ,EF(`D:\samples\mpeg\clips\rail116.mpg',`0]]]',1)}Rail116.mpg
{button ,EF(`D:\samples\mpeg\clips\work054.mpg',`0]]]',1)}Work054.mpg
{button ,EF(`D:\samples\mpeg\clips\work067.mpg',`0]]]',1)}Work067.mpg
{button ,EF(`D:\samples\mpeg\clips\work071.mpg',`0]]]',1)}Work071.mpg

Note: If your MPEG files do not play when you click on the button, make sure you have the MPG file format associated with the Windows 95 media player.   Please see your Windows 95 documentation for more information.

Installing and Using Microsoft Internet Explorer 2.0

Installation of the Microsoft Internet Explorer v2.0 and creating a RAS Icon to connect to MSN using RAS from Dial-Up Networking

- Install the Microsoft Internet Explorer 2.0 Program from the provided disk by running MSIE20.EXE from A(or B):
- Re-start the system and click on The Internet icon to go through the Internet Setup Wizard.
- Select "Connect Using my Local Area Network.
- Click Next.
- Chose to use Internet Mail if you have a provider.
- Click Next.
- Click "Use DHCP…".
- Click Next, Next, then YES to continue anyway.
- Do not enter a Gateway Address.
- Click Next, then YES to continue anyway.
- Click Finish and restart your system.

Call the MSN at 1-800-386-5550 or connect to MSN with your analog modem to open an account.

Create a MSN Dial-Up Networking Icon:
- Click on the "Make New Icon" option in Dial-Up Networking.
- For the name field enter "The Microsoft Network".
- Select the "Diamond NetCommander Data Line 1" for the modem field.
- Click Next.
- Enter the Area Code and Phone Number for a ISDN POP listed at the end of the
- document
- Click Next, then Finish.
- Right-Click The Microsoft Network RAS Icon and select Properties.
- Click on Server Type - Make sure "PPP: Windows 95, Windows NT 3.5, Internet" is
- selected in the Type of Dial-Up Server field.
- Disable NetBEUI if enabled.
- Disable IPX/SPX if enabled.
- TCP/IP settings should be Server Assigned IP and Name Server Address.
- Exit Icon Properties.

Double-click on The Microsoft Network RAS icon.

Enter the required information:
- **User Name**: MSN/your account (NOTE: you must precede your account name by "MSN/").
- **Password**: your password.
- Click "connect"

Double-click The Internet icon to browse the World Wide Web!

A Quick Guide to Using Microsoft Internet Explorer

A Quick Guide to Using Microsoft Internet Explorer 2.0

Microsoft Internet Explorer is a powerful web browser that takes complete advantage of Windows 95 and works as an excellent compliment to NetCommander.

For more information, please see the Microsoft Internet Explorer Help File.

Tips for using Microsoft Internet Explorer

Any of the commands you can give to Internet Explorer are available from it's taskbar.   For a definition of what each taskbar button does, hold your cursor over the icon until pop-up help appears.

Keyboard shortcuts:

Stop the current activity	ESC
Go to the previous page	Backspace
Go to the next page	Shift + Backspace
Add to favorites	Alt + A

Any website you save as a "favorite" is stored as a Windows 95 shortcut.   You can copy these shortcuts anywhere you want for quick and easy access to your favorite web pages.   Double-click on one of these shortcuts and Internet Explorer will open and take you right to that page.

Known Bugs

Games

[Virtua Fighter](#)
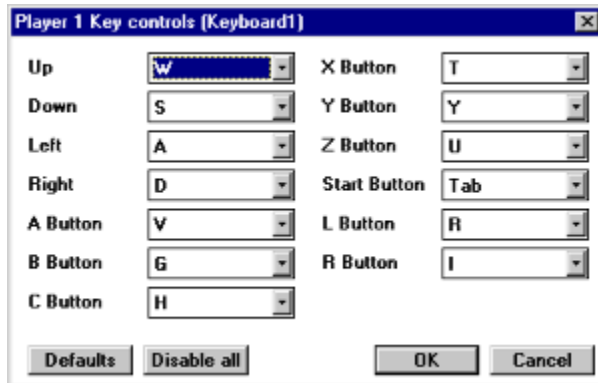[Panzer Dragoon](#)
[NASCAR Racing](#)

Virtua Fighter

Installation and getting started
- Place the Virtua Fighter CD into your CD-ROM drive.
- Open Explorer and Navigate to your CD-ROM drive, usually D:\.   Run
- \Install.
- You will be given a choice between full installation which requires
- 20MB of hard disk space
- and a minimal installation which requires 14MB of hard disk space.
- Make your choice and click OK to begin the installation process.
- After installing Virtua Fighter, you will see 3 buttons on a dialog box, giving you the option to Play, Exit, or Uninstall. Click the "play" button, Virtua Fighter will start.
- Make sure you have inserted the Virtua Fighter CD before you begin playing the game.

   Virtua Fighter can be played using a keyboard, joystick attached to the EDGE® 3D digital joystick port or a SEGA Saturn GamePad or Virtua Stick. To change the device you want to use to control Virtua Fighter, right-click on Virtua Fighter and choose Configurations.   You can also use F6.   This dialog box contains all of the settings for playing Virtua Fighter.   If you are playing with two people, you will need choose device settings for both Player 1 and Player 2.

   Keyboard Controls

Panzer Dragoon

<u>Installation Instructions</u>
- If you have an EDGE® 3D board with 2 or more MB of memory, we recommend that you select "full sound capability". From the Options menu choose "Change Sound Setting" and "Number of Sound".
- The game will pause when you change the screen size between full-screen and window. Press F3 to continue the game.

1. **Note:** If you are using the 1MB DRAM board, please don't choose "Full sound capability". This setting will be active after you restart the program.

Installation and getting started
Panzer Dragoon supports Autoplay on Windows95.
- Place the Panzer Dragoon CD into your CD-ROM drive, and the install program will run automatically.
- After installing Panzer Dragoon, you will see 3 buttons on a dialog box, giving you the option to Play, Exit, or Uninstall. Click the "play" button, Panzer Dragoon will start.
- Make sure you have inserted the Panzer Dragoon CD before you begin playing the game.

Panzer Dragoon can be played with your keyboard, a standard joystick connected to the EDGE 3D digital joystick port, or with a SEGA Saturn GamePad or Virtua Stick. Use the Change Control command from the Panzer Dragoon Options menu to select the device you want to use.

Keyboard Control

NASCAR Racing

<u>**Installation Instructions**</u>

Installing NASCAR Racing

Note: Before installing NASCAR, both Windows 95 and the EDGE® 3D multimedia accelerator must be installed on your system.

- Start Windows 95
- Insert the NASCAR CD-ROM into your CD-ROM drive.
- Select RUN from the Start Menu.
- In the RUN dialog box, enter *X*:\NASCAR\SETUP and click OK.   (Note: Replace *X* with the drive letter of your CD-ROM drive.)
- NASCAR installation will offer two installation options: CD-ROM and Hard Drive.   The CD-ROM option will install only the minimum files need to run NASCAR.   Use this option if you have limited hard drive space.   The Hard Drive option will install the majority of NASCAR files to your hard drive for faster and smoother game performance.   The default installation folder is C:\NASCAR.
- The SETUP program will create a folder for NASCAR Racing, the NASCAR Racing manual and Readme files.
- To start the game, double-click on the NASCAR Racing icon in the NASCAR Racing folder.

In-Game Hot-keys

Whilst you're racing, it's very important to keep a close eye on how your car is performing. All the changes that you make to the car during testing, will affect handling and performance out on the track.

F1

Every time you finish a lap, your pit crew will hold out a board that details your average lap speed. However, in the heat of the moment, it's very easy to miss it. This key calls up the Pitboard Screen enabling you to view your times at any time during a

F2

Because many of the Nascar circuits are ovals, it's very difficult to work out what place you're in, from simply looking in front and behind you. After all, some cars may be right in front of you and yet still be five laps down. Knowing where you are in a

F3

Stock car racing, just like any other form of motor sport, is as much about tactics as driving skills. Knowing how much fuel you've got, whether or not you're going to have to refuel, and when to do it is crucial to finishing in the top places. This functi

F4

Stock car tires come in for a lot of punishment. As a race progresses, and according to how a car is set, they will get hotter and hotter. This option will display the Tire   Temperatures on the outer, middle and inner surfaces. Pay close attention to the d

F5

Another tire indicator. This time, the pit crew will tell you what pressure your tires are set at. Tire Pressures are measured in pounds per square inch. Over inflate a tire and it'll get too hot, under-inflate it and you won't get the performance you require.

F6

When you set up your car, you decide exactly where you'd like the weight to be distributed. This configuration governs how the car handles in corners and when accelerating and braking. If at any time, you need to know how your car is Weighted access this o

F7

Down-force and uplift on a car are governed by the angles at which the four Spoilers are set. To check how your car is configured, use this option. If it's not going fast enough, you may have the spoilers set too high - if you're losing it on the corners,

F8

It's no good pulling into the pits for that all important refuel, if the pit crew haven't got the tires or fuel that you need. This option displays Pit-stop Availability, so always check before pulling off the track, in case your pit crew are out of what y

Customizing the Competition

There are a number of additional setting within the game that will affect the frame rate and graphics details. In the Options/Opponents menu, you may change the number of opponents as well as the number that are drawn or heard.   Select Number to decrease.

If you are just starting out at driving computer simulations and would like to be more competitive with the computer cars without practicing for many hours, there are a number of settings that may be customized. The first thing to do is to decrease the opposition.

Accelerated Time

If you crash out of a race, but want the race to finish without your participation, press the letter A from the standings screen.   You will automatically received a "DNF" for the race.   The screen will then show the updating standings as the race is resolved.

Joystick Calibration and Setting Controls

The joystick control of the menus is turned off by default in NASCAR Racing.   It may be turned on and off by pressing the J key at the main menu.   This will enable/disable the steering device's control of the menu option, but have no adverse affects on steering.

If you enter the driving mode of the game, but your joystick or steering device is not reacting, or if you would like to customize the controls to your preferences, choose Set Controls from the Options/Controls menu.

Save Race Weekend

In NASCAR Racing, you may save your races.   At any point during your race weekend you may press ESC to leave the track and return to the Race Weekend menu.   If you select Done, you will be prompted to Save Race Weekend.   Select Yes to save the race.

Black Flags

If you exceed the pit lane speed limit (55 mph) or pass a car under the yellow, you will receive a black flag.   If you pass a car under the yellow flag, you will be told the number of the cars you must stay behind.   You have until the green flag to get behind those cars.

When you have been given a black flag, you must go to your pit for a stop and go penalty.   Going into a the pit while under yellow will not resolve your stop and go penalty.   You have 5 laps to go to the pit for your stop and go penalty.   If you do not go

Release Notes

If the disk is constantly being accessed while driving your NASCAR (caused by not enough free memory), turn off object texturing or set all texturing options to AUTO in NASCAR Racing options.   You can also reduce the number of opponents you are racing against or the number of opponents seen and/or heard ahead of you and behind you.

Credits

This helpfile was written by Ben Miller

"From the existence or non-existence of one state of affairs it is impossible to infer the existence or non-existence of another.
                    --Ludwig Wittgensein

3D Technical Information

3D Pipeline Background Information

It is necessary to describe the 3D pipeline.   A pipeline is a series of steps that transform something from one step or stage to another.   A 3D pipeline takes 3D objects (like spheres and cubes) from one coordinate system to another finally arriving in device/window coordinates.   During the various pipeline stages the 3D objects are clipped using the camera, illuminated using a lighting equation, and transformed into the display.   Once in the display, a texture can be applied to the object or more complex 3D operations can be performed.

The following diagram shows the pipeline of 3D objects from local coordinates into the display for flat, Gouraud shading or a simple texture map:

3D Pipelines for Flat, Gouraud, and Texture Map

For the first generation 3D products in the PC space some of this pipeline will be performed in the host and the rest will be done in hardware.   For most of our products, anything at or below the level of rasterization is performed in hardware.   The reason for splitting the 3D pipeline between software and hardware is essentially an application of the 80-20 rule.   Currently, the software implementation of the 3D pipeline spends 80% of the time at or below the rasterization layer and 20% in the host transforming, clipping and lighting geometric entities.   Thus, it is obvious that we should accelerate the rasterization layer and below to achieve the biggest bang for the buck.   The same idea applies to 2D acceleration and in general we can say that generating pixels into the frame buffer is the slowest process in any graphics pipeline.

The following table summarizes the split between software and hardware within the pipeline:

Pipeline Stage	CPU or Hardware	Description
Modeling Transformation	CPU	A 4x4 transformation of 32bit floating point or 16.16 integer coordinates
World or Global Transformation	CPU	A 4x4 transformation of all 3D objects into a common space where lighting and clip test can take place
Trivial accept or reject	CPU	A comparison of XYZW to minimum and maximum planes
Lighting Calculation	CPU	Uses various methods for approximating lighting affects. Most popular is Lambert's law for diffuse plus Phong illumination for specular. This

		is Ambient+Diffuse+Specular.
Camera or Viewing Transformation		
Camera Space Clipping	CPU	Actually clip objects to viewing frustum
Divide by W	CPU	Compute 1_w = 1/w and (x*1_w, y*1_w, z*1_w) for each vertex in every object in scene
Transformation to window or screen coordinates	CPU or HW	A simple 3x3 transformation of xyz points
Rasterization	CPU or HW	In the case of CPU, the CPU does actual **edge walking** and the hardware perform **span** conversation. In the case of HW, the hardware does **edge walking** and pixel generation.
Flat shading	HW	Write color into frame buffer using Zbuffer if required
Gouraud shading	HW	Interpolate colors at vertexes and write into frame buffer using Zbuffer if required
Texture map	HW	Lookup color in texture space by performing transformation of screen xy into texture space and write into frame buffer using Zbuffer if required
Gouraud shading and texture map	HW	Interpolate colors, lookup texture color and modulate the two colors into the frame buffer using Zbuffer if required
Phong shading	CPU or HW	Compute lighting equation for each pixel by transforming xyz back into world coordinates then write final color into frame buffer using Zbuffer if required
Phong shading and texture map	CPU or HW	Compute lighting equation for each pixel and lookup texture color and modulate the two colors into the frame buffer using Zbuffer if required

Lighting Features

Lighting is very important for 3D games.   The game developers use 3D Studio and other high end CAD systems to produce realistic lighting affects which contribute to realistic scenes.   These CAD systems use ray tracing, huge disk arrays and massive numeric processor to achieve high performance graphics.   A low end graphics engine cannot be expected to produce the same affects (at least not in the first generation).   One important feature of realistic affects is the lighting equation.   The lighting equation is a fairly simple numerical approximation to real world lights.

In the real world, we are exposed to 3 different types of illumination; ambient, diffuse, and specular. The simplest form of illumination is ambient light.   This type of light produces anonreflective, self-luminous objects.   Each object appears as a monochromatic silhouette unless its individual parts are given different shades.   Diffuse illumination abeys Lamertian reflection.   Objects such as chalk demonstrate diffuse lighting affects.   In order to have diffuse illumination, we must have a light source which is describes as a point light source whose rays emanate uniformly in all directions from a single point.   Specular reflection can be observed on any shiny surface.   Objects such as waxed table tops or plastic parts show specular highlights.   There is a highlight which is caused by specular reflection.   Using specular reflection we get affects light spot lights and cones of light.

Another affect of lighting is attenuation.   Attenuation can be observed as the dimming of light as the distance from the light source increases.   One example of attenuation is demonstrated by a flashlight.   As the distance from the flash light increases, the spot light diminished in intensity and increases in size.   Attentuation

calculations approximate the diminishing intensity of the light source.

Software developers use all different types of lights when defining a scene within a game.   Spot lights are very popular for pre-rendered scenes.   Iron Helix uses a spot light to enhance game play.   Games like Virtual fighter and Sento use ambient and diffuse light sources to produce affects.   The following list shows the lighting requirements from software developers.   This list is based on discussions with developers about what they currently do in their games.

- Ambient and diffuse light sources are necessary
- Specular light sources are a requirement for the next generation of games
- Attenuation must be there for flight simulators
- The lighting equation must apply to textures.   This means that results of the lighting equation must be applied to texture maps at some point.   It can be at the lighting stage of the 3D pipeline (pre-lit textures) or at the rasterization stage.

NV1 Controller

The NVI controller handles all of EDGE 3D's video, graphics, audio, and of course 3D functionality.   It is the only integrated multimedia chip of it's kind.

NV1 also delivers these benefits:

◆ Concurrent acceleration of standard APIs including the Direct X suite from Microsoft Corp. which includes DirectDraw, DirectSound, DirectVideo, DirectInput and Direct3D.
◆ Memory optimized graphics technology which delivers high resolution (640X480 at 16 bits/pixel), 3D graphics rendering at 30+ frames per second using minimal memory (1MB).
◆ Texture mapping which enables the industry's most realistic graphics rendering of any shape objects.
◆ Audio engine that supports midi through wavetable technology which is far superior to any other product on the market
◆ Game console input (i.e.: joystick) synchronized with 3-D displays that captures and portrays realistic screen imagery.

NV1 DAC

The DAC (Digital Analog Converter) is responsible for taking the digital information produced by the NV1 Controller which you can't see and turning it into analog information which is displayed on your monitor. A color mixing palette is built into the DAC.

CD-ROM Connector

Use the provided cable to connect the audio port on your CD-ROM drive to this connector.

Audio CODEC Mixer

The Audio CODEC Mixer takes the compressed audio signal from the NV1 chip and decompresses it so you can hear the audio signal through your speakers or headphones.

Digital Joystick Port

This is the world's first digital joystick port, designed to take advantage of the next generation of high-performance digital joysticks.   By using the provided adapter cable, you can connect any standard joystick to EDGE 3D and reap the benefits of faster, smoother game operation.

DB-15 Monitor Connector

Connect your monitor here.

Audio In

The audio in port can be used to accept input from external audio devices, such as CD-ROM drives and other sound cards.   Particularly if you play older DOS games, you should leave your old sound card installed and connect its line-out port to EDGE 3D's audio in port for complete audio support.

Audio Out

Connect your powered speakers here.   Because this is a non-amplified connector, non-powered speakers will not work.

Microphone Connector

For WAV file recording or playing voice activated games, connect a microphone to this port.

Nothing

This hole doesn't do anything.

VRAM Memory Module

This is a 2MB VRAM memory module.   DRAM memory upgrades are also available.

For more information on VRAM upgrades, please click here.

For more information on DRAM upgrades, please click here.

www.scitech.com

Please wait while the web page loads in your web browser.