

The Oxygen™ GVX420
Graphics Accelerator
User's Guide



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2. Increase the separation between the equipment and receiver.
3. Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
4. Consult 3Dlabs or an experienced radio/TV technician for assistance.

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Specifications Subject to Change With Notice

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INTRODUCTION

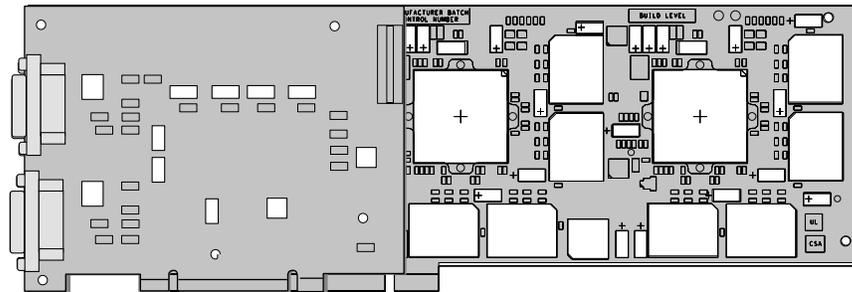
Introduction

Welcome to 3Dlabs!

Thank you for selecting the 3Dlabs® Oxygen™ GVX420 graphics accelerator card!

Oxygen GVX420 delivers high-end geometry and rasterization graphics acceleration on a single AGP/AGP Pro card for the most demanding workstation professional. By integrating two 3Dlabs GLINT R4 rasterizers, the new generation GLINT Gamma G2 geometry processor and 128MB of memory on a single card, Oxygen GVX420 boosts the interactivity of huge models with a 256-bit memory bus.

Oxygen GVX420



Overview

Your Oxygen GVX420 card has the following features:

- **Seamless Dual-head support**

Oxygen GVX420 supports dual high-resolution displays under Windows NT 4.0 and Windows 2000 from a single card, seamlessly supporting a total multi-monitor true-color desktop size of up to 4096 x 1536. The two VGA connectors and two DVI connector allow you to connect either two VGA monitors, two DFP monitors, or one VGA monitor and one DFP monitor.
- **Dual GLINT R4 rasterization processors**

The dual GLINT R4 processors doubles rasterization performance for sustained productivity with more textures and higher resolution screens.
- **GLINT Gamma G2 geometry processing**

On-board hardware geometry acceleration boosts the interactivity of large models by up to three times and offloads the CPU for increased application performance. The 5Gflop new generation GLINT Gamma G2 processes 100% of the OpenGL geometry pipeline in silicon, including 16 simultaneous light sources.
- **Virtual Textures**

Oxygen GVX420 implements 3Dlabs unique full demand-paged virtual texture sub-system in hardware, using on-board graphics memory to cache up to 256MB of textures stored in main system memory. Oxygen GVX420 allows you to manipulate up to 256MB of textures, seamlessly from your favorite applications.
- **PowerThreads SSE OpenGL Drivers**

3Dlabs' new-generation PowerThreads SSE and 3DNow! OpenGL drivers are fully optimized for Pentium III and Athlon processors to dynamically load balance the geometry and lighting load between the GLINT Gamma hardware geometry processor and host CPU. PowerThreads SSE and 3DNow! give you the power of geometry hardware *plus* the additional power of Pentium III's SSE-instructions or Athlon's 3DNow! instructions for full performance scalability with faster host CPU's.
- **Dynamic load balancing**

When the GLINT Gamma processor is busy, geometry and transform calculations are automatically shared between the CPU and the GLINT Gamma.
- **High-resolution Digital Flat Panel Output**

The Oxygen GVX420 is pre-configured with a factory-installed daughter card that provides support for digital flat panel displays through two Digital Video Interface (DVI) connectors. The daughter card provides improved on-screen image quality at resolutions up to 1280 x 1024 on two monitors.
- **Quad-buffered stereo**

Left and right buffers are flipped simultaneously to preserve synchronization in your stereo 3D images at resolutions up to 1280 x 1024.
- **128 MB memory**

128 MB of SGRAM memory supports high-precision, high-performance acceleration.
- **High-precision, high resolution display**

Your Oxygen card has dual 300 MHz RAMDACs enabling flicker-free resolutions up to 2048 x 1536 on a single monitor or 4096 x 1536 with two monitors connected.

Introduction

- **16, 24, and 32-bit linear Z-buffer**
The Z-buffer provides the highest level of depth-precision, even at the highest resolutions.
- **Full AGP support**
Full AGP support ensures high-performance 3D acceleration through the advanced features of the AGP/AGP Pro bus.
- **SoftEngine AutoCAD support**
SoftEngine enhances AutoCAD R12, R13, R14, and LT performance by up to four times on Windows NT systems.
- **Colorific screen-to-print color matching**
Colorific simplifies color matching without sacrificing accuracy.
- **Control Panel Application Configuration**
3Dlabs' advanced control panel and task-bar applet let you optimize your system configuration for your favorite professional applications in just three mouse clicks.

System Requirements

Your system needs a minimum of the following features in order to support Oxygen GVX420:

- Intel Pentium II or AMD Athlon K6 or compatible, 166 MHz system
- Windows® NT 4.0 Service Pack 5.0 or later or Windows 2000 operating system.
- Minimum 64 MB RAM (Random Access Memory)
- 16 MB available hard drive space
- AGP/AGP Pro and adjacent PCI expansion slots
- VGA multisync monitor or DVI digital flat panel

Introduction

Software Partners

Your Oxygen GVX420 card and drivers are designed to optimize the performance of a variety of software applications, several of which are listed below. Many of these applications are also tuned to the Oxygen GVX420 to further improve the performance that you will see when using the card, drivers, and application together. For the most current information about applications support, testing, and certification status, please visit www.3dlabs.com.

Software Application	Web Site Address
AutoCAD	http://www.autodesk.com
Colorific	http://www.colorific.com
3D Studio MAX	http://www.ktx.com
Lightscape	http://www.lightscape.com
LightWave 3D	http://www.newtek.com
Maya	http://www.aw.sgi.com
MicroStation	http://www.bentley.com
Pro/ENGINEER	http://www.ptc.com
SDRC I-DEAS	http://www.sdrc.com
Softimage 3D	http://www.softimage.com
SolidWorks	http://www.solidworks.com
Unigraphics	http://www.ug.eds.com/

CHAPTER 1 - INSTALLATION

Getting Ready

To successfully use your new Oxygen GVX420 card, you must install the card and the accompanying driver software. Whether you install your new card or the driver first depends on whether a video card is already present in your system.

If there is a video card in your system: Uninstall the drivers for the existing card, then install the Oxygen driver. Once the new driver is loaded, remove the old card and install your Oxygen GVX420 card. The instructions for uninstalling an old driver and installing the new driver begin on page 3.

If there is not a video card in your system: Install your new card as described in the Installing Hardware section, below, then install the driver.

Once the basic installation is complete, you can choose to install the SoftEngine and Colorific enhancements as described on page 7.

Note: Be sure to register your new card using one of the options described on page 8.

Before You Start

Take every possible precaution against static electricity as you prepare to install the card: static can damage components. We have included an anti-static wrist strap for you to wear while installing the hardware: you should also try to work in a static free area (such as on a tile floor rather than carpet). You might even consider wearing special ESD, or at least rubber-soled, shoes.

Save any work in progress and exit any open applications. Always back up your system before you install new hardware or software.

Have your anti-static strap and a Philips-head screwdriver ready.

Installation

Installing Hardware

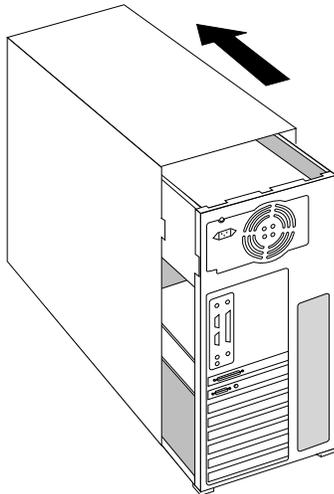
Your Oxygen GVX420 card is designed to work in an AGP or AGP Pro slot, and the adjacent PCI slot, in your system. Check the documentation for your system to locate the AGP or AGP Pro expansion slot.

To remove an old card from your system

1. Make sure you have uninstalled any old drivers and installed the Oxygen driver in their place.
2. Turn off and unplug the power source for your system and each of its peripherals.
3. Unplug the monitor cable from the old card.
4. Remove the cover from your system.
5. Attach the anti-static strap to your wrist, and attach the other end to a bare, conductive (as opposed to painted or sticker-covered) area of your system's chassis.
6. Remove any screws securing the card to the chassis.
7. Lift the card out of the slot.

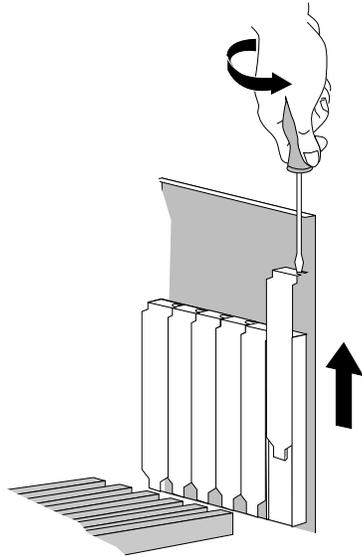
To install your Oxygen GVX420

1. Turn off and unplug the power source for your system and each of its peripherals, if you have not already done so.
2. Remove the cover from your system so you can access an appropriate expansion slot. See your system documentation for the AGP or AGP Pro slot location.



Installation

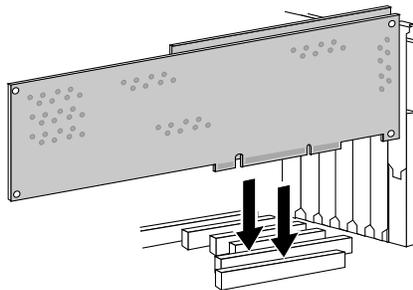
3. Locate the AGP or AGP Pro slot and remove its slot cover. The PCI slot adjacent to the AGP or AGP Pro slot must be empty to make room for the daughter card.



4. Remove the slot cover from the PCI slot adjacent to the AGP or AGP Pro slot.
5. Attach the anti-static strap to your wrist, and attach the other end to a bare, conductive (as opposed to painted or sticker-covered) area of your system's chassis.
6. Remove the card from its anti-static packaging. Write down the serial number for registration and future use.
7. Align the connector on the Oxygen GVX420 card over the AGP or AGP Pro slot and the connector on the daughter card over the adjacent PCI slot before attempting to seat the cards.

Important! See your system documentation for instructions on securing the card to the chassis. Loose cards and connections can cause grounding and operating problems.

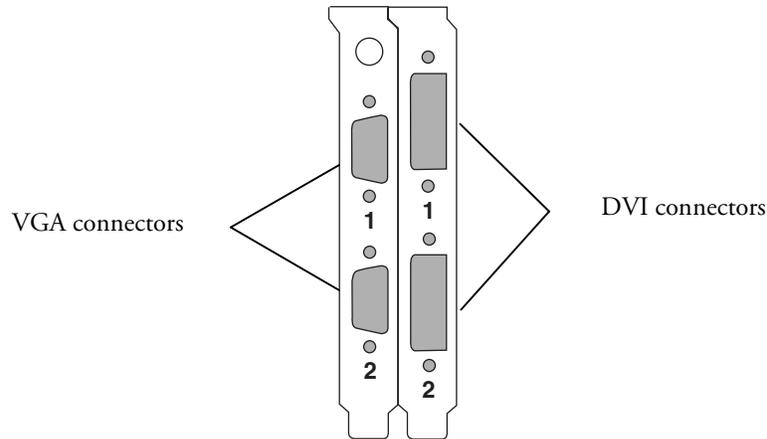
Installing Oxygen
GVX420 with
DVI daughter card



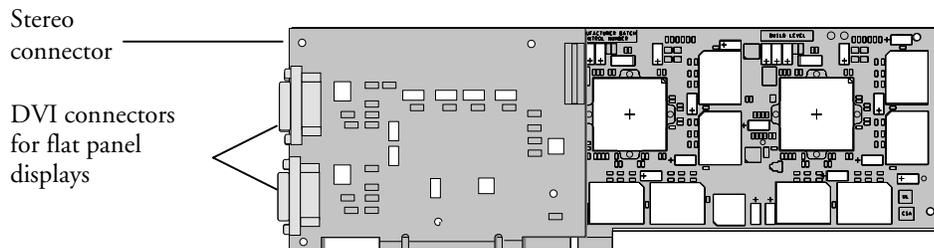
8. Remove the anti-static strap and replace the cover on your system.

Installation

9. Connect the video cable from your monitor to one of the VGA connectors on the base board or one of the DVI connectors on the daughter card. Always connect your first or only monitor to a connector marked "1" and then connect your second monitor (if used) to one of the connectors marked "2".



10. If you want to attach a second monitor, connect the second monitor to either the VGA or DVI connector marked "2". The Oxygen GVX420 card supports multi-monitor functionality on one card. You can connect either two VGA monitors, two DFP monitors, or one VGA monitor and one DFP monitor.



11. Plug in and start up your system, including peripherals, and log on to your operating system.

Installing Software

The *Oxygen Product CD-ROM for the Oxygen GVX420* includes Oxygen PowerThreads video driver software, which lets you set image quality and performance preferences for your card. It also includes the Soft Engine AutoCAD accelerator and productivity tool package, and Colorific screen-to-print color matching software. Installing Soft Engine on your AutoCAD equipped system will improve graphics performance by up to four times, while Colorific painlessly ensures that what you see is what you print.

This section describes the two software installation processes for supported Windows operating systems.

Installation

To uninstall an old video driver

1. If there is an icon for the video card on the taskbar, desktop, or on the Control Panel, select the icon and then check for an uninstall option. If an uninstall option exists, select the option and follow the instructions. (To display the Control Panel, click the Start button, point to Settings, and click Control Panel.)
2. If an uninstall option does not exist, click the Start button, point to Settings, and click Control Panel.
3. Double-click the Add/Remove Programs icon.
4. Click the name of the video card driver you want to remove.
5. Click Add/Remove and follow the instructions.

To install the Oxygen Windows NT driver

1. Start up Windows NT. Log onto an account with administrator privileges.
2. Place the Oxygen Product CD-ROM in your CD-ROM drive. When the installation window opens, choose the Oxygen driver installation.
3. Follow the instructions that appear on your screen. (Be sure to read the software license agreement.)
4. Restart your system at the prompt.

To install the Oxygen Windows 2000 driver

1. After installing the Oxygen GVX420, start up Windows 2000. The Hardware Wizard appears.
2. Click Cancel in all dialog boxes that appear regarding "Found New Hardware."
2. Place the Oxygen Product CD-ROM in your CD-ROM drive.
3. On the CD-ROM, locate the drivers directory and run setup.exe. The 3Dlabs Graphics Driver Setup program begins and guides you through the driver installation process.
4. Click Yes each time you are asked for confirmation before installing a driver. The Oxygen GVX420 requires three drivers: one for the GLINT Gamma geometry accellerator, and one each for the two GLINT R4 graphics accelerators.
5. Restart your system at the prompt.

To uninstall the Oxygen GVX420 Windows NT or Windows 2000 drivers

Administrator privileges are required to uninstall these drivers.

1. On the Start menu, point to Settings and then click Control Panel.
2. In the Control Panel, double-click the Add/Remove Programs icon.
3. Click the 3Dlabs Graphics driver to select it.
4. Click Add/Remove.
5. Follow the instructions to complete the removal of each driver.
6. Restart your system at the prompt.

Installation

To install SoftEngine

Soft Engine works exclusively with AutoDesk's AutoCAD R12, R13, R14, and LT software. Install Soft Engine if you use one of these AutoCAD programs. Do not install Soft Engine if you do not use one of these AutoCAD programs; it will have no beneficial effect.

1. Place the Oxygen Product CD-ROM in your CD-ROM drive. When the installation window opens, choose Install Soft Engine. A menu appears.
2. Select your AutoCAD product type to start the installation.
3. Follow the instructions that appear on your screen.

To install Colorific

1. Place the Oxygen Product CD-ROM in your CD-ROM drive. When the installation window opens, choose the Colorific installation.
2. Follow the instructions that appear on your screen.

Registering Oxygen GVX420

When you register your Oxygen GVX420 card you:

- Activate your warranty
- Receive notification of software updates
- Qualify for technical support

You can complete the registration card and return it to us in the mail, or register on-line once your hardware and software installations are complete. (You must have Internet access to register on-line.)

1. Open your Internet browser.
2. Go to <http://www.3dlabs.com/register>
3. Fill out the registration form that appears on your screen, and click Submit when you are finished.

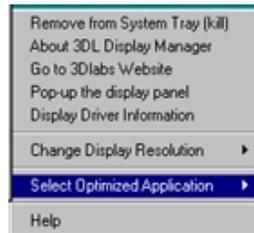
CHAPTER 2 - SOFTWARE CONFIGURATION

The Oxygen GVX420 Driver

The OxygenGVX420 driver software lets you optimize the working relationship between your card, your system and your applications. The 3Dlabs Display Control Panel allows you to customize and create driver settings. The Taskbar based Configuration Manager provides quick and convenient access to most of the Display Control Panel features, and allows you to quickly switch between alternative driver settings.

The Task Bar - based Configuration Manager

When you install the Oxygen GVX420 card and software, the 3Dlabs logo appears in your system tray, also called the task bar. Click the logo with your right mouse button to access the Display Configuration Manager and its shortcuts to these configuration tools:



Remove from System Tray lets you delete this task bar utility from your system. You will still be able to access the driver configuration options with the Display Control Panel.

About 3DL Display Manager displays version information for this configuration utility.

Go to 3Dlabs Website takes you directly to www.3dlabs.com through your existing Internet connection.

Pop up the Display Panel reaches the 3Dlabs section on the display control panel.

Display Driver Information provides quick access to information about your Oxygen card configuration.

Change Display Resolution brings up a pop-up list of supported resolutions. Each resolution has an associated pop-up list of available refresh rates.

Select Optimized Application quickly accesses a list of supported applications. Click an application in the list to optimize card settings for your selected option. (The Display Control Panel allows you to create new application settings.)

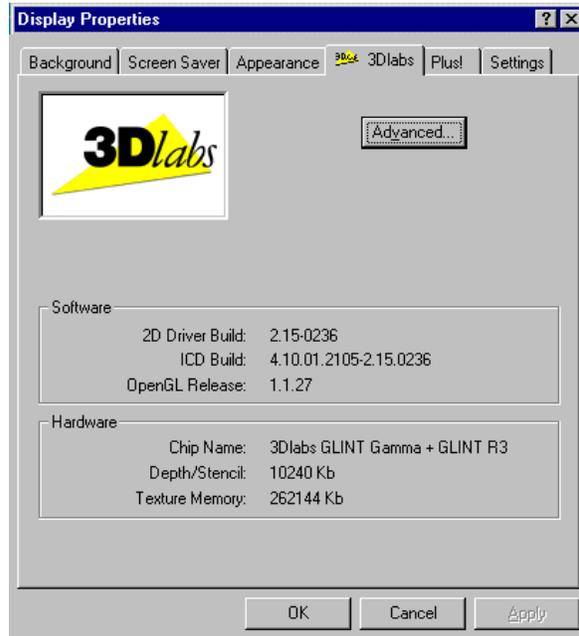
Help provides help on the task bar configuration manager, the driver, and its settings.

Software Configuration

The Display Control Panel

You access the configuration tools through the Display Properties Control Panel. To display the Panel, click the desktop with your right mouse button, and select Properties from the menu that appears.

When you first click the 3Dlabs tab in the Display Control Panel, this introductory page appears:



Note: This is only an example. Your own panel displays the information specific to your board, BIOS, and driver version.

It provides software version and basic hardware specifications, and a point-of-entry to the full set of Oxygen driver customization tools. To fine-tune your driver's behavior, click the Advanced button for access to these panels:

- Information

- Setup

- Direct3D (Windows 2000 only)

- OpenGL Support

- Monitor (Windows NT only)

The following sections describe each in detail.

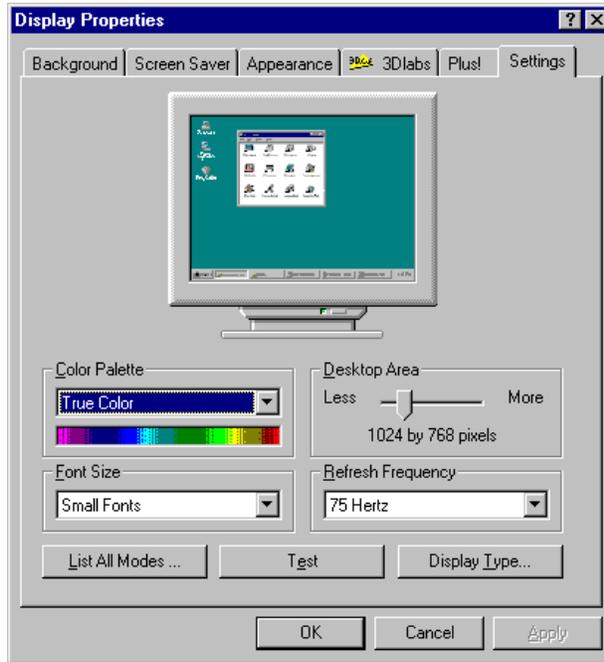
(You also have easy access to Help by clicking the "?" icon in the top right corner of the control panel, and then clicking the field in the panel about which you want information.)

Configuring Multiple Monitors

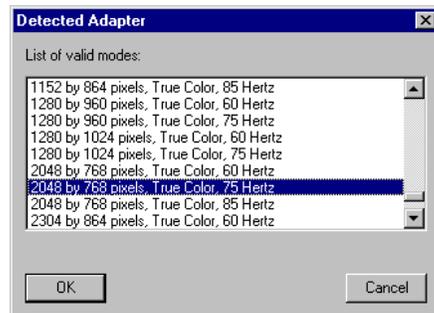
If your operating system is Windows 2000, you can configure your system to support two monitors by clicking the *Extend my Windows desktop onto this Monitor* checkbox on the Setup screen of the Windows 2000 Display Properties Control Panel.

To configure a second monitor in Windows NT

1. In the Display Properties Control Panel, click the Settings tab.



2. Click List All Modes.



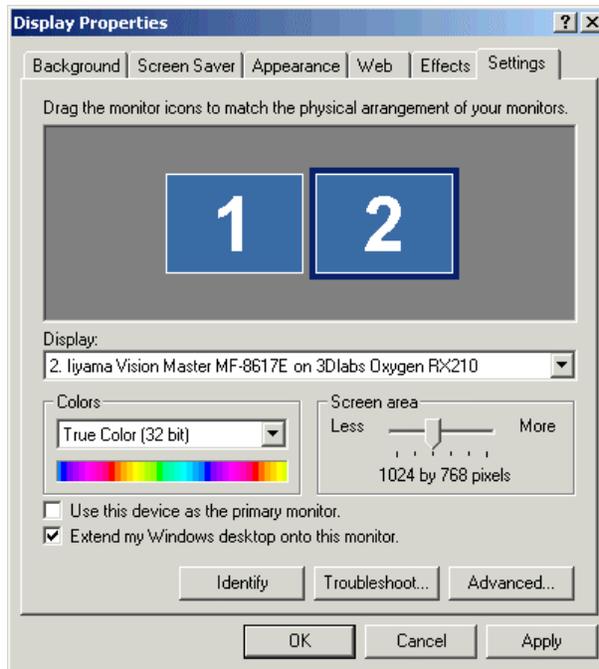
3. In the List of Valid Modes, click a resolution and then click OK. Select a resolution that is twice the width of your current resolution. For example, if your current resolution is 1024 x 768, select 2048 x 768, 75 Hertz for your new resolution.

Software Configuration

4. On the Display Properties Panel, click Test. This tests the new mode on the second monitor screen for five seconds.
5. Click OK to test the new mode.
6. Click OK if you saw the test bitmap correctly.
7. Click OK or Apply to select the new mode.
8. In the Display Properties Control Panel, click OK. Your Oxygen GVX420 card is now configured for dual monitor mode.

To configure a second monitor in Windows 2000

1. Open Display in the Control Panel.
2. In the Display Properties Control Panel, click the Settings tab. A dialog box appears displaying two monitor icons.
3. Select the monitor icon labeled "2".



4. Click the checkbox next to the option *Extend my Windows desktop onto this Monitor.*
5. Click OK or Apply to accept the change.

Configuring your Oxygen GVX420 Card for Stereo Viewing

The Oxygen GVX420 card supports 3D stereo viewing. This requires that the appropriate equipment such as stereo glasses be connected to the 3-pin miniature DIN connector on the Oxygen GVX420 card. It is recommended that you use a monitor with a screen refresh frequency of at least 100 Hertz.

In addition, it is recommended that you turn off fluorescent lighting before viewing stereo images to prevent a possible headache.

To set up and configure stereo viewing

1. Connect the stereo hardware to the round, stereo connector on the Oxygen GVX420 card. See the documentation that came with your stereo hardware.
2. In the Display Properties Control Panel, click the 3Dlabs tab.
3. In the 3Dlabs Display Properties screen, click Advanced.



Note: This is only an example. Your own panel displays the information specific to your board, BIOS, and driver version.

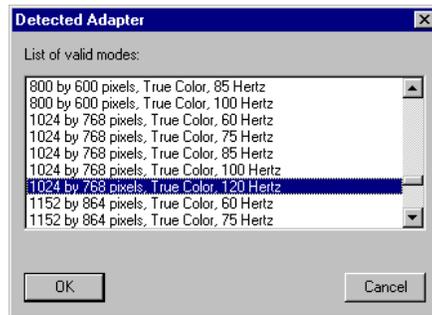
4. Click the OpenGL Support tab.

Software Configuration

5. In the OpenGL Support screen, click Advanced.



6. Click the checkbox to the right of Stereo View Support to select it.
7. Click Apply and then click OK.
8. In the Display Settings Control Panel, click the Settings tab.
9. Click List All Modes.



10. Select a screen refresh frequency of 100 Hertz or higher and then click OK. If you are using a DDC-type monitor, modes with suitably high refresh rates should be available in the List of Valid Modes. If no high refresh modes are listed, open the Display Properties Control Panel, click the 3Dlabs tab, and then click the Monitor tab. Click DDC and check for stereo settings. If they still do not appear, click VESA and check again. If necessary, restart your system.

Software Configuration

11. On the Display Properties Panel, click Test. This tests the new mode on the monitor screen for five seconds.
12. Click OK to test the new mode.
13. Click OK if you saw the test bitmap correctly.
14. In the Display Properties Control Panel, click OK. Your Oxygen GVX420 card is now configured for stereo viewing.

CHAPTER 3 - TROUBLESHOOTING

Troubleshooting

If you have trouble using your Oxygen GVX420 card or a 3D application, you may find the answer to your problem in the following sections. Always start your problem-solving efforts with the simplest solution and work up to the more complex ones.

Monitors and Display Resolutions

Question: My monitor is either blank, or the displayed image is distorted, scrambled or smaller than I expected.

Solution: If the monitor is blank, be sure that your system and monitor are plugged in and turned on. Is the monitor's power cord attached securely? Check each component's documentation for the location and use of power connectors and switches.

Solution: Make sure that your video cable is connected securely to the monitor *and* to the monitor connector on your Oxygen card. See your monitor documentation and Chapter 1 - Installation, in this document.

Solution: Your card might not be seated properly in the AGP or AGP Pro slot. Remove and reinstall your card as described in Chapter 1 - Installation. Remember to use the anti-static wrist strap when opening your system and handling the card.

Question: The performance of and/or the available resolutions for my Oxygen card are not what I expected.

Solution: The Oxygen driver may not have installed fully, or a file may have been corrupted. Try installing the driver again.

Solution: You may have selected a display setting that is incompatible with accelerated 3D graphics applications. See the Monitor Screen in your 3Dlabs display control panel for a list of compatible resolutions.

Solution: If the performance is different from what you expected, check to see that the correct application or setting has been selected in the Optimized Application Setting in the Taskbar Based Configuration Manager.

Solution: If the performance is different from what you expected, check to see that the *Wait for VBlank* setting has been set correctly in the Display Control Panel under Direct3D Support or OpenGL Support.

Question: When I restart my system, an "Invalid Display Settings" message appears on-screen, followed by "The default display resolution has been temporarily used by the system."

Solution: Within a few seconds, the error messages should be replaced by a window that allows you to set a display resolution. Pick your preferred resolution from the list and you should get the sharp results you expected.

Systems and Networks

Question: Since installing the Oxygen GVX420 card, the speakers are unable to produce sound.

Solution: You may need to reinstall or update the drivers for your sound card.

Question: Since installing the Oxygen card, my system either hangs or crashes to a blue screen when I try to start up, or the system starts up but VGA graphics don't display.

Solution: Try to disable "VGA Palette Snoop." Follow these steps.

1. Remove the Oxygen card and reinstall your old graphics card. See Chapter 1- Installation, for instructions.
2. Restart your system and enter Setup at the on-screen prompt. The key command to enter Setup can differ with each BIOS, so consult your system documentation if you do not see the command displayed as the system boots.
3. Disable VGA Palette Snoop, again consulting your system documentation for its specific location in your BIOS.
4. Choose Exit and Save Settings.

Troubleshooting

5. Shut down, remove your old graphics card, and reinstall your Oxygen card.
6. Make sure that you are not using an old graphics board driver, and that you have uninstalled any other graphics drivers — particularly those provided by other companies using 3Dlabs chipsets.
7. Please see the Oxygen and Permedia System Integration Guide in the Troubleshooting FAQ section at <http://www.3dlabs.com/support>
8. You may need to update your system BIOS. See your system documentation for system BIOS update information.

Question: I'm experiencing network problems since I installed my Oxygen card.

Solution: You may need to reinstall or update your Ethernet driver. See your system or Ethernet adapter documentation for more information.

Online Information

If you cannot find the problem you are experiencing, or the solution to a problem, listed in this chapter, check the Troubleshooting FAQ list at <http://www.3dlabs.com/support>, or contact your Oxygen card vendor for additional help.

APPENDIX A - SPECIFICATIONS

Specifications

Oxygen GVX420 Specifications

Item	Specification
Card size	Full-length ATX form factor, single slot AGP and AGP Pro compatible
Power requirement	18.4 W @ 3v3, 8 W @ 5V
Geometry processing	GLINT Gamma G2 with PowerThreads SSE
Rasterizer	Dual GLINT R4 rasterization engines
RAMDAC frequency	300 MHz
Memory	128MB SGRAM

Monitor Resolutions

Oxygen GVX420 is capable of supporting monitor resolutions up to 2048 x 1536 with one monitor, or 4096 x 1536 with two monitors, in color depths of 8, 16 and 32 bits, and with refresh rates from 60Hz to 200Hz – dependent on your system hardware, operating system, graphics driver version, and your monitor's capabilities.

APPENDIX B - SOFTWARE LICENSE

SOFTWARE LICENSE AGREEMENT

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APPENDIX C - REGULATORY STATEMENTS

Regulatory Statements

Declaration of Conformity

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Sunnyvale, CA 94086
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3Dlabs Oxygen GVX420

to which this declaration relates are in conformance with the following standards:

EN 55024:1998, clause 4.2.1
EN 55024:1998, clause 4.2.2
EN 55024:1998, clause 4.2.3
EN 55024:1998, clause 4.2.3.2
EN 55024:1998, clause 4.2.6
EN 55022:1994, clause 5
EN 55022:1994, clause 6
IEC950:1991, 2nd Edition
EN60950:1992

following the provisions of the 89/336/EEC Directive.
San Jose, California, December 1999

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Sunnyvale, CA 94086
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APPENDIX D - GLOSSARY

Terms and Definitions

AGP

Advanced Graphics Port. A dedicated graphics bus that transfers data at significantly higher speeds than the PCI bus.

Alpha Blending

This means to create transparent objects by allowing for the blending of pixels to simulate the transparency characteristics of an object. With alpha information, an object can be designed from being totally transparent to opaque.

Alpha Buffer

A portion of the frame buffer used to define the transparency value of a pixel in the frame buffer. This data can be used to blend the frame buffer pixel with the pixel to be drawn to create a composite pixel.

Anti-Aliasing

A technique employed to remove any jagged edges from an object to appear smooth. This is accomplished by gradually modifying the hue and saturation of pixels.

API

Application Programming Interface. The API translates the instructions from the application program into device commands that are specific to the screen's display controller, the graphics board.

Atmospheric Effects

The effect derived from adding one or more layers around an object.

Bilinear Sampling

The process whereby texture mapping is done through filtering.

Bit Depth

Bit depth is another way of expressing the numbers of colors available. A color bit depth of 8 is equivalent to 256 colors, a bit depth of 16 (15 bit of color plus a 1 bit overlay) yields 32768 colors, and a bit depth of 32 (24 bit RGB plus 8 bit of overlays) equals 16.7 million colors. The latter is often referred to as true color.

Clipping

Removal of elements or sections not contained within the active viewing area.

CPU (Central Processing Unit)

The part within a PC that executes programs in main memory.

DAC

Digital to Analog Converter.

Depth Cueing

A technique used to give the illusion of depth. With depth cueing, the part of an object that is farther away is displayed with a lower intensity to give the effect of depth.

Digital Flat Panel Display

A digital, flat-panel display uses a digital (instead of analog) cable connection to transfer data to the display screen. This can eliminate some display artifacts. Flat panel displays occupy less desk space than conventional monitors.

DirectX

Microsoft's APIs developed to access various system hardware.

Glossary

Direct 3D

Microsoft's API dedicated to 3D graphics, and a component of DirectX.

Dithering

The process of converting an image with a certain bit depth to one with a lower bit depth. Dithering enables the application to convert an image's colors that it cannot display into two or more colors that closely resemble the original. Dithering works because the mind is tricked by the pattern of colors into thinking it's a different color.

Double Buffering

With double-buffering, images are rendered in the back buffer and then displayed on the screen once the drawing is completed. This results in the smooth, flicker-free rotation and animation of 3D models and scenes.

Driver

A driver is a special interface program that is developed to perform the communication between the application program, the device (i.e., graphics peripheral) and the operating system.

EVGA

Extended Video Graphics Array. EVGA runs at 1024 x 768.

Flat Shading

The simplest method of shading. Each triangle is assigned one single color, resulting in a faceted appearance of the surface.

Frame Buffer

A 24-bit, true-color frame buffer provides 8 bits for each red, green and blue primary display color. This results in 16.8 million color combinations. A second, or double, buffer enables system to calculate pixels one step ahead of the screen display for smooth, distortion free images.

Gamma

A curve representing both the contrast and brightness of an image. Changing the shape of the curve changes the RGB color output. (Not to be confused with GLINT Gamma, the 3Dlabs geometry processing device.)

Geometry

The intermediate stage of the 3D pipeline, geometry determines the location of the object and the frame of reference of the viewer in relation to the object.

Gouraud Shading

This method of shading, more complex than flat shading, shows subtle color changes across an object. Gouraud Shading is accomplished by adding pixels in a graduated scale of colors.

Graphics Accelerator Card

A graphics accelerator performs 3D functions in the hardware, thereby relieving the CPU of repetitive, complex and intensive calls. This results in enhanced performance and speed.

Heidi

The API developed by Autodesk to work with its products, such as 3D Studio MAX and AutoCAD.

MIP-Mapping (for texture processing)

A feature that delivers photo-realistic images by wrapping 2D bitmaps around 3D objects closely matching the texture to the object. MIP-Mapping allows different versions of a texture to be used for objects of different sizes. It also enables faster performance as textures do not need to be scaled in real time.

Multiple Resolution Support

The ability to support multiple resolutions on the screen.

OpenGL

The industry standard library of advanced 3D graphics functions developed by Silicon Graphics, Inc.

Perspective Correction

A function that allows an object to maintain its 3D textural features as it moves away from the viewer, into the background.

Pipelining

A basic hardware tool for accelerating processes.

Pixel

The smallest addressable element of a cathode ray tube display. More simply put, the individual dots that make up the screen image.

Point Sampling

The basic method of adding texture to an object. Point sampling does not include any filtering of textures.

RAMDAC

The final component in the graphics subsystem that translates a digital image into an analog representation.

Rasterization

A method to fill in colors for all pixels bound by vertices.

Rendering

The final and most rigorous stage in the 3D pipeline where an object undergoes shading, texturing, etc.

RISC

Reduced Instruction Set Computing.

SDRAM

Synchronous Dynamic Random Access Memory (SDRAM) is a cost-effective solution to improve bandwidth to and from memory, resulting in increased graphics performance.

SGRAM

Synchronous Graphics Random Access Memory allows data to be written in a single operation, rather than a (slower) sequence of operations. It also handles background and foreground image fills effectively.

SDTP

Super Desktop Publishing. SDTP runs at 1600 x 1200.

Stencil Buffer

Similar to stipple masking, the stencil buffer assists with the creation of transparent effects.

Stipple masking

A technique that spatially creates transparent effects by rendering an object through various patterns.

Glossary

Streaming SIMD

An instruction set developed by Intel for Pentium III-processor based systems. Streaming SIMD can improve 3D vertice transformation and lighting, among other operations.

SVGA

Super Video Graphics Array. SVGA runs at 800 x 600.

Tessellation

The initial part of the 3D pipeline where the object is described by a set of triangles.

Texture Mapping

A technique that enables 2D graphic images to be “wrapped” around or “pasted” on to a 3D primitive. Perspective correction and lighting calculations allow for added realism.

Transformation

The change in rotation, size, position, and perspective of an object in 3D space.

Transparency

A function that refers to the rendering of transparent (non-opaque) objects. Transparency is generally accomplished on a polygon rendering system using either screen-door transparency or alpha blending.

Vectors/second

Lines drawn per second.

VGA

Video Graphics Array. VGA runs at 640 x 480.

VHR

Very High Resolution. VHR runs at 1280 x 1024.

VRAM

Video Random Access Memory is an expensive, fast type of RAM that is used as display memory on high-end graphics boards.

VRML

Virtual Reality Modeling Language.

Z-Buffer

Also known as the Depth Buffer, the Z-Buffer is a region of memory containing the depth component of a pixel. Used, for example, to eliminate hidden surfaces from the image.

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