A New Future For Stereo 3D

Remember when 3D was really 3D? On movie screens and in ViewMasters™ worldwide, everything from ghouls to gorillas made their way from a flat screen into our laps. That was 3D! Today, 3D has been translated by software companies and chip makers to mean something else entirely—2D rendered images that look somewhat 3D. But without the perception of an object floating in space—off screen—it can't be truly appreciated. So how do we restore the third dimension to 3D games?

Stereoscopic 3D glasses are doing just that. But because stereo glasses are a new type of peripheral, and stereoscopic 3D is a new data type on PCs, there are a number of hardware and software issues that must be addressed to maximize the potential of the category. The elements that are effected include the new crop of 3D acceleration chips from vendors such as Rendition, S3, and 3Dfx, which are adding synchronization support for 3D glasses.

Additionally, a low-level software interface is now being codified by the Video Electronics Standards Association (VESA) into VESA BIOS Extension 3.0 for graphics chipsets with stereo display support. The standard will provide a means for automatic detection of stereo support and supply of a sync signal for use with stereo-ready applications.

Graphics card vendors are adding significant value to their products while reducing the cost of implementing stereo 3D support by putting a stereo connector on their graphics cards. The current standard dictates the use of a common 3.5 mm stereo jack, much like those used for audio headphones. While this is a readily available and inexpensive solution, VESA has proposed the use of a mini-DIN 3 jack which facilitates further differentiation of stereo support.

With these vendors and standards organizations dictating the direction of multidimensional computer graphics, a new era of highly-immersive and extremely powerful stereo 3D is under way. This will empower title developers to be more daring and imaginative than ever before, while giving gamers worldwide the same amazement as those 3D moviegoers or ViewMaster-equipped kids. The third dimension has finally been restored to 3D.

CALENDAR OF EVENTS

Look for StereoGraphics products and/or exhibits at these upcoming trade shows:

Multimedia/VR World	5/7—5/9	Toronto, Canada
3D Design Conference	6/2—6/5	San Francisco, CA
A/E/C Systems	6/16—6/19	Philadelphia, PA
PC Expo	6/17—6/19	New York, NY
E3	6/19—6/21	Atlanta, GA

StereoGraphics would like to support you in your trade show efforts. If you are interested in exhibiting your stereo-ready software, please do not hesitate to contact us and we will provide you with SimulEyes or CrystalEyes for every workstation showing SimulEyes or CrystalEyes compatible applications.

In This Issue

UPDATE:

VESA 3.0

The VESA BIOS Extension 3.0 proposal information presented in the last issue of 3DView is already outdated. It's now even more advantageous for stereoscopic applications. StereoGraphics is pleased to announce that the latest and final VBE 3.0 proposal for stereoscopic support specifies left and right display addresses at arbitrary video memory locations. This facilitates a direct software interface to 3D chips which incorporate dual display start address registers. These chips include the Rendition Verite1000 and the Alliance AT3D.

When an applications programmer calls VBE function 07 to select the next page for display, a linear address is passed into register ECX. For stereoscopic displays, the programmer passes a pair of linear addresses in ECX and EDX corresponding to automatically flipping left and right pages. Specifying left and right bitmap pointers together keeps them as matched stereo pairs. The underlying page-flipping hardware automatically insures left and right fields stay in sequence.

You can get a sneak preview of some of the standardized features in VBE 3.0 like variable refresh rate with Scitech Software's Display Doctor 5.3. Download the latest trial version at www.scitechsoft.com and you'll be able to use it with SimulEyes games at higher refresh. For example, you can replace LCDBIOS in games like Descent II with SGC's SIMBIOS, and see stereo images at whatever refresh rate you've configured for your monitor.

Also under consideration by VESA Software Standards Committee is a new revision of the accelerator function driver, VBE/AF 2.0. Among high-level features afforded by this protected-mode driver layer will be hooks for abstracting various types of stereo display techniques and formats. Look for more news about VBE/AF coming soon.

IN THE NEWS

StereoGraphics and Tripos Partner to Deliver Advanced 3D Visualization Solutions

StereoGraphics and Tripos Inc. have announced a partnership to jointly deliver high-performance 3D visualization products to scientists and researchers. Based on StereoGraphics CrystalEyes technology and Tripos' Sybyl suite of molecular modeling software products, the companies will use a number of marketing vehicles to educate scientific professionals on the benefits of stereoscopic 3D visualization in research environments.

As part of the partnership, StereoGraphics and Tripos have launched a direct marketing campaign targeted at the companies' installed base, customers of Qualix Direct, and members of several professional organizations, such as the American Chemical Society. The campaign will communicate the significant improvements in technical proficiency offered by stereoscopic viewing for users of scientific and technical applications. In addition, the companies will develop and publish a series of user case-studies and white-papers that discuss the implementation and benefit of 3D viewing for scientific and technical professionals.

New OCTANE Workstations from Silicon Graphics

The CrystalEyes stereoscopic visualization system is now directly supported by Silicon Graphics Incorporated's new OCTANE family of workstations. With OCTANE, CrystalEyes is compatible with Silicon Graphics' entire range of graphics workstation products, including O2™ and Onyx2™. This provides professionals engaged in solid modeling and multi-dimensional imaging for scientific, industrial and entertainment applications with the broadest range of 3D visualization options.

"Our customers place the highest possible demands on graphics computers, software and peripherals," said Kay Matsuo, peripherals product manager for Silicon Graphics' Desktop Systems Division. "StereoGraphics'

CrystalEyes has shown conspicuous leadership in delivering real-world 3D visualization capabilities and we're pleased to be supporting this product line in our new OCTANE family."

StereoGraphics and EDS Unigraphics Revolutionize 3D Design

StereoGraphics and EDS Unigraphics have announced a partnership to deliver stereoscopic 3D visualization support to Unigraphics' customers. The first result of that partnership is the release of Unigraphics' V12 design and modeling software with built-in support for StereoGraphics CrystalEyes stereoscopic 3D eyewear. The combination of StereoGraphics CrystalEyes and Unigraphics V12 will significantly speed the 3D design process and provide virtual prototyping capabilities to all Unigraphics users. In example, engineers can produce realistic views of their models with accurate height, width and depth, eliminating costly and time-consuming physical prototyping.

"Because of customer demand and the superior design capabilities it lends, implementing support for CrystalEyes was a major priority for us with Unigraphics V12," said John Seiler, platform marketing manager for EDS Unigraphics. "With the new visualization and analysis capabilities of V12, our customers can truly take advantage of StereoGraphics CrystalEyes, working with their models in a more natural environment."

Silicon Graphics O2 Workstations Now Support CrystalEyes

StereoGraphics CrystalEyes eyewear system is now supported by Silicon Graphics Incorporated O2 workstations via a new add-in board called X-Eyes. Available through Qualix Direct at a list price of $325, the X-Eyes board provides O2 users with CrystalEyes connectivity and a stereoscopic drive signal. Now, O2 users engaged in molecular modeling, mechanical CAD, GIS, medical imaging and 3D visualization can take advantage of CrystalEyes and high-definition stereoscopic imaging. Qualix Direct can be reached at 1-800-455-9273 or at www.qualixdirect.com.

Notes from the DeveloperDen...

CrystalEyes SDK v1.0 Available!
The first version of the CrystalEyes Software Development Kit (SDK) has been completed and is now accessible for those interested in developing software applications for use with HP, SUN, DEC and SGI workstations. IBM and Macintosh versions will be made available in the coming months. Also included in the document is a modified C code fragment adapted from an OpenGL example "TQUAD.c" provided in the WinNT SDK CD-ROM (from Microsoft Corp.). It demonstrates how to display a stereoscopic image pair using the above/below format.

One of SGC's original stereoscopic display formats uses an above/below spatial layout on a full-screen window. That is, the screen is vertically divided into two halves, with the left-eye view presented above the right-eye view.

The idea behind this scheme is that such a configured image can be electronically converted to a field-sequential stereo pair. This is accomplished by inserting an extra vertical sync pulse in between the left and right image components of the original video stream. This sync-doubling feature is included with CrystalEyes eyewear for PC.

This is the common baseline stereoscopic display format which can be programmed universally among all platforms, since it does not depend on underlying stereo technology. It simply requires the programmer to draw the stereo views on the same full-screen window area.

Managing dual viewports in a window client area is easy with OpenGL. Since rendering has to occur twice for stereo, a separate viewport is set each time with left and right 3D projections. The main rendering update loop contains two matched sets of calls to glViewport() and glFrustum() for generating separate left and right views.

To download the CrystalEyes SDK, or to get started with stereo apps under OpenGL in WinNT, check out the CrystalEyes NT SDK examples at our ftp site:
ftp.stereographics.com/Outgoing/winglexe.zip
or our website under CrystalEyes software development.

SIMWEB3D — Stereoscopic Image Viewing on the Web
SIMWEB3D is a new utility that enables stereoscopic image viewing on the World Wide Web using StereoGraphics SimulEyes glasses. Currently, SIMWEB3D is implemented as a Java plug-in applet for Web browsers such as Netscape Navigator on Windows 95. The SIMWEB3D plug-in can be extended to operate with Java-compatible Web browsers on other computer platforms which support interlaced video modes and SimulEyes glasses.

With interlaced video format, stereoscopic images are composited with left and right views on alternate lines. The stereo image pair will be automatically displayed as alternating odd and even video fields.

Stereo images which are composited in this format need only be posted on Web sites as single image files. When presented by the Web browser, SIMWEB3D and SimulEyes' white-line registration code insure correct stereoscopic viewing of the windowed images.

SIMWEB3D functions by controlling a window separate from the Web browser. That way, a user may drag the window anywhere on the desktop and the window will always be insured to align to the appropriate scan line for correct stereoscopic viewing. For example, if the user happens to move the window to an odd line, the window will position itself on the next even line.

Just as importantly, the user needs an easy way to switch in and out of stereo viewing mode. When the user moves the cursor over a SIMWEB3D image window, stereo is enabled automatically. If the user removes the cursor from that area, stereo is disabled. The same stereo toggling action works in response to minimized or maximized window operations.

SIMWEB3D is available at:
ftp://ftp.stereographics.com/java/simweb3d.zip

Stereo images in SimulEyes-ready interlaced format are currently posted at these sites:
ftp://ftp.stereographics.com/java/stereo.html
http://www.concentric.net/~bruced

3DVIEW

Contact StereoGraphics

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