Detonator XP Unified Driver

Technical Brief

Unleashing Features and Performance for All GPUs

Detonator XP Unified Driver

The NVIDIA® Detonator XP Unified Driver delivers new performance optimizations and features in both OpenGL® and DirectX® to deliver industry-leading performance, visual quality, and reliability in the industry's only true integrated software upgrade. Detonator XP provides a free performance upgrade for your NVIDIA Graphics Processing Unit (GPU), including the TNT™, GeForce2™ and GeForce3™ family of GPUs. Detonator XP also offers full hardware and software acceleration for Windows® XP (the next-generation operating system from Microsoft®), enabling the best digital experience for Windows XP Home Edition and Professional users.

Detonator XP software provides up to 50% increase in performance in both DirectX and OpenGL Application Programming Interfaces (APIs). In addition, Detonator XP software exposes new hardware acceleration enabling new features including 3D textures and shadow buffers.

Features

The NVIDIA Detonator XP Unified Driver delivers the following features and functions:

- OpenGL 1.3 ICD with NVIDIA Extensions
- OpenGL Performance Optimizations
- Optimized DirectX Pipeline with NVIDIA Pixel and Vertex Shaders
- Detonator XPress Link
- Patented Unified Driver Architecture
- Professional Application Certification

OpenGL

OpenGL 1.3 ICD with NVIDIA Extensions

OpenGL 1.3 represents the latest enhancement to the industry's leading cross-platform 3D graphics API. OpenGL 1.3 exposes exciting new features, providing developers with the ability to create content that fully exposes the hardware features of NVIDIA's GPUs, thereby creating real-time, cinematic effects for consumers.

OpenGL 1.3 with NVIDIA Extensions enables support for Vertex Programs and Register Combiners – also known as NVIDIA Pixel and Vertex Shaders – for GPUs with the nfiniteFX™ Engine.

Several additional features and functions have been ratified and brought into OpenGL 1.3's core functionality, including:

- Cube map texturing
  Higher quality environment mapping and lighting support
- Multisampling
  Order-independent antialiasing rendering of points, lines and polygons
- New Texture Modes
  More powerful ways of applying textures to rendered objects, such as:
  - Texture Add Environment Mode
  - Texture Combine Environment Mode
  - Texture Dot3 Environment Mode
  - Texture border filtering mode
- Compressed texture framework
  Allows for higher quality textures in less memory regardless of file format

Detonator XP's software OpenGL 1.3 ICD also supports the following NVIDIA Extensions under OpenGL:

- NV_Blend _square
- NV_evaluators
- NV_fence
- NV_fog_distance
- NV_light_max_exponent
- NV_multisample_filter_hint
- NV_packed_depth_stencil
- NV_register_combiners2
- NV_texgen_emboss
- NV_texgen_reflection
- NV_texture_compression_vtc
- NV_texture_env_combine4

- NV_texture_rectangle
- NV_texture_shader
- NV_texture_shader2
- NV_vertex_array_range
- NV_vertex_array_range2
- NV_vertex_program

With these advanced NVIDIA Extensions and OpenGL 1.3, developers can create real-time cinematic effects that were previously only possible on ultra-high end workstation computers.

OpenGL Performance Optimizations

Detonator XP software delivers the highest performing OpenGL driver on the planet because it is more efficient at helping the GPU and CPU handle memory in parallel. This allows each processor to cache data before it is transferred between system and graphics memory, increasing performance in high-resolution antialiasing modes.

In addition, optimizations for Vertex Programs were added to the OpenGL 1.3 ICD, which yields performance gains across multiple applications and larger gains in heavily vertex-processing-bound applications. Examples of applications that utilize these features are SPECViewperf, Pro/E and NVIDIA's Chameleon demo.

Detonator XP Software also optimizes the setup time needed to prepare vertex arrays for processing by NVIDIA hardware. Many different applications benefit from the GPU's ability to process vertices more efficiently.

Other optimizations in Detonator XP software reduce bus transfers, effectively decreasing the peak saturation of the bus. In turn, this gives the GPU a larger pipeline to transfer texture and geometry information to and from the GPU.

The result of these performance optimizations is higher performance for high-resolution antialiased modes. This in turn allows developers to utilize more OpenGL 1.3 features with NVIDIA Extensions to deliver real-time, cinematic-quality graphics for the personal computer.

DirectX

Optimized DirectX Pipeline with NVIDIA Pixel and Vertex Shaders

Detonator XP software features a highly-tuned DirectX pipeline specially designed to fully accelerate Windows XP and all other Windows-based operating systems. New optimizations were added to the pipeline to deliver increased performance in high-resolution antialiased modes.

In order to achieve better performance, Detonator XP software optimizes the movement of data read/writes and decreases the memory requirements when transferring texture data. Detonator XP software reduces bus transfers, effectively decreasing the peak saturation of the bus. This reduction provides the GPU more bandwidth to transfer texture and geometry information.

As the reference platform for developers creating new content using DirectX 8 Pixel and Vertex Shaders on both the PC and Microsoft Xbox game console, GeForce3's performance must be incredibly fast in order to deliver fluid, real-time cinematic effects for the consumer. All of these new optimizations will enable Detonator XP software to deliver the fastest NVIDIA Pixel and Vertex Shader performance, enabling high performance, real-time cinematic effects on GeForce3 GPUs, regardless of platform.

Windows XP

Detonator XP Powers Ultimate Windows XP Experience

Windows XP is the highly-anticipated, next version of the Windows operating system from Microsoft. Windows XP unlocks the full potential of the personal computer and enables users to do amazing things with their PCs, such as acquire, organize and share their digital photos; have an all-in-one place to download, store and play back the highest-quality digital music; enjoy instant messaging, voice and video capabilities for communicating with friends and family; and make easy connections to enable sharing of computers and devices within a home or business.

Detonator XP software enables all of Windows XP's new features, including 3D graphics, streaming multimedia, and graphical user interface. Whether you use your computer for music, video, games or photos, NVIDIA hardware and software solutions power the complete Windows XP digital experience.

The new graphical user interface (GUI) of Windows XP is more intuitive, simpler, and works the way you do. To enable this next-generation GUI, Windows XP demands GPUs that supports new features in hardware, with high-quality drivers that fully accelerate the GUI. Detonator XP software enables full hardware acceleration for all Windows XP GUI features including ClearType™, hardware

alpha cursor, and alpha menu effects, delivering the fastest 2D performance on Windows XP.

Detonator XP software enables the fastest Windows XP 3D performance solutions on all platforms through NVIDIA's XPress Link technology (see below).

Longer mobile system uptime is also vital to Windows XP, delivering the best end user experience. Detonator XP software also features complete Windows XP mobile support for GeForce2 Go and Quadro2 Go mobile GPUs, consistently yielding longer system uptime to keep you going on the road.

Powered by Detonator XP Software, NVIDIA's family of graphics and multimedia processors are the fastest Windows XP solutions on every key industry benchmark and enable more key Windows XP features than any other solution. No matter what application, Windows XP looks better and runs faster with NVIDIA hardware and software.

Detonator XPress Link

Windows XP contains new low-level enhancements designed to improve overall system, graphics, and multimedia performance. While current Windows drivers will work with Windows XP on NVIDIA-based platforms, it is necessary to re-write drivers in order to take advantage of the new improvements as new routines have been added to the Windows XP core.

Detonator XP software contains a first of its kind, proprietary Detonator XPress Link technology, written specifically for Windows XP. Utilizing the patented Direct Memory Access (DMA) found on all NVIDIA hardware, Detonator XPress Link provides a direct connection from the hardware to the operating system. As a result, XPress Link assists in accelerating the new optimizations made in the I/O Subsystem and Memory Management portions of Windows XP's core. With Detonator XP's XPress Link technology, NVIDIA is able to deliver the fastest 3D graphics performance on all Windows XP platforms.

Figure 1 shows how NVIDIA XPress Link (NXL) technology interfaces with Microsoft's Windows XP.

Figure 1. NXL Technology

Highest Quality Software

Unified Driver Architecture

NVIDIA's Patented Unified Driver Architecture (UDA) delivers the lowest total cost of ownership for graphics processing units and platform processors through simplified setup and support with a single driver binary for all of product families. UDA ensures high-quality, stable drivers for all NVIDIA products.

World Class Windows Hardware Quality Labs Team

The industry's best Windows Hardware Quality Labs (WHQL) team delivers NVIDIA's high quality software. With over 300 software engineers dedicated to delivering high-quality WHQL drivers, NVIDIA consistently delivers more reliable WHQL drivers than any other company in the industry.

Professional Application Certification

NVIDIA's has not only delivered the world's fastest driver, the world's best Windows XP driver, and the world's most stable WHQL driver, but Detonator XP Software is the world's highest quality professional application certified driver. Detonator XP Software is certified on a wide range of professional applications, and will ensure a stable computing environment for mission critical applications.

Conclusion

Detonator XP software, the newest version of NVIDIA's award-winning software, delivers the world's fastest performance, the highest quality, and the best features in a single driver binary. With the latest Detonator XP Software, NVIDIA is providing a free performance upgrade for your GPU, powering the best Windows XP experience for the digital world.

NVIDIA has developed world-class driver software that has proven in benchmark tests not only to increase application performance by 30-to-50%, but to provide the best Windows XP performance to the end user.

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