



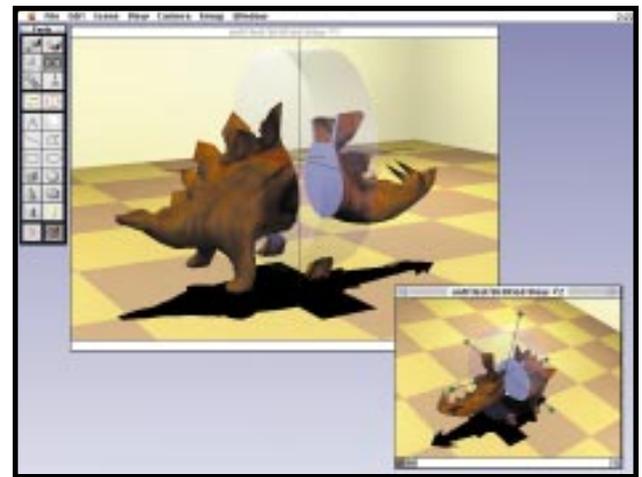
# QuickDraw 3D



In 1995 Apple introduced QuickDraw™ 3D, and brought to personal computers, for the first time, OS-integrated, real-time, workstation-class 3D

graphics. It provides a comprehensive, **multiplatform** foundation for desktop application, Internet, media title, and game development.

The QuickDraw 3D toolkit includes a complete geometry toolkit; shading and rendering architecture; object-oriented, multiplatform file format (3DMF); **hardware abstraction layer (QD3D RAVE)** for plug-and-play hardware acceleration; input device architecture; and a set of 3D interface guidelines. The geometry, shading, rendering, input, and file I/O



architectures are extensible.

QuickDraw 3D is **integrated** with QuickTime®, QuickTime VR, and Apple Game Sprockets, giving developers unparalleled flexibility.



*Apple's 3DMF is an integral part of the future of 3D on the Internet. As part of the VRML 2.0 specification for dynamic 3D environments on the Internet, 3DMF will enable higher compression, file streaming, and faster parsing of 3D objects and virtual worlds across the Internet.*



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QuickDraw 3D RAVE (Rendering Acceleration Virtual Engine) enables developers to transparently access 3D graphics accelerator cards, while still providing exceptional rendering speed with software-only systems. An integral part of the QuickDraw 3D API, RAVE can be accessed directly by developers who want to leverage existing rendering engines but also gain access to the hardware acceleration and optimized software rasterizers of RAVE. It also provides third-party hardware vendors with a means for shipping 3D acceleration hardware that can plug-and-play with a variety of 3D applications.

With complex 3D models rapidly becoming the standard in computer-based graphics, hardware-assisted 3D rendering capabilities are increasingly a necessity for many computer users. Apple offers the PCI-based QuickDraw 3D Accelerator Card, which provides workstation-class 3D rendering capabilities for users who require an easy-to-use and affordable desktop computer 3D graphics solution. The QuickDraw 3D Accelerator Card accelerates Gouraud shading, texture mapping, transparency, and Constructive Solid Geometry (CSG).

## The Performance Advantages of QuickDraw 3D

- **Your Complete Multiplatform 3D API.** To meet your software and hardware development needs, we've made QuickDraw 3D a complete, multiplatform solution. The QuickDraw 3D Draw Context layer ensures that roughly 99 percent of the API is identical, regardless of platform. QuickDraw 3D supports retained, immediate, and mixed modes. It also features a complete, extensible API and extensible file format for exchanging 3D information, as well as a HAL for hardware acceleration.
- **Flexible, high-performance software-only rendering; plug-and-play hardware acceleration.** To provide maximum performance, RAVE has been designed to provide minimum overhead between the application and the drawing engine. QuickDraw 3D RAVE (Rendering Acceleration Virtual Engine) supports features such as diffuse color, texture mapping with full color texture modulation and specular highlights, and texture compression. The QuickDraw 3D RAVE Texture Abstraction layer enables next-generation texture compression algorithms such as YUV or wavelet encoding and vector quantization. More advanced RAVE drawing engines may support any or all of the following features:
  - High-precision hidden surface removal (24 bits or more)
  - Perspective-corrected hidden surface removal
  - Texture mapping, fast and/or high quality
  - Transparency blending, RGB or ARGB
  - Anti-aliasing, fast and/or high quality
  - Z-sorted rendering of non-opaque objects
  - OpenGL support, which includes a collection of features such as scissoring, multiple blending modes, area and line stipple patterns, and more
- **Excellent multiplatform data exchange for the desktop and beyond.** The 3D metafile format (3DMF) is a freely available open standard that supports 3D data—not simply geometry, but all the information that represents a particular view or scene, including high-level geometry, lights, cameras, textures, animation sets, and custom information. 3DMF is the widely accepted choice for the exchange of 3D data. The format can be represented as either ASCII or binary, and can be streamed. The binary representation of 3DMF is a core part of VRML 2.0.

## QuickDraw 3D Accelerator Card

- Accelerates QuickDraw 3D rendering to speeds as high as 12 times faster
- Renders 10 million trilinearly filtered, mip-mapped texture pixels per second
- Renders up to 120,000 triangles per second
- Accelerates Gouraud shading, texture mapping, transparency, and Constructive Solid Geometry (CSG)
- Continually enables trilinear filtering, mip-mapping, diffuse and specular lighting, producing very high-quality texture mapped images
- Uses high-performance SRAM memory to display up to 12 texture maps in each open window
- Outputs an alpha channel, making it fast and easy to transfer images between applications
- Offers hardware-accelerated per-pixel Z sorting for precise rendering of transparent surfaces or CSG, regardless of submission order or interpenetration
- Accelerates 3D rendering to all frame buffers in the system with a single card

**A w a r d s**

- MacUser 1995 Editor's Choice Award (Eddy), Breakthrough Technology of the Year
- Macworld World Class Awards 1995, Best New Technology
- Byte Magazine 1995 Editors' Choice Awards, Award of Distinction
- 1996 Discover Magazine Awards for Technical Innovation Finalist in the Computer Software Category

**Ordering Information for the QuickDraw 3D Accelerator Card**  
Order No. M4333LL/A (U.S.); M4333ZM/A (elsewhere)

**For More Information**  
For demo files, parser code, complete specifications, a technical overview, and QD3D RAVE SDK/DDK, visit the QuickDraw 3D home page at the Internet World Wide Web site: <http://product.info.apple.com/qd3d/>

The best way to get started with QuickDraw 3D is to pick up the recently released Addison Wesley book, *Programming with QuickDraw 3D* (ISBN 0-201-48926-0). A comprehensive book on the Apple QuickDraw 3D API, it also comes with a CD-ROM containing the complete QuickDraw 3D 1.0 software development kit. If you cannot find this book in your local bookstore, you can order the book by contacting the Apple Developer Catalog, Apple's source for developer tools, at 1-800-282-2732, via e-mail at [ORDER.ADC@applelink.apple.com](mailto:ORDER.ADC@applelink.apple.com), or via the web at: <http://www.devcatalog.apple.com/>