

# HP Apollo 9000 TurboVRX



*Getting  
you from  
concept to  
reality...  
in record  
time.*

**HP Computer Museum**  
**[www.hpmuseum.net](http://www.hpmuseum.net)**

**For research and education purposes only.**

## Reality – only better.

**Visualize it, simulate it, prove it, before you invest in it.**

HP delivers a startling new level of 3D realism and performance for advanced graphics applications. The TurboVRX graphics system produces realistic 3D renderings allowing you to visualize a new product or process with speed, accuracy and confidence. Development and approval cycles can be significantly shorter, saving time, money and resources.

The TurboVRX combined with the HP Apollo 9000 Series 400 workstations, is a high-performance graphics system designed specifically for MCAD/MCAE, industrial design and corporate communications, as well as scientific visualization applications. It is available in three, scalable configurations.

## High-speed performance for results you can't wait to see.

HP has broken graphics processing speed barriers by designing a unique, balanced workstation architecture. The TurboVRX utilizes multiple transform engines to off-load graphics processing tasks from the SPU. This frees the compute power of the SPU for other tasks, boosting overall productivity.

### Speed features

- The graphics transform engine utilizes an Intel i860™ RISC processor. Multiple processors running in parallel enable the TurboVRX to render realistic 3D models at speeds of up to one million vectors per second.
- Custom VLSI technology balances the power of the i860 so throughput of the graphics pipeline is greatly enhanced.

### TurboVRX Graphics System: Key Features

**Speed:** 1.009M 3D vectors/sec\*  
788K 3D anti-aliased vectors/sec\*  
300K triangles/sec\*  
135K quads/sec\*  
6th order NURBS with trimming  
Sectioning  
Capping  
Interference checking  
Contour mapping  
Deformation animation  
Polyhedron primitives  
Triangle strip  
Quadrilateral mesh  
Hardware cursors  
MOMA 3D windows  
Fast DMA to frame buffer

**Standards:** HP-PHIGS (PHIGS/PHIGS+ based)  
OSF/Motif  
The X Window System  
GKS  
CGM

**Realism:** Personal Visualizer  
Radiosity - progressive refinement  
Ray tracing  
Texture mapping with perspective interpolation  
Anti-aliased vectors  
Anti-aliased polygons  
Sub pixel addressing  
Color map per window (up to 15)  
Alpha blending  
Stereoscopic support  
Dithering

### System Features:

24 color planes  
24 bit Z- buffer  
4 color overlay planes

### Supported SPUs: (HP-UX)

Model	400s	12 MIPs	0.5 MFlops
	433s	26 MIPs	4.5 MFlops
	375	12 MIPs	0.5 MFlops

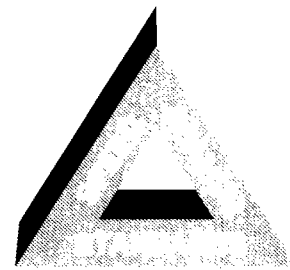
- Capping and sectioning lets you cut into 3D renderings from any direction to display the interior workings of the model while maintaining an accurate solid image of the object's surface. And interference checking alerts you to dimensional conflicts.
- NURBS (Non-Uniform Rational B-Splines) give you more precise control over curves, faster rendering and smaller databases.

### Realism features

- The Personal Visualizer is a menu-driven rendering application that makes it easy for everyone on your team to take advantage of advanced 3D rendering techniques such as texture mapping, ray tracing and radiosity.
- Texture mapping with perspective interpolation lets you scan 2D images or textures and quickly map them onto rendered 3D surfaces, in the correct perspective. You gain realistic detail without adding polygons, for improved speed and interactivity.
- Full-color anti-aliasing provides smooth multi-colored vectors against any color background.

## Innovative technology plus standards to work smart.

HP has always been a leader in high-performance graphics workstations. HP gives you the advantage of full-performance graphics and standards to protect your investment. HP is committed to graphics industry standards such as PHIGS and PHIGS+, X11 Windows, and OSF/Motif. HP's innovative technology combined with standards keeps your team operating at peak productivity.



## HP Apollo Graphics

**There is a better way to visualize reality before you invest in it.**

**For more information on the TurboVRX, call 1-800-752-0900 for the location of your nearest HP sales office. In areas outside of the U.S., contact your local HP sales office.**

i860 is a U.S. trademark of Intel Corporation. Personal Visualizer is a trademark of Wavefront Technologies, Inc. OSF/Motif is a trademark of the Open Software Foundation, Inc.  
\*Peak performance. †64 pixel, gouraud, 100 vertices, strip. ‡8x8 pixel, gouraud, no clip, no Z-buffer.  
Technical data subject to change without notice.