AAlchemy™4

Realtime 3D Graphics Subsystem for Heavy Metal GX+ with Full-scene, Sub-pixel Anti-Aliasing

P R E L I M I N A R Y   D A T A S H E E T

OVERVIEW

AAlchemy™4 is an advanced realtime 3D graphics subsystem available exclusively for deployment in Quantum3D's Heavy Metal™ GX+ family of open architecture, interactive visual computing systems. AAlchemy4 harnesses between four and thirty-two 3dfx® VSA-100 chips to deliver between 12.8 and 102 Gigabytes-per-second of dedicated graphics memory bandwidth. AAlchemy4 employs this unique, parallel architecture to provide 16- or 64-equivalent sub-sample, single-pass, full-scene, sub-pixel anti-aliasing with scalable fill rate performance between 200 Megapixels-per-second and 1 Gigapixels per second fill rate (trilinear filtered, with perpixel fog, Z and alpha enabled).

AAlchemy4, with its state-of-the-art, full-scene anti-aliasing and scalable graphics performance, enables realtime rendering of complex synthetic environments - rich in cultural features - at sustained frame rates without distracting visual artifacts, such as object popping, edge crawling, and moiré patterns. It features enhanced texture download performance, compression, texture resolution and on-board memory support for industry leading performance on geo-specific texture, imagery-based training applications such as mission rehearsal. AAlchemy4 is compatible with popular realtime 3D scene management software products and realtime database formats for ease of development and reduced life-cycle costs. AAlchemy4 supports Quantum3D's unique SwapLock™ and SyncLock™ precision channel synchronization technologies for multi-channel and other wide field-of-view applications.

AAlchemy4 Model	3dfx VSA-100 Chips	Effective Memory	Dedicated Graphics Memory Bandwidth	Trilinear Fill Rate	Power Consumption
4132	4	32 MB	12.8 GB/sec	200 MP/sec	200 W
8132	8	32 MB	25.6 GB/sec	370 MP/sec	400 W
8164	8	64 MB	25.6 GB/sec	370 MP/sec	400 W
8232	16	32 MB	51.2 GB/sec	648 MP/sec	800 W
8264	16	64 MB	51.2 GB/sec	648 MP/sec	800 W
8464	32	64 MB	102.4 GB/sec	1068 MP/sec	1600 W

PRELIMINARY SPECIFICATIONS

- Features 4 or 8 3dfx VSA-100 chips in a single PCB module acting as a channel or sub-channel
- Supports 1, 2 or 4 sub-channels per channel and up to 4 channels per Heavy Metal GX+ system (depending on model)
- Supports Quantum3D patent-pending offset anti-aliasing for full-scene, sub-pixel anti-aliasing with 16 or 64-equivalent sub-samples
- Supports Quantum3D SwapLock™ and SyncLock™ precision inter-channel synchronization (up to 16 channels)
- Supports 32-bpp (with dedicated 8-bpp alpha channel) and 22-bpp effective RGB/RGBA rendering
- Supports 24-bpp (integer or floating point, with 8-bpp stencil) and 22-bpp effective (16-bpp floating point) depth buffering
- Supports single, double and triple buffered rendering
- Supports perspective correct bilinear, trilinear and selective anisotropic texture filtering with per-pixel LOD MIP mapping with Gouraud modulated, detailed and projected texture mapping
- Supports transparency and chroma-key capabilities
- Supports 16 or 64 levels (depending on model) of screen door transparency for fade LOD
- Supports per-pixel and per-vertex atmospheric effects with simultaneous OpenGL-compliant alpha blending
- Features 4 bits of fractional sub-pixel/sub-texel positioning
- Supports for 16, 24 and 32-bpt RGB/RGBA, 8-bpp YIQ and color-indexed compressed texture formats
- Supports 4-bpt 3dfx FXT1 and S3CT compressed texture formats
- Supports texture map resolutions up to 2048 x 2048 texels per map
- 32 or 64 MB Effective Frame Buffer & Texture Buffer Memory provides between 50 and 120 Megatexels of on-board texture memory (depending on resolution and color depth)

- Support for 3dfx Glide®, Microsoft Direct3D™, OpenGL® and Quantum3D SimGL™ (Quantum3D's optimized subset of OpenGL®) 3D graphics APIs
- Support for popular realtime 3D scene management software including Multigen-Paradigm Vega™, CG^2 Vtree™, Soft Reality SoftVR™, Carmel Applied Technology X-IG™, Reality2 Tiepolo™, Thomson Training and Simulation SPACE Magic™, Lockheed Martin SE/View™ and Quantum3D OpenGVS™
- Support for popular 3D database formats including Multigen-Paradigm OpenFlight™ and Terrex TerraPage™ and 3D Studio MAX™
- 12.8 – 102.4 GB/sec dedicated graphics memory bandwidth for 200 – 1,068 Megapixels per second trilinear texture fill rate with anti-aliasing, Z, alpha, and per pixel fog enabled
- 66 MHz PCI 2.1 Interface with multi-chip broadcast capability and on-chip triangle set-up engine enables sustained, independent triangle throughput of 2.1 M textured, independent triangles per second and peak texture paging rates of up to 528 M texels/sec
- 135 MHz RAMDAC with analog RGB output supports non-interlaced resolutions from 640x480 to 1280x1024 at industry standard, international refresh rates with stereo support
- Utilizes VSA-100 T-Buffer technology for depth-of-field, motion-blur and depth of focus special effects
- EMI and Safety: FCC A, ETL and CE Approval Pending
- Support planned for edge blending, distortion correction, sensor post processing and calligraphic lights via optional modules for AAlchemy family