reactor™

THE COMPLETE DYNAMICS SOLUTION

Introducing reactor™ powered by Havok™, the Discreet dynamics extension for 3ds max™ - the world's best selling 3D animation and modeling solution for games, broadcast, television, post-production and web content. The most advanced soft body and rigid body dynamics, free form deformations, cloth, fluids and new rope simulations can be designed within one highly interactive system. Keyframed animations can be created from realistic physical simulations or use reactor's deep support of MAXScript to extend virtually every aspect of your dynamics simulation. All of the reactor dynamics are driven by the Havok physics engine with a real-time preview capability for fast, precise modifications, unsurpassed realism, speed and stability.

Film and broadcast graphics designers can add various types of highly realistic dynamics to their scenes that fully interact with each other, including powerful, new simulations of deformable chains from realistic hair to knottable climbing rope. Content created in reactor can be injected into a game title using the Havok Physics SDK†, further solidifying 3ds max as the solution for designing game interaction. Artists creating web content can take advantage of 3ds max with reactor to design real world effects for more engaging 3d web environments.

You quickly reach all your dynamics goals with reactor: rippling fluids, fast, superior cloth, and perfect interactivity between silky cloth and collapsing walls.

Image courtesy of Marcus Morgan, Discreet

features

- *A seamless extension to the* 3ds max *workspace*
- *Delivers rigid body and soft body dynamics*
- *Fluid surfaces and cloth creation*
- *New rope functionality found only in* reactor
- *Greatly improved cloth simulation*
- *Significantly extended access to most functionality via MAXScript*

discreet™

rigid body dynamics

- Assign physical properties such as gravity, wind, friction and restitution
- Accurate static and dynamic friction ensure realistic behavior
- Robust solid object simulation for collapsing walls, landslides, machines and vehicles
- Properties can be taken directly from dynamics property fields using get/set from material options
- Full integration with 3ds max-controlled keyframed objects, such as animated characters, which can be chosen to affect physically controlled objects
- Supports any geometry within 3ds max, and simulates fast, robust collision detection and reaction in real-time
- Select collision detection methods on a per-object basis, from bounding box, bounding sphere, convex hull, proxy object, or actual geometry
- Specify arbitrary sets of collision pairs to ignore which optimizes the behavior of specific scenes
- Display proxies to simplify the geometry used for simulation while maintaining high-fidelity display geometry
- Select from multiple ODE‡ solvers (Euler, Back-Euler, Midpoint, Runge-Kutta).
- Multiple friction models, from simple to complex
- "Analyze world" feature to check for scene physical validity prior to animation
- Key reduction feature strips virtually all unnecessary keys to facilitate post editing of the generated keyframe data
- Dynamics core with estimate momentum and inertia properties for keyframed objects allowing full interaction of keyframed and dynamically simulated objects
- Optimize for speed by controlling when objects are deemed to have "come to rest", and then effectively remove them from the simulation

cloth

- Create clothes from any mesh
- No mesh stitching necessary
- Choose stiffness and damping parameters to simulate anything from denim to silk
- Full physically correct interaction with all other reactor objects in the environment
- Complete self-intersection avoidance
- Cloth modified feature may be applied to arbitrary geometries, or even to a subset of the faces making up an object, using the vertex selection methods
- Full control over common cloth parameters to control stretchiness, bend flexibility, shear flexibility, cloth motion damping, friction, mass and density
- Full collision detection with soft and rigid bodies
- Cloth may be attached via constraints to any object in the scene
- Cloth fully interacts with the fluid dynamics with control over the cloth air resistance and relative density for floating effects
- Automatic smoothing of the cloth mesh for higher fidelity display with selectable smoothing levels for real-time display

soft body dynamics

- Any object in 3ds max can be identified as soft with full control over its mass, friction and deformation properties
- Objects have stiffness, damping and friction parameters for fine-tuning the soft body behavior. Create soft bodies from any mesh
- Allows for the easy generation of secondary motion
- Two core methods for simulating soft objects; mesh modifiers and FFD modifiers
- Mesh modifiers work directly on the object’s geometry with full polygon accurate collision detection
- FFD modifiers use bounding soft cubes which act as modifiers using mesh deformation techniques
- Selected vertices may be tagged as non-soft
- Automatic smoothing of coarse meshes for high-fidelity display of soft objects in real-time preview

fluids

- Full surface-based fluid dynamics simulation
- Simulation of fluid surfaces and buoyancy
- All simulated objects float realistically, creating waves, ripples, and even cloth
- Real-world object flotation and fluid simulation including wake and bow effects, ripple reflection and damped interference on fluid surfaces
- The fast fluid dynamics model integrates completely with all other objects in the environment
- Density and viscosity parameters for tuning fluid behavior and fluid behavior override parameters including wave speeds and ripple limits
- Control over polygon density used to represent the fluid
- Full wave collisions with arbitrary landscape
- All other dynamic objects interact with the fluid surface
- Rigid, soft and cloth objects will float, cause waves, be affected by waves and potentially sink to the bottom depending on their physical characteristics

rope

- Optimized simulation for ropes and chains
- Ropes can automatically knot and tangle
- Make any spline behave like rope to model effects such as hair, ribbon or tassels

constraints & keyframe systems

- Mix any keyframed object with simulated ones for physically realistic and controllable effects
- Create articulated rigid body structures like robot arms or bridges
- Constrain cloth, soft bodies or rope to other simulated bodies or keyframed objects
- Objects in the system can be attached to each other or to fixed points or even paths in space
- Objects may be connected via springs, with full control over the spring's rest length, compression / extension and damping
- For particularly hard or rigid springs, dashpots are a cross between a constraint and a spring
- Dashpots may be used to constrain points on objects together or object orientations
- A motor with arbitrary rotation and gain can be attached to an object, allowing the construction of automated machinery
- Objects may be assembled to act as a single rigid body, but instructed to break apart if they hit another object with sufficient force
- A full wind simulator is provided with control over speed, magnitude, turbulence and variance as well as specific ripple parameters
- Wind can use actual geometry to determine sheltering effects
- A basic chassis simulator facilitates fast creation of vehicles

real-time preview

- Preview the dynamic behavior of your scene in real-time
- Preview supports OpenGL and DirectX and includes many of the scene properties including lighting (with planar shadows) and texturing
- Interact directly with the scene using a mouse
- Preview window can be used as a real-time scene-modeling tool
- The preview window may also be used to debug your scenes allowing mesh edge display in real-time, and provides full control over the simulation speed and accuracy

system requirements

- 3ds max 3 or greater
- Windows 2000 or Windows® 98
- Intel® or AMD processor at 300 MHz minimum (dual system recommended)
- 128MB RAM and 300MB swap space minimum
- Graphics card supporting 1024x768x16-bit color. (OpenGL and Direct3D hardware acceleration supported; 24-bit color, 3D graphics accelerator preferred)
- Specifically tested: nVidia TNT and Gforce range of chipsets, Matrox G400, ATI Rage and 3Dfx Voodoo cards
- Windows-compliant pointing device. (specific optimization for Microsoft Intellimouse™)
- CD-ROM drive
- Optional: sound card and speakers, cabling for TCP/IP-compliant network, 3D hardware graphics acceleration, video input and output devices, joystick, midi-instruments, 3-button mouse

† Havok Physics SDK available directly from Havok, Inc.
‡ Ordinary Differential Equations

additional information

To obtain more information about Discreet systems and software visit the Discreet web site at www.discreet.com or email product_info@discreet.com

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Contact your local reseller for sales information. Resellers are listed on the Discreet web site at www.discreet.com

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