

RENDERER FEATURES

RENDER ENGINE

- **Biased** and **Unbiased** solution
- **Path Tracing:** unbiased solution
- **UHD cache:** faster biased cached solution for interiors
- **Denoising**
 - Reduces the number of passes needed to get a noise-free image, with render time reductions of 50 to 70%
 - Interactive amount adjustment
- **Adaptive Image Sampling**
 - Balances out the rendering calculations over the image to focus more processing power on tricky areas
- Progressive rendering
- Max Sample Intensity (MSI): automatically removes fireflies - accuracy/render speed tradeoff
- Bidir/VCM: experimental unbiased engine with faster/more precise caustics
- Proudly CPU based

INTERACTIVE RENDERING

- **100% the same render engine** as for the final frame
- **All final frame rendering features supported**, including Interactive LightMix, post-production effects such as bloom & glare, LUTs, etc.
- Sampling focus while zooming in IR
- Subsampling for virtually real-time performance
- Results shown in 3ds Max viewport or Corona VFB

DISTRIBUTED RENDERING

- Slaves can join or quit the render session after it has started
- Auto discovery of slaves on local network
- Auto sending of assets to all machines (only if required)
- Pass, Time and Noise Level limits can be used
- Requires matching Backburner version installed with 3ds Max

INTERACTIVE LIGHTMIX

- **Adjust color and intensity of lights, during and after rendering**
- **Single-click** set up by instanced, grouped or individual lights (with memory requirements reported for each setup)
- Manual set up if required
- Controlled from the VFB
- **Results can be pushed to the scene**
- Can be used for anything from subtle adjustments, to turning day into night, without re-rendering
- Optional Denoising, independently for each light select pass (can be enabled during automatic setup)
- Light select passes can be saved to a single CXR file and then adjusted and mixed in the Corona Image Editor, or saved separately for compositing or animating in other post-production software

CORONA VIRTUAL FRAME BUFFER

- An optional, feature-rich replacement for the 3ds Max native VFB
- **Integrated Interactive LightMix**, allows changing color and intensity of lights without re-rendering
- **Integrated post-processing effects**, including bloom & glare, vignette, sharpening/blurring, histogram, curves, etc.
- **Integrated color mapping controls**, including exposure, filmic tone mapping, LUTs, etc.
- Statistics: render time, remaining time, performance, polycount, ...
- Displaying/saving render elements
- Pixel color probe on right mouse button
- Controls: start render/stop render, resume last render, resume rendering from file, save/clone/copy image, ...
- Optional stamp with scene info at the bottom of rendered image
- Customizable information in the title bar
- VFB History and Comparison
- Interactive and Multiple Render Regions
- Render Regions scale with the VFB, are saved with the 3ds Max scene file, and can be globally disabled or enabled
- Fuzzy render regions

POST-PROCESSING EFFECTS

- Controlled from render settings, Corona Camera Mod, or VFB
- All settings are **adjustable during/after rendering**
- Image **updated in real time**
- **Bloom & Glare**
 - Independent strength for each
 - Threshold
 - Color intensity & shift to adjust colors
 - Glare ray count, blurriness and rotation

EXPOSURE AND COLOR MAPPING

- Controlled from render settings, Corona Camera Mod, or VFB
- All settings are **adjustable during/after rendering**
- Image **updated in real time**
- **Two exposure control modes**
 - Photographic exposure: shutter speed + ISO + f-stop
 - Simple exposure: single EV value
- **Additional settings**
 - Contrast
 - Highlight compression
 - Filmic Highlights
 - Filmic Shadows
 - Color tint
 - Saturation
 - White balance
 - LUTs with opacity adjustment
 - Custom curves for overall brightness, and individual RGB
 - Sharpening/Blurring (both can be used at the same time, to reduce “pixel-perfect” noise)

CORONA IMAGE EDITOR

- Runs outside of any 3D software
- All the familiar controls from the Corona VFB
- Adjust lighting in the rendered image using the full range of LightMix controls (on Corona EXRs)
- Apply Denoising (on Corona EXRs)
- Apply all the Corona post-processing options (on any EXR)
- Save and load LightMix and post-processing configurations, and exchange those to and from the Corona VFB
- Save to EXR, PNG, JPG and BMP

CAMERA

- High quality (raytraced) **depth of field and motion blur** effects
- Photographic controls (optional): shutter speed + ISO + f-stop
- **Bokeh shape**
 - Circular
 - N-gonal (bladed aperture)
 - Custom image
- Multi-segment (curved) motion blur
- 3ds Max 2016 Physical Camera support
- Virtual Reality Camera

CORONA CAMERA MOD

- Camera object modifier
- Allows setting Corona exposure/DOF/motion blur/bloom & glare/color mapping on any camera

LIGHTS

- **CoronaSun**
 - Standalone object or part of 3ds Max daylight assembly
 - Uses state of the art Hošek & Wilkie model of emission
 - Allows non-physical properties (changing size, color, disabling visibility in reflections, ...)
- **CoronaLight**
 - Shapes: sphere, rectangle, disk, cylinder
 - IES profiles
 - Directionality
 - Textured emitters
 - Physical units
 - Color (RGB input, Kelvin temperature, texmap)
 - Non-physical settings: disabling shadows, includes/excludes, disabling visibility in reflections, preventing black appearance for lights with directionality
- **Corona Light Material**
 - Turns any object into a light
 - No render time differences compared to using a CoronaLight
- **3ds Max native lights**

RENDER ELEMENTS

- Arbitrary number of render elements
- Optional render elements anti-aliasing
- Optional render elements Denoising (where relevant)
- Beauty element, with independent Denoise amount
- Alpha element
- **Beauty composition elements**
 - Direct, indirect, reflect, refract, translucency, emission
- **Geometry elements**
 - Geometry normals, shading normals, primitive coordinates, UVW coordinates, world position, z-depth, Velocity render element
- **Masking elements**
 - Wire color
 - Primitive/Material/Object ID
 - Custom mask
 - Object selection
 - Material G-buffer ID
 - Object G-buffer ID
- **Shading elements**
 - Albedo, individual direct/indirect BRDF components, raw components, source colors, shadows
- **Arbitrary texmap elements**
 - Ambient occlusion
 - Wire shader
 - Vertex colors

ENVIRONMENT

- All environment textures automatically light the scene
- No dome object required
- Uses importance sampling
- Direct/Reflect/Refract overrides
- Global material (for volumetric effects - fog)

TEXMAPS

- **CoronaAO**
 - Ambient occlusion shader
 - Supports textures
 - Includes/Excludes
 - Additional controls: spread, directionality, inverted mode, ...
- **CoronaDistance**
 - Gradient based on distance to other objects
 - Supports textures
 - List of objects to calculate distance from
 - Can be used in Corona Scatter density map to control placement of objects
 - Wide range of other creative uses, e.g. ripples on water around objects, controlling light intensity and color, etc.
 - Supports all geometry including Corona Proxy, Corona Scatter, and 3ds Max particle objects
 - Works as an input to bump mapping
- **CoronaFrontBack**
 - Shows different colors/texmaps on front/back sides of a material
- **CoronaOutput**
 - Allows disabling color mapping for a specific texture
 - Unique tone mapping capabilities (not present on other output nodes), including LUTs, gamma, etc.
- **CoronaMix**
 - Advanced mix shader
 - Texture or color inputs, different blending modes
 - Works as an input to bump mapping
- **CoronaRaySwitch**
 - Same as RaySwitch material, but on texmap instead of material level
- **CoronaSky**
 - Implements latest Hošek & Wilkie realistic sky model
 - Allows changing ground color and turbidity
- **CoronaColor**
 - Allows to input single constant color using a color picker
 - HDR numerical values, Kelvin temperature, web hex input
- **CoronaWire**
 - Wire shader
 - Allows to set edge/vertex size in world or screen coordinates
 - Falloff between Base and Edges / Vertices color
 - Can be used as an input to bump mapping
- **CoronaBitmap**
 - Works similarly to 3ds Max bitmap, but faster (10-20%)
 - Spherical, Dome, Cross and Mirrorball modes for use as an Environment
 - Rotation via degrees or U Offset (for environments)
- **CoronaRoundEdges**
 - Rounded corners shader
 - Works as an input to bump mapping and other material slots
- **CoronaMultiMap**
 - Randomly assigns colors/maps to instances
 - Frequency spinners
 - Hue and Gamma randomization
 - Features advanced blending modes
- **CoronaTriplanar**
 - Apply textures without explicit UV mapping, with no stretching or seams thanks to the in-built blending
- **CoronaNormal**
 - Automatic detection of incorrect input gamma

MATERIALS

- **CoronaMtl**
 - Diffuse, translucency, reflection, refraction, glossiness, opacity
 - GGX BRDF with full glossiness range
 - Compatible with third-party tools such as Allegorithmic's Substance Painter and Quixel's Megascans
 - Adaptive displacement
 - Vector displacement
 - Bump mapping
 - Volumetric scattering and absorption, SSS
 - Self-illumination
 - Fresnel reflections, anisotropic reflections
- **CoronaLayeredMtl**
 - Similar to 3ds Max Blend material
 - Combines **multiple materials** instead of just two
- **CoronaPortalMtl**
 - Optional
 - Accelerates lighting in interiors with small windows
- **CoronaLightMtl**
 - Identical performance to CoronaLight
 - Various non-physical settings
 - Textured emission (useful for backplates)
- **CoronaRaySwitchMtl**
 - Uses different material for different ray types: direct, GI, reflections, refractions
- **CoronaShadowCatcherMtl**
 - Custom backplate textures
 - Screen, spherical, or no projection
 - Supports glossy surfaces
 - Bump mapping
 - Lights work additively (illuminators) or subtractively
- **CoronaVolumeMtl**
 - Simplified material for volumetric scattering and absorption
- **3ds Max materials**
 - Standard
 - Blend (including nested blend materials)
 - Multi/Sub-Object
 - XRef
 - Shell
 - Double Sided
 - Top/Bottom
 - DirectX Shader

GEOMETRY

- **CoronaProxy**
 - Cross-platform proxy format – .cgeo
 - Faster save/load/display of large scenes
 - Compressed format to save disk space
 - Supports animated meshes
- **CoronaScatter**
 - Fast and simple scattering tool
 - Supports multiple distribution and scattered objects
 - Supports scattering on splines
 - Supports scattering in regular patterns
 - Random translation/rotation/scaling of instances, with optional discrete stepped values
 - Supports aligning instances to local normal
 - Supports millions of instances
 - Textured density, scale
 - Vertex paint support
 - Optionally avoids object intersections, with tweakable inter-object spacing
 - Fast generation and viewport preview using multiple threads
 - Included Scatter Lister plugin to easily access and control all scatters in a scene

SUPPORTED 3DS MAX FEATURES

- **Most texmaps**
 - Including Bitmap, Camera Map Per Pixel, Cellular, Checker, ColorCorrection, Composite, Dent, Falloff, Gradient, Gradient Ramp, Marble, Mix, Noise, Output, Particle Age, Perlin Marble, RGB Multiply, RGB Tint, Smoke, Speckle, Splat, Stucco, Vertex Color, Waves, Wood
- **3ds Max standard/photometric lights**
 - Including soft shadows via CoronaShadows
- **3ds Max render switches**
 - Disabling Displacement, Render Hidden Geometry, Renderable, Object Visibility, ...
- **XRef geometry/scenes**
- **2D Pan Zoom Mode**
- **Render to Texture (RTT)** basic support; denoising RTT results is supported

VR

- Corona Camera Mod can render to spherical or cubemap format, **supporting a wide range of VR apps**
- Easy set up, with default settings handling 99% of cases
- **Integration with the Corona VR app** so that no middle software is required to create interactive walkthroughs
- Corona VRWarp helper object to create warps (icons that enable the viewer to move to another point of view or location in the Corona VR app) directly in 3ds Max
- Conventional stereo rendering (non-360)
- Bloom & Glare supported for spherical VR images

MISC

- **Corona Displacement Modifier**
 - All displacement features and settings available in **CoronaDisplacementMod**
- **Advanced “Render Selected”**
 - Render mask by an include list, object ID, or viewport selection
- **Improved Color Picker**
 - Can be set to replace default 3ds Max color picker
 - sRGB mode for ease of use with Photoshop and similar; can be disabled for a linear workflow
 - Perceptually uniform color gradients in both modes
 - Color selection by Temperature
- **Error reporting with online help**
 - Error messages linked to dedicated support pages with more info and possible solutions
 - Automatic selection of the offending object
 - Automatic correction of certain errors
 - Error message forwarding from render slaves in DR
- **Corona Converter**
 - One-click solution to convert materials, lights, and maps from other renderers
- **Improved material editor scene**
 - More representative previews
- **Override material option** (with excludes/includes)
- **Save and resume**
 - Ability to save VFB and resume rendering later (even on a different computer)
- **Render only elements**
 - Computes render elements in seconds without doing shading
- **Autosave**
 - Optionally saving the VFB every few minutes and after rendering. Rendering can be resumed from these backups
- **Bundled LUTs**
 - Over 70 LUTs included with the install
- **Bundled IES profiles**
 - Sample IES files included
- **Support for 3ds Max physical material**