

3Delight For Softimage Technical Summary

Key technical features of *3Delight For Softimage*

Table of Contents

.....	1
1 Introduction.....	2
1.1 Distinction Between <i>Artist</i> and <i>Studio</i> Versions.....	2
1.2 Additional Readings.....	2
2 Overview of 3Delight For Softimage	3
2.1 Integration with <i>Softimage</i>	3
2.2 Core Features of 3Delight	4
2.3 Pipeline.....	5
3 Additional Tools.....	6
Index	7

1 Introduction

3Delight For Softimage is an integrated rendering plug-in for *Softimage*. It is built on top of *3Delight*, a high quality, heavy duty, RenderMan®-compliant renderer. The product is aimed at both artists and studios looking for a powerful solution to some of the shortcomings in *Softimage*'s internal renderer. Additionally, a goal of this plug-in is to introduce - in a non-binding, non-intrusive manner - some rendering and pipeline concepts that are proper to RenderMan® into *Softimage*.

There are two versions of the plug-in: the entry level *Artist* version and the professional *Studio* version. This document covers both versions.

1.1 Distinction Between *Artist* and *Studio* Versions

The most important distinction between the two versions is that most RIB oriented features are only available in *3Delight For Softimage|Studio*. The *Artist* version still contains most of the fundamental features that are, in our opinion, an advancement in targeted rendering technologies for *Softimage* users. In this document, features that are unique to *Studio* will be marked with '*[Studio]*'.

1.2 Additional Readings

- *3Delight Licensing*
Describes the licensing setup for *3Delight For Softimage* as well as for *3Delight* and *3Delight for Maya*.
- *3Delight For Softimage User's Manual*
A comprehensive guide to *3Delight For Softimage*. Includes description of all properties and contain many rendering guidelines.
- *3Delight User's Manual*
Documentation for the *3Delight* renderer. A very recommended reading.

2 Overview of 3Delight For Softimage

2.1 Integration with *Softimage*

Particular care has been taken to ensure a seamless integration with *Softimage*:

Support for All Versions and Platforms

All versions starting from 7.0 are supported, for all platforms. A version for 6.5 can be provided on-demand.

Full Render Region Support

Simply select ‘3Delight’ as the current renderer in *Softimage*’s *render options* and launch renders as usual. *3Delight For Softimage* can render into *Softimage*’s render region and frame buffer. All framebuffer channels are supported (such as depth, normals and alpha).

Complete *Render Tree* support

3Delight For Softimage automatically converts *Softimage*’s render trees (including *compounds*) into **RenderMan**© shaders and compiles them on the fly¹. All textures are converted (if needed) into *3Delight*’s mip-mapped and tiled TIFF format for efficient rendering and filtering. Material clusters, vertex colors, implicit and explicit projections are all supported. The following material slots are recognized:

- Surface
- Displacement
- Bump
- Environment

Additionally, the conversion system has been designed in such a way so that advanced users can convert their in-house shaders to *3Delight* format easily.

NOTE: This means that *Softimage*, in conjunction with *3Delight For Softimage*, can be used as a **RenderMan**© shaders authoring tool.

Complete ICE Support.

Point Clouds and ICE attributes are fully supported and efficiently rendered².

Toon rendering and Inking.

All toon shaders are supported and the ink lens shader is also supported. Making *3Delight For Softimage* a good choice to render beautifully anti-aliased outlines, fast.

Stand-Ins *3Delight For Softimage|Studio* fully supports stand-ins for efficient rendering of large data sets³.

Image-Based Lighting

Any environment shader can be used to light the scene using a simple to use render property.

¹ Compilation is multi-threaded to take full advantage of multi-core machines.

² However, volume rendering of point clouds and *strands* are not implemented yet

³ Starting with *Softimage* version 7.01 and higher.

Softimage Shader Balls rendering

3Delight For Softimage will render *Softimage* shader balls if the user enables this features in *File -> Preferences*.

Softimage Properties Sharing

3Delight For Softimage accesses all the common rendering properties so that its behaviour is as close as possible to *Softimage*'s internal renderer.

Rich Geometry Support

Here is a complete list of supported geometric primitives:

Polygons All types of polygons are supported. Additionally, polygonal geometry with a *subdivision step* greater than 1 will be rendered as a *smooth* subdivision surface. Edges and vertices tagged as "hard" are rendered properly.

NURBS All NURBS surfaces are supported. Trim curves on surfaces are also fully supported and rendered to sub-pixel accuracy.

Particles All particle types are supported with proper shading. Additionally, *3Delight For Softimage* can take advantage of *3Delight*'s *lightweight* particles to render extremely large clouds of small particles.

Hair Hair is rendered using *3Delight*'s efficient *RiNuCurves* primitive. Linear, quadratic and cubic curves are all supported. Special RIB export options for hair enable memory efficient off-line rendering. Hair instancing is fully supported.

Curves *3Delight For Softimage* can render *Softimage* curves of any shape and degree.

Point Clouds

Older (pre-ICE) *Softimage* particles are supported.

NOTE: *3Delight* has no tessellation controls other than the **ShadingRate**. This means that, by default, all surfaces (hair, subdivisions, nurbs) are rendered as smoothly as visually required for the given resolution, *and this is the normal operational mode of 3Delight*.

2.2 Core Features of 3Delight

Motion Blur and Depth of Field

Multi-Segment motion blur and realistic camera shutter simulation contribute to high quality rendered images. Compared to other rendering software, motion blur in *3Delight For Softimage* is *fast*. Depth of field is fully supported and simulates a realistic camera *bokeh*.

High Quality Anti-Aliasing

Edge anti-aliasing, motion blur and depth of field quality are all controlled using very simple and *predictable* options. Contrary to other rendering soft-

ware, increasing pixel samples for higher quality anti-aliasing does not affect performance significantly⁴.

Geometric Displacements

Displacements are efficiently rendered to sub-pixel accuracy. *Softimage*'s displacement shaders as well as **RenderMan**© shaders can be used for displacement.

Subsurface Scattering

Automatic subsurface scattering can be enabled on a per-object basis and delivers impressive results, fast. All standard *Softimage* materials can be used without modification to achieve subsurface scattering effects.

2.3 Pipeline

RenderMan© Shaders Support [*Studio*]

It is possible to connect **RenderMan**© shaders to geometry (or groups) and use them instead of *Softimage*'s materials. Surface, displacement and volume shaders are supported.

Scene Caching [*Studio*]

This feature enables you to “cache” a scene for efficient re-rendering. Once a scene is cached, the plug-in doesn't have to parse it for subsequent renders. This minimizes the time necessary to start the render of complex scenes, especially those with hair⁵.

RIB Export [*Studio*]

Softimage scenes can be exported into efficiently constructed RIB files. RIBs can be monolithic or fragmented into smaller archives for memory efficient rendering. RIB can be outputted in binary and/or compressed format.

RIB Archive Import [*Studio*]

Individual objects or groups of objects can be replaced by RIB archives. *Delayed* RIB archives⁶ are also supported.

RIB “Boxing” [*Studio*]

The purpose of *RIB boxing* is to enable the insertion of **RenderMan**© commands during scene rendering. This is a common facility in **RenderMan**© oriented workflow.

⁴ By the principle of dissociation between shading and visibility in *3Delight*, as explained in *3Delight For Softimage User's Manual*.

⁵ This feature is intended primarily for the lighting stage, where rapid feedback is of prime importance.

⁶ Mainly used in depth-complex scenes, for faster and memory efficient rendering.

3 Additional Tools

3Delight For Softimage comes with the following additional tools:

i-display - Image Sequence Viewer and Frame Buffer

This production oriented tool has been designed for HD image playback and sequence viewing. Through the years it has been extended to be used along with *3Delight* as a flexible flip book. Many advanced options are available: 3D color lookup tables, precise playback frame rate control, image mixing and comparison, . . .etc. **i-display** can be used to view renders from inside *Softimage*¹.

shaderdl - The Shader Compiler

3Delight's shader compiler is an optimizing SIMD² compiler for the RenderMan© SL language. The compiler incorporates advanced code optimization algorithms and complies to the latest SL specifications. This shader compiler is the *only* tool one needs to write platform-independent RenderMan© shaders: no C++ compiler is necessary. The shader compiler is automatically executed when *Softimage*'s materials are converted into RenderMan© shaders.

tdlmake - The Texture Optimizer

This tool converts the most common texture formats (including high dynamic range images) into *3Delight*'s mip-mapped TIFF files. Additionally, **tdlmake** can convert common light probe formats (*two fish*, *lightprobe*) into cubic environment maps. The texture optimizer is automatically executed when *Softimage*'s image clips are converted into *3Delight* textures.

hdri2tiff - Image Range Compressor [*Studio*]

Converts high dynamic range images to low dynamic range images by using advanced *tone mapping* techniques. This tool can be used to both compress the range of output (rendered) images or to view high dynamic range textures and light probes.

ribdepends - RIB Packaging and Dependency Generation [*Studio*]

This tool can generate *site independent* RIB packages. It takes any RIB as input and generates a directory structure containing all the needed resources (textures, archives, shaders) with a new RIB file that uses only these new resources. This tool is useful for off-line rendering.

ribshrink - A RIB Sequence Compressor [*Studio*]

This tool takes a series of RIB files as input, and generates a new, space optimal, sequence of RIB files. The tool works by analyzing input RIB files and factorizing common geometry into RIB archives. Can potentially reduce disk space taken by RIBs by *orders of magnitude*.

ptcview - Point Cloud Viewer [*Studio*]

A tool to view point cloud files for *Studio* users that use *3Delight* point cloud and *baking* features.

¹ Closing *Softimage* won't close **i-display**, meaning that **i-display** will accumulate your renders as long it is open.

² Single Instruction Multiple Data.

Index

3

- 3delight for softimage|artist 2
- 3delight for softimage|studio 2

A

- anti-aliasing 4
- artist version 2
- automatic subsurface scattering 5

B

- baking 6
- bump shaders 3

C

- caching, scene 5
- clusters 3

D

- delayed archives 5
- depth of field 4
- displacement shaders 3
- displacements 5

E

- environment map conversion 6
- environment shaders 3
- explicit projections 3
- exporting RIB 5

G

- geometry, nurbs 4
- geometry, polygons 4

H

- hair support 4
- high dynamic range images 6

I

- i-display 6
- image-based lighting 3
- implicit projections 3
- inking 3

M

- material clusters 3
- motion blur 4
- multi-segment motion blur 4

N

- nurbs 4

O

- outlines 3

P

- point cloud viewer 6
- polygons 4
- preview, shaderballs rendering 4
- projections 3
- properties, shading 4
- ptcview 6

Q

- quality controls 4
- quality, depth of field 4
- quality, motion blur 4

R

- render region support 3
- rendering shaderballs 4
- rendering, integration 3
- renderman shaders 5
- rib archives 5
- rib compression 6
- rib dependencies 6
- RIB export 5
- rib shrink 6
- ribdepends 6
- roon rendering 3

S

- scene caching 5
- shader compiler 6
- shaderballs, rendering 4
- shaderdl 6
- shaders, renderman 5
- softimage curves 4
- softimage hair 4
- softimage point clouds 4
- softimage stand-ins 3
- softimage standard properties 4

studio version..... 2
sub-pixel displacements..... 5
subsurface scattering..... 5
supported platforms..... 3
supported versions..... 3
surface shaders..... 3
surfaces..... 4

T

tdlmake..... 6
texture conversion..... 3
texture optimizer..... 6

V

vertex colors..... 3