RenderWare Graphics

RenderWare Graphics 3.5

PlayStation 2 Readme

April 2003

Table Of Contents

Introduction

Welcome to the RenderWare Graphics 3.5 SDK for the PlayStation 2 platform, the world-leading, high performance, open and extensible, truly multi-platform 2D/3D graphics module of RenderWare Platform.

The focus of RenderWare Graphics 3.5 has been to enhance the usability and to improve core performance across all platforms.

We have also responded to more customer requests than ever before and are delighted to be able to offer these improvements within this release.

If you're new to RenderWare Graphics we recommend that you read and take a look at:

- the User Guide
- the API Reference
- the knowledge base on the Fully Managed Support Service (FMSS) using your customer account at https://support.renderware.com/. The FMSS also gives instant access to our world-wide Developer Relations Team.
- the Examples

What's New in 3.5?

Improved User Interface

The export tools user interface has been improved in order to simplify the process of exporting artwork. Options are now clearly split into standard and advanced categories allowing new users to better focus their work. Greater use has been made of context sensitive menus in order to reduce the number of commands that need to be learnt.

A new RenderWare specific output window allows filtering of messages after export by verbosity level. Message logs may also be saved to text files.

All user interfaces are now implemented using ActiveX controls and are common between 3ds max and Maya. This reduces the need to re-learn export commands when moving between the applications.

XML Based File Format (.RF3)

RF3 is a new XML based RenderWare scene graph format. It contains a high level RenderWare representation of a 3ds max or Maya scene and stored links to the option templates that should be used to export it. It does not contain any platform specific optimizations such as tri-stripping or world sectorization. Once a scene has been exported to the RF3 format it may be converted offline to RenderWare stream format using a command line tool or custom application. The RF3 format separates the artist export process from conversion to platform specific RenderWare formats. This allows artists to concentrate on generating quality artwork whilst allowing programmers full control over conversion to platform specific RenderWare streams without use of 3ds max or Maya.

By using RF3 files it is now much easier to set-up automated build processes that generate final in-game assets from the source artwork. The art package no longer needs to be included in the build process. Because the RF3 format is XML based it is easy to extend with custom scene graph data.

Option Template Files

Template files (.RWT) are a new XML based file format used to store the export settings relating to a single asset or an entire project. Rather than setting export options manually for every scene artists may now simply link to a template file that has been set-up by a programmer or technical artist. This reduces the risk of errors being introduced by incorrect settings and allows options to be shared across multiple scenes. When an option needs to be changed or a new option added, a single template file might be edited rather than multiple artwork scene files.

Template files can be edited using any XML editor or through the new template manager UI in the export tools. If custom options have been added to the template file these too will be displayed in the template manager.

ADC Functionality

We've introduced a new `RpADC` plugin. This is an offline process that will process your geometry and worlds to reduce degenerated triangles. This processed geometry can then be used with a new set of G3xd pipelines. These pipelines replicate all the functions of the G3x pipelines but with added ADC support.

UV Transformations

The `RpMatFX` plugin has been extended to include two new material effects. These allow first and second pass texture coordinate animation. This will allow programmers to create simple animated texture effects.

Export driven texture animation is still in development and will be announced in the near future.

Compressed Animation Toolkit

Support is now offered for a compressed key-frame format. With exporter support and driving extra functionality now available in RtAnim, you can reduce your key-framed data memory occupancy by 40%.

Toolkits

We've developed a geometry conditioning toolkit and a winged-edge algorithm toolkit. They have been designed to optimize vertex and polygon configurations that are inefficient on console architectures or that are sub-optimal in specific situations.

Unicode Support

Unicode fonts are now supported in Rt2d.

Instance Tool

The preinstancer tool has had functionality improvements and enhancements to the custom instancer facilities. Skin splitting is now carried out in the custom instancer, for which source code is provided.

NULL library run-time requirements

The pre-built NULL libraries for PC now require the multithreaded DLL run-times when linked to an application.

Other Art Path Improvements

3ds max 5 Edit Normals Support

The Edit Normals modifier in 3ds max 5 gives artists fine control over the normals used for mesh objects. Any tweaks that are set-up using this modifier are now honored in the RenderWare geometry exported.

More Per Object Controls

The export tools now provide per-object control of many exporter settings such as export of vertex normals, vertex prelight and toon rendering. This extra control allows artists to fine tune small sections of the scene without splitting the export process into multiple parts.

Plugin Manager Control

The new plugin manager dialog allows artists to quickly diagnose problems by listing the location and version of all exporter components. Any custom OpenExport plugins are also listed making it easy to tell what customizations are being used.

3ds max Batch Exports

Recursive batch exports make it easy for artists to quickly re-export multiple 3ds max scenes. The assets for an entire game can now be exported with a single click.

Export Wizard

The RenderWare Export Wizard now guides the user through the first export performed on a scene. The common export options are set-up easily without the need to work through advanced options.

Managed Assets

By default the exporter now transparently handles the decision of how a scene should be split into RenderWare export assets. As the scene is modified this information is automatically updated so there is no need to manually update export options. Of course the user may take manual control at any time to tune options to their particular requirements.

Platform Specific Exports

Exports may now be targeted explicitly at a particular platform. A RenderWare stream relevant to that platform will be generated and the default export options will be fine-tuned to the selected platform. Multiple platforms may also be targeted by a single export operation.

Better Error Detection

The exporter error checking code has been expanded to detect and give warnings about areas of the scene that may require attention. The checks performed are tuned to the platform being targeted. The list of new checks includes:

- Invalid texture sizes
- Invalid bone counts
- Unweighted skin vertices
- Unsupported modifiers
- Unsupported animation

Open Export Improvements

Better API documentation

API documentation for the OpenExport architecture is now provided in `CHM` format. The `RwComm`, `RwExp`, `RwMax` and `RwMaya` layers are all documented making it easier to develop OpenExport plugins. Class hierarchy diagrams visualize the architecture aiding learning.

New Examples

More OpenExport examples have been provided giving new users more help in learning to use the OpenExport SDK. New examples include:

- Extending the exporter animation support to include scale animation
- A cut down exporter plugin showing the whole architecture from builder to exporter
- Customizing the export manager to alter how RenderWare streams are created

Improved Return Values

`RwCommError` has been extended to provide more detailed error codes from SDK functions.

Examples - OpenExport

More OpenExport examples have been provided giving new users more help in learning to use the OpenExport SDK. New examples include:

- Extending the exporter animation support to include scale animation
- A cut down exporter plugin showing the whole architecture from builder to exporter
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Examples - SDK

New examples for RenderWare Graphics 3.5 are listed below.

GCOND

The GCond is used to show how to create a geometry conditioned BSP world from an import world (building on the World example). Geometry Conditioning has a set of parameters that can be used to affect the conditioning in a number of ways. The example is a simple coplanar patch tessellated into 15x15 triangulated quads. Each quartile's UV coordinates are shifted to show how UV translation affects conditioning. The BSP world is displayed on the screen and the results of conditioning can be displayed in wireframe.

HANIM4

The fourth Hierarchical Animation example illustrates how to use compressed keyframe data to animate HAnim hierarchies.

PRTSTD2

The PRTSTD2 example illustrates the use of a custom property with the `RpPrtStd` plugin. It shows how a custom emitter and particle property can be created and used with other standard property in the prtstd plugin.

RWSVIEW

The RWSView example illustrates how to load assets from an RWS file into your RenderWare Graphics application. The supplied RWS file contains a world, a platform independent texture dictionary, two clumps, and two animations.

VCLGENP (PlayStation 2 only)

The VCL Generic Pipelines example demonstrates the VCL generic pipelines and the equivalent G3 pipelines. The example illustrates how to create special effects using VCL and shows the following standard features:

1. Skinning
2. Morph-target animation
3. UV-animation
4. Dual-pass rendering
5. Fogging

VCLPIPES (PlayStation 2 only)

The VCL Pipelines example demonstrates using the VCL dot3 and specular pipelines. The specular pipelines require a fullscreen pass to add the specular lighting written to the alpha channel to the other color channels. The dot3 pipelines require fullscreen passes to finish the dot3 calculation.

Functionality Added

RpHAnimHierarchyFlag

RpHAnimHierarchyGetCurrentAnim

RpLtMapGetRasterFormat

RpLtMapSetRasterFormat

RpMatFXMaterialSetUVTransformMatrices

RpMatFXMaterialGetUVTransformMatrices

RpPrtStdEmitterClone

RpPrtStdEmitterPrt2DRotate

RpPrtStdParticle2DRotate

RtAnimInterpolatorGetCurrentAnim

Rt2dFontCallBackRead

Rt2dFontGetReadCallBack

Rt2dFontIsUnicode

Rt2dFontSetReadCallBack

RtLtMapGetLightMapProcessCallBack

RtLtMapLightingSessionLightMapProcess

RtLtMapSetLightMapProcessCallBack

RtLtMapGetVisCallBackCollisionScalar

RtLtMapSetVisCallBackCollisionScalar

RwCorePluginID

RwPalQuantGetMaxDepth

RwPalQuantSetMaxDepth

RwTextureCallBackFind

RwTextureGetFindCallBack

RwTextureSetFindCallBack

RpPatchMeshStreamWrite now wraps the patch mesh in a rwID_PATCHMESH chunk. Hence when streaming in an RpPatchMesh with RpPatchMeshStreamRead the rwID_PATCHMESH must be found first. If old functionality is required use the stealth function _rpPatchMeshStreamReadNoChunk.

Functionality Renamed

`RtAnimAnimationAddAnimTime` to `RtAnimInterpolatorAddAnimTime`

`RtAnimAnimationSetCurrentTime` to `RtAnimInterpolatorSetCurrentTime`

`RtAnimAnimationSubAnimTime` to `RtAnimInterpolatorSubAnimTime`

Many structures and functions renamed in `RpPrtAdv` to reduce their length

Functionality Removed

RwCameraForAllClumpsNotInFrustum

RpPrtStdEmitterPrtAnimFrame

RpPrtStdParticleAnimFrame

RpToonType

RpWorldGetOrigin

Documentation

New and extensively updated documentation for RenderWare Graphics 3.5 is listed below.

User Guide - New Chapters

The User Guide has new chapters on:

- Geometry Conditioning

User Guide - Updated Chapters

The User Guide has updated chapters on:

- 2D Graphics Toolkits
- Cameras
- Dynamic Models
- HAnim
- Introduction
- Lightmaps
- Maestro - substantial updates
- MatFX
- Rasters Images & Textures
- Serialization
- World & Static Models

Exporter Documentation Guides:

- Converting Exports from 3.4 to 3.5 transition document
- Max and Maya Tutorials have been re-written
- Max and Maya Reference Guides have been re-written
- New Technical Artist Guide
- Programmers Guide has been incorporated into the OpenExport CHM.

Tools Guides

Tools guides have been produced/updated to accompany the following:

- BuildTool
- Instance
- RenderWare Visualizer
- Rf3cc tool

OpenExport API Reference

API documentation for the OpenExport architecture is now provided in `CHM` format. The `RwComm`, `RwExp`, `RwMax` and `RwMaya` layers are all documented making it easier to develop OpenExport plugins. Class hierarchy diagrams visualize the architecture aiding learning.

RenderWare Graphics API Reference

The API Reference guide is now organized by subject group, for example all lighting components are now kept together.

There is also an API user/help guide, explaining useful features such as wildcard searches.

New and significant updates to the API reference guide include:

- `RpADC` - Address Control flag generation plugin
- `RtCmpKey` - Keyframe system supporting compressed matrix animation toolkit.
- `RtGCond` - Geometry Conditioning toolkit.
- `RtWing` - Winged edge/half-edge toolkit.

Other general API changes:

- Release notes have been added
- A glossary has been added
- Feedback link has been added to the bottom of each HTML page

White Papers

The white papers have been updated for RenderWare Graphics 3.5.

The “Updating your RenderWare Graphics Assets” white paper discusses the reasoning behind, and the process of, keeping your art assets up to date with RenderWare Graphics releases.

New white papers for PlayStation 2:

- Timing Diagrams
- VCL Pipes

Directory Structure

The directory structure has remained unchanged in 3.5 although the `export` directory has been added. The default root is `rw\graphics` and the layout within is:

`docs`	Documentation which includes the API Reference, Artist Guides, User Guide and White Papers.
`examples`	Examples including new examples for the new plugins.
`export`	Common exporter binaries and SDK which includes libs and examples.
`rwsdk`	Root location of the SDK.
`shared`	Shared files for examples, viewers and tools.
`tool`	Tools provided for use with the elements of the RenderWare Graphics SDK.
`viewers`	Location of the viewers for use with RenderWare, including the new Visualizer.

`rw\graphics\rwsdk`:

`bin`	This contains the useful tools that are used to build RenderWare Graphics.
`include`	RenderWare Graphics header files.
`lib`	RenderWare Graphics library files.

PlayStation 2 Configuration

- This release has been built against the latest available set of Sony libraries Release 2.7.0. Please note that Sony libraries Release 2.6.x will not work with this release of RenderWare Graphics.

- For CodeWarrior builds, this release assumes Release 3.03 or above and the library/tool chain set from Sony (Libs 2.6.1/TC2.96).

- Please be aware that the T10000 development kits have four times the memory of the debug station and user consoles. Memory management in RenderWare Graphics uses the memory space established by the linker script. By default, the linker script (`/usr/local/sce/ee/lib/app.cmd`) allows all of the T10000 memory to be used. During development you may wish to change this linker script in order to investigate the effect of reducing your application's memory space to the 32Mb available on the user consoles.

- If you are not using the Sony supplied `ee-gcc`, you are advised to change the value of RWCOMPILER in `%RWGDIR%\examples\options.mak` if you are using command line builds. (cwsky will invoke CodeWarrior and sky2953 will invoke the SN compilers.) IDE hosted builds are unaffected.

PlayStation 2 Enhancements

VCL Pipelines (Source code licensing customers only)

Customizable VCL pipelines for Generic, Skin, Dual-pass and UV Animations have been added to the PDS. There are also two development examples, demonstrating how to perform full screen Specular and Dot3 bump mapping. We hope the new generic VCL pipelines will be a start place for developers writing more custom pipelines.

Art Path Improvements - PlayStation 2 Pipeline Overrides

Option template files may contain PlayStation 2 render pipeline overrides. This allows programmers to fine tune artwork for their games resulting in better performance at runtime.

PlayStation 2 Functionality Added

_rwDMAMinVsyncCntSet

_rwDMAYieldCallbackSet

RpMatFXMaterialSkyRenderStateSet

RpMatFXMaterialSkyRenderStateGet

RpPTankAtomicSkyRenderStateSet

RpPTankAtomicSkySwapFrames

RpSkyGetDisplayBufferRaster

RpSkyGetDrawBufferRaster

RpSkyRenderStateGet

RpSkyRenderStateSet

RpSkyTexCacheSetReleaseCallBack

RpSkyTexCacheGetReleaseCallBack

RpSkyTexCalcTex1

RtLtMapSkyGetLumCalcCallBack

RtLtMapSkyLumCalcCallBack

RtLtMapSkyLumCalcMaxCallBack

RtLtMapSkyLumCalcSigmaCallBack

RtLtMapSkyLumResetCallBack

RtLtMapSkySetLumCalcCallBack

PlayStation 2 Functionality Renamed

RpPTankSkyGetPreviousBuffer to RpPTankAtomicSkyGetPreviousBuffer

rwVIDEOMODEFSAA0 mode to rwVIDEOMODE_PS2_FSAASHRINKBLIT

rwVIDEOMODEFSAA1 mode to rwVIDEOMODE_PS2_FSAAREADCIRCUIT

PlayStation 2 Functionality Removed

RpSkyTextureCacheSetState

Further Information

Criterion Software Ltd.

For general information about RenderWare Graphics email info@csl.com.

Developer Relations

For information regarding Support please email devrels@csl.com.

For support or advice or to sign up to the fully managed support system. Go to: https://support.renderware.com/.

Known Issues

Visualizer

In Visualizer only one `RpWorld` can be displayed at one time. Although the exporters will allow you to export and `.rws` file which contains more than one `RpWorld`, only the first world will be displayed.

In Visualizer for PlayStation 2 you are unable to view patch skinned models with more than 64 bones. However polygon skinned models with more than 64 bones can be viewed.

Exporters

In response to customer requests the bounding boxes of exported `RpWorlds` are no longer extended to include all objects in the 3ds max or Maya scene. There is no backwards compatibility option to retain the old behavior. Similarly when Visualizing scenes that contain animated objects outside the world bounding box the animated objects will only render when the world is in view. These issues will be resolved in a future release.

When updating 3.4 scenes that contain multiple batch export nodes that export to different directories the updated scene will export all assets to the first of these directories. This issue affects the legacy files types only (dff, bsp, anm, spl) and does not affect rws or rf3 files.

3ds max

If an object in a scene has third party plugin animation controllers assigned and these plugins are missing then an exception may occur during export. We are raising this issue with Discreet and are hoping to have this fixed in a future release of RenderWare Graphics.

Maya

The “Camera and Aim” and the “Camera, Aim, and Up” camera types are not currently supported. These camera types will not be exported and Assets will not be created for them using the “Auto Create Assets” functionality.

RF3

1. Since the RF3 file only stores the texture’s file name, 3ds max procedural textures are not supported.

2. When compiling RF3 files, the rf3cc compiler uses its own image library for building texture dictionaries. Since the 3dsmax/Maya exporters, in some cases, modify the image format (from true color to pseudo color or vice versa), this might lead to inconsistent behavior when exporting directly from 3dsmax/Maya or from an RF3 file. In these scenarios the exported texture dictionary might contain different image

formats. As a general rule, the rf3cc does not modify the image format, so if the image was a 4-bit pseudo color image, it will be exported as so.

3. For patch meshes, the RF3 file can either store the patch information or the tessellated patch information but not both. Therefore we do not support multiple assets, referencing the same patch mesh, with a conflicting tessellation setting.

4. RF3 files currently do not support the 3ds Max filter top level keys option. Users can use the dynamic key frame generation option to add additional key frames to their animations.

RtLtMap Toolkit

There is a known issue with the lightmap toolkit during lightmap generation. Not all slivers, (long thin triangles), are correctly detected and rejected. This can later lead to incorrect results being generated, causing assertions or divide by zero errors.

Such triangles are normal used to fill in cracks at geometry boundaries. If such errors are reported during lightmap generation, try removing such triangles from the geometry. Either by remodeling the original scene to ensure cracks does not appear or with the Geometry Conditioning Toolkit (`RtGCond`).

RpDMorph Plugin

`RpDMorph` function `RpDMorphGeometryCreateDMorphTargets`, calling this function allocates memory for the delta morph targets data. If it has already been called on a geometry any subsequent calls on the same geometry will fail to free up the original memory allocations but still allocate new memory. It is not intended that this function would be called on a geometry more than once, however currently no checks are made to inform you if you call it multiple times on a geometry.