



**COLLADA – Digital Asset Schema Release 1.4.1
and
1.4.1 Specification (2nd Edition)**

Patch Release Notes: Revision C

April 2008

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COLLADA 1.4.1 Schema and 1.4.1 Specification (2nd Edition) Patch Release Notes: Revision C

About This Document

The 1.4.1 Release Notes provide an overview of changes for the 1.4.1 COLLADA Digital Asset schema release. The 1.4.1 version of the schema and the *COLLADA – Digital Asset Schema Release 1.4.1 – Specification (2nd Edition)* are available for download from:

<http://www.khronos.org/collada/>

The COLLADA 1.4.1 schema itself has not changed; only the *Specification (2nd Edition)* has been upgraded with a variety of corrections and enhancements.

Purpose of These Release Notes, Revision (C)

This is an updated edition of the Release Notes for COLLADA 1.4.1. It supersedes all prior versions of the 1.4.1 Release Notes, including the June 2006 1.4.1 *Release Notes*, the December 2006 *Patch Release Notes: Revision A*, and the August 2007 *Patch Release Notes: Revision B*.

This update (Revision C) no longer includes detailed text that now appears in appropriate places in the 1.4.1 *Specification (2nd Edition)*. It also summarizes the changes to the *Specification (2nd Edition)*.

These Release Notes serve as a summary of changes made between the 1.4.0 and 1.4.1 COLLADA schemas and the original 1.4.1 *Specification* and the 1.4.1 *Specification (2nd Edition)*.

Additional Web Resources

Additional information about COLLADA is available at the following web locations:

- <http://collada.org>: Additional technical information about COLLADA; directories of publicly available COLLADA extensions, plug-ins, and conditioners; and a public forum for COLLADA discussions.
- <http://www.khronos.org/bugzilla/>: Public COLLADA bug-reporting system.

Schema Changes Since Version 1.4.0

Changes in this schema release are compatible with existing COLLADA 1.4.0 documents unless otherwise specified.

For details about schema features, including those that have changed for this release, refer to the updated *COLLADA – Digital Asset Schema Release 1.4.1 – Specification*.

<color_target>, <depth_target>, and <stencil_target> now have optional face and mip attributes

Resolves bug K-125.

All **<*_target>** elements now have the attributes:

```
<xs:attribute name="index" type="xs:nonNegativeInteger"
  use="optional" default="0"/>
<xs:attribute name="mip" type="xs:nonNegativeInteger"
  use="optional" default="0"/>
<xs:attribute name="slice" type="xs:nonNegativeInteger"
  use="optional" default="0"/>
<xs:attribute name="face" type="fx_surface_face_enum"
  use="optional" default="POSITIVE_X"/>
```

<COLLADA>'s version attribute now supports 1.4.1

Resolves bug K-171.

Valid values for `version` attribute are now 1.4.0 and 1.4.1.

<COLLADA> element now has optional xml:base attribute

Resolves bug K-207.

```
<xs:element name="COLLADA">
  ...
  <xs:attribute ref="xml:base"/>
```

<connect_params>'s ref attribute type has changed

Resolves bug K-203.

The `ref` attribute for **<connect_param>** is now `xs:token`.

<convex_mesh> child elements are now all optional

Resolves bugs K-380, K-382.

Child elements **<source>** and **<vertices>**, which were previously required, are now optional. This allows correct, unambiguous syntax when the attribute `convex_hull_of` is used, which indicates that the application should compute the convex hull of the specified mesh. In this case, the presence of child elements is potentially misleading. In 1.4.0, the only way to unambiguously use `convex_hull_of` was by defining empty sources and vertices, such as the following:

```
<convex_mesh id="cm" convex_hull_of="#someMesh">
  <source id="empty"/>
  <vertices id="verts">
    <input semantic="POSITION" source="#empty"/>
```

```

    </vertices>
  </convex_mesh>

```

This is no longer necessary.

Note: If `convex_hull_of` is *not* used, child elements `<source>` and `<vertices>` should still be specified to define a valid `<convex_mesh>`.

`<extra>` child element added to several elements

Resolves bugs K-174 and K-175.

Optional, unbounded `<extra>` child element added to:

- `<bind_material>`
- `<sampler1D>`
- `<sampler2D>`
- `<sampler3D>`
- `<samplerCUBE>`
- `<samplerDEPTH>`
- `<samplerRECT>`
- `<surface>`
- `<profile_CG>`
- `<profile_CG> / <technique>`
- `<profile_CG> / <technique> / <pass>`
- `<profile_GLES>`
- `<profile_GLES> / <technique>`
- `<profile_GLES> / <technique> / <pass>`
- `<profile_GLSL>`
- `<profile_GLSL> / <technique>`
- `<profile_GLSL> / <technique> / <pass>`
- `<texture_unit>`

`fx_setparam_common` unused type removed

Resolves bug K-140.

The type `fx_setparam_common` was defined but not used and has been removed.

`<input>` element's semantic attribute value list has changed

Resolves bugs K-138, K-305, K-316, and K-344. (COLLADA documents that use a `TEXTURE` semantic value must be changed.)

For `<input>`'s semantic attribute:

- **TEXTURE** value is no longer valid. (It should have been removed in 1.4.0.)

- The following are now valid values.
 - CONTINUITY
 - LINEAR_STEPS
 - MORPH_TARGET
 - MORPH_WEIGHT
 - TEXBINORMAL
 - TEXTANGENT

<instance_material> has a new <bind_vertex_input> child element

Resolves bugs K-348 and K-360.

The **<bind_vertex_input>** element binds geometry vertex streams (identified as **<input>** elements within **<geometry>** elements) to material effect vertex stream semantics. Although applications commonly perform automatic binding of vertex streams with identical semantic identifiers, there are frequently mismatches in a semantic identifier's meaning. Use **<bind_vertex_input>** to remove these ambiguities.

<instance_rigid_body>'s <*velocity> elements now have defaults

Resolves bug K-317.

Added default values in **<instance_rigid_body>** for **<velocity>** (0, 0, 0) and **<angular_velocity>** (0, 0, 0).

<instance_*> elements now have optional name and sid attributes

Resolves bug K-189.

Added optional `name` and `sid` attributes to all **<instance_*>** elements that did not already have them, which are the following:

- **<instance_animation>**
- **<instance_camera>**
- **<instance_controller>**
- **<instance_effect>**
- **<instance_force_field>**
- **<instance_geometry>**
- **<instance_light>**
- **<instance_material>**
- **<instance_node>**
- **<instance_physics_material>**
- **<instance_physics_scene>**
- **<instance_visual_scene>**

Added optional `name` attribute to the following:

- **<instance_physics_model>**
- **<instance_rigid_material>**

<library_physics_material> now has id and name attributes

Resolves bug K-371.

<newparam>'s sid attribute type has changed

Resolves bug K-203.

The **sid** attribute for **<newparam>** is now **xs:token** under the following parent elements of **<newparam>**:

- **<profile_CG>**
- **<profile_CG> / <technique>**
- **<profile_GLSL>**
- **<profile_GLSL> / <technique>**

<pass> no longer has extra <sequence> layer

Resolves bug K-177.

Removed redundant **<xs:sequence>** from **<pass>** elements.

<pass> render state <color_material_enable> now applies to all profiles

Resolves bug K-390.

A **gl_pipeline_setting**, missing from COLLADA FX 1.4.0, has been added to allow authors to indicate when runtimes should perform **glEnable(GL_COLOR_MATERIAL)** and **glDisable(GL_COLOR_MATERIAL)** or feature equivalents in profiles such as GLES, GLSL, and Cg.

```

<xs:element name="color_material_enable">
  <xs:complexType>
    <xs:attribute name="value" type="bool" use="optional" default="true"/>
    <xs:attribute name="param" type="xs:NCName" use="optional"/>
  </xs:complexType>
</xs:element>

```

<profile_*> elements now have optional <asset> child element

Resolves bug K-176.

An optional **<asset>** child element is now available in:

- **<profile_COMMON>**
- **<profile_GLES>**
- **<profile_GLSL>**
- **<profile_CG>**

<profile_*> elements now have optional id attribute

Resolves bug K-322.

Added an optional **id** attribute to **<profile_COMMON>**, **<profile_CG>**, **<profile_GLES>**, and **<profile_GLSL>**.

<profile_GLES> now has optional platform attribute*Resolves bug K-323.*Added an optional **platform** attribute to **<profile_GLES>** to match other **<profile_*>**.**<profile_GLES>/<technique>/<annotate> child element is now unbounded***Resolves bug K-206.***<profile_GLSL>/<technique> now has optional <annotate> child element***Resolves bug K-206.***<annotate>** element is now the optional first child element of **<profile_GLSL>**'s **<technique>**:

```
<xs:element name="annotate" type="fx_annotate_common"
  minOccurs="0" maxOccurs="unbounded"/>
```

<rigid_constraint>/<technique_common> child elements now have default values*Resolves bugs K-169 and K-210.*In **<rigid_constraint>/<technique_common>**, added default values to several child elements:

```
<xs:element name="technique_common">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="enabled" default="true" minOccurs="0">
        . . .
      <xs:element name="interpenetrate" default="false" minOccurs="0">
        . . .
      <xs:element name="limits" minOccurs="0">
        <xs:complexType>
          <xs:sequence>
            <xs:element name="swing_cone_and_twist" minOccurs="0">
              <xs:complexType>
                <xs:sequence>
                  <xs:element name="min" type="TargetableFloat3"
                    default="0.0 0.0 0.0" minOccurs="0">
                  </xs:element>
                  <xs:element name="max" type="TargetableFloat3"
                    default="0.0 0.0 0.0" minOccurs="0">
                  </xs:element>
                </xs:sequence>
              </xs:complexType>
            </xs:element>
            <xs:element name="linear" minOccurs="0">
              <xs:complexType>
                <xs:sequence>
                  <xs:element name="min" type="TargetableFloat3"
                    default="0.0 0.0 0.0" minOccurs="0">
                  </xs:element>
                  <xs:element name="max" type="TargetableFloat3"
                    default="0.0 0.0 0.0" minOccurs="0">
                  </xs:element>
                </xs:sequence>
              </xs:complexType>
            </xs:element>
            <xs:element name="spring" minOccurs="0">
              <xs:complexType>
                <xs:sequence>
                  <xs:element name="angular" minOccurs="0">
```

```

<xs:complexType>
  <xs:sequence>
    <xs:element name="stiffness" type="TargetableFloat"
      default="1.0" minOccurs="0">
    </xs:element>
    <xs:element name="damping" type="TargetableFloat"
      default="0.0" minOccurs="0">
    </xs:element>
    <xs:element name="target_value" type="TargetableFloat"
      default="0.0" minOccurs="0">
    . . .
  </xs:sequence>
</xs:complexType>
<xs:element name="linear" minOccurs="0">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="stiffness" type="TargetableFloat"
        default="1.0" minOccurs="0">
      </xs:element>
      <xs:element name="damping" type="TargetableFloat"
        default="0.0" minOccurs="0">
      </xs:element>
      <xs:element name="target_value" type="TargetableFloat"
        default="0.0" minOccurs="0">
    
```

<setparam>'s ref attribute type has changed

Resolves bug K-203.

The **ref** attribute for `<setparam>` is now **xs:token** under the following parent elements of `<setparam>`:

- `<surface>` / `<generator>` (in GLSL scope, was **xs:string**; in CG scope was **xs:NCName**)
- `<profile_CG>` / `<technique>` (was **xs:string**)
- `<instance_effect>` (was **xs:string**)
- `<profile_GLSL>` / `<technique>` (was **xs:string**)
- `<usertype>` (was **xs:string**)

Note: For parent `<profile_GLES>` / `<technique>`, it remains **xs:NCName**.

<surface> now has optional <format_hint> child element

Resolves bug K-111.

If the exact format cannot be resolved using `<format>` then the optional `<format_hint>` describes the important features of the format so that the application can select a compatible or similar format. Valid child elements of `<format_hint>` are `<channels>`, `<range>`, `<precision>`, `<option>`, and `<extra>`.

<surface> now has optional initialization child element

Resolves bugs K-108, K-126, and K-178.

Specifies how to initialize this surface. Valid initialization child elements are `<init_as_null>`, `<init_as_target>`, `<init_cube>`, `<init_volume>`, `<init_planar>`, and `<init_from>`.

<surface> in GLSL scope now has optional <generator> child element

Resolves bug K-343.

This results from a schema change in which `<glsl_param_type>` now includes:

```
<xs:element name="surface" type="glsl_surface_type"/>
```

which replaces:

```
<xs:element name="surface" type="fx_surface_common"/>
```

<surface> child element <init_from> is no longer an array of IDs

Resolves bug K-43. (COLLADA documents that use an array of IDs in <init_from> must be changed.)

Changed from `<xs:extension base="xs:IDREFS">` to `<xs:extension base="xs:IDREF">`.

<surface> child element <format> is no longer required

Resolves bug K-106.

It can now occur 0 or 1 times.

<technique_hint> now has optional profile attribute

Resolves bug K-136.

Specifies for which API profile this hint is intended. Profiles are constructed by appending this attribute's value to "profile_". For example, to select `profile_CG`, specify `profile="CG"`.

<technique_hint>'s platform attribute is now optional

Resolves bug K-136.

<transparent> now has an optional opaque attribute

Resolves bugs K-397, K-400, K-406, P-39.

In `<blinn>`, `<constant>`, `<lambert>`, and `<phong>`, the child element `<transparent>` now has an optional `opaque` attribute whose valid values are:

- **A_ONE** (the default): Takes the transparency information from the color's alpha channel, where the value 1.0 is opaque.
- **RGB_ZERO**: Takes the transparency information from the color's red, green, and blue channels, where the value 0.0 is opaque, with each channel modulated independently.

In the Specification, this is described in the "FX Reference" chapter in the `common_color_or_texture_type` entry, along with a description of how transparency works in the "Getting Started with COLLADA FX" chapter in the "Determining Transparency" section.

<usertype> now has required source attribute

Resolves bug K-190. (COLLADA documents that include <usertype> must add a source attribute.)

Added the following attribute:

```
<xs:attribute name="source" type="xs:NCName" use="required">
```

<usertype> now has optional <setparam> child element

Resolves bugs K-191 and K-208.

<usertype>'s name attribute type has changed

Resolves bug K-203.

The name attribute for <usertype> is now **xs:token**.

Known Schema Issues In Version 1.4.1

<surface>'s <init_*> child elements use less-flexible type of identifier

Bug K-339.

When moving FX surfaces (**fx_surface_common** or derived types) between XML databases, the associated images must be moved with them. This is because the <init_*> elements of <surface> use IDREFs, which are local, rather than URIs, which can be external.

Specification Changes Between Version 1.4.0 and 1.4.1

- Added 1.4.1 schema changes.
- Verified specification content against the schema and corrected a variety of errors and omissions.
- Updated and corrected all examples.
- Reformatted “Attributes” and “Child Elements” sections for all elements to more clearly convey information.
- Reorganized some material.

Specification Changes Between 1.4.1 and 1.4.1 (2nd Edition)

- Fixed 1.4.1 *Specification* bugs and omissions (see next section).
- Folded in text details from earlier Release Note versions.
- Clarified text throughout.
- In the “About This Manual” introduction:
 - Added “Notation and Organization in the Reference Chapters”
 - Expanded “Other Sources of Information”
- In the “Tool Requirements and Options” chapter:
 - Removed a table of requirements from the “Animation” subsection.
- Renamed the “Schema and Reference Overview” chapter to “Schema Concepts”. In this chapter:
 - Expanded the “Address Syntax” section significantly. (*Bug K-1886*)
 - Added an “Instantiation and External Referencing” section.
 - Clarified and expanded “The Common Profile” section.
 - Moved the table of <input> semantic values from the “Common Glossary” section to the <input> element.
 - Merged the “Schema and Reference Organization” section into “About This Manual.”

- Added “Programming Guide” chapter with:
 - Curve Interpolation information (*Bugs K-374, K-535, K-830, P-23, P-24*)
 - Skinning a Skeleton in COLLADA (*Bug K-419*)
- In all Reference chapters:
 - Added tables of “Elements by Category” at the beginning of each chapter with a summary of each element, and added a Category label to each element in those chapters. This is navigational information only.
 - Ensured that each element has a one-line Introduction, summarizing the element’s purpose.
 - Renamed the “Remarks” subsection in each element to “Details” to better reflect the importance of the subsection’s content.
 - Removed “Occurrences” line from the “Related Elements” subsection, as the information was identical for all elements. (*Bug K-453*)
 - In many places, added “Other” related element names in the “Related Elements” subsection for elements that are neither parent nor child but are, in some way, related to the current element.
 - In the “Child Elements” subsections, filled in missing Descriptions and Defaults for all elements. (*Bugs K-528, K-529, K-530, K-531*)
 - Added the text “See main entry” to the descriptions for all child elements that are described in detail in their own Reference entries, to distinguish them from child elements that are described only locally to their parent elements. (*Bug K-528, K-538*)
 - When a parent element is ambiguous, clarified which parent element is relevant. (*Bug K-701 and others*)
- Added “Getting Started with COLLADA FX” chapter, including some material from the previous “FX Reference” chapter and some new material. (*Bug K-513 and others*)
- Added a “COLLADA Types” chapter, which lists some of the simple and common types defined in COLLADA. (*Bug K-235, 533.*)
- Added an appendix containing a “Profile_GLSL Example.” (*Bug K-469*)
- Expanded the list of terms in the “Glossary.”
- The “Index” has been split into two indexes, one for general terms and concepts, and the other for element names. All elements, whether or not they have full reference entries, are now indexed. Additional concepts and terms have been indexed.

Specification Bug Fixes for 1.4.1 (2nd Edition)

DOUBLE_SIDED listed type is incorrect

Bug P-16.

On page 3–5, in the “Common Glossary” table, changed the type for **DOUBLE_SIDED** to Boolean.

(Core) <accessor>: Examples and explanation could be better; <accessor>, <source>, and <param> need more explanation

Bugs K-357, K-865

Added several examples of <accessor> <source> and <param> use.

(Core, FX) <ambient>: There are 2 varieties

Bug K-570.

Clarified that there are Core and FX varieties, and labeled all occurrences.

(Core) <ambient>: Example is incorrect

Bug P-46.

Inserted a missing `</technique_common>` into the example.

(Core) <animation>: Examples could be more useful

Bug K-845.

Removed erroneous spaces and apostrophes from strings in the example.

(Core) <animation_clip>: What to do when more than one <animation> has the same target

Bug K-804.

Added to the “Details” subsection a description of how to handle `<animation>`s that have the same target.

(FX) <array>: Needs more description; Parent elements listing not complete

Bug K-432, K-841.

Added information clarifying usage and updated parent elements list.

(Core) <asset>: Descriptions of <unit> child element is unclear

Bug K-358.

More clearly stated the use and implications of `<unit>`.

(Core) <asset>: Missing profile parent elements

Bug K-585.

Corrected the list of parent elements.

(Physics) <attachment> and <ref_attachment>: Missing descriptions

Bug K-587.

Added reference entries for these elements.

(FX) <bind>: Two types need different info and clarification

Bug K-417, K-628.

Split into two reference entries for use in different contexts with different definitions and expanded the information about both versions.

(FX) <bind_material> symbolic name binding is misleading

Bug K-436.

Added clarifying information in its “Concepts” subsection and an additional example.

(FX) <blinn>, <constant>, <lambert>, <phong> default colors are not specified

Bug P-27.

The entry for [common_color_or_texture_type](#) now explains what happens if any child element (such as [<diffuse>](#)) is unspecified in [<blinn>](#), [<constant>](#), [<lambert>](#), or [<phong>](#).

(FX) <blinn>: <blinn> has no example

Bug K-455.

Added example. Expanded explanation of [<blinn>](#).

(Core) <camera> description of in axis might be confusing

Bugs K-259, P-8, and P-13.

The use of the word “into” in the [<camera>](#) description could be confusing. A diagram has been added and the text has been changed to read (in part):

Declares a view *of* the visual scene hierarchy or scene graph.

A camera embodies the eye point of the viewer looking *at* the visual scene.

The camera optics focuses the incoming light *onto* an image plane.

(FX) <code>: <code> example has typo

Bug K-456.

Fixed typo in example.

(FX) <color_clear>: Example could be better; Descriptions not quite correct

Bug K-457, K-640.

Expanded “Details” subsection.

(FX) common_color_or_texture_type:

Bug (none).

Expanded “Concepts” subsection.

Added description of [<texture>](#) child element attributes.

(FX) <compiler_target>: Has no example

Bug K-458.

Added explanation and examples.

(Core, FX) <constant>: Has two forms and spec doesn't mention that

Bug K-602.

Clarified.

(FX) <constant>: Has no example

Bug K-792.

Added explanation for equation element.

Bug K-460.

Added examples.

(Core) <control_vertices> element is not documented

Bug K-535.

Added reference entry for this element in the "COLLADA Core Elements Reference" chapter.

(Physics) <convex_mesh>: Needs optional children

Bug K-382.

Corrected the number of occurrences of the <source> and <vertices> child elements.

(FX) <depth_clear>: Example could be clearer

Bug K-461.

Expanded "Details" subsection.

(Core) <directional>: Typos in specification

Bug K-418.

Removed an extraneous ">" from the example.

(FX) <draw>: Has no example

Bug K-462.

Added example.

(FX) <effect>: Has no example

Bug K-463.

Added example.

(FX) <effect>: Child elements are incorrect

Bug K-475.

Added correct profiles to child elements list.

(Core) <extra>: Missing many parent elements

Bug K-586.

Corrected the list of parent elements.

(Core) <extra>: Need extensibility example

Bug (none).

Added example of how <extra> and <technique_common> can work together.

(Core) <h>: Element doesn't seem to exist in Specification

Bug P-18.

Added to index; documented within its parent elements.

(Core) <image> and <library_images>: Belongs in FX chapter

Bugs K-543, K-563.

Moved these elements' descriptions from "Core Elements Reference" to "FX Reference" and expanded the descriptions.

(Core) <input>: There are two variants of <input>

Bugs K-534, K-536, K-564, K-565.

Split into two reference entries for use in different contexts with different definitions and expanded the information about both versions.

Removed an incorrect # from the example; the correct line is:

```
<polygons count="1" material="Bricks">
```

(Core) <instance_animation>: Typos in specification

Bug K-418.

Corrected the example to have a closing </animation_clip> instead of </animation>.

(Core) <instance_animation>: Needs better documentation

Bug K-499.

Rewrote "Concepts" subsection.

(Core) <instance_camera>: Needs better documentation

Bug K-500.

Rewrote "Concepts" subsection.

(Core) <instance_controller>: Needs better documentation

Bug K-501.

Rewrote "Concepts" subsection.

(Core) <instance_geometry>: Needs better documentation

Bug K-502.

Rewrote “Concepts” subsection.

(Core) <instance_light>: Needs better documentation

Bug K-503.

Rewrote “Concepts” subsection.

(FX) <instance_effect>: Needs better documentation

Bug K-509.

Rewrote “Concepts” subsection.

(FX) <instance_material>: Needs better documentation

Bug K-510.

Rewrote “Concepts” subsection.

Moved <bind_vertex_input> information to its own reference entry.

(FX) <instance_material> missing description for locating a parameter in <bind> and <bind_vertex_input>

Bug K-417.

Added this information to the <bind> and <bind_vertex_input> elements’ “Details” sections.

(Core) <instance_node>: Needs better documentation

Bug K-504.

Rewrote “Concepts” subsection.

(Physics) <instance_rigid_body>: Missing some child elements

Bug (none).

Added information about child elements under <technique_common>.

(Physics) <instance_rigid_constraint> is not documented

Bug K-332.

Added reference entry for this element.

(Core) <instance_visual_scene>: Needs better documentation

Bug K-505.

Rewrote “Concepts” subsection.

(FX) <lambert> equation is incorrect

Bugs K-792, P-20.

Corrected the calculation for <lambert>.

Bug K-465.

Added example.

(Core) <library_animation_clips>: Needs better example

Bug (none).

Expanded the example.

(Core) <library_animations>: Needs better example

Bug (none).

Expanded the example.

(Core) <library_lights>: Example elements are in the wrong order

Bug K-2746.

Moved the <rotate> element in the example to a valid position.

(Core) <lines>: Could use more complex example

Bug K-1863.

Expanded the example.

(Core) <lookat>: Example is incorrect

Bug P-54.

Moved the <instance_camera> element in the example to a valid position.

(Physics) <mass_frame>: Can't find information

Bug K-601.

Added to index, referenced in text.

(Core) <mesh>: Need to explain/give example of <mesh><vertices><input> alternative to set attribute

Bug K-372.

Expanded the example.

(Core) <morph>: Attribute name wrong; type on example

Bug (none).

Corrected the list of attributes; the first one's name is `sid`, not `source`.

Corrected a syntax error in the `</targets>` line in the example.

(FX) <name>: Has no example

Bug K-466.

Added example.

(Core) <Name_array>: Needs a more complete example

Bug K-537.

Expanded the example.

(FX) <newparam>: Missing a valid type for <profile_COMMON>

Bug K-1670.

Corrected the list of valid parameter types for `<newparam>` under `<profile_COMMON>` to include `<float4>`.

Corrected and clarified child elements.

(Core) <orthographic>: Occurrences of child elements not quite correct

Bug (none).

Clarified the occurrences of child elements.

(Core) <p>, <ph>: Elements don't seem to exist in Specification

Bug P-19.

Added to index; they are documented within their parent elements.

(FX) <param>: There are at least four variants and that's not clear

Bug K-477.

Corrected and clarified child elements.

(FX) <pass>: Render states table is missing some information or has misspellings

Bugs K-391, K-392, K-401, K-638, K-2754.

- `color_material_enable`, added to the table.
- `blend_color`, `depth_bounds`, `line_stipple`, and `logic_op_enable`, noted as being invalid in GLES.
- `clip_plane`'s type has been corrected to `boool4` in GLES and `float4` in other profiles
- `stencil_op_separate`, added to the table.

- **blend_func**: Corrected values DST_ALPHA, ONE_MINUS_DST_ALPHA.
- **blend_equation**: Corrected value FUNC_SUBTRACT.
- **stencil_op**: Corrected value DECR_WRAP.
- Whether the index attribute is required or optional has been added for each render state.
- Removed **gl_hook_abstract**

(Core) <perspective>/<aspect_ratio>: Description is incorrect

Bugs P-25, K-539.

Corrected the description.

(Core) <perspective>: Could use more examples

Bug K-539.

Corrected the **<xfov>** in the example to 90.0 to match the explanatory text.

(FX) <phong>: Has no example

Bug K-467.

Added example.

(FX) <phong>: Equation is incorrect or unclear

Bug K-874, 792.

Added the correct equation to the description of the shader **<phong>** element.

(Physics) <physics_material>: Typo in child elements

Bug K-1868.

Corrected closing element for **<dynamic_friction>**.

(Core) <physics_model>: Example has typo

Bug K-369.

Removed an incorrect closing **>** from the example. The correct line is:

```
<instance_physics_model sid="rock"
```

(Core) <polygons>, <polylist>: Child elements could be clearer

Bug K-1838.

Clarified the syntax of the **<ph>** child element.

(Core) <polygons>, <polylist>, <trifans>, <triangles>, <tristrips>: Example attribute is incorrect

Bug K-848.

Changed the following:

In the examples for <polygons>, <polylist>, <trifans>, <triangles>, and <tristrips>, the material attribute is given as a URL; for example:

```
<polygons count="1" material="#Bricks">
```

Removed the # character.

**(FX) <profile_*> elements: <technique> children are incomplete or incorrect and
(FX) <technique>: List of children is incorrect**

Bugs K-97, K-237, K-2548.

Corrected the lists of child elements for <profile_*>/<technique>.

(FX) <profile_COMMON>: Example is incorrect

Bug P-5.

Corrected the example syntax. The correct line is:

```
<diffuse><param ref="myDiffuseColor"/></
```

(FX) <profile_COMMON>: Texture Mapping needs more explanation

Bugs K-360, K-449.

The new chapter "Getting Started With COLLADA FX" includes a section on "Texture Mapping in <profile_COMMON>."

(FX) <profile_GLES>: Has no example

Bug K-468.

Added example.

(FX) <render>: Needs its own reference page

Bug K-574.

Added reference entry for this element in the "FX Reference" chapter.

(Physics) <rigid_constraint>: Child element descriptions need work

Bug (none).

Cleaned up descriptions of child elements and <technique_common> child elements.

(Core) <sampler>: Description needs improvement; Animation keys must be increasing

Bugs K-2749, P-31.

Added a lot of information about animation curves.

(FX) <sampler*>: Child elements lack descriptions

Bugs K-449, P-7, P-21.

Added descriptions of the child elements for `<sampler1D>`, `<sampler2D>`, `<sampler3D>`, `<samplerCUBE>`, `<samplerDEPTH>`, and `<samplerRECT>` in the “FX Reference” and “Types” chapters.

Bugs K-470.

Added examples for these elements.

(FX) <sampler_state>: Has two varieties that need documenting

Bug K-839.

Corrected the attribute description and the list of parent elements.

(FX) <setparam>: Child elements aren't completely correct

Bug K-700.

Corrected the order and descriptions for `<setparam>` child elements.

(Core) <shader>: Child elements aren't completely correct

Bug K-637.

Corrected the order and descriptions for `<shader>` child elements.

(Physics) <shape>: Child element descriptions need work

Bug (none).

Cleaned up descriptions of child elements.

(Core) <skin>/<bind_shape_matrix>: Description is unclear

Bug K-569.

Clarified the description.

(Core) <spline>: Curve interpolation info applies to several elements

Bug (none).

Moved information about curve interpolation into the new “Programming Guide” chapter.

(FX) <stencil_clear>: Example could be clearer; Description isn't quite right

Bugs K-471, K-640.

Expanded the “Details” subsection.

(FX) <surface>: Need info about <surface> element's type attribute and <format> element, and <size> and <viewport_ratio> children; Description could be clearer

Bugs K-445, 571, 572, 706, 809.

Expanded and corrected the descriptions of child elements.

(Core) <technique>: Descriptions in spec incorrect

Bugs K-97, P-17.

Corrected the list of child elements. Expanded the examples.

(Core) <technique_common>: More clean-up needed

Bug K-331.

Provided more information about using <technique_common>.

(FX) <texcombiner>, <texenv>, <texture_pipeline>, <texture_unit>: alpha/argument elements needs more info in spec; Descriptions are sparse

Bugs K-430, K-431, K-603, K-840.

Significantly expanded the "Details" subsections.

(Core) <translate>: Description is unclear

Bug K-619.

Changed the text in <translate> from:

Translations change the position of objects in a coordinate system without any rotation.

to:

Translations change the position of objects in a local coordinate system.

(FX) <usertype>: Child elements aren't quite correct

Bug K-842.

Clarified.

(Core) <visual_scene>: <visual_scene>/<evaluate_scene> attributes and child elements not documented

Bug K-574.

Added description of <evaluate_scene> child element. Added an additional example.