

3ds Max FBX Plug-in Guide

***3ds Max FBX plug-in
August 2005***

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Installation

The 3ds Max FBX plug-in is used by 3ds max® to import, export, and convert files using the .fbx file format. This document describes how to install the 3ds Max FBX plug-in for Windows® 2000/XP.

The 3ds Max FBX plug-in is bundled with 3ds max and is installed automatically with 3ds max, however, this procedure is included so you can upgrade your plug-in with later versions.

Note

Verify that the version of the 3ds Max FBX plug-in that you are installing is appropriate for 3ds max. The 3ds Max FBX plug-in runs correctly only on the version of 3ds max for which they are created, and 3ds max will reject a plug-in created for a different version.

Windows Installation

The 3ds Max FBX plug-in is available for Windows 2000 and Windows XP.

- 1** Download the .zip file from the Alias website (<http://www.alias.com/glb/eng/community/downloads.jsp>).
- 2** Double-click the .zip file and extract the files to C:\Alias\FBXPlugins<fbxver>\3dsmax<maxver> directory.
- 3** Copy the .dli and .dle files to your 3ds max plug-in directory.
- 4** Make sure that there is only one FBX plug-in .dli and .dle file in your 3ds max plug-in directory.

1 | Installation

Windows Installation

2

Importing and Exporting

This section describes how to export models from 3ds max using the *.fbx* file format, and how to import *.fbx* files into 3ds max.

It also includes a list of the 3ds max features supported by this version of the 3ds Max FBX plug-in.

Exporting from 3ds max to an *.fbx* file

- 1** Create the model, textures (UV file texture), and skeleton in 3ds max.
- 2** Select File>Export scene from the main menu bar. A file browser appears. Browse to the location where you want to save the *.fbx* file.
- 3** Name the file and select FBX as the File Type.
- 4** Click OK. The Export FBX File dialog box appears.

2 | Importing and Exporting

Exporting BVH Animation for Character Studio

Select the elements that you want to export (figure 2-1).

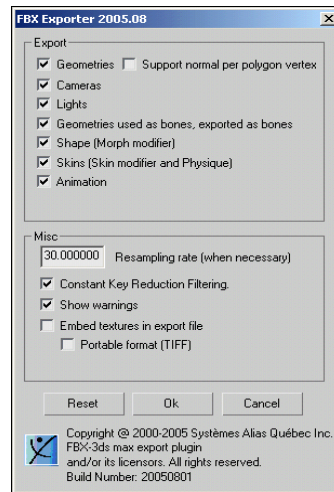


figure 2-1: FBX exporter window

Exporting a .bvh file to an .fbx file

- 1 Select the hips of the skeleton.
- 2 Select File>Motion Files>Export>Biovision.
- 3 Browse to the directory where you want to save the Biovision file.
- 4 Type a name in the File Name field (remember to include the .bvh extension), and click Ok.

Exporting BVH Animation for Character Studio

If you want to use BIPED in Character Studio, you may have to export your animation as a Biovision (BVH) file. Before exporting your animation, you need to create a BIPED type skeleton with the proper naming conventions in your 3ds Max FBX plug-in software. You must also plot the animation onto the skeleton itself.

2 | Importing and Exporting

Exporting BVH Animation for Character Studio

Character Studio imposes names for the skeleton's bones/nodes. If your skeleton does not use the following names (alternate names are shown in parentheses), then Character Studio rejects the skeleton when you attempt to import the *.bvh* file.

You must export your scene in *.bvh* format in order to bring it back into Character studio.

Note	<i>Before exporting a model from 3ds max, make sure that you reset all transformations, the pivot, and the scale of your model.</i>
-------------	-------------------------------------------------------------------------------------------------------------------------------------

Hips	Origin of the entire skeleton. Parent to LeftHip, RightHip, and Chest.
LeftHip (LeftUpLeg)	Must be child of Hips and parent to LeftKnee.
LeftKnee (LeftLowLeg)	Must be child of LeftHip and parent to LeftAnkle.
LeftAnkle(LeftFoot)	Must be child of LeftKnee.
RightHip (RightUpLeg)	Must be child of Hips and parent to RightKnee.
RightKnee (RightLowLeg)	Must be child of RightHip and parent to RightAnkle.
RightAnkle (RightFoot)	Must be child of RightKnee.
Chest	Must be child of Hips and parent to LeftCollar, RightCollar, and Neck.
LeftCollar	Must be child of Chest and parent to LeftShoulder.
LeftShoulder (LeftUpArm)	Must be child of LeftCollar and parent to LeftElbow.
LeftElbow (LeftLowArm)	Must be child of LeftShoulder and parent to LeftWrist.
LeftWrist (LeftHand)	Must be child of LeftElbow.

2 | Importing and Exporting

Exporting BVH Animation for Character Studio

RightCollar	Must be child of Chest and parent to RightShoulder.
RightShoulder (RightUpArm)	Must be child of RightCollar and parent to RightElbow.
RightElbow (RightLowArm)	Must be child of RightShoulder and parent to RightWrist.
RightWrist (RightHand)	Must be child of RightElbow.
Neck	Must be child of Chest and parent to Head.
Head	Must be child of Neck.

FBX Exporter window options

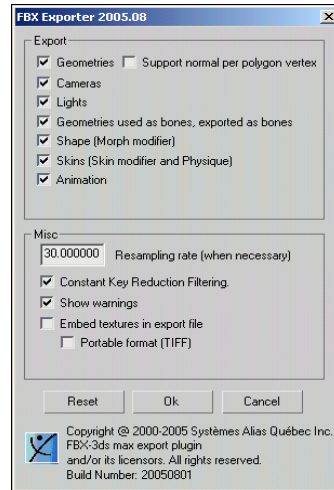


figure 2-2: FBX exporter window

Export Area

Select the elements to export to FBX format:

Option	Description
Geometries	Activate this option to export geometries to <i>.fbx</i> format.
Support normal per polygon vertex	Activate this option if you want FBX to support normal per polygon vertices.
Cameras	Activate this option to export cameras to <i>.fbx</i> format.
Lights	Activate this option to export lights to <i>.fbx</i> format.

2 | Importing and Exporting

Misc. Area

Option	Description
Geometries used as bones, exported as bones	Activate to convert geometries used for deforming objects into real bones in the <i>.fbx</i> file. When you import this file back into 3ds max, they are now bones.
Shape (Morph Modifier)	Activate this option to export shape deformations to <i>.fbx</i> format.
Skins (Skin modifier and Physique)	Activate this option to export skins deformations to <i>.fbx</i> format.
Animation	Activate this option to export animation to <i>.fbx</i> format.

Misc. Area

This area contains miscellaneous options for the export process:

Option	Description
Resampling Rate field	Shows the scene's Resampling rate. Double click the field to enter a new Resampling rate (the default is the 3ds max frame rate).
Constant Key Reduction Filtering	Deactivate this option to turn off the Constant Key Reduction.
Show Warnings	Activate to view any warnings from the export process.
Embed Textures in Export File	Activate this option if you want to export any textures associated with your scene.
Reset	Restores the FBX Exporter window to its last saved values.
Ok	Starts the import process.

Option	Description
Cancel	Closes the Import FBX window, without performing any action.

Importing .fbx files into 3ds max

This section describes the types of import available with the 3ds Max FBX plug-in and the two methods of importing an *.fbx* file into 3ds max:

- Importing into an empty scene
- Merging back to the original scene

Import to an Empty Scene

You can import the *.fbx* file directly into an empty scene. Morph creation, mesh, textures, and 3ds max bones structure (hierarchy) are supported.

- 1 Launch 3ds max.
- 2 Select File>Import, and use the file browser to locate the *.fbx* file to import.
- 3 Select FBX as the File Type, and click Ok.
- 4 Select Add in the pop-up menu that appears, and leave the rest of the selected options as they appear.
- 5 Click Ok.

Merge Back with the Original Scene

You can also merge the *.fbx* file with your original scene. Use this method to recognize your existing models and simply copy the new animation onto them.

This is useful when you already have special behavior effects saved with your 3ds max scene.

2 | Importing and Exporting

Importing a .bvh file in 3ds max

To merge back with the original scene:

- 1 Launch 3ds max.
- 2 Load your original scene.
- 3 Select File>Import, and use the file browser to locate the .fbx file to import.
- 4 Select FBX as the File Type, and click Ok.
- 5 In the menu that appears (figure 2-3), make sure that Merge is selected in the Import Type area. Click Ok.

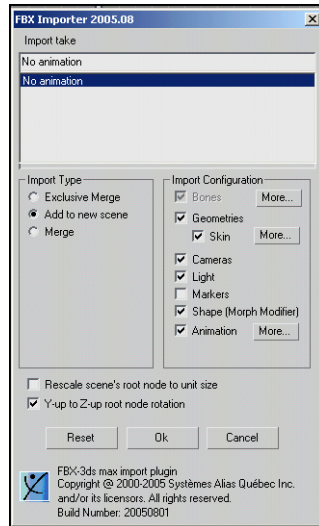


figure 2-3: FBX importer window

- 6 Change the Resampling rate if it is necessary (The default is the 3ds max frame rate).
- 7 Click Ok.

Importing a .bvh file in 3ds max

- 1 Create a BIPED within Character Studio.

2 | Importing and Exporting

Importing a .bvh file in 3ds max

- 2** Go to the BIPED settings under motion. A line displays “Motion capture”.
- 3** Open the Motion Capture tab. Ten icons appear.
- 4** Click the first icon (top left, a folder and a camera) to display a file browser.
- 5** Select bvh as the File of Type.
- 6** Browse and select the *.bvh* file that you saved from your 3ds Max FBX plug-in software.

In 3ds max v4.0 and 4.2, you can use the Key Reduction option so that the file uses less memory.
- 7** Activate the Point option under Knee and Elbow in Limb Orientation.
- 8** Click OK in the dialog box.
- 9** Play back the animation on the Biped.

2 | Importing and Exporting

FBX Importer window options

FBX Importer window options

Once you select an *.fbx* file to import into Maya, the FBX Importer window appears. The FBX Importer window contains import options.

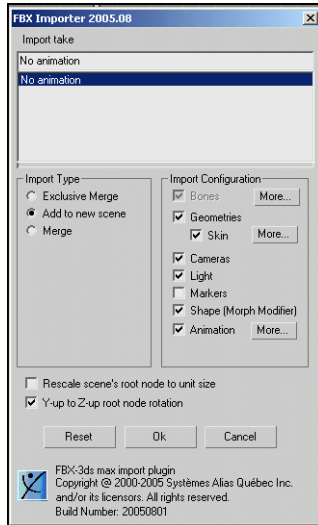


figure 2-4: FBX importer window

Take window

Displays the takes saved with the scene. Click a take to select it for import.

Note

You can only select one take at a time.

Import Type area

Select the import type that best suits your needs before choosing your import method.

Import Types

The following describes the import available with the 3ds Max FBX plug-in and when it should be used:

Import type	Description
Exclusive merge	Use to merge only the elements modified in your 3ds Max FBX plug-in software with elements in the original 3ds max scene. Exclusive Merge does not import control-sets, optical markers and other specific 3ds Max FBX plug-in software elements.
Add to a new scene	Use to import all the 3ds Max FBX plug-in software elements (enabled in the Import Configurations menu) into a new scene.
Merge	Use Merge to use a combination of the Exclusive Merge and Add to New Scene. When you activate Merge, the 3ds Max FBX plug-in merges the animation with the elements that are already present in the 3ds max scene, and creates any other objects that are defined in the <i>.fbx</i> file.
Add to current scene	Use to import all the 3ds Max FBX plug-in software elements (enabled in the Import Configurations menu) into an empty scene.

Import Configuration area

Activate the following options to import these features of your scene:

Option	Description
Bones	Imports bones.
Geometry	Imports geometries.

2 | Importing and Exporting

Using the 3ds Max FBX plug-in

Option	Description
Skin	Imports Skin.
Cameras	Imports cameras used in the scene.
Light	Imports lights used in the scene.
Markers	Imports any markers used in the scene.
Shape (Morph Modifier)	Imports shapes in the scene.
Animation	Imports any animation found in the scene.
Rescale Scene's Root Node to Unit Size	Activate to ignore the unit conversion from the <i>.fbx</i> file.
Y-Up to Z-up Root Node Rotation	Deactivate to import your <i>.fbx</i> file so that it maintains FBX's world axis.
Reset	Restores the FBX Importer window to its last saved values.
Ok	Starts the import process.
Cancel	Closes the Import FBX window, without performing any action.

Using the 3ds Max FBX plug-in

This section begins by providing information on how to build characters, build skeletons, apply skinning, and other 3ds max features for use in your 3ds Max FBX plug-in software.

Building a Character in 3ds max

In order to create a character, you need to do the following:

- 1 Build a mesh.

2 | Importing and Exporting

Using the 3ds Max FBX plug-in

- 2 Apply the UV mapping.
- 3 Create a morph.
- 4 Build a skeleton.
- 5 Skin the character.
- 6 Build the Mesh.

Note

All the geometry imported into your 3ds Max FBX plug-in software must be collapsed into an Editable mesh.

- 7 Once the mesh model is completed, reset the pivot and transform it in the Hierarchy pane.

Applying the UV Mapping

FBX supports 3ds max UV mapping and UVW Unwrap modifiers.

Creating a Morph

3ds Max FBX plug-in software supports Morph targets.

When a Morph is applied to a mesh, the Morph channel is preserved; there is no need to export the Morph Target geometry.

Building a Skeleton

This section describes how to create a skeleton in 3ds max 6.0 and 7.0 in order to use it in 3ds Max FBX plug-in software.

To build a skeleton:

2 | Importing and Exporting

Using the 3ds Max FBX plug-in

- 1 Create a skeleton in In 3ds max 6.0, or 7.0 without IK chains (history independent) (figure 2-5).

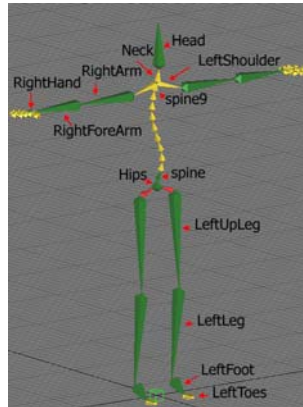


figure 2-5: 3ds max Hierarchy example

2 | Importing and Exporting

Using the 3ds Max FBX plug-in

- 3 Select the Mirror Bones option if you are mirroring bone chains in order to prevent negative scaling on the bones (figure 2-7).

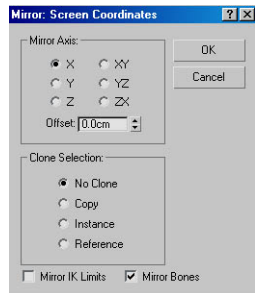


figure 2-7: Select the Mirror Bones option.

Note

Alias strongly recommends that you export your skeletons and mesh before skinning (vertex assignment) your characters to detect any negative and/or uniform scaling.

Negative scaling of objects with weighting applied to them is not supported in 3ds Max FBX plug-in software.

- 4 Select all the bones.

2 | Importing and Exporting

Using the 3ds Max FBX plug-in

- 5 Select Character>Bone Tools from the 3ds max 5.0 menu bar (figure 2-8).

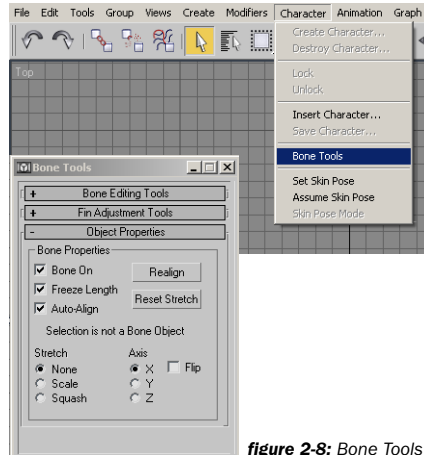


figure 2-8: Bone Tools in 3ds max

Note

Bones are first considered as Geometry, which lets you use Scale and Squash channels. However, these channels are not supported by 3ds Max FBX plug-in software.

The skeleton is now ready to be exported into your 3ds Max FBX plug-in software. Use this .fbx file for merging back into 3ds max.

Geometry objects can be exported as bones in your 3ds Max FBX plug-in software, but they are treated as bones and are only visible in X-Ray mode.

Skinning the Character

- 3ds max Weighting is supported only when applied to an Editable mesh.
- Skin and Physique are the only two 3ds max weighting modifiers supported.

2 | Importing and Exporting

What's supported in 3ds Max FBX plug-in

- Both Skin and Physique modifiers can be applied to two different objects in the same scene.
- Negative scaling on meshes that are weight on a skeleton is not supported.

Skin Modifier Issues

Absolute and Relative weighting of the skin modifier is supported. When bones are removed from “bones list” of the Skin Modifier, the modifiers become unstable. This instability continues in 3ds Max FBX plug-in software. Be sure to not remove any bones after their initial assignment.

Physique Modifier Issues

Only the Rigid envelopes are supported. Deformable and Partial blending envelopes are automatically converted to rigid envelopes in your 3ds Max FBX plug-in software.

What's supported in 3ds Max FBX plug-in

This section lists the supported and unsupported features for the 3ds Max FBX plug-in:

- Convert Polygons to triangles when exporting mesh geometry.
- Normals (computed automatically by the 3ds Max FBX plug-in).
- All texture mapping types are exported as a UV map.
- Colored Vertices
- Control Points
- Morphing
- Colored Vertices
- Only Geometry (mesh). Transform data are supported for merge back. Everything else is ignored.

- All NURBs and Patches are converted and exported as triangle meshes. We recommend that you use triangle meshes when building models.

Lights

The following section has tables that indicate what how lighting is treated by both 3ds Max and FBX.

Export

The following table lists 3ds Max lights and how they are treated by the *.fbx* file format on export:

In 3ds Max	Becomes in FBX
Omni	Point Light.
Free Directional	Directional Light.
Targeted Directional	Directional Light. The Target is exported as a null.
Free Spot	Spot.
Targeted Spot	Spot. The Target is exported as a null.
Intensity	Intensity FCurve (resampled).
Color channel	Color channel.
Coneangle FCurve	Coneangle. The coneangle is computed as the (Hotspot+Falloff)/2. If these parameters are animated, the resulting FCurve is evaluated at each frame.

2 | Importing and Exporting

What's supported in 3ds Max FBX plug-in

In 3ds Max	Becomes in FBX
Ambient Light color	Ambient light. Applies only to 3ds max's Ambient light, not to the Environment Tint and Level fields.

Import

The following table lists FBX lights and how they are treated by 3ds Max on import.

In FBX	Becomes in 3ds Max
Omni	Point Light.
Directional Light	Free Directional light.
Light Spot	Free Spot.
Coneangle FCurve	Hotspot and Falloff channels.
Intensity FCurve	Intensity channel.
Color FCurve:	Color channel. The animation on a Target null node is merged as usual, and the Targeted light retains its Targeted state while in 3ds max.

Merge Back

- Intensity is merged into the Intensity channel.
- Color FCurve is merged into the Color channel.

Cameras

The following section has tables that indicate what how cameras are treated by both 3ds Max and FBX.

Export

The following table lists 3ds Max cameras and how they are treated by the *.fbx* file format on export:

In 3ds Max	Becomes in FBX
Free Camera	Camera without interest.
Targeted Camera	Camera with interest.
Roll Angle Animation	Roll Fcurve. Angle values are inverted when exporting to <i>.fbx</i> to maintain a consistent orientation.
Parallel Camera	Ortho (parallel), but the width and height values are not the same.
FOV channels	Field of View FCurve. The view is consistent, even though the focal length values changes.
Width-related FOV	Horizontal Aperture.
Height-related FOV	Vertical Aperture.
Near and Far plane	Near and Far values if clipping is enabled. Since Near and Far values cannot be animated in 3ds Max FBX plug-in software, the current time value is used for evaluating the resulting Near and Far value.

2 | Importing and Exporting

What's supported in 3ds Max FBX plug-in

Notes

The UpVector animation is plotted on the Roll FCurve. If not animated, it is always exported as (0,1,0).

Camera Scale is not supported.

Diagonal-Related Field Of View is not supported, and its channels are interpreted as an horizontal Field of View.

Environment Planes are not supported.

Target Distance is exported as a static value. If the channel is animated, the resulting value is the one evaluated at the current time.

Import

The following lists how FBX cameras are treated by 3ds Max on import:

In FBX	Becomes in 3ds Max
Free Camera	Free camera.
Camera (With a look at Target)	Targeted camera.
Ortho (parallel) Camera	Parallel camera
3ds max Parallel Camera (a parallel camera generated by a 3ds Max export)	Their width is set in the FOV Channel. By importing an exported 3ds max parallel camera, the width parameters are restored, even if it is not considered by 3ds Max FBX plug-in software.

Notes

Since the Near and Far plane values for cameras in 3ds Max FBX plug-in software are constant, the 3ds max channel cannot be animated.

Target Distance is imported for the Free Camera.

Custom Properties

Because of type limitations in .fbx files, the following conversions are applied.

Exported from 3ds max	Becomes in FBX
Float	REAL
Boolean	BOOL
Integer	INTEGER
Color	COLOR
Array	INTEGER
Node	ignored.
TextureMap	ignored

Note

The minimum and maximum values of this property cannot be retrieved, so they are not considered.

2 | Importing and Exporting

Known limitations

Imported FBX	Becomes in 3ds max
REAL	Float
BOOL	Boolean
INTEGER	Integer
COLOR	Color
VECTOR3	Float

Known limitations

The following is a list of known limitations for this version of the 3ds Max FBX plug-in.

- The AutomaticUVW operator is not correctly supported and should be avoided.
- The 3ds Max FBX plug-in destroys wire connections to Position, Rotation and Scale controllers. These connections should be re-created after importing.
- While Import and export of the ambient light color is supported, this applies only to 3ds max's Ambient light, not to the Environment Tint and Level fields. The color of this ambient light is Set/Get at time 0
- Because of differences between 3ds max and 3ds Max FBX plug-in software, animations set on controllers with TCB interpolation or tangent slopes set to Fast, Slow or User are systematically resampled.
- Polygon (faces) may be flipped during import. To fix this problem, access the stack, select the Faces sub-object, select all the faces of the object, and flip them back using the Flip and Unify functions.

What's not supported in the 3ds Max FBX plug-in

- Nurbs and Patches are not supported by 3ds Max FBX plug-in software (they are converted to Triangle meshes).
- Negative scaling on mesh objects is not supported by 3ds Max FBX plug-in software.
- Ambient light animation is not supported.

2 | Importing and Exporting

Known limitations

3

Scripting the 3ds Max FBX plug-in

This chapter contains the commands for scripting 3ds Max FBX plug-ins.

FBXExporterGetParam [arg]

Queries the export plug-in parameters where [arg] is a recognized export parameter.

FBXExporterGetParam returns the value of the named parameter. If the parameter is unrecognized or the wrong number of arguments are provided, the value “unsupported” is returned.

For a list of supported parameters, see FBXExporterSetParam.

FBXExporterSetParam [arg] [value]

Sets the specified argument for export where [arg] is a recognized export parameter and [value] is an appropriate value for the supported parameter. For example, to prevent the export of cameras:

```
FBXExporterSetParam "Cameras" false
```

FBXExporterSetParam returns “OK” if successful or if it is sent an unrecognized parameter.

FBXExporterSetParam returns “unsupplied” if the wrong number of arguments are passed.

FBXExporterSetParam recognizes the following parameter and values:

Name	Value
Animation	True or false

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FBXExporterSetParam [arg] [value]

Name	Value
Cameras	True or false
Convert2Tiff	True or false
EmbedTextures	True or false
FilterKeyReducer	True or false
GeomAsBone	True or false
Geometries	True or false
Lights	True or false
NormalsPerPoly	True or false
Resampling	Float
Shape	True or false
Skin	True or false
ShowWarnings	True or false

For example, to query the export camera's state:

```
FBXExporterGetParam "Cameras"
```

FBXImporterGetParam [arg]

Queries the import plug-in parameters where [arg] is a recognized import parameter.

FBXImporterGetParam returns the value of the named parameter. If the parameter is unrecognized or the wrong number of arguments are provided, the value "unsupported" is returned.

For example, to query the import Mode's state:

3 | Scripting the 3ds Max FBX plug-in

FBXExporterSetParam [arg] [value]

FBXImporterGetParam "Mode"

Returns either *#create*, *#merge*, or *#exmerge*.

For a list of supported parameters, see FBXImporterSetParam.

FbxImporterSetParam [arg] [value]

Sets the specified argument for import where [arg] is a recognized import parameter and [value] is an appropriate value for the supported parameter.

- FBXImporterSetParam returns “OK” if successful or if it is sent an unrecognized parameter.
- FBXImporterSetParam returns “unsupplied” if the wrong number of arguments are passed.

FBXImporterSetParam recognizes the following parameter and values:

Name	Value
Animation	True or false
Cameras	True or false
FilterKeyReducer	True or false
FilterKeySync	True or false
FilterUnroll	True or false
Geometries	True or false
HumanIK	True or false The HumanIK option is available only if a compatible HumanIK product is installed.
Lights	True or false
Markers	True or false

3 | Scripting the 3ds Max FBX plug-in

FBXExporterSetParam [arg] [value]

Name	Value
Mode	“Create” or “merge” or “exmerge” When queried using FBXImportGetParm, this parameter returns #create, #merge, or #exmerge
Resampling	Float
RescaleRoot	True or false
Shape	True or false
Skin	True or false
SkinModifier	“Skin” or “physique” When queried using FBXImportGetParm, this parameter returns #skin or #physique
TakeIndex	An integer number from 1 to the number of takes in the fbx file. This parameter is only available for setting.
YUpZUp	True or false

For example, to import an fbx file using the “Add to new scene” mode and the skin modifier, but without loading animation fcurves:

```
FBXImporterSetParam "Mode" "create"  
FBXImporterSetParam "skin" true  
FBXImporterSetParam "Animation" false
```