

3ds max FBX Plugins Guide

Version 6.0

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Chapter 1

Installing the 3ds max FBX Plugins

Overview

FBX plugins are used by 3ds max® to import, export, and convert files using the *.fbx* file format. This document describes how to install 3ds max FBX plugins on Windows® systems.

Plugins for 3ds max are available for use with Windows 2000/XP.

Manual Installation

In order for your 3D software to use these plugins, you must manually move these files into the proper directories.

This section describes the naming conventions, supported software versions, and installation process for manually installing and removing the FBX plugin for 3ds max.

3ds max Plugin Naming Conventions

3ds max FBX plugins conform to the following naming conventions:

```
fbxmax<maxver>imp.dli
```

```
fbxmax<maxver>exp.dle
```

where *<maxver>* is the 3ds max version for the plugin. The plugin extension *.dli* represents the import plugin, and the extension *.dle* represents the export plugin.

Both are standard *.dll* files that use non-standard extensions, as required by 3ds max.



Note:

A plugin's name can be changed as long as the extension (for example *.dli* or *.dle*) stays the same.

Supported 3ds max Versions

The following plugins are currently available for 3ds max versions 5.0 and 6.0 respectively:

Import:

```
fbxmax50imp.dli
```

```
fbxmax60imp.dli
```

Export:

```
fbxmax50imp.dle
```

```
fbxmax60imp.dle
```

Installing the 3ds max FBX Plugin

1. Locate the *fbxmax<maxver>exp.dle* or the *fbxmax<maxver>imp.dli* file.

By default, the plugin files are installed to the *C:\Alias\FBXPlugins<fbxver>\3dsmax<maxver>* folder.

2. Verify that the version number of the plugins match the version of 3ds max installed on your computer. Plugins run correctly only on the version of 3ds max for which they were created.

3. Copy the *.dli* and *.dle* files to your 3ds max plugin directory.

4. Read the release notes that are in the *readme.txt* and *feature.txt* files.

5. Make sure that there is only one FBX plugin *.dli* and *.dle* file in your 3ds max plugin directory.

6. Launch 3ds max and load a scene.

7. Export an *.fbx* file (click File>Export scene from the main menu bar).

8. Modify your scene. For example, move an object.

9. Import an *.fbx* file (as a merge back).

10. Click File>Import scene from the main menu bar.

11. Import the same *.fbx* file as a new scene.

If you are able to perform each step of this procedure, then the plugin is installed correctly.

Removing the 3ds max FBX Plugin

1. Close 3ds max.
2. Delete the *.dli* and *.dle* files from the 3ds max plugin directory.

Renaming Plugins

All plugins can be renamed as long as you do not change the file extension.

If you choose to backup your files, all files with the same name as those you are installing should be renamed with the extension *.FBX_BAK*.



Note:

It is recommended that you always remove old versions of FBX plugins before installing newer versions, as only one version of the plugin can reside in the 3ds max plugin directory.

Chapter 2

3ds max Plugin

Overview

This document shows you how to export *.fbx* files from 3ds max, and how to import *.fbx* files into 3ds max.

This document also includes important information regarding the 3ds max features supported by this version of the FBX plugin and MotionBuilder software.



Note:

For information on supported features between 3ds max and other 3D software (cross-package support), consult the Alias website (<http://www.Alias.com>).

In addition, this document explains how to export animation as a *.bvh* file for use with BIPEDs in Character Studio (see “Exporting BVH Animation for Character Studio” on page 8).

Using the 3ds max Plugin

This section describes how to use the FBX 3ds max plugin to import and export *.fbx* format files.

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

Building a Character in 3ds max

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

- Build a mesh
- Apply the UV mapping
- Create a morph

- Build a skeleton
- Skin the character

Build the Mesh

All the geometry imported into your MotionBuilder software must be collapsed into an Editable mesh.



Note:

Nurbs, Patch, Weighting are not supported by MotionBuilder software.

Negative scaling on mesh objects is not supported by MotionBuilder software.

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

MotionBuilder 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 5.0 and 6.0 in order to use it in MotionBuilder software.

To build a skeleton:

1. Create a skeleton in In 3ds max 5.0, or 6.0 without IK chains (history independent).

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Using the 3ds max Plugin

2. Build the skeleton using a standard hierarchy referring to the examples in fig 2-1 and fig 2-2.



Note:

The green bones represent bones that must be dropped into the base slots of the Define pane the Character Tool (found in your MotionBuilder software).

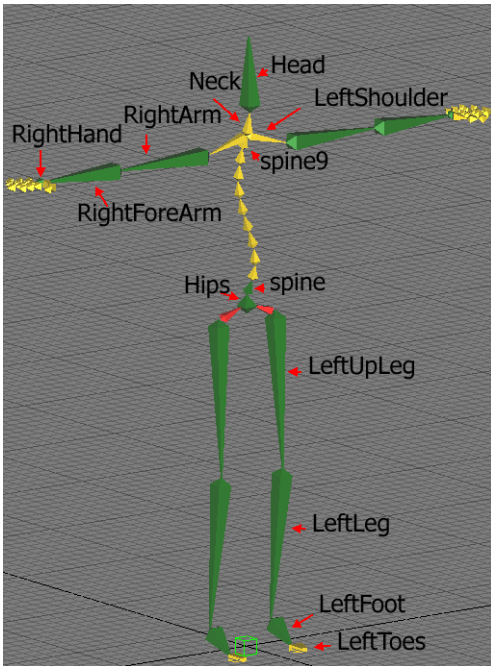


fig 2-1: 3ds max Hierarchy example

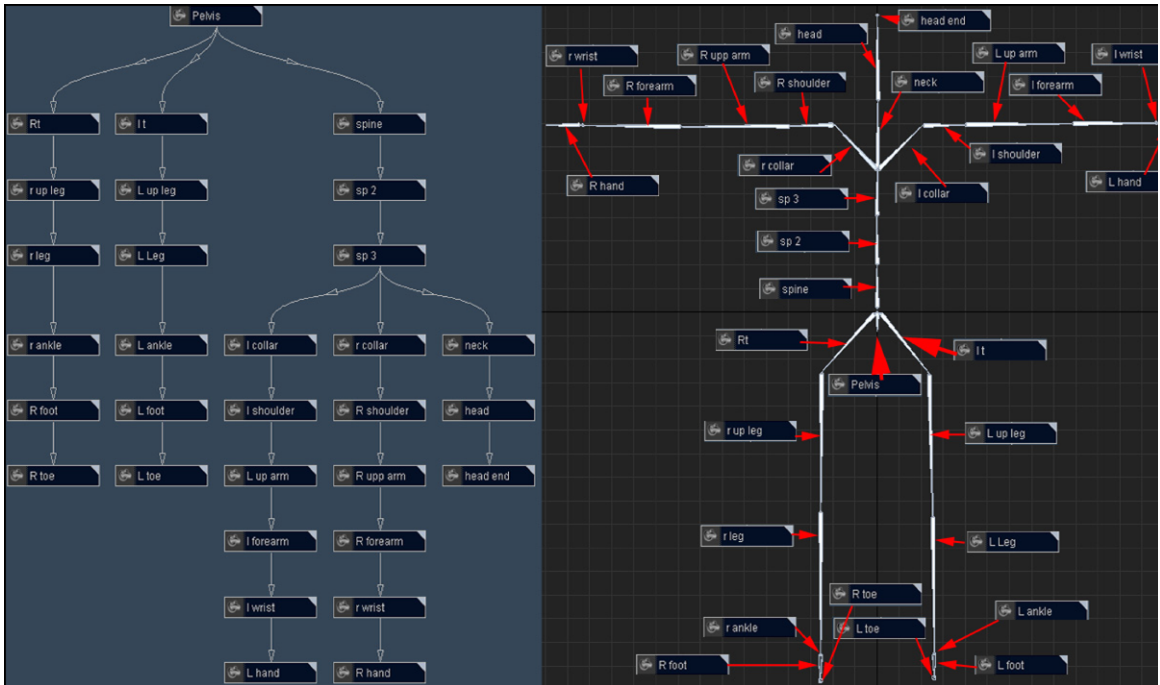


fig 2-2: Example skeleton with IK chains.

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

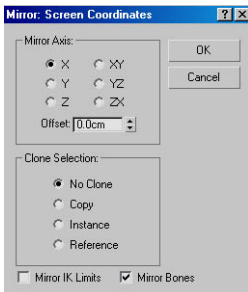


fig 2-3: Select the Mirror Bones option.

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 MotionBuilder software.

4. Select all the bones.

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

Note:

Bones are first considered as Geometry, which lets you use Scale and Squash channels. However, these channels are not supported by MotionBuilder software.

The skeleton is now ready to be exported into your MotionBuilder software. Use this *.fbx* file for merging back into 3ds max.

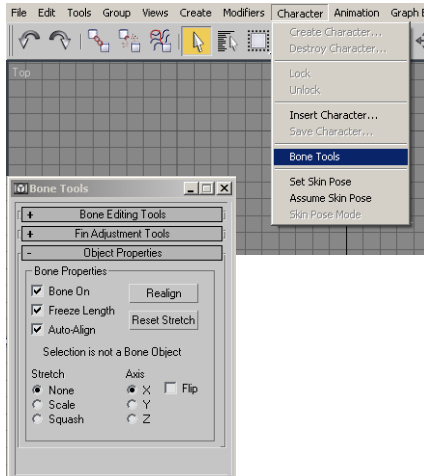


fig 2-4: Bone Tools in 3ds max 5.0.

Geometry objects can be exported as bones in your MotionBuilder software, but they are treated as bones and are only visible in X-Ray mode.

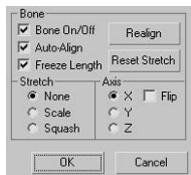


fig 2-5: Object Properties in 3ds max 4.0, 4.2.

Skinning the Character

- 3ds max Weighting is supported only when applied to an Editable mesh.
- Skin and Physic are the only two 3ds max weighting modifiers supported.
- Both Skin and Physic 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 MotionBuilder software. Be sure to not remove any bones after their initial assignment.

Physic Modifier Issues: Only the Rigid envelopes are supported. Deformable and Partial blending envelopes are automatically converted to rigid envelopes in your MotionBuilder software.

Exporting from 3ds max

This section describes how to export *.fbx* files from 3ds max.

Note:

Before exporting a model from 3ds max, make sure that you reset all transformations, the pivot, and the scale of your model.

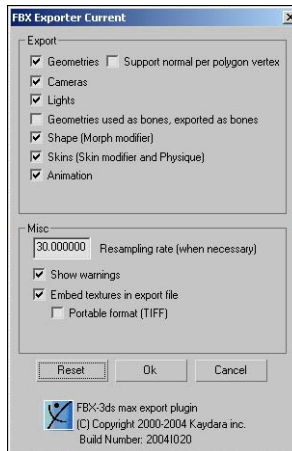


fig 2-6: Export FBX File settings

To export from 3ds max:

1. Select File>Export and browse to the location where you want to save the *.fbx* file.
2. Name the file and select *.FBX* as the File Type.
3. Click OK. The Export FBX File dialog box appears.
4. Select the elements that you want to export (fig 2-6).

Importing .fbx Files into 3ds max

This section describes the types of import available with the 3ds max plugin and the two methods of importing an .fbx file into 3ds max:

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

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 plugin and when it should be used:

Merge	Use Merge to use a combination of the Exclusive Merge and Add to New Scene. When you activate Merge, the plugin 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 .fbx file.
Exclusive merge	Use to merge only the elements modified in your MotionBuilder software with elements in the original 3ds max scene. Exclusive Merge does not import control-sets, optical markers and other specific MotionBuilder software elements.
Add to current scene	Use to import all the MotionBuilder software elements (enabled in the Import Configurations menu) into an empty scene. Known problems: 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.

Add to a new scene	Use to import all the MotionBuilder software elements (enabled in the Import Configurations menu) into a new 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.

To import in an Empty Scene

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.

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 (fig 2-7), make sure that Merge is selected. Click Ok.
6. Change the Resembling rate if it is necessary (The default is the 3ds max frame rate).
7. 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 MotionBuilder software. You must also plot the animation onto the skeleton itself.

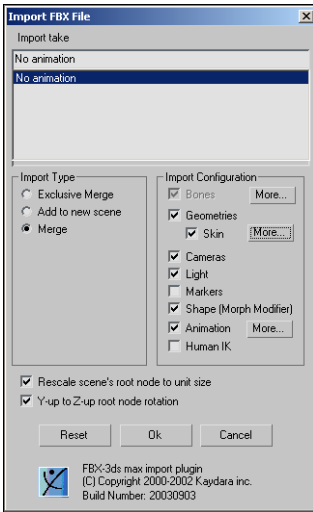


fig 2-7: Import FBX File settings

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.



Note:

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

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.
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.

To export a .bvh 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.

To import the .bvh file in 3ds max:

1. Create a BIPED within Character Studio.
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 MotionBuilder 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.

You should be able to play back the animation on the Biped.

Supported 3ds max Features

This section lists the supported and unsupported features for the FBX 3ds max plugins:

Mesh Geometry

The following are the supported and unsupported features for Mesh Geometry in the 3ds max plugin.

Export

Polygons	Convert Polygons to triangles when exporting mesh geometry.
Normals	Normals are computed automatically by the plugin.
Texture	All mapping types are exported as a UV map.
Colored Vertices	Supported.

Import

Control Points	Supported.
Normals	Supported.
Morphing	Supported.
Colored Vertices	Supported.

Merge back

Geometry	Only Geometry (mesh). Transform data are supported for merge back. Everything else is ignored.
-----------------	--

NURBs

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

The following lists additional information on using NURBs and related features.

Export

Geometry	Exporting NURBs creates different NURBs nodes for NURBs components.
Texture	All mapping types are exported as a UV map.
Morphing	NURBs Morph primitives must be converted to Polygons. Morph of NURBs is not otherwise supported. Export with deleted Morph Primitives is unsupported. If any Primitives are missing from the Morph channel when exporting, a dialog box appears to alert you.
Skin (Modifier and Physique)	Both Skin Modifier and Physique are unsupported.



Note:

NURBs with several components (trims, caps, and so on) are converted to polygons and exported as a hierarchy of nodes named after the single 3ds max NURBs node with its component name as a suffix.

Import

Geometry	FBX Plugins do not support NURBs import. NURBs are converted to an editable mesh.
Morphing	NURBs are converted to an editable mesh.

Merge back

Geometry (NURBs, patch, mesh)	Only Geometry transform data are supported for merge back; everything else is ignored. (Trims import is not supported. Usually caps are trimmed and will export as planes, but the merge back ignores this).
Morphing	All NURB components must have the same Morphing (shape) animation. If not, a dialog box appears asking you which node it should import the Morphing animation from.

Patches

All patches are converted to polygons. The following lists additional information on using patches and related features.

Export

Patches	Patches are converted to triangle meshes.
----------------	---

Import

Patches	Patches are converted to Triangle meshes.
----------------	---

Merge back

Geometry (NURBs, patch, mesh)	Only Geometry transform data are supported for merge back; everything else is ignored.
--------------------------------------	--

Lights

The following are the supported features for Lights in the 3ds max plugin.

Export

Omni	Exported as a Point Light.
Free Directional	Exported as a Directional Light.
Targeted Directional	Exported as a Directional Light. The Target is exported as a null.
Free Spot	Exported as a Spot.
Targeted Spot	Exported as a Spot. The Target is exported as a null.
Intensity	Exported as a resample curve.
Color channel	Export supported.
Coneangle FCurve	The coneangle is computed as the (Hotspot+Falloff)/2. If these parameters are animated, the resulting FCurve is evaluated at each frame.
Ambient Light color	Export supported. Applies only to 3ds max's Ambient light, not to the Environment Tint and Level fields.

Import

Omni	Imported as a Point Light.
Directional Light	Imported as a free Directional light.
Light Spot	Imported as a free Spot.
Coneangle FCurve	Imported in both Hotspot and Falloff channels.
Intensity	Import supported.
Color FCurve	Imported into the color channel.



Note:

The animation on a Targeted null node is merged as usual, and the Targeted light retains its Targeted state while in 3ds max.

Merge Back

Intensity	Supported.
Color FCurve	Supported.

Cameras

The following are the supported and unsupported features for Cameras in the 3ds max plugin.

Export

Free Camera	Exported as a Free camera.
Camera Scale	Not supported.
Targeted Camera	Exported as a camera looking toward a Target.
Roll Angle Animation	Supported. Angle values are inverted when exporting to MotionBuilder software, to maintain consistent orientation.
Parallel Camera	Exported as Ortho (parallel), but the width and height are not the same as in your MotionBuilder software.

FOV channels	Exported as Field of View FCurves. The view is consistent, even though the focal length is not the same between 3ds max and MotionBuilder software.
Width-related FOV	Exported as Horizontal Aperture.
Height-related FOV	Exported as Vertical Aperture.
Diagonal-Related FOV	Not supported. Diagonal-Related FOV Channels are interpreted as Horizontal.
Near and Far plane	Exported if clipping is enabled. Since Near and Far values cannot be animated in MotionBuilder software, the current time value is used for evaluating the resulting Near and Far value.
Environment Planes	Not supported.
Target Distance	Exported as a static value. If the channel is animated, the resulting value is the one evaluated at the current time.
UpVector	Supported. Plotted on the Roll FCurve.



Note:

The Up vector is always (0,1,0) when exporting to MotionBuilder software.

Import

Free Camera	Imported as a Free Camera.
Camera (With a look at Target)	Cameras (with a look at target) are imported as a Targeted Camera.
Ortho (parallel) Camera	Ortho cameras are imported as Parallel.
3ds max Parallel Camera	Parallel cameras have their width 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 MotionBuilder software.
Near and Far Planes Import	Supported.
Target Distance	Imported for the Free Camera

Note:
Since the Near and Far plane values for cameras in MotionBuilder software are constant, the 3ds max channel cannot be animated.

Custom Properties

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

Export (3ds max to 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.

Import (FBX to 3ds max)

REAL	Float
BOOL	Boolean
INTEGER	Integer
COLOR	Color
VECTOR	3 Float

Additional Features and Enhancements

This section lists the additional features and enhancements found in version 6.0 of the FBX plugins for 3ds max.

General

- Added a TAKEINDEX user parameter to let you import specific takes during batch processing. The syntax is `FBXImporterSetParam "TakeIndex" anumber`.
- On shell materials, the plugin exports the original texture associated with the SubMaterial 0. It ignores which texture (original/baked) is actually selected for the rendering/viewing.
- Added a Convert2Tiff option in the user parameters and a script command for embedded textures. Use this option to save an embedded texture image that can be read on different platforms and by most applications. The syntax is: `FBXExporterSetParam "Convert2Tiff" state` where 'state' is a boolean value.
- The tiling/scaling of textures in the UVMapping operator is now correctly interpreted. Previously, the values were multiplied, and the mapped texture was not displayed properly.

- The Rescale Scene's Root Node to Unit Size option is so that the objects imported from the *.fbx* file do not change units (centimeters). A new node, *Fbx_Root*, is now created, affecting the whole hierarchy by applying the scaling factor that converts the centimeters to 3ds max's current units.

Known Limitations

The following is a list of known limitations for the version 6.0 of the FBX 3ds max plugin.

- The AutomaticUVW operator is not correctly supported and should be avoided.
- The plugin 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
- Ambient light animation is not supported.

Because of differences between 3ds max and MotionBuilder software, animations set on controllers with TCB interpolation or tangent slopes set to Fast, Slow or User are systematically resampled.

