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# Animation Saver for PlayStation™

The plugin of LightWave 3D™

Aug 04, 1998 Ver.1.4.2

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## Introduction

- The Animation Saver for PlayStation is a plug-in module for saving animation data from LightWave 3D™ to an HMD file. Scene information such as objects, surfaces, textures, motion, and bones can be converted to the HMD format. This plug-in was created using PlayStation library 4.2.5.

## Note

- **Regarding distribution:** This plug-in module was developed by D-Storm Corp. Ltd. under an NDA with Sony Computer Entertainment. It is distributed free of charge to entities licensed with PlayStation™. However, the module may not be distributed without the consent of Sony Computer Entertainment Corp. Ltd. or D-Storm Corp. Ltd.

## Operating environment

- **LightWave 3D™ versions:** This plug-in can be used with the following versions of LightWave 3D™.
  - INTEL version, PC98 version ver.5.0, ver.5.5
  - DEC Alpha version ver.5.5
  - PowerMac version ver.5.5
  - \* Because additional functions and part of the GUI that is used are incompatible, cannot be used in Intel and DEC Alpha ver. 5.0 versions.
- **PlayStation library:** PlayStation library 4.2.5 and later versions.

## Installation

The Animation Saver for PlayStation™ consists of two modules: PSXANIM.P and TIMIMAGE.P. These modules should be copied to the Layout folder for LightWave 3D™ Plug-ins. This folder can usually be found under NewTek\Plugins\Layout.

Note that separate versions of PSXANIM.P and TIMIMAGE.P are provided for the INTEL and DEC Alpha versions.

Launch LightWave 3D™ Layout and add the plug-ins which have been copied.

- From Generic Options in the Options panel, click the Add Plugin button.
- Select PSXANIM.P and TIMIMAGE.P, which have been copied to the plug-in folder.

## Conversion data details

- **Polygon data:**
  - The only object files that this plug-in can convert are LWOBJ and RSD files.
  - Three-sided and four-sided polygons are allowed. Polygons with five or more sides are divided automatically into triangles.
  - Point polygons and line polygons will be output as three-sided polygons.
  - By checking "Sort Polygons by Surface" of "More Settings...", polygons can be sorted by surface name and number of polygon vertices.
- **Vertex coordinates and normal vectors:**
  - Vertex coordinates will be converted to and output as integer values supported by HMD. The Y-axis value will be multiplied by (-1) and all vertices will be multiplied by the scale factor specified by the options.
  - If Flat shading is specified for the surface, the normal vector is calculated from the surface normal vector.  
If Smooth Shading is specified, the normal vector is calculated from the Max Smoothing Angle between polygons.
  - By setting the "Calculate Vertex Normals for Each Point" button on the "More Settings..." panel of the object, a 1 to 1 normal vector can be created for each vertex.
  - However, in this case surface information is never referenced, so the 'Smoothing flag' for each Lightwave surface must be set to "on". This is mainly used when you wish to match the number of vertices and the number of normal vectors when outputting RSD files.
- **Object coordinate systems:**
  - The position of frame 0 of the object that is placed in Layout will be output as the HMD COORDINATE. For NULL objects, just the COORDINATE will be output without the polygon.
  - The pivot point for each object will be output as a separate COORDINATE. A parent-child relationship is set up so that the pivot point COORDINATE refers to the COORDINATE of the object as its parent. If the pivot point is < 0,0,0 > no COORDINATE will be generated.
  - The object parent-child relationships specified in Layout will be converted to COORDINATE parent-child relationships.
- **Surfaces:**
  - With surface color data, only the RGB of the "Color" specified in the Layout surface panel is converted to polygon RGB values. Diffuse, Specular, and Luminosity settings will be ignored.

- If Color RGB values are modified in the Animation Saver for PlayStation, they will be output.
- Color data specified by Shader Plug-ins will not be converted.
- If "Double Sided" is specified, the BOT flag in the polygon driver will be set.
- Polygon packets can be output as "Light calculations enabled" (with normal vectors) and "Light calculations disabled" (without normal vectors).
- The following "Light calculations enabled" and "Light calculations disabled" polygon packets are supported.
  - FLAT\_NOTEXTURE\_TRIANGLE
  - FLAT\_TEXTURE\_TRIANGLE
  - FLAT\_NOTEXTURE\_QUAD
  - FLAT\_TEXTURE\_QUAD
  - GOURAUD\_NOTEXTURE\_TRIANGLE
  - GOURAUD\_TEXTURE\_TRIANGLE
  - GOURAUD\_NOTEXTURE\_QUAD
  - GOURAUD\_TEXTURE\_QUAD
- The Transparency setting sets the STP flag of the polygon driver. This flag is set when semi-transparency is used.
- The Fog setting sets the polygon driver's FOG flag.
- The divide setting enables polygon division. Static specifies fixed division (DIV). Active specifies automatic division (ADV). One or the other should be chosen, and the division level (2x2, 4x4, 16x16, 32x32) must be specified for both.
- Press the F1 key to display the option button for specifying polygon clipping (CLP). This setting is not yet supported in LIBHMD 4.2.5.
- **Texture UV coordinates:**
  - Among the texture mapping settings specified in Layout, Surface Color data will be used in calculating UV values.
  - Supported texture types are: "Planar Image Map", "Cylindrical Image Map", "Spherical Image Map", and "Cubic Image Map".
  - Tiled textures are supported. Tiled texture settings are specified in the PSX Animation Saver panel's "Enable Tile Mapping". Textures with vertical and horizontal pixel sizes of 8, 16, 32, 64, 128, 256 can be tiled.
  - The UV coordinate space is normalized to the pixel space of the texture image.
  - If polygons are mapped outside of the texture, the polygons may be improperly displayed when textures straddle polygons. In such cases, tiled polygons should be used.
- **Texture images:**
  - Only the TIM format is supported for texture images.

- By adding TIMIMAGE.P to Layout, TIM files can be directly loaded from Layout. 4-bit, 8-bit, and 16-bit color are supported.
- The texture mapping information to be converted is limited to the textures specified in Surface Color.
- For procedural textures, such as Fractal Noise, only Surface Color data is output.
- **Bones:**
  - If there is a bone setting for an object, the bone coordinate system and parent-child relations are converted to COORDINATES.
  - Information from polygons affected by bones are converted to shared polygons.
  - If "Limited Region" is set for bones, the vertices belonging to the bone are calculated according to "Maximum Range". If "Limited Region" is not specified, the vertex will belong to the bone for which the distance between the vertex and the bone starting point is smallest.
  - Bones that are not active will not be used in the calculations for shared polygons, but COORDINATES will be output.
  - Vertices positioned outside the "Limited Region" will be handled as vertices belonging to the COORDINATE of the object.
  - If the Limited Regions of bones that are in a parent-child relationship both cover the same vertex, the bone to which the vertex belongs will be determined according to the two methods below.
    - **Prior To Distance:** Give priority to the bone closest to the vertex
    - **Prior To Child Bone:** Give priority to the child bone
  - When using the Point Group file (PGL) as an experimental function, the bone belonging to each point unit can be specified.

### [Point Group File](#)

- **Motion:**
  - In object and bone motion, translation, rotation, and scaling data are converted.
  - Motion output can be "Keyframe only" or "All frames".
  - If "Keyframe Only" is specified, HMD interpolation will be linear.
  - The X, Y, Z coordinate components of a translation (Trans) will be converted to HMD integer values.
  - Coordinates are multiplied by a scale factor specified under Options.
  - When the "HPB (YXZ) Rotation Order" flag is on, priority in rotations is X->Y->Z. When the flag is off, the priority is converted from LightWave's H->P->B to HMD's X->Y->Z.
  - Specifications for a rotational order other than the standard X->Y->Z are supported from LIB 4.2.5. We recommend using LIBHMD 4.2.5 with the "HPD (YXZ) Rotation Order" turned on.
  - Rotation values are converted to integers, where 4096 represents 360 degrees.

- The "End Behavior" specified in LightWave's Motion panel is converted to HMD's CONTROL SEQUENCE.
  - **Repeat:** Repeats motion
  - **Stop:** Stop at last frame
  - **Reset:** After last frame, return to frame 0 and stop.
- Motion packets combine translation, rotation and scaling information, and can be output in the following formats.
  - SI\_NONE | RI\_LINEAR | TI\_NONE (ps0r1t0)
  - SI\_LINEAR\_1 | RI\_LINEAR | TI\_NONE (ps9r1t0)
  - SI\_NONE | RI\_NONE | TI\_LINEAR (ps0r0t1)
  - SI\_LINEAR\_1 | RI\_NONE | TI\_LINEAR (ps9r0t1)
  - SI\_NONE | RI\_LINEAR | TI\_LINEAR (ps0r1t1)
  - SI\_LINEAR | RI\_LINEAR | TI\_LINEAR (ps1r1t1)
  - SI\_LINEAR\_1 | RI\_LINEAR | TI\_LINEAR (ps9r1t1)
- Multiple motion paths can be specified for a single Coordinate.
- Motion files are specified using LightWave's (.mot) files or (.lws) files. When using (.lws), the object and bone configuration must be identical to the scene being referred to.
- Added motions can be assigned a sequence ID as specified by HMD's Motion Switch.
- Up to 127 sequences can be added at one time for each object or bone.
- Added sequences can be specified only for repeated motions (Repeat).
- When two branching motions are specified for one motion, the following jump sequence is generated. SID\_DST is always set to 0, so if SID\_DST must be changed to a specific value, the LABP file must be edited and conversion to HMD must be performed again using the LABP command.

```
SEQD(JUMP)|SID_DST(0)|SID_CND(3)|SEQ_IDX((Seq0_obj_colball_S3 - CtrlSect_0000) / 4 + 1);
SEQD(JUMP)|SID_DST(0)|SID_CND(2)|SEQ_IDX((Seq0_obj_colball_S2 - CtrlSect_0000) / 4 + 1);
SEQD(JUMP)|SID_DST(0)|SID_CND(0)|SEQ_IDX((Seq0_obj_colball_S1 - CtrlSect_0000) / 4 + 1);
```

#### • Keyframes -> Joint MIME:

- Object and bone keyframe data can be converted to and output as HMD Joint MIME.
- Joint MIME supports both Axes MIME and RPY MIME, but only one type can be output to a single HMD file.
- Joint MIME uses frame 0 as a reference and outputs difference values for all other frames.
- The maximum number for MIME data is 32, which is the maximum MIME count for the HMD format.
- Keyframes in objects or bones for which JointMIME is specified are used for DIFF data for all objects and bones. For example, if Bone(1) has keyframes 0, 10, 30, and Bone(2) has keyframes 0, 20, the DIFF data for all bones will be created based on the four frames 0, 10, 20, 30.  
This is done to match up keyframe display from Lightwave with HMD output display.

• **Morph Gizmo -> Vertex MIME:**

- The morphing information created using Morph Gizmo of LightWave 3D ver. 5.5 can be transformed to vertex MIME.
- Of the VNMIME, only the vertex MIME is created. The normal MIME information is not output.
- The key frame information created by Morph Gizmo is created as MIME keys.
- The object in frame 0 is handled as the original vertex information, so it must be the same as the vertex of the anchor object specified by Gizmo.
- The maximum number of MIME data is 32, and is the maximum number of HMD-format MIME.
- The Gizmo data is specified by specifying the project file (.giz) created using MorphGizmo in the appropriate object.
- The number of vertices of the layout objects for which vertex MIME is performed and the objects specified as the Anchor Object by Morph Gizmo must always be the same.
- In order to make the relative paths of each file correspond, match the "Content Directory" after the Gizmo data are created with the "Content Directory" of the scene.
- Joint MIME and vertex MIME can be specified simultaneously. In this case, always match the scene keyframe position with the Gizmo keyframe position.
- In this version, VNMIME is created as Pre Primitive and Post Primitive. The setting method may change in a future version.
- In this version, separate vertex MIME data can be given to the same original object.
- In a Gizmo setting group, only the first group's keyframe information is referenced. For the purpose of creating VNMIME, do not make group targets when using Gizmo.

[Example of the use of Morph Gizmo -> Vertex MIME](#)

• **RSD -> HMD:**

- Instead of specifying an LWOB file which is read into the layout, an RSD file can be specified as the output object.
- The RSD file specified by each object is converted directly to HMD, without being loaded into the layout.
- The number of polygons, number of vertices, etc., of the specified RSD file and the LWOB file read into the layout may differ.
- For normal vector information, (.ply) file information is output.
- For surface information, (.mat) outputting of file information takes precedence.
- For UV mapping information, (.mat) file information is output.
- Regarding the parent-child relationship between the bone information and the object, the original object's information is inherited.

• **LWOB -> RSD v1.0:**

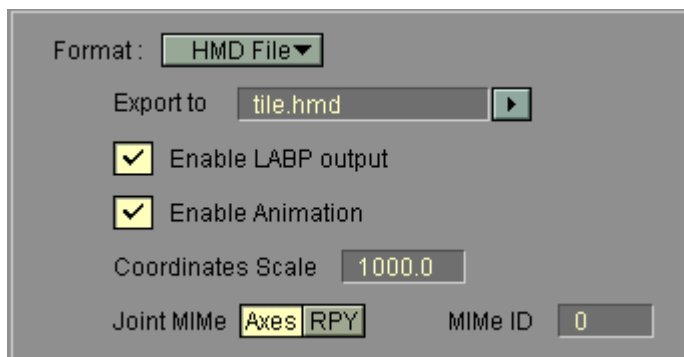
- Batch-converts the LWOB files read into the layout to RSD (v. 1.0) files.
- The filename is created by appending (.rsd) to the object name.
- The scale factor specified by "Coordinate Scale" is suitable for the RSD file that is output.
- Of the surface parameters, (LGT), (STP), (BOT), and (ABR) are converted and output to a (.mat) file.

[How to use the RSD file load and save functions](#)

## Description of screens

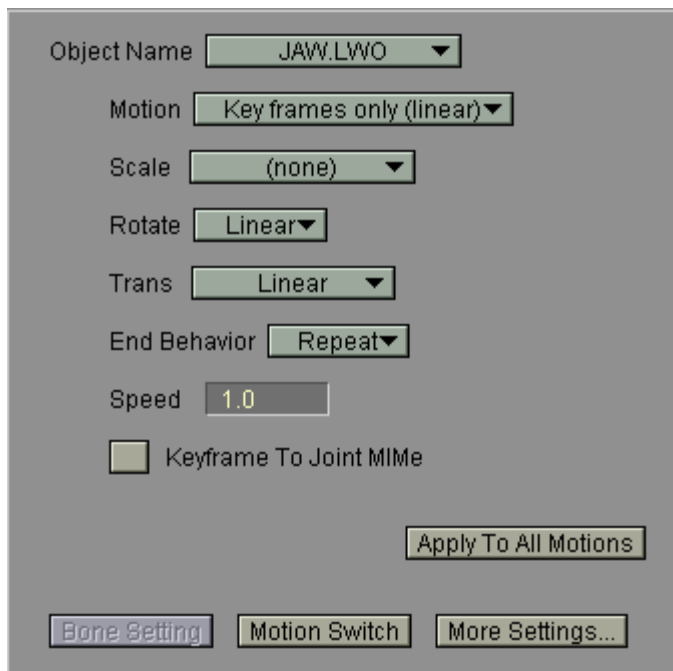
The PS Animation Saver screens can be divided into five categories.

- **General settings**



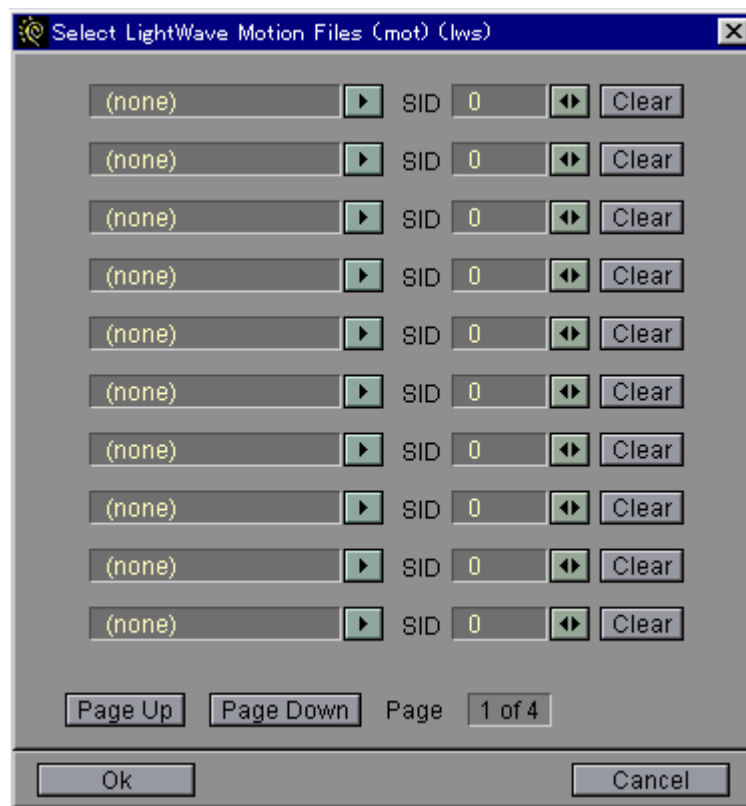
- **Format:** Specifies the output format. Supports HMD and RSD (v. 1.0).
- **Export to:** Specifies the name of the HMD file that is output. For RSD, specifies the output directory.
- **Enable LABP output:** Enables output of an LABP file (disassembled file for the HMD format).  
This file is a text file and can be converted to an HMD file using the LABP.EXE command.
- **Enable Animation:** Check this box if motion data is to be output.
- **Coordinate Scale:** Scaling factor used to multiply COORDINATEs, vertex coordinates, and motion translations.
- **Joint MIME:** Specifies the MIME type used for creating Joint MIME data.
- **MIME ID:** Specifies a unique ID for Joint MIME data.

- **Object settings**

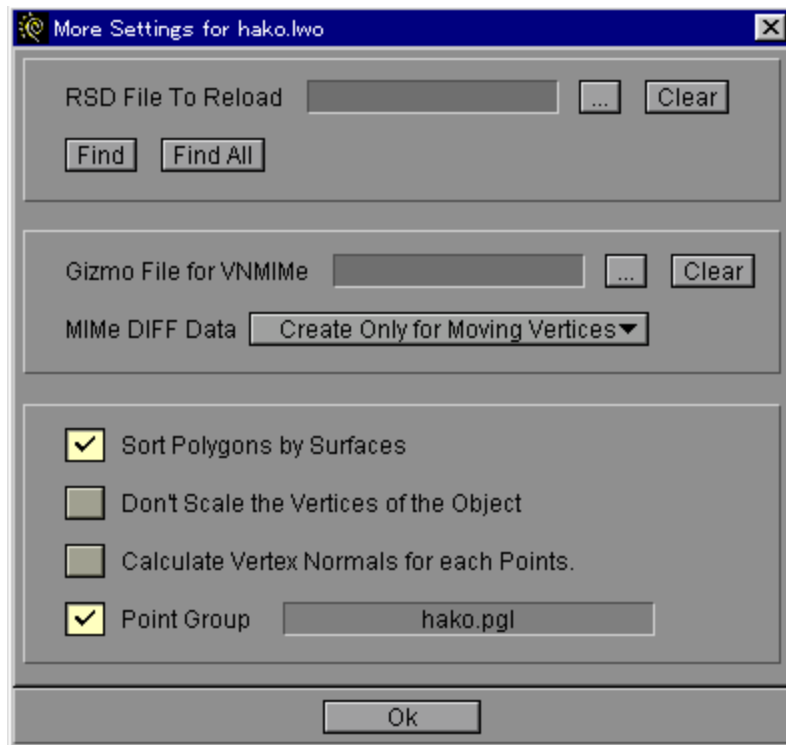


- **Object Name:** A list of objects to be output. When a new object is selected from the pop-up menu, the following parameter displays will change. Use the up-arrow and down-arrow keys on the keyboard to scroll the list.
  - **Motion:** Specifies whether to output motion with only keyframes or with all frames. When (none) is specified, motion will not be output even if "Enable Animation" is checked.
  - **Scale:** Specifies the type of scale motion.
  - **Rotate:** Specifies the type of rotation motion.
  - **Trans:** Specifies the type of translation motion.
  - **End Behavior:** Specifies action after final frame.
  - **Speed:** Specifies speed at which motion is played back. Default is 1.0.
  - **Keyframe To Joint MIME:** Converts keyframe values of an object to Joint MIME.
  - **Bone Setting:** Displays the settings screen for bones belonging to the current object.
  - **Apply To All Motion:** Copies Motion, Scale, Trans, End Behavior, and Speed settings to motion settings for all objects and bones.
  - **Motion Switch:** Settings for adding motion sequences to specified object.
- **Motion Switch**

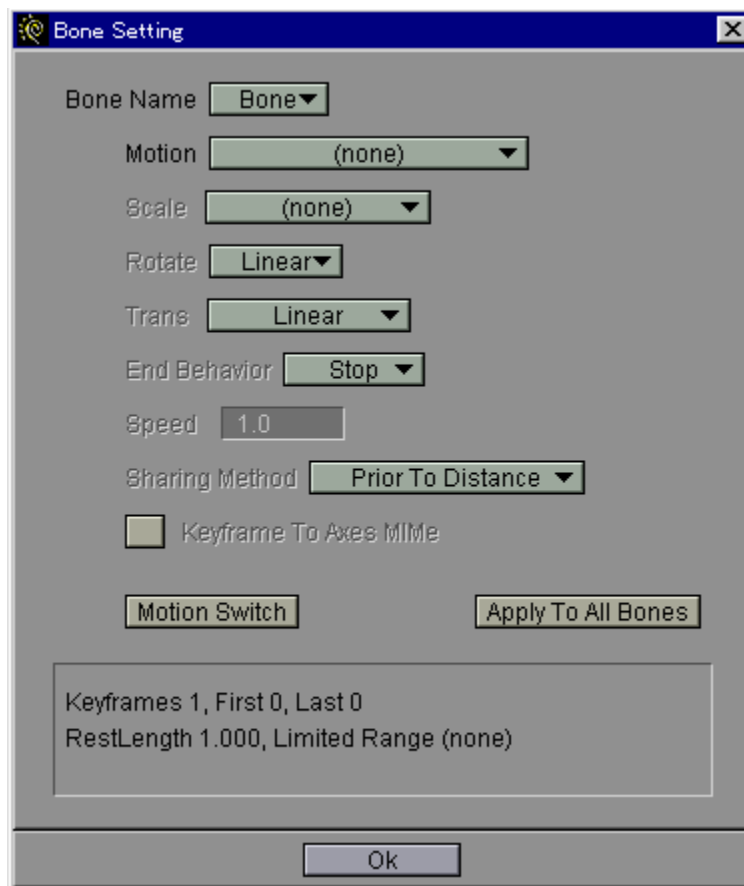




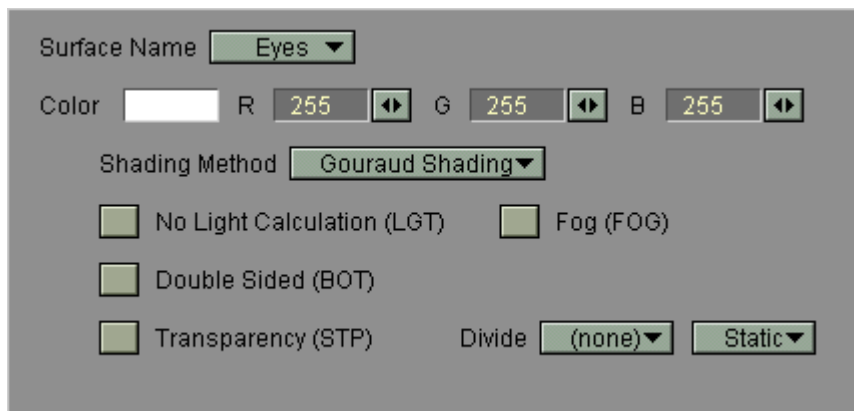
- **Motion filename:** The first field is a selector for selecting motion files to be added. Corresponds to (.mot) and (.lws) files in LightWave. When (.lws) is specified, Clicking "OK" in the query panel below will result in the same file being set for all objects and bones for which sequences can be added.  
**"Do you copy the file to All."**
- **SID:** Specifies the Sequence ID for the motion sequence. Settings can range from 0 to 127.
- **Clear:** Clears the specified motion file.
- **Page Down:** Displays the next setting page.
- **Page Up:** Displays the previous setting page.
- **More Settings...**



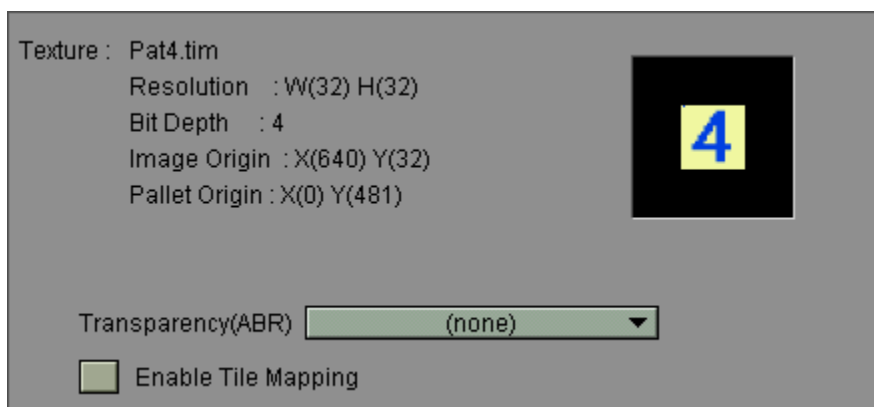
- **RSD File To Reload:** Specifies the RSD file that outputs to the HMD file instead of the LWOB file read into the layout.
  - **Find:** Searches for the file with an (.rsd) extension with the same name as the current LWOB file.
  - **Find All:** Performs the Find function for all objects.
  - **Clear:** Clears the specified RSD file.
  - **Gizmo File for VNMIME:** For the current object, specifies the (.giz) file for creating VNMIME.
  - **MIME DIFF Data:** Specifies whether to create each Vertex MIME Data as a different part of all vertices within HMD, or to use only partial vertices referenced by each object.
  - **Sort Polygons by Surfaces:** Sorts the current object's polygons by surface name and number of polygon vertices.
  - **Don't Scale the Vertices for the Object:** Disables the scale specified by "Coordinate Scale." for the current object's vertex coordinate values.
  - **Calculate Vertex Normals for Each Point:** Forcibly creates a normal vector for each vertex. Mainly used when you wish to match the number of vertices and the number of normal vectors when outputting RSD files.
  - **Point Group:** When a PGL file exists, the PGL filename is displayed. If you do not want to use the PGL file, remove the checkbox.
- **Bone settings**



- **Bone Name:** A list of bones belonging to the current object. Changing a bone in a pop-up window will cause the associated parameters below to change.
  - **Motion:** Specifies whether motion is to be output with only keyframes or with all frames.  
When (none) is specified, motion will not be output even if "Enable Animation" is checked.
  - **Scale:** Specifies the type of scaled motion.
  - **Rotate:** Specifies the type of rotation motion.
  - **Trans:** Specifies the type of translation motion.
  - **End Behavior:** Specifies action after final frame.
  - **Speed:** Specifies the speed at which motion is played back. Default is 1.0.
  - **Keyframe To Axes(RPY) MIME:** Converts bone keyframe values to Joint MIME.
  - **Apply To All Bones:** Copies Motion, Scale, Trans, End Behavior, Speed, Keyframe To Axes MIME settings from the current bone to all bones in the current object.
  - **Sharing Method:** Specifies the basis for establishing bone priority when the Limited Regions of bones in a parent-child relationship contain the same vertex.  
Default is "Prior To Distance" (Priority based on distance from bone).
  - **Motion Switch:** Settings for adding motion sequences to specified object.
- **Surface settings**

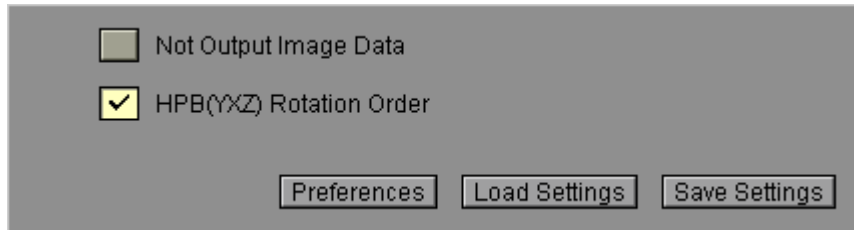


- **Surface Name:** A list of surfaces to be output. Changing a surface in a pop-up window will cause the associated parameters below to change. Use the left-arrow and right-arrow keys on the keyboard to scroll the list.
- **Color:** Displays the Surface Color of the current surface. This color is output as the RGB color for the polygon.
- **Shading Method:** Specifies the shading type. If Smoothing is specified in LightWave's Surface panel, the default value will be Gouraud Shading.
- **Light Calculation:** Specify "Enable Light Calculations" or "Disable Light Calculations".
- **Double Sided(BOT):** Specifies double-sided polygons. (for LIB4.2 and later)
- **Transparency(STP):** Specifies semitransparent polygons.
- **Fog(FOG):** Specifies the presence / absence of fog.
- **Divide:** Enables the polygon division function.
  - **2x2,4x4,8x8,16x16,32x32:** Polygon division level
  - **Static:** Fixed division (DIV)
  - **Active:** Automatic division (ADV)
- **Texture settings**



- **Texture:** Displays the TIM image data used by the current surface.
- **Transparency(ABR):** Specifies the transparency ratio for textured polygons.
- **Enable Tile Mapping:** Specifies whether or not to use tiled textures.

- **Other settings**



- **Not Output Image Data:**  
Selects whether or not to output TIM image data used in a scene as HMD data. If this flag is set, only the UV data from the texture will be output for the polygon.
- **HPB (YXZ) Rotation Order:** Outputs rotation information in the LightWave 3D rotation Y->X->Z sequence.
- **Preferences:** Sets the initial setting parameters.
- **Save Settings:** Saves current parameters to file.
- **Load Settings:** Loads a setting file and sets the settings as the current parameters. If no match is found with the scene file specified in the settings file, only the corresponding items can be called unconditionally.
- **Sort Objects by Hierarchy:** Outputs objects in the hierarchical structure displayed in the LightWave layout "Scene Editor". Changes made to these settings will be reflected the next time the plug-in is activated.
- **Skip Null Objects of IK Goal:** The null object used as the inverse kinematics goal is automatically skipped. The setting changes will be reflected the next time the plug-in is activated.

## Notes

- **Saving object files:** When this plug-in is launched, polygon and surface data are obtained directly from the LWOB file rather than from Layout. Data can become out-of-sync if the plug-in is launched right after a surface is changed from the Layout Surface panel. Before using this plug-in, always click "Save All Objects" from the Objects panel so that Layout surface and object file data are in sync. The same applies when using "Import" and "Export" from the Modeler and Layout.
- **Frame range settings:** The current version does not allow animation frame ranges to be restricted. For example, using a 100-frame animation, if First Frame is limited to 20 and Last Frame is limited to 80, animation or AXES MIME will not be properly created.
- **Range of influence of bones:** If "Limited Region" is not specified for a bone, the bone will be considered as a point (the starting point) for purposes of determining its range of influence over vertices. Depending on how the bone settings are made, the vertices that make up a polygon may be influenced by a bone that is not continuous (for example, the right leg and the left leg). In such cases, use "Limited Region" to avoid this problem.
- **Multi-layered textures not allowed:** This plug-in does not contain support for LightWave's multi-layered texture settings. Please specify only one texture for "Surface Color".
- **Keyframe interpolation:** When outputting motion rotation information without using "HPB (YXZ) Rotation Order", LightWave's H->P->B rotation priority is converted to the Z->Y->X

priority used by the PS. When output for keyframes, the displacement for each rotation component may not match up with the position of the keyframe. If this occurs, set the "HPB (YXZ) Rotation Order" flag to "On" and output using the Y->X->Z rotation sequence.

- **TIM file search order for RSD loading:** When the RSD files and LWOB files in the layout are replaced using the RSD load function, the TIM files referenced as the texture in the RSD file are searched for in the following order:
  - Searches for the TIM image with the same name, that already is loaded into the layout.
  - Searches the same directory as that of the specified RSD file.
  - Searches for the same-level "TIM" directory if the name of the directory containing the specified RSD file is "RSD."

## Troubleshooting

- **Abnormal termination during conversion:**  
The AnimationSaver plug-in won't work because a temporary file cannot be properly created. For LightWave5.0, the temporary file is created in the "Content Directory." For LightWave5.5, the temporary file is created in the directory specified by TempDirectory in NewTek\Programs\LW.CFG. Please check to make sure these directories are writeable.
- **The motion switch's 2nd-page SID slider does not work with the mouse:**  
LightWave 3D's panel display problem prevents the mouse-driven operation of the motion switch's 2nd-page SID slider. Keyboard input is possible, so enter the 2nd-page SID via the keyboard.  
\* This problem will be solved if you use the 5.5DJ patch available on the Internet.
- **After the message dialog is displayed in the MacOS version, the "Options Panel" is displayed on top:**  
As a result of LightWave's panel service problem, the following symptom appears: After the 3rd-displayed panel (e.g., message dialog) closes, the "Options Panel" is displayed on top. In this case, double-click the mouse 2 or 3 times consecutively in the upper frame area of the Animation Saver plug-in. This restores the original display.

## Obtaining an update

The Animation Saver for PlayStation can be downloaded or updated via Sony Computer Entertainment's WWW site for PlayStation software development support.

## Revision history

[Animation Saver History](#)

## Contacting us

Contact us via e-mail regarding plug-in related suggestions, bug information, requests, etc.

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