



Life Forms & LightWave

Animating Puppet sections in Life Forms

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Background

Life Forms studio 3 imports and exports LightWave scene files (.lws). The ability to import LWS files means that you can import any segmented geometry such as Puppet Master (PM) sections into Life Forms.

This document shows you how to set up your PM sections to take advantage of Life Forms' fast and simple keyframing and mocap editing features.

What you need

You will need:

- **LightWave 3D 5.5 or later**
- **Puppet Master**
- **Life Forms Studio 3**

Tutorial: Animating Puppet Sections

The objective of this tutorial is to help you understand how to use Life Forms to apply motion to Puppet Master section.

There is some set-up time involved that cannot be avoided. But, you only do it once. You'll can then add motion to the model quickly by:

- Apply motion capture data
- Apply predefined animations that come with Life Forms Studio 3 to your character. The Animation Gallery and PowerMoves Library contains a very large selection of keyframed motion and motion captured animations.**
- Using Smart Paste functions to loop and recombine your keyframed sequences

** Some limitations apply when pasting motion between models. Please see Caveats.

When you build character models from scratch we recommend that you build your model arms down to the side. The range of motion for the arms can still be good if you carefully define and set pivot points for the Shoulder or collar sections. When the arms are built down to the side, you will be able to apply a large number of predefined keyframed and mocap sequences to your model very quickly.



Take a look at **Nemesis.mov** created by Tony Olivera at Nemesis Productions. This movie can be seen in Credo's website:



Nemesis.mov

The tutorial is broken into these parts:

- Preparing Lightwave Characters**
- Pasting Animation**
- Mapping the motion**
- Exporting Animation**
- Importing Animation**

Part1: Preparing LightWave Characters

1 Modelling

Before you start modelling a character for use in Life Forms, it is very important to know that Life Forms prefers the figure to be modelled facing the -Z. Aside from this one important difference when modelling, set up your PM sections as usual in Lightwave.

Model your Character facing -Z.

2 Setting up PM sections in Puppet Master

Be careful to parent and set pivot points for each section correctly. Generally, the pelvis or waist should be at the top of the parenting hierarchy. If you are not familiar with Puppet Master, see Related Resources for tutorials on Puppet Master.

It's very important to get the pivot points and parenting right.

Sample Files: **X_pm.lws** contains correctly setup PM sections.

3 Be especially careful when defining the Shoulder section

When building custom model with arms down to the side, you need to define the Shoulder sections correctly.

When the model's rest position is arms down, the shoulder section needs to be defined properly.

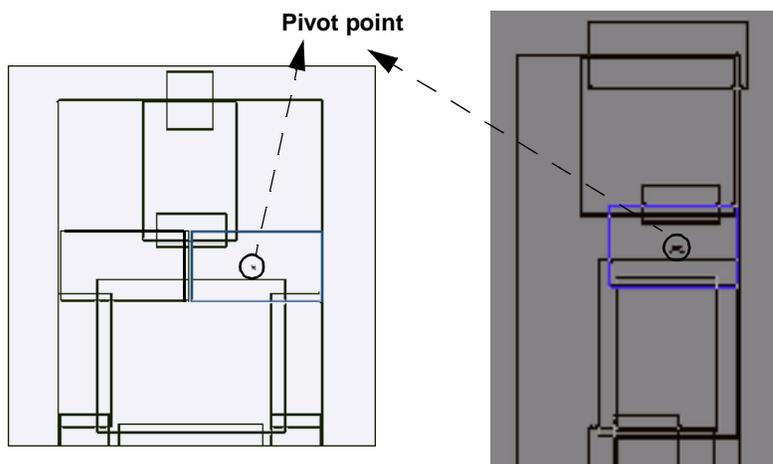
For animating in Life Forms, the optimal set up is to define the Puppet Master shoulder (or collar) section to include the top of the upper arm down to the armpit, or straight up and around if your modelling in T form.



4 Setting the Pivot point for the Shoulder section

You can get a good effect by positioning the pivot point for the Shoulder section at the centre of the geometry. It's easier to do this in bounding box mode. You should carefully examine the animation of the Shoulder joint in Life Forms. If you see a problem, you may have to readjust the pivot point accordingly.

It may take a few tries to set the pivot point correctly for the Shoulder sections.



Shown in bounding box mode, these are Shoulder Sections for building meshes with arms down. Note the position of the pivot point.

5 Clear the metamation target object

Load your metamation target object and check that the joints bend properly. If all seems fine, clear the metamation target object and Puppet Master anchor from the scene, leaving behind the PM sections only.

6 Save at least two copies of the scene

Finally, make sure this Lightwave scene has no keyframes in it (first frame=0, last frame=0) before you save it.

It is a good idea to make an identical scene with a different name, which you can overwrite as you put your scene together. This way, you will always have the original scene for your next animation section.



Part2: Pasting Animation

1 Open the scene file

Start up Life Forms. Choose **File menu > Open**. In the File types menu of the Open dialog box, choose the LightWave.lws format. Open the scene that you just saved in Lightwave.

At this point, Life Forms may ask you to direct it to the folder which contains the Puppet limbs for your character. Find the folder and click OK. The character pieces should load very quickly if you turned **OFF** the Puppet anchor or Metaform target in the scene.

2 Open a mocap animation

Choose **File menu > Open**. In the Open dialog box and browse to *Life Forms Demo CD/ Animations Gallery / New Motion Capture /...* Select any animation file and click Open.

When you are asked whether you want to close the previous animation or not, select **NO**.

3 Copy animation

You should now see two Timeline windows. The first should be **Untitled** and the other is for **mocap sequence**. The Untitled Timeline window is the timeline of your character. Go to the timeline for the motion capture sequence and select the first SHIFT key down and scroll to the last frame that you want to copy. Now choose **Edit menu > Copy**.

4 Paste the animation to the model.

You can now close all the windows related to the Walk3-1.lfa just to free up some space. Click in the first frame of the **Untitled** timeline (the one with your character) and choose **Edit menu > Paste**. This will immediately open the Joint Map editor.

Part3: Mapping the motion

Mapping motion from the BioVision skeleton to the PM sections involves matching the source and destination joints. This tells Life Form how you want to apply motion from the mocap sequence to your model.

The Joint Map editor allows you to match the joints of the BioVision skeleton with the PM sections by clicking on a joint on the BioVision skeleton and then clicking the a corresponding Puppet Master sections. Repeat this until all joints have been mapped.

This would be a very good time to save your Life Forms animation!

Part4: Exporting Animation

1 Export a LightWave scene file.

Make sure that the animation file containing your character is active. Then, choose **File menu > Export**. In the Export Format list, select **LightWave**.

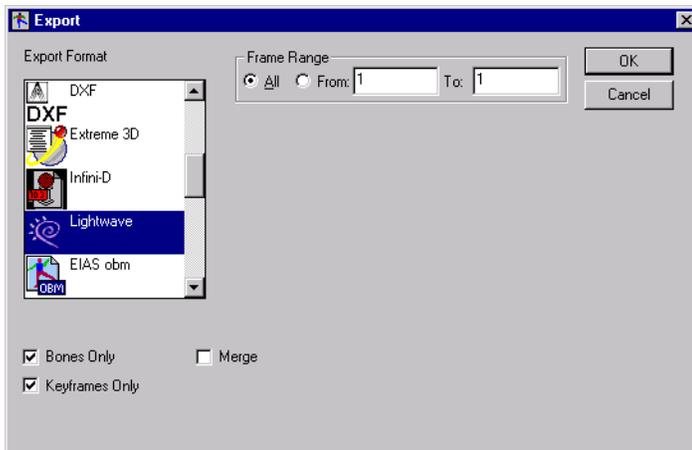


- **Clear** the Bones Only option.
- **Check** the **Merge** option
- Do **not** check **Keyframes Only**.

When Life Forms exports motion it keyframes every frame of the animation - hence if the frame rate is 30f/s it will create 30 keyframes for each second of animation. This ensures that LightWave has enough data to interpolate the motion correctly.

To make it easier to edit the animation in LightWave, you may want to export **Keyframes Only**. For some motions, however, you may find that the motion has *discontinuities* in the motion - a sudden break or jerk in the animation caused by the joint moving from one position to the next using an alternate route that does not make sense for that animation. Another way to reduce the number of keyframes generated (without reducing the frame rate) is to Thin the keyframes. See “[Thinning Mocap](#)” on page 7.

Exporting all frames as keyframes ensures that the motion data is correctly interpolated in LightWave. To reduce the number of keyframes you can try exporting Keyframes Only, or thinning keyframes before export.



Export dialog box

- 2 Merge the animation of your character to the scene file it came from**
In the Export dialog box, click **Choose** to open the Merge dialog box. Select the Lightwave scene that you saved earlier. This will be the file that Life Forms is going to merge animation to. Click **Open** to merge the file and click **OK** to close the export window. Now a Save dialog box will ask you to rename and save the Merged Scene file. Do so and click OK.
- 3 Overwrite the scene file**
You will be asked if you want to overwrite the file. Select **YES** and Life Forms will take a few seconds to merge the files.

Part4: Importing Animation

1 Import motion

In Lightwave, load the file you just saved. Go to the Objects panel and load the:



- anchor object, and
- metamation target object.

2 Reassign the anchor object

Reassign the Anchor object as PUPPET_ANCHOR and reassign the Metamation plug-ins. Dissolve your anchor 100% along with your PM sections and you should see your Puppet Master character moving as he did on the Life Forms Stage!

Note: Parented objects may appear in weird places

If you have any parented objects, (such as a head object in our case) that were brought into the scene after exporting from Life Forms, those objects appear to be offset from their position as you scrub through the frames. Don't panic. If you are a frequent user of Puppet Master, you will realize that Lightwave 3D does not update correctly for Puppet Master in Layout when Puppet Section Object is not selected while scrubbing.

End Comments from the Author

After you have gone through this cycle once, you will find Life Forms a huge time saver for generating complex movements for your characters, whether that motion was keyframed or taken from existing motion files, or created by combining both techniques in the same animation. We hope that this tutorial was enough to get you familiar with the use of Life Forms as it relates Puppet Master, and feel free to email us with any questions, or corrections relating to this tutorial. Have fun!

Thinning Mocap

If you are using motion capture, you should consider *thinning the keyframes* in Life Forms before exporting the animation to LightWave. With fewer keyframes the scene file becomes smaller, and you will be easier to add secondary motion to the animation in LightWave.

1 Select the range frames you want to thin.

Hold down the SHIFT key while you click on the first frame in the range. Scroll to the last frame in the range and click on it. The range of frames you selected should now be enclosed.

2 Open the Thin Keyframes dialog box

Choose **Edit menu > Thin Keyframes**. You can thin some motion sequences more severely than others. For a simple motion sequence you may choose to keep as few as 1 keyframe every 5 frames. You'll have to experiment to determine the ideal ratio.

3 Experiment to determine the ideal ratio

Click Play in the Control Panel and examine the quality of the animation. Click **Edit menu > Undo** if you are not satisfied with the result.



Related Resources

A Free tutorial is available at: <http://www.tv3d.com/Articles.html>

Notes about Puppet Master at: <http://www.lightwavelab.com/puppetmaster.htm>

Caveats

In this tutorial we strongly suggested that you build your models arms down to either side of the body. If your custom model are not built this way but instead have their arms out-stretched to either side of the body, Life Forms may not be able to paste arm motion correctly. We are working on a significant improvements to the Joint Map editor which will solve this problem.

Acknowledgements

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- Ed Konyha at Brainchild studios for the bulk of what you've read.
- Tony at Nemesis Productions sample models and many refinements to this document.

If you have suggestions or corrections to make please email us at info@credo-interactive.com.