MadED Manual
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[Last updated: 25th March 2007 for v1.0.1]

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1. Introduction

MAD animation files in Homeworld2 consist of a single, giant, long series of keyframes, and animations are defined according to their timelines. So a single MAD file may contain animation, for example, of a ship deploying it's weapons, and then taking them back in, or the docking bay of a ship opening and then closing, as a complete animation in the MAD, but different parts are limited as animations, by defining the animation's start and end time (you can also give loop start and loop end timings, for things like resource collectors). So if we consider the Hiigaran Mothership, the single, complete animation in the MAD (not in a 'animation marker') is of the door opening, closing and more animations for SP missions. Their specific parts are defined as animations, not the keyframes. In short: Animations are defined by their start\end times, not keyframes. Keyframe are global to the animation, and start\end times are local to an animation. Thus, if we want to implement the Bentusi Super Acolyte, we will have to first make the keyframes for it to open, then the keyframes to close, and then create animations, which tell that open animation is defined from this time to that time and so for the close animation. Getting what I try to mean? It's crucial to understand this aspect of MAD file animations; otherwise you may have some trouble working on them. It's quite possible that one animation overlaps other; it really shouldn't be a problem. Just make sure that all the animations don't have a negative starting time that could cause some problems, also a frame-rate of 24 or 30 is recommended for animations.

Animations work on the basis of joints, not objects (like in Homeworld and Homeworld Cataclysm), nor individual vertices. So, any geometry objects (meshes), parented under a joint will move when the joint itself moves\rotates. Thus, you can't individually control them, but you control them through joints. We animate joints in MAD animations, not meshes.

Now, each animation is defined by what is called, an 'animation channel'. These animation channels handle only one type of animation, throughout their lifetime. For Example, an animation channel which controls X Position (called as X Translation, or 'translateX') cannot affect rotation in X-axis or any other axis; neither it can affect position of the joint being controlled in Y-axis or Z-axis. These animation channels exist throughout the lifetime whenever the animation is being used. So for an animation of 6

seconds, if you define the animation channel for 1-5 seconds, at the 0th second, it's effect will be the same as it's effect at 1st second, but from 0-1 second, it will not animate for that channel (**Note**: No in-depth analysis has been made till the time of writing of this document. While what has been said should be true, again, it's always better to be on the safe side, read on to know how…). But still, you should have a keyframe for the channel in question, at every point where other channels have, including the starting and ending times, to be on the safer side.

Summarizing the above points
- Animations are done by joints, not 'objects'
- Individual animations have start\end times, not keyframes
- All channels have keyframes in them, and these channels (Usually 6 or 7) work together to produce an animation.

That's the basic concept behind animation in HW2. Actual usage varies a bit. Animations have joints defined in them, which are affected, and joints, in turn have animation channels defined in them (not exactly, but they have 'indices' to the animation channels which will be played when that joint (in turn, the animation) is animated. So, if we have an animation called "Open", which animates the joint "Door", and this joint "Door" moves only in X axis (during the animation), then the joint's only animation channel will be "Door_translateX" (i.e. in the form <Joint Name>_<Channel Name>. If the same object rotated in the Y-axis simultaneously, then the joint defined in the animation would have a second channel, which would be "Door_rotateY". In other words, animation reference joints, joints have a limited number of channels, which they will animate, and these channels in joints will point to an animation channel.

Following are different possible channel names:
- translateX – Controls the X position of the joint.
- translateY – Controls the Y position of the joint.
- translateZ – Controls the Z position of the joint.
- rotateX – Controls the X rotation of the joint.
- rotateY – Controls the Y rotation of the joint.
- rotateZ – Controls the Z rotation of the joint.
- visibility – Maya specific parameter. Leave this to 1, always.

That sums up to seven channels per joint. Usually you only keep those channels, which are used. Rarely will you need all the channels working. All this information is enough for making animations work without using Maya.

2. Creating MAD files

a. 'General Info' section
General info section mainly tells about the statistics of the animation, i.e. number of joint maps, number of joint indices, number of animation markers, number of animation channels (animation curves), etc. It allows you to edit general info like "name" of the MAD file (this looks like it is ignored by HW2), it's version (don't play with this), and it's frame per second (FPS at which animation is played). Following is the interface:
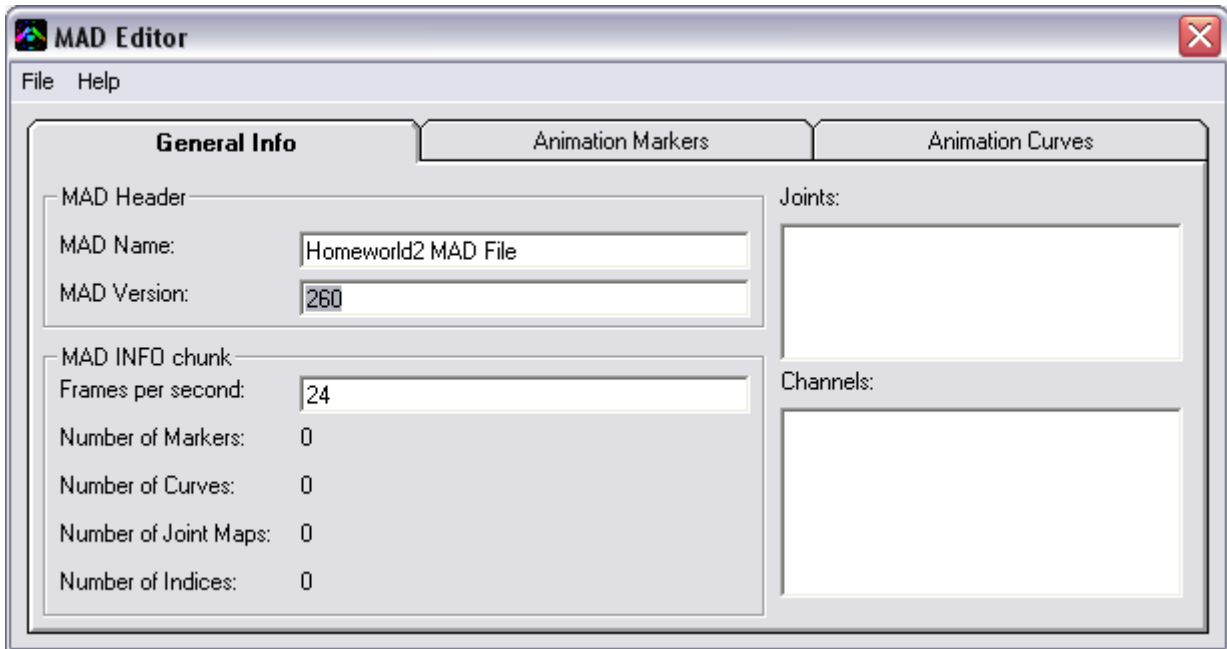
MAD Name: Name (this is actually type) of the file, which is written in the MAD file.

MAD Version: Version of this MAD file

Frames per second: FPS of the MAD animation. Usually 24 or 30.

Number of Markers: Number of 'animation markers' defined.

Number of Curves: Number of 'animation curves' (i.e. animation channels defined)

Number of Joint Maps: Number of joints, of all animations defined (this includes same joints, but under different animations).

Number of Indices: Number of animation channels (animation curves) referenced by all the joints, in all animation markers.

Joints: Lists all the joints that have been defined.

Channels: Lists all the animation curves (Animation channels) defined.

b. 'Animation Markers' section

Animation Markers are the animations themselves. They are called so because in Maya, to define the start and end points of an animation, a special type of marker was placed. Its keyframes would indicate which is the starting point of the animation, and which is the ending point. Its (the marker's) name would be the name for the animation. Following is the interface to edit animation markers:
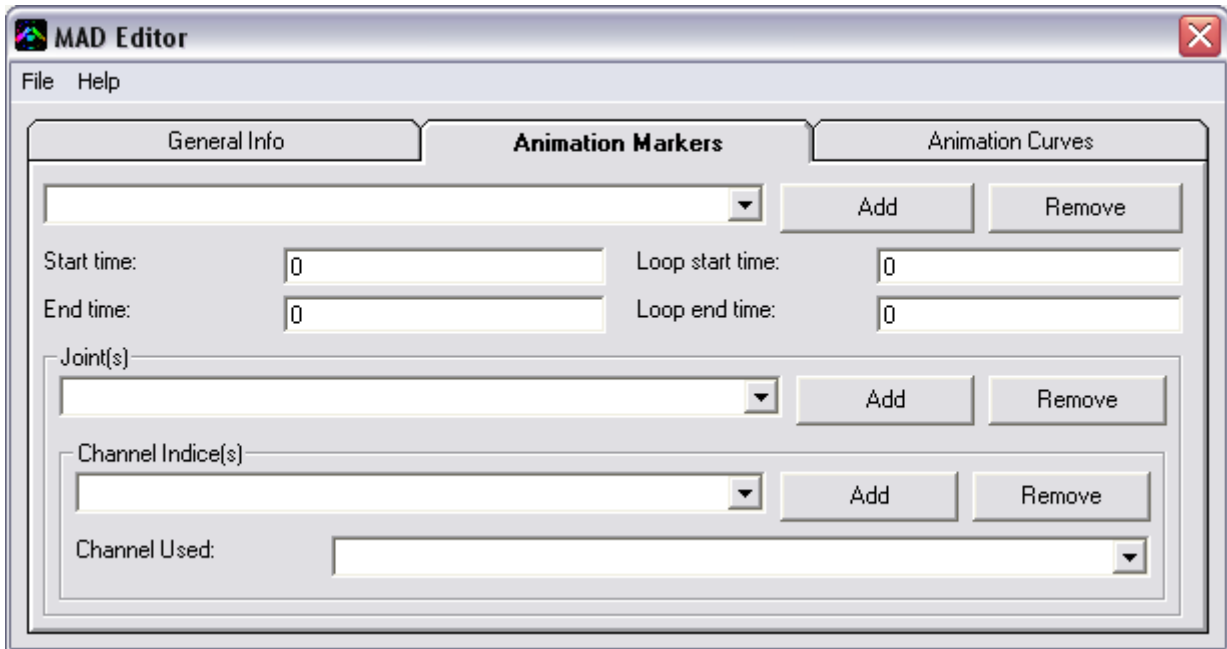
Add: Adds a new animation marker (i.e. an animation)
Remove: Removes the selected animation marker.

Start time: Start time for the animation.
End Time: End time for the animation.
Loop start time: Loop start time for the animation.
Loop End time: Loop end time for the animation.

Joints section:
Add: Adds a new joint for the selected animation.
Remove: Removes the selected joint's reference from the selected animation.

Channel indices section:
**Add:** Adds reference to a channel indice.
Remove: Removes the reference from the selected joint.
Channel used: The animation channel (animation curve) used at this indice of the selected joint for the specified animation.

To rename any object, select it (like a joint or animation marker) and simply press F2. It will ask you, what name you want to assign. This will rename *all* instances. You can use this to your advantage.
c. 'Animation Curves' section.
Animation curves are also called as animation channels and they are the heat of animations. Following is the interface to edit them:
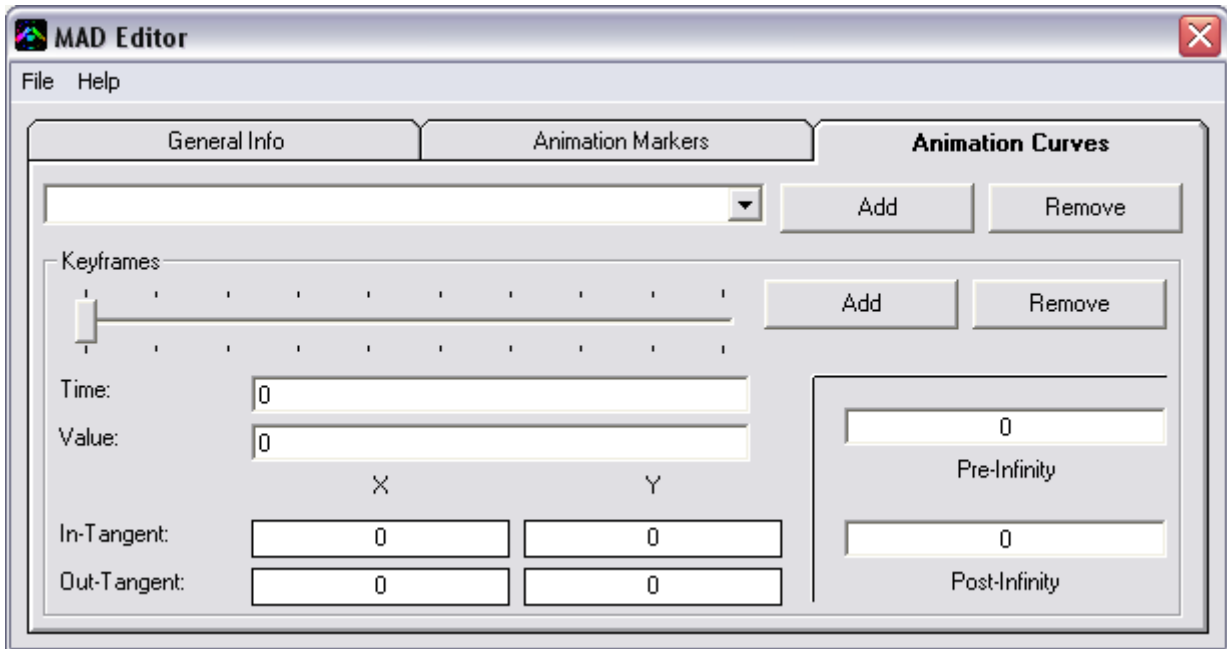
Add: Adds a new animation curve (animation channel).
Remove: Removes the selected animation curve.

Keyframes section:
Add: Adds a new keyframe.
Remove: Removes the selected frame.

Pre-Infinity: How the value is interpreted before the very first keyframe (the first keyframe need not be at the very first frame). For all possible values, look at the table below.

Post-Infinity: How the value is interpreted after the last keyframe. For all possible values, look at the table below.

Value	Effect
0	**Constant**. Usually this is what you should use.
1	**Linear**
2	**Cycle**
3	**Cycle (relative)**
4	**Oscillate**

The following are automatically calculated by MadED (whenever time and\or value is\are changed), though you may change them, if you know what you are doing.

In Tangent (**X** and **Y**)**:** Probably related to the 'continuity' of values, from this to next keyframe. You may change this if you know what effect changing it will produce.

Out Tangent (**X** and **Y**)**:** Probably related to the 'continuity' of values, from this to next keyframe. You may change this if you know what effect changing it will produce.

To rename any animation curve (animation channel), select it and simply press F2. It will ask you, what name you want to assign. This will rename *all* instances. You can use this to your advantage.

3. <u>Miscellaneous Information</u>

Incase of any feature requests, questions, bugs, errors, either post at the Relic forums (Tanis Shipyards), or e-mail me at 4E534B@gmail.com

You may use source code of MadED to derive Homeworld2 MAD file editing programs, and mentioning my name is not necessary.

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