

SONY®

AIBO Motion Editor

User's Manual and Reference



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Chapter 1 - Introduction

1.1 Overview

AIBO Motion Editor (MEdit) is a tool that allows you to create new motions for AIBO ERS-7. It contains a pose editor and a keyframe editor, as well as a realistic 3D virtual AIBO. By manipulating the poses and attaching these poses together, you can create motions for AIBO to play back.

1.2 Important Information

The following two rules are very important. Please keep these rules in mind as you create motions with MEdit.

(1) Please ensure that you follow these important rules located at the AIBO SDE website: http://openr.aibo.com/openr/eng/no_perm/notice.php4

(2) Additionally, please ensure that you “check” your motions before using your motions on AIBO. You can read more about the “check” function in the Tutorial “Creating a Simple Animation”.

(3) (Only for R-CODE SDK and AIBO Remote Framework) Please ensure that all of your motions begin and end with the same posture. (e.g. a motion that begins with ‘sit’ should end with ‘sit’). The reason for this is that if your customized motions represent a transition movement (e.g. stand-to-sit), AIBO’s motion network may inadvertently choose your custom motion for its normal functioning. If your custom motion is a dance, it would be very strange to see AIBO dancing when it is trying to sit down!

1.3 Installation

1.3.1 System Requirements

PC requirements:

OS : Windows 2000 Professional/XP

CPU : at least 600Mhz Pentium III Processor (or similar)

Memory : at least 128MB

Hard Disk : at least 50MB free space

Graphics : at least 16MB VRAM 3D graphics card

MEdit will not work with some graphics cards due to compatibility.

Sound : DirectSound compatible

AIBO requirements:

To create motions with AIBO Motion Editor, an actual AIBO ERS-7 isn't needed. But, an AIBO ERS-7 is needed to play back motions created with AIBO Motion Editor.

1.3.2 Installing MEdit

There is no installation program for MEdit. MEdit is shipped as three separate packages: the MEdit main program archive (MEdit_ver1.zip), the sample contents archive (sample_contents_ver1.zip), and this PDF document (MEdit_Manual_ver1.pdf).

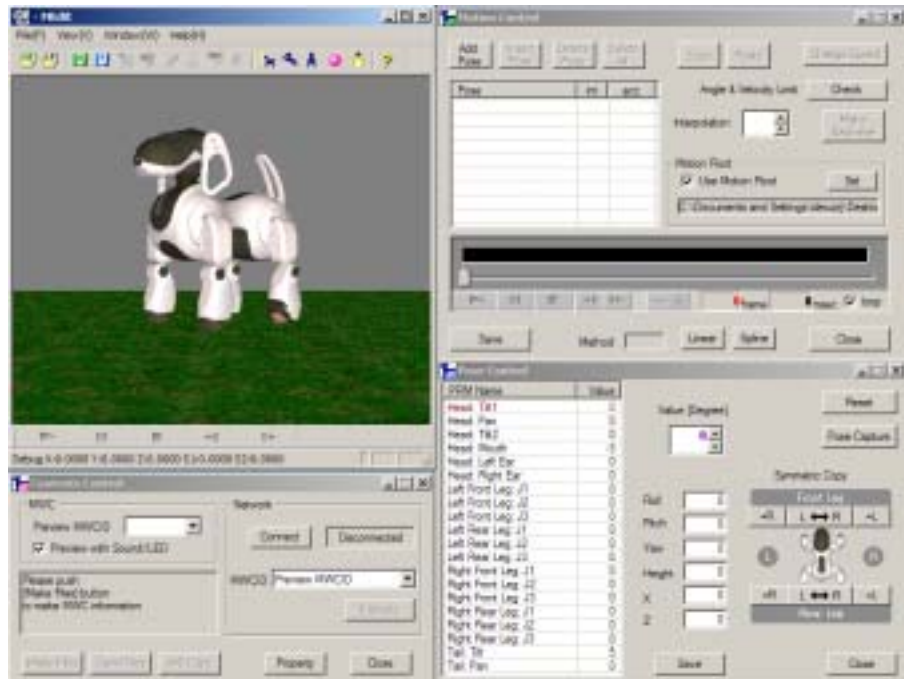
Simply unzip MEdit_ver1.zip into a directory on your computer; you can choose any directory you like, as long as you remember where you put it. Similarly, unzip the sample_contents_ver1.zip file into a directory of your choosing.

1.3.3 Running MEdit

To execute MEdit, simply run the MEdit.exe program located in the directory where you unzipped the MEdit_ver1.zip file archive. If you like, you may create a shortcut to this file on your desktop for easy access in the future.

Chapter 2 – A Tour of the User Interface

The MEdit user interface is divided into four windows, as shown below.



These windows consist of,

- Main Window – The 3D view of AIBO
- Contents Control – Interactive testing; currently unused
- Motion Control – Allows you to manipulate keyframes
- Pose Control – Allows you to manipulate individual poses

By default, these four windows will move together if you click-and-drag the Main Window. You can move the other windows independently of the Main Window, but once you move the Main Window again, they will snap back to the four-paned configuration. If you do not like this behavior, you can separate each window by selecting the “Move Windows Together” function under the Window(W) menu. This is a toggle; selecting it again will revert to the default behavior.

Let’s take a look at each window individually.

2.1 Main Window

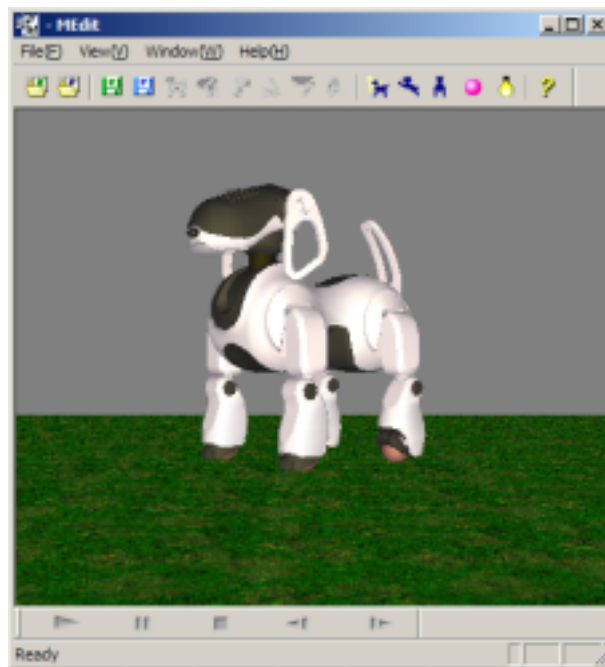


Figure 2 – Main Window

The main window consists mainly of a 3D model of AIBO. You can rotate the camera's position around AIBO by left-clicking anywhere on the scene and dragging the mouse. When you drag the mouse, the camera swivels around AIBO. When you are happy with the placement of the camera, just let go of the mouse button.

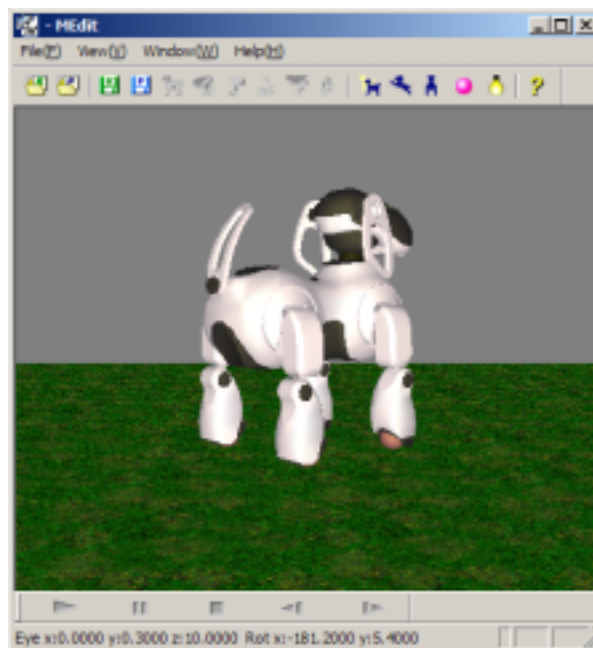




Figure 3 – Camera in a different location

You can zoom in and out by holding down the Ctrl key while dragging. If you move the mouse forward and backward, the camera will also move forward or backward. Moving the mouse left and right while holding the Ctrl button will pan the camera left and right.

While you are moving and rotating the camera around, you may get ‘lost’ or in a strange orientation. To put the camera back where it started, just select the “Go to Home Position” icon in the taskbar, represented by . This will snap the camera back to its original position.

If you are working with an animation that demands that many parts be in sync (e.g. a walking motion), it might be helpful to see the front and back views simultaneously. This avoids the need to have to constantly swivel the camera back and forth. To see this view, click on the “View Twin AIBO” button: 

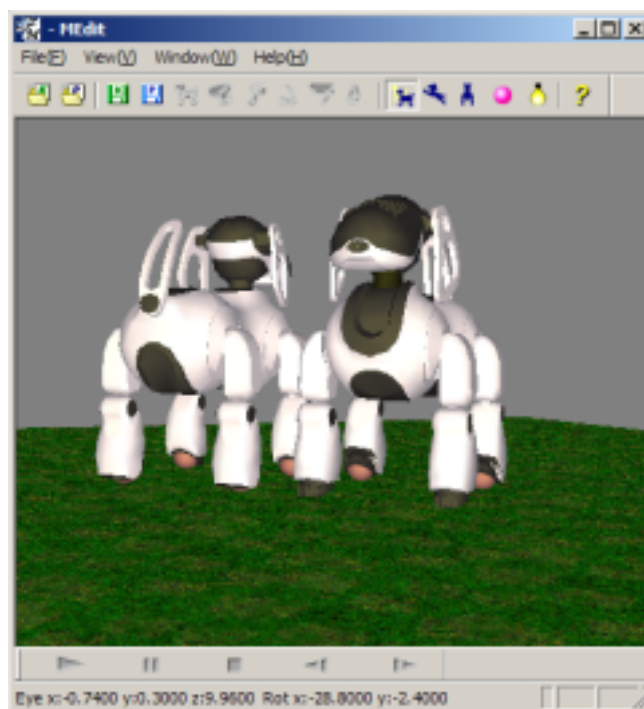


Figure 4 – Twin AIBOs

Whatever you do to AIBO’s pose will be simultaneously done to AIBO’s twin. This allows you to see “both sides” of AIBO at the same time.

If you find that you do not need sophisticated 3D lighting for AIBO, you can activate the Wireframe mode by selecting “View/Model/Wireframe” from the menu:

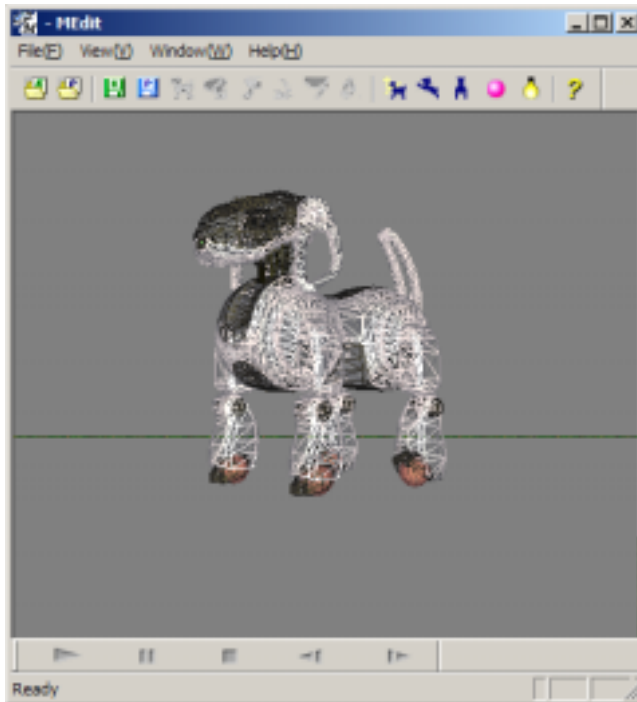


Figure 4 – Wireframe Mode

To revert back to shaded mode, select “View/Model/Shade” from the menu.

You can also change AIBO’s color to assist you. Sometimes, AIBO’s parts can appear to blend into each other, especially at a distance. You can choose different colors for AIBO by selecting an appropriate color from the “View/Color” menu. An especially useful color scheme is the “MEdit” color, which makes each part a separate color:

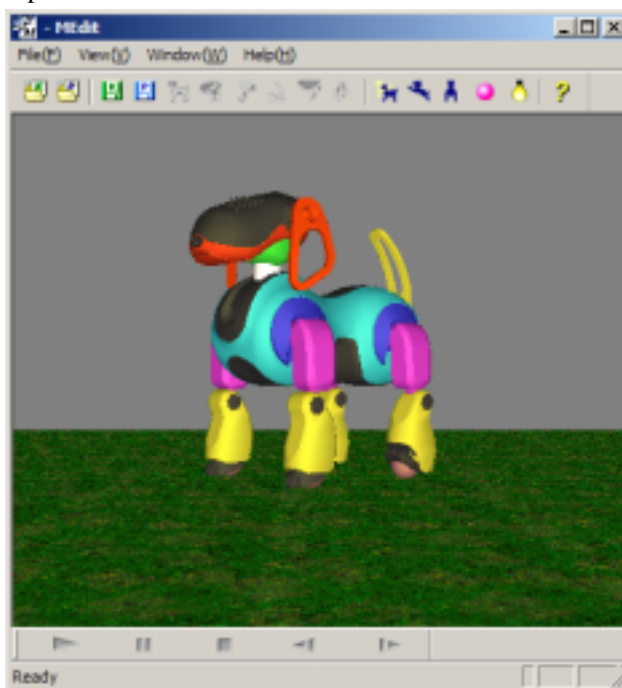


Figure 4 – MEdit Color Scheme

Note: The presence of certain color schemes in MEdit should not be construed as a plan to make new AIBO products with those colors – they are here only for animation assistance.

2.2 Contents Control

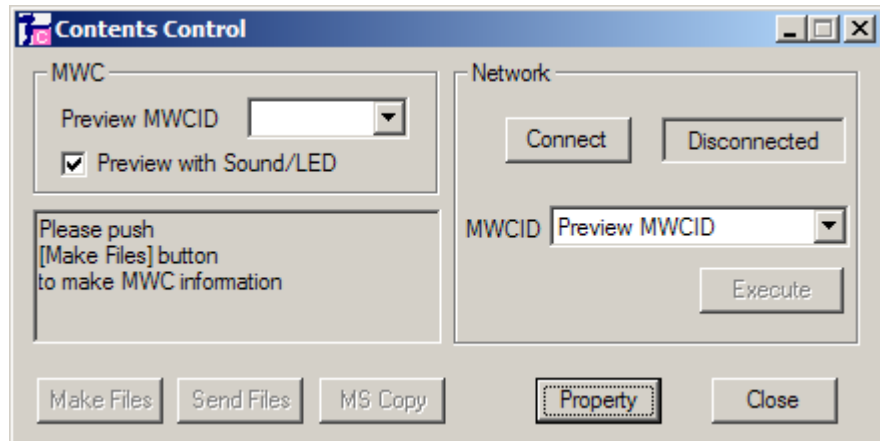


Figure 4 – Contents Control Dialog

The contents control dialog is normally used for interactive testing with an AIBO connected via Wireless LAN. Unfortunately, this function is not active in the current version of MEdit, so we will not cover it here. Please disregard this window in your daily use.

2.3 Motion Control

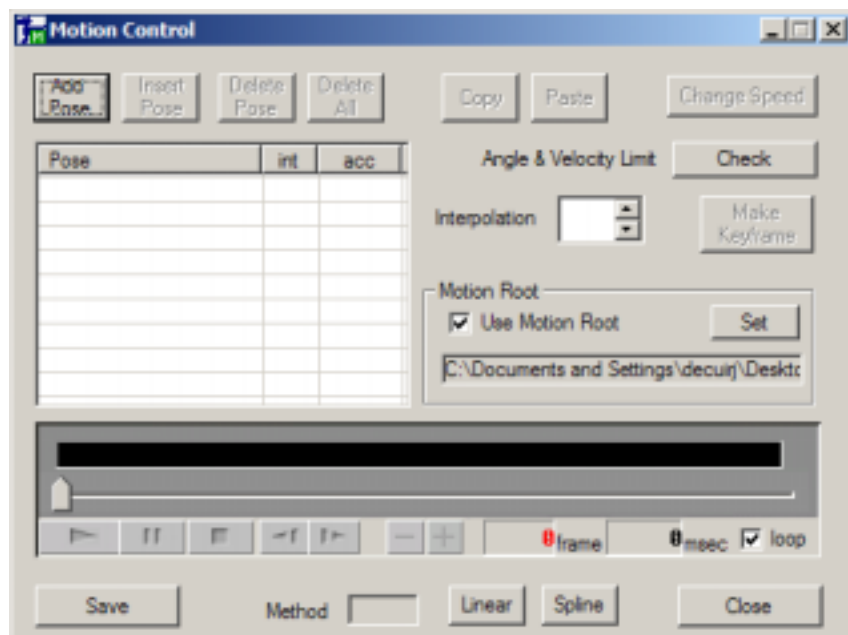


Figure 4 – Motion Control Dialog

This window allows you to control the flow of your animation, by managing

keyframes. Keyframes are important poses that dictate the structure of your animation. AIBO plays an animation by smoothly interpolating, or animating, from one keyframe to the next. By placing keyframes next to each other, you can create an interesting animation.

In this window, the Pose list contains a list of all the keyframes in your animation. You can add poses to your list by hitting the Add Pose button. You will then be asked to locate a file with the extension of .PSE. (These .PSE files are created in the Pose Control dialog, discussed below.)

The bar across the dialog box is a graphical representation of your animation. As you add keyframes, you will see breaks in the bar. Each break represents a keyframe. This gives you a visual thumbnail sketch of your animation.

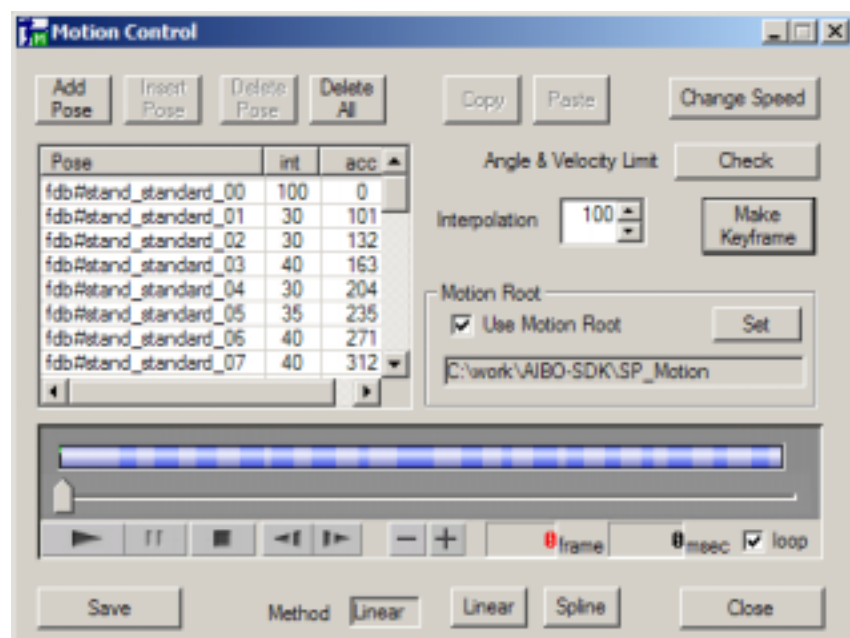


Figure 4 – Motion Control Dialog with animation loaded

The most important button on this dialog box is the Check button. It is vitally important that you use this button before finishing your animation. The purpose of this button is to check the safety of your animation. If you cause AIBO to play an animation that is too fast, you could cause damage to the robot. By getting in the habit of checking the safety of your animation frequently, you will avoid such trouble.

2.4 Pose Control

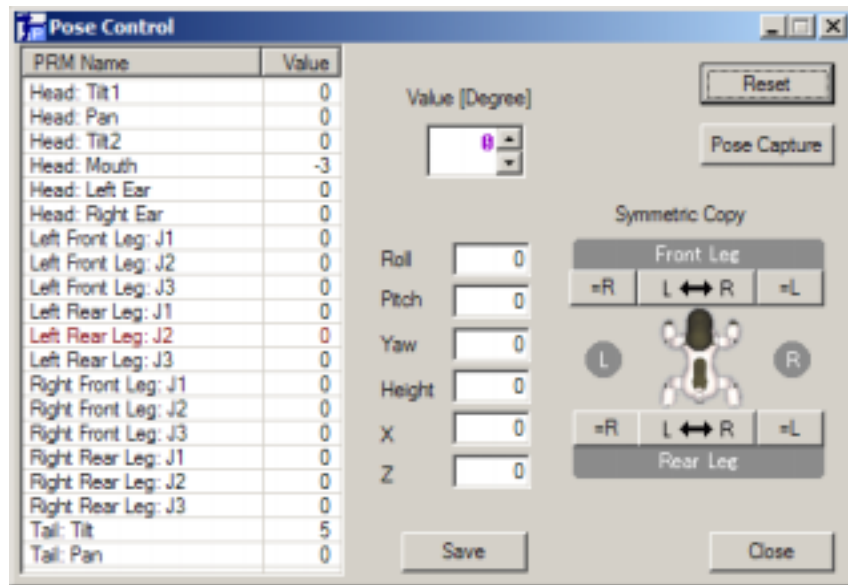


Figure 4 – Pose Control Dialog

The pose control dialog is where you manipulate AIBO's joints to create a new pose. These poses eventually will be added to your animation through the Motion Control dialog (discussed above).

There are two ways to change AIBO's pose:

1. Click on one of the items in the list, such as "Left Front Leg: J1". The part that you clicked on will become white in the 3D window. You can then enter in a new value in the "Value" field. When you press enter, the 3D model will reflect your change.
2. In the 3D window, right-click on one of AIBO's parts. The part that you clicked on becomes white, to signify that it is the part currently selected. Now, click-and-drag with the right mouse button to move the selected part.

Generally, clicking-and-dragging in the 3D window is a good way to get a rough estimate of your pose, while entering exact numbers in the Pose Control dialog is a good way to refine that estimate.

The Roll, Pitch, Yaw, Height, X, and Z fields represent global changes to the 3D AIBO model. It is useful if you need to tilt AIBO upside down. Please note that these changes do not affect the animation in any way – they are there just for your reference.

The Symmetric Copy buttons allow you to copy the poses on AIBO's left side of its body to the right side, and vice versa. This is useful if you are trying to make an

animation where both sides of the body should be in sync. The buttons on top represent the front two legs, while the buttons on bottom represent the back two legs. The =R button causes the pose on the right side of the body to be copied to the left side. The =L button does the opposite. The L \leftrightarrow R button will cause the two sides to trade positions.

Please disregard the Pose Capture button, as it is not functional in the free version of MEdit.

Chapter 3 – Tutorial: Creating a Simple Animation

Now that you've been given a basic tour of the user interface, let's try and make a simple animation.

In this animation, we will have AIBO's head nod down and up.

First, start MEdit (if you haven't done so already). The standard four-paned user interface will appear.

In the Motion Control dialog (the upper right corner dialog), set the Motion Root directory to point to your SP_Motion folder. In the same dialog, press the Add Pose button, to add a new pose to your animation. In this case, we will be starting with a standard pose – the SIT pose.

Open the OrgPse folder in your SP_Motion folder, and open the sit.pse file. You will see that the first pose, named "sit", has been added to your animation. We create new motions by stringing these poses, called keyframes, together.

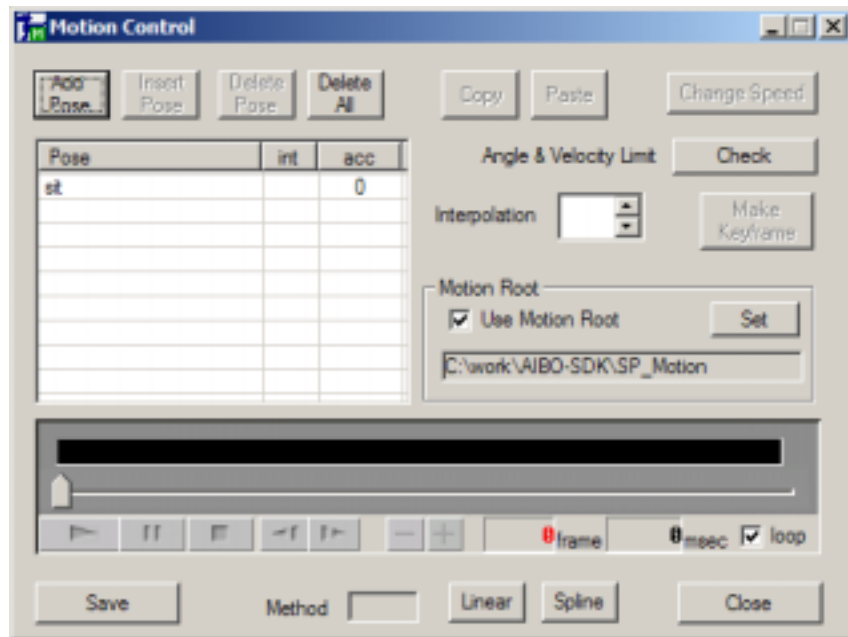


Figure 4 – One pose added

Next, we will be adding the end of our animation. In this case, we want the animation to end on the same pose as it started with. Go ahead and select Add Pose again. This time, the program will ask you how many frames you want interpolated. Enter “100” and press OK, and select the same sit.pse file that you opened before.

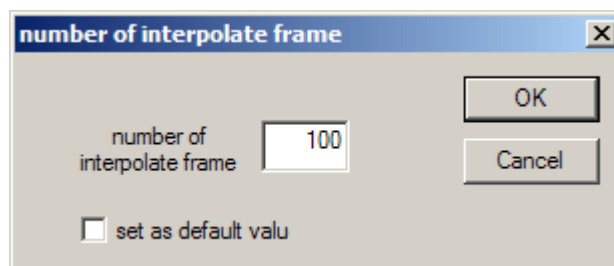


Figure 12 – Number of interpolated frames

Now your Motion Control dialog should reflect the fact that we have two keyframes in our animation.

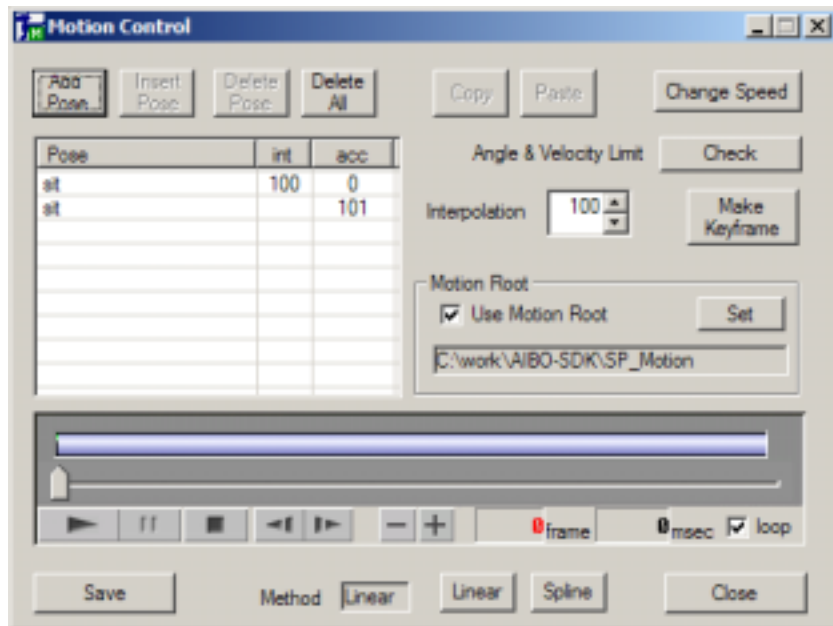


Figure 13 – Two poses added

Of course, this is not a very interesting animation, as it animates from one pose to the same pose! In fact, if you hit the Play button, you will see the timeline scroll from the left to the right, but nothing will change in the 3D window. Hit Stop to stop the animation.

To save our work so far, push the Save button. When prompted what to save the file as, navigate to the “Kfm” directory in your SP_Motion directory, and save the file as sit#sit_mysample1.kfm.

The KFM and MTN filenames generally should adhere to a format:

<start posture> # <end posture> _ <some appropriate name>

In our case, we signify that the animation starts and ends with “sit”, and we are calling it “mysample1”. This format convention is not strictly required, but it is recommended – once you have hundreds of animations on your hard drive, you will be thankful you have this extra element of organization!

Now we will create a new keyframe, which will cause our animation to, well, animate! In the Pose Control dialog (lower left corner), select Head: Tilt1. This represents one of the motors in the head assembly that controls one of the up-and-down tilt angles. In the Value field, change the value from -40 to -60, and hit Enter:

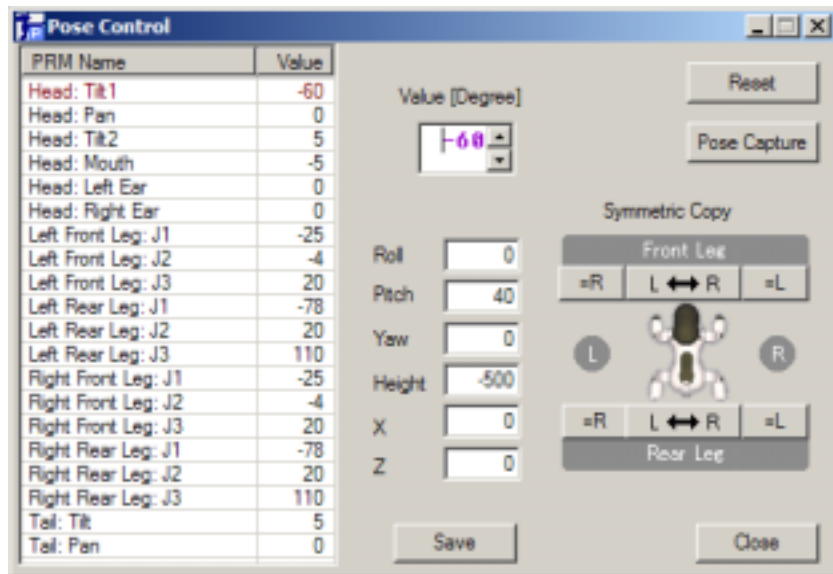


Figure 14 – Changing the head tilt

You will notice that AIBO's head tilts down a little bit in the 3D window as well.

Now that we're done changing our new pose, hit the Save button in the Pose Control dialog box. You should name this file sit#sit_mysample1_01.pse. This adheres to our file naming conventions above, with one addition – we add a number (in this case, '01') to signify that this is the first original keyframe that we made. Be sure to save this file in the Pse directory under your SP_Motion folder.

Now we can add this new pose to our animation. In the Motion Control dialog, select the ending pose (the 2nd 'sit' in the list). Press the Insert Pose button. This button allows you to insert a new keyframe immediately before the keyframe that you have selected. When prompted, enter 100 interpolated keyframes to insert. Your screen should look like this:

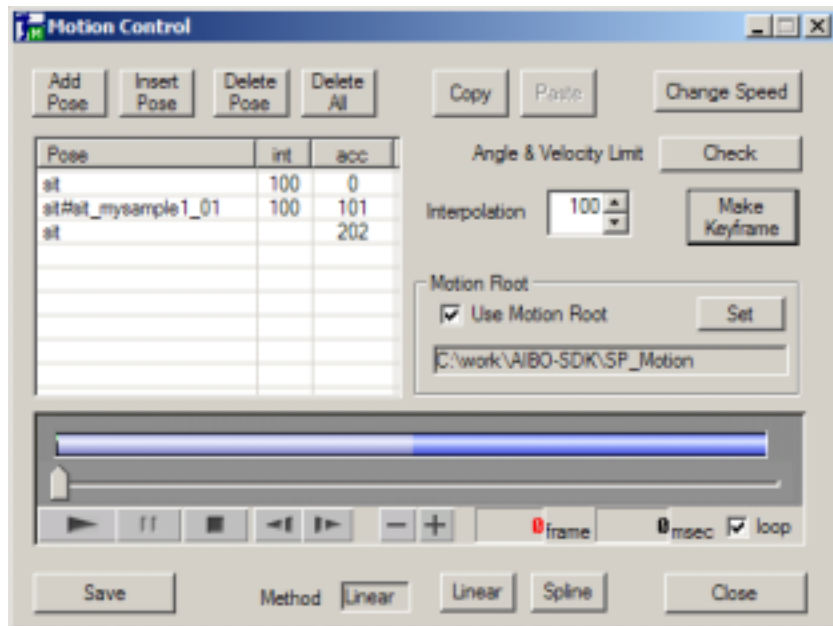


Figure 15 – Three poses added

Notice that the blue strip has become divided in the middle. The left side is light blue, while the right side is dark blue. This signifies areas of the animation that represent keyframes. As you add more keyframes to your animation, you will see this graphical representation of your animation become more and more divided. This helps in letting you see where keyframes exist graphically.

You can hit the Play button and watch the animation. AIBO will tilt its head down, and then up. Congratulations, we are done with our first animation!

IMPORTANT NOTICE – Make sure to check your motion!

Whenever you complete an animation, and are ready to test it on AIBO, you must press the “Check” button. This button does a check of your animation to ensure that it is safe for the robot to execute. Unlike computer graphics, where strange and impossible things can be animated, we eventually want our animation to run on a real physical object. As such, it is possible to create an animation that could be harmful to AIBO – for example, if his arm moves too quickly. To avoid this, the Check function will inform you if any part of your animation is improper. In our simple example, the Check function should report no errors.

Assuming you had no errors, select “Export Mtn All” in the File menu, and save the file in the Mtn folder. As before, call the file “sit#sit_mysample1.mtn”.

The next step is to create a mwc.cfg file. This file tells AIBO certain attributes about the motion that you want to run. It is usually created using a text editor. In

fact, MEdit can generate this file for you by following the steps below:

1. Open the folder where you saved your .KFM file, and drag that file into the main MEdit dialog box.
2. Copy the mwc.cfg file to your clipboard by hitting Ctrl-C.
3. Open notepad (or some other text editor) and paste the contents of the clipboard by typing Ctrl-V.

To see the structure of the contents of mwc.cfg, please refer to Quickguide.txt in the RTool distribution.

We are going to edit mwc.cfg so that it looks like the following:

```
#MWC 1.0
1 1
9000 1
cmagentMOTIONPERFORMER a_sit#sit_mysample1 1 1 0x0 0x0 0
```

Once you are finished, save this file as mwc.cfg in the RTool/ODA/MWC folder. Additionally, copy the file sit#sit_mysample1.mtn to the RTool/ODA/MOTION folder.

Run RTool, and push the Make MWC button, followed by the Make ODA button. Exit RTool and copy the RTool/MS/OPEN-R folder to your Memory Stick root. Note that *.ODA and ERS-7.MWC will be overwritten. (This is correct.) Create R-CODE.R with a text editor and insert the following:

```
PLAY:MWCID:26000
WAIT
```

Save this file as OPEN-R/APP/PC/AMS/R-CODE.R on the Memory Stick. Insert the Memory Stick into AIBO, and turn AIBO on.

The result of all this hard work is that AIBO will “nod”! You can now understand the process of how motions created with MEdit are inserted and activated by AIBO.

Appendix 1 – User Interface Reference

A1.1 Menus

File

<u>Open Kfm:</u>	opens a .KFM file to replace the current motion list in the Motion Control dialog.
<u>Save Kfm:</u>	saves the current motion list in the Motion Control dialog to a .KFM file. Same as the “Save” button in the Motion Control dialog.
<u>Open Pse:</u>	Opens a .PSE file to replace the current pose.
<u>Save Pse:</u>	Saves the current pose as a .PSE file. Same as the “Save” button in the Pose Control dialog.
<u>Export Mtn All:</u>	Saves the entire body animation as an .MTN file. This is an export-only feature; .MTN files cannot be loaded back into MEdit.
<u>Export Mtn Head:</u>	Same as above, but only exports the head motion.
<u>Export Mtn Legs:</u>	Same as above, but only exports the leg motions.
<u>Export Mtn Tail:</u>	Same as above, but only exports the tail motion.
<u>Export Mtn Mouth:</u>	Same as above, but only exports the mouth motion.
<u>Export Mtn Ears:</u>	Same as above, but only exports the ear motions.
<u>Export all sort of Mtn:</u>	Performs all of the “Export Mtn” commands in one click.
<u>Install Motion:</u>	This command is useful for copying sets of .PSE/.KFM files. When selected, this command will create .PSE files belonging to the current .KFM file with the .KFM filename structure. This means if you rename a .KFM file and select this command, it will recreate all the .PSE files with the new .KFM filename’s structure.
<u>Symmetric Convert:</u>	Revises all .PSE files referred to by the current .KFM file and makes these poses symmetric. For example, if one pose has AIBO’s right leg lifted, this command will rewrite this pose and match the left leg to the right leg.
<u>Make Mtns from Kfms:</u>	Exports all of the “Export Mtn” commands for each .KFM file in the directory. Useful for making .MTN files from many .KFM files in one click.

<u>Export Marked MIDI:</u>	Exports a MIDI file with markers at each keyframe location. While there is no music in the exported MIDI file, this will allow you to load the file in a MIDI-creation program and synchronize your music to the various keyframes.
<u>Export Motion as CSV:</u>	Export motion data as .CSV format, which can be imported into other applications (Excel, CAD)
<u>Save Screen Image:</u>	Saves a copy of the current 3D view as a .BMP graphics file.
<u>Save Motion Movie:</u>	Saves a rendering of the current animation as an .AVI movie file.
<u>Open Ball Motion:</u>	Import a special file containing keyframe data for AIBO's ball. The ball will be animated in the 3D preview window, together with your AIBO motion. This is useful for matching an AIBO animation to a certain ball movement. This file must be a text file, containing the following lines:

```

<red_value> <green_value> <blue_value> <ball_size>
<number of keyframes>
<x_location> <y_location> <z_location>
<number of interpolated frames until the next keyframe>
<x_location> <y_location> <z_location>
... repeat for remaining keyframes ...

```

An example follows:

```

1.0 0.4 0.6 0.4
3
-2.0 -0.6 0.0
200
-4.0 -0.6 1.2
300
-3.0 -0.6 -0.2

```

<u>Open Camera Motion:</u>	Import a special file containing camera data. The camera will be animated in the 3D preview window, together with your AIBO motion. This file must be a text file, containing the following lines:
----------------------------	--

```

<number of keyframes>
<x_location> <y_location> <z_location> <x_rotation> <y_rotation>
<number of interpolated frames until the next keyframe>
<x_location> <y_location> <z_location> <x_rotation> <y_rotation>
... repeat for remaining keyframes ...

```

An example follows:

```

3
0 0.3 10 4.20 -31.80
255
0 0.3 10 -94.20 -17.80
300
0 0.3 10 4.20 -31.80

```

Exit: Exits the program.

View

Tool Bar: Toggles the toolbar on and off.

Status Bar: Toggles the status bar on and off.

Lower Tool Bar: Toggles the lower tool bar on and off.

Jump to User View Point: Moves the camera to a previously saved user viewpoint.

Record User View Point: Records the current camera position as the saved user viewpoint.

Home Position: Moves the camera to the default home position.

Model

Wireframe: Changes the 3D rendered AIBO to a wireframe model.

Shaded: Changes the 3D rendered AIBO to a shaded model.

Lower Polygon Model: Reduces the number of polygons making up the 3D AIBO model. This is useful for slower computers.

High Quality Model: Increases the number of polygons making up the 3D AIBO model. This is useful for faster computers.

Color

MEdit: Uses the special multicolored AIBO in the 3D window.

Gold: Uses a gold colored AIBO in the 3D

	window.
<u>Silver:</u>	Uses a silver colored AIBO in the 3D window.
<u>Black:</u>	Uses a black colored AIBO in the 3D window.
<u>White:</u>	Uses a white colored AIBO in the 3D window.
<u>Orange:</u>	Uses a orange colored AIBO in the 3D window.
<u>User:</u>	Uses a preselected color as AIBO's color in the 3D window.
<u>Set User Color:</u>	Allows you to select a color to render AIBO with. This will only take effect if the current color is set to "User".
<u>Set Background Color:</u>	Allows you to select a color for the background "sky".
Ground	
<u>None:</u>	Removes the ground in the 3D window.
<u>Wireframe:</u>	Uses a wireframe ground in the 3D window.
<u>Solid:</u>	Uses a solid color as the ground in the 3D window.
<u>Texture:</u>	Uses a grass bitmap as a textured 3D ground.
<u>Set Ground Color:</u>	Allows you to select a color for the ground, when "Solid" is selected.
<u>Twin AIBOs:</u>	Adds another AIBO to the 3D window. This is useful for seeing the front and back of AIBO simultaneously.
<u>Set 2nd AIBO:</u>	Prompts you for parameters positioning the 2 nd AIBO relative to the first AIBO.
<u>3rd AIBO:</u>	Adds a third AIBO to the window. The position of the 3 rd window is similar to the position of the 2 nd AIBO.
<u>Pink Ball:</u>	Adds a pink ball to the scene.
<u>Enable Spotlight:</u>	Adds a spotlight to the scene. This may slow down the rendering of your scene.

Window

<u>Motion Control:</u>	Toggles the visibility of the Motion Control dialog.
<u>Pose Control:</u>	Toggles the visibility of the Pose Control dialog.

<u>Contents Control:</u>	Toggles the visibility of the Contents Control dialog.
<u>Move Windows Together:</u>	When checked, allows all four windows to be moved together when moving the main screen.

Help

<u>Help Topics:</u>	Opens help.
<u>Version:</u>	Shows the current version of MEdit.

A1.2 Toolbars

Most of the toolbar icons are shortcuts to their corresponding menu commands.



Same as File / Open Kfm File



Same as File / Open Pse File



Same as File / Save Kfm File



Same as File / Save Pse File



Same as File / Export Mtn All



Same as File / Export Mtn Head



Same as File / Export Mtn Legs



Same as File / Export Mtn Tail



Same as File / Export Mtn Mouth



Same as File / Export Mtn Ears



Same as View / Twin AIBOs



Same as View / Jump to User View Point



Same as View / Home Position



Same as View / Pink Ball



Same as View / Enable Spotlight



Same as Help / Help Topics

A1.3 Motion Toolbars



Play



Pause



Stop



Slow motion backwards



Slow motion forwards



Move backward one frame



Move forward one frame



If this is checked, the motion will loop (continue to repeat playing).