CINEMASUITE

USER DOCUMENTATION FOR CINEMA MO CAP

DOC VERSION V1.3 - MAY 2015

Contents

Introduction

Thank you for purchasing Cinema Mo Cap! Our team makes software extensions for Unity that allow game developers, machinima gurus, and movie professionals to create and control content for their projects quickly, and easily. More importantly, we want our users to have fun doing it.

Being avid fans of video games and movies, our team set out on a common goal - to create a set of cinematic game and film tools, which are powerful, affordable and available to the masses.

Cinema Mo Cap is the motion capture module of our set of tools called "Cinema Suite". Cinema Suite is a collection of software extensions for Unity3D that will allow developers to create content without the need for scripting or programming. Cinema Mo Cap allows you to use your Microsoft Kinect® or Kinect® 2 to capture simple animations, which you can then use in your Unity project. Animations created with Cinema Mo Cap are fully compatible with Unity3D's Mecanim engine, and are meant to be compatible with any humanoid (biped) character.

Making great products is only possible if we have feedback from our community. Feedback is critical to our success and we welcome it in all forms, be it Facebook, Twitter, Email or our Forums. Please check out ways that you can directly communicate with us, at the end of this document.

Thank you for helping us make Cinema Mo Cap great!

The Cinema Suite Team

Cinema Mo-Cap Overview

Key Features

- Quickly create animations for Unity3D, using the Microsoft Kinect® or Kinect® 2.
- Control various options for Kinect® and Kinect® 2 devices.
- Automatic animation filters available during capture.
- Flexibility on naming animations and when to start capturing.

Interface Overview

Cinema Mo Cap is a software extension for Unity3D. As with any Unity window, you can position the application any way you wish. We always recommend 2 monitors. Things just look cooler that way (and you can get more work done)!

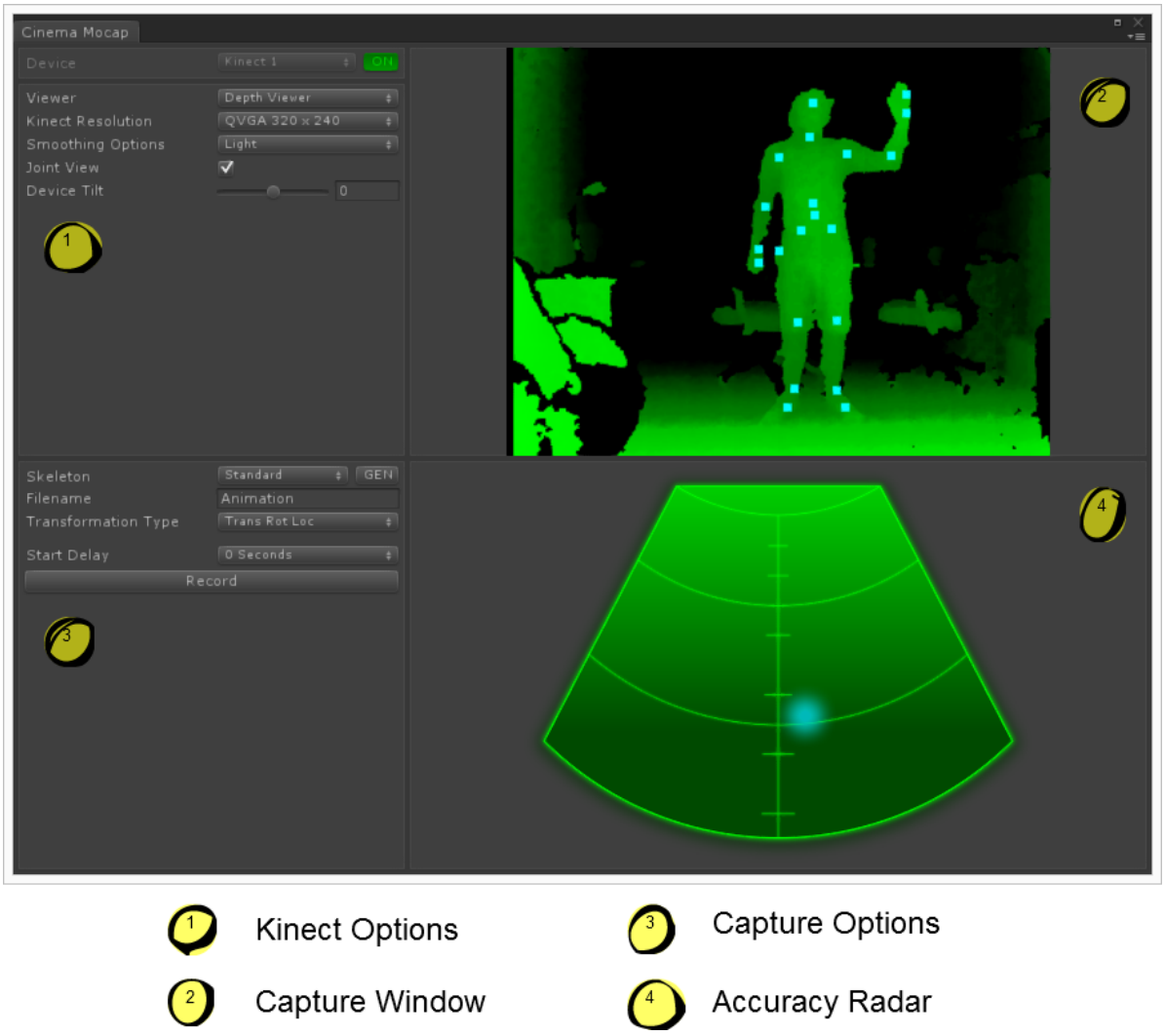


Figure 1: Cinema MoCap Overview

We will go more in depth with functionality later in this documentation.

Installing Cinema Mo Cap

If you are using Kinect® version 1 hardware for either Xbox360 or PC, Cinema Mo Cap requires the Microsoft Kinect® SDK version 1.8 in order to operate properly. You will require a PC with Windows 7 or 8.1, 32 or 64 bit. You can run Cinema Mo Cap on Mac computers running these versions of Windows in a virtual environment (Parallels® or Bootcamp®) but we cannot guarantee optimal performance. Our product is compatible with Unity 4.x and above. However, Unity 4.x **free** does **NOT** support the Kinect® version 2 hardware device.

If you are using Kinect® version 2 hardware for either XboxOne or PC, Cinema Mo Cap requires the Microsoft Kinect® SDK version 2.0 or higher in order to operate properly. You can only run the Kinect® version 2 hardware on a Windows 8 or 8.1 computer with the following requirements:

- USB 3.0 port available on your computer.
- 64-bit processor
- 4 GB of memory or higher (8 GB recommended)
- 3.1 Ghz or faster multi-core processor
- DX11 capable graphics adaptor

Installing Microsoft Kinect® SDK

The Microsoft Kinect® requires drivers and associated software to be loaded, so that other applications on your computer can take advantage of the features built into the product (such as Cinema Mo Cap). At this time, Microsoft requires you to download their full Microsoft Kinect® SDK for this functionality. Steps for installing the SDK are as follows:

1. **FOR KINECT VERSION 1:** Download the Microsoft Kinect® SDK 1.8 at the following location:

   http://www.microsoft.com/en-ca/download/confirmation.aspx?id=40278

2. **FOR KINECT VERSION 2:** Download the Microsoft Kinect® SDK at the following location:

   http://www.microsoft.com/en-us/download/details.aspx?id=44561

3. Make sure your Kinect® is **UNPLUGGED FROM YOUR COMPUTER**. This is very important. If this step is not done, the Kinect® drivers **WILL NOT** properly install.

4. Run the executable file downloaded in step 1 or 2 above. The SDK process is a one button install, simply accept the license terms and click the install button.

5. Click Close when prompted. Note: you do not need to install the Developer Toolkit.

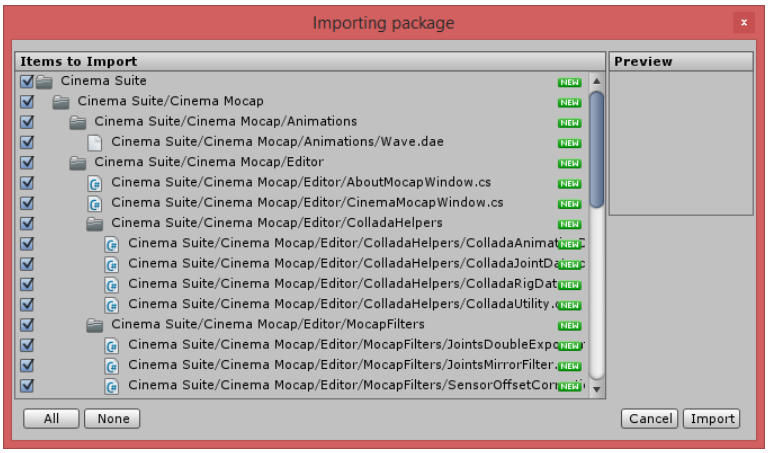
6. For install instructions from Microsoft, see the following link:

   http://msdn.microsoft.com/en-us/library/hh855354.aspx#Installation

Installing Cinema Mo Cap Unity Package

Cinema Mo-Cap is a standard Unity3D Software Extension, and installs like any other Unity3D package. The name of the file we have created is called "CinemaMoCap.unitypackage"

In order to load the Cinema Mo Cap Unity3D package you either drag the Unity package into your current Unity3D project, or in Unity3D go to the dropdown menu: **Assets > Import Package... > Custom Package...** then browse to the CinemaMoCap.unitypackage file. If you purchased from the Unity Asset Store, this process is automatic. The below image shows the Import Package dialog box, and the contents of the Cinema Mo Cap Unity Package.



Once the Importing package dialogue appears, click the Import button. After approximately ten seconds, you will see a new drop down menu (Cinema Suite) under the window pulldown. Once installed, Cinema Mo Cap will appear in a folder, inside your Unity project.

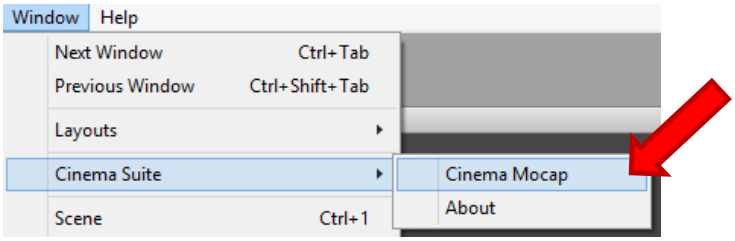


Figure 2: Unity Pull down for Cinema Mo-Cap

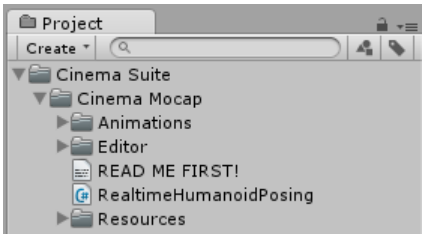


Figure 3: Unity Project Folder

Cinema Mo Cap Features

Cinema Suite Menu

From the newly installed Cinema Suite pull down menu (located under the Window pull down in Unity), you will be able to open Cinema Mo Cap. Once you select Cinema Mo Cap from the pull down, the Cinema Mo Cap window will open.

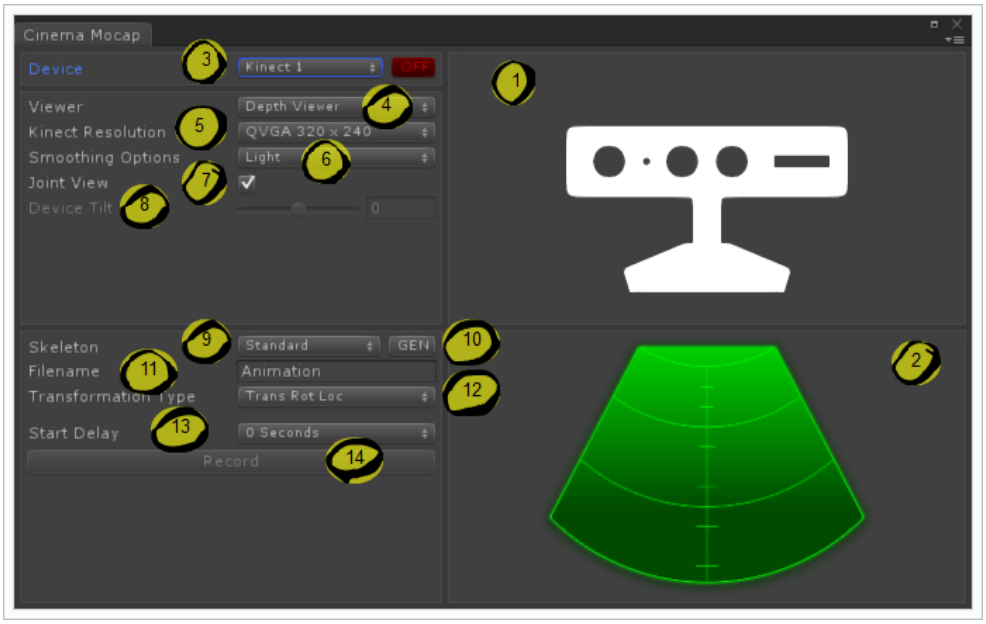


Figure 4: Detailed Overview

This is the window that will display when you first start Cinema Mo Cap. The window is Unity compliant and can be resized, dragged, and docked, just like any other Unity window. Let's get into a breakdown of all the available features, in Cinema Mo Cap.

1. Capture Window

The capture window will show feedback to the user, while they are performing actions being recorded by the motion capture device. When you start Cinema Mo Cap, this window will display only the Cinema Mo Cap logo. (the logo will change when interface is switched to Kinect® 2). When you enable Kinect® Tracking, the capture window will enable, and you will see the depth viewer that the hardware sensor sees.

2. Accuracy Radar Window

The radar window will track where you are standing in relation to the Kinect®, and provide feedback on whether or not the Kinect® is capturing accurate information. If the user stays within the radar grid, the Kinect® can see that person.

3. Device Selection and Device Tracking

You can select whether to use a Kinect® 1 or Kinect® 2 device. The interface options will change depending on which device you select. Pressing the red off button will turn the Kinect®'s tracking

sensor on, and the button will turn green. When enabled, the capture window will change to show what the Kinect® is viewing.

4. Viewer

The user can select the type of view he wishes to see, in the capture window. Choices available are:

- Depth Viewer
- Image Viewer

5. Kinect® Resolution

Cinema Mo Cap provides an option as to what resolution the user would like the Kinect® to display. **Note:** this does not affect capture resolution, only the resolution by which the Kinect® is displayed in the Capture Window. Available choices are:

- QQVGA 160 x 120
- QVGA 320 x 240
- VGA 640 x 480

For the Kinect® 2, this option is not available. Default depth for the Kinect® 2 camera is 1080p.

6. Smoothing Options

Cinema Mo Cap gives the user the opportunity to adjust how smooth they would like the motion capture to be. Choices available are:

- None
- Light
- Medium
- Heavy

Note that the heavier the smoothing, the more latency the Kinect® will have while recording the capture.

7. Joint View

This option allows the user to decide if they would like to turn the motion capture nodes on or off. Changes are reflected in the Capture Window.

8. Device Tilt

For further precision in what you want to capture, you can use this slider to adjust the tilt of the Kinect® device. The user can select tilt options between -27 and +27 degrees. Once selected, the Kinect® will tilt accordingly.

The Kinect® 2 does NOT have an automatic tilt function. You must tilt the device manually using your hand. When the device is selected, this option will not be available.

9. Skeleton

Select the type of skeleton to use with your capture. Current option = standard.

10. Model Preview

To improve the quality of the captured recording, the user can import a model preview into their Unity project. Once the subject is detected by the Kinect® sensor, the model will match the movements that the user is making, live inside of the Unity project.

11. Filename

Enter the name of the file that Cinema Mo Cap should create when the animation is complete. Once captured, the model will be called **MoCapHumanoid@<your *animation*>** *(with <your animation> being the name you selected)*

12. Transformation Type

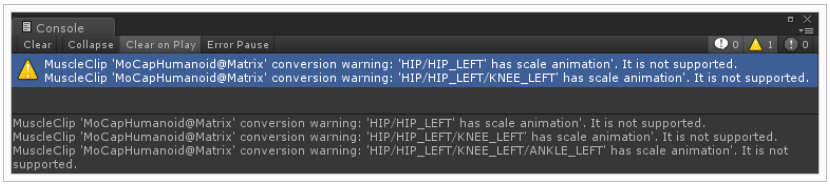
To ensure full compatibility with external animation applications such as Blender or Maya, we have added the ability to select how the created model's animation data is transformed. Available choices are:

- Trans Rot Loc
- Matrix

By default, Cinema Mo Cap will use the "Trans Rot Loc" transformation type when creating animations. Recordings created using the "Trans Rot Loc" option (Translation Rotation Location) will create a model with animation data that uses component-wise values for location and position of joints.

Recordings created with Cinema Mo Cap that use the "Matrix" option will create a model with 4x4 matrix animation data for location and position of joints within the generated Collada model. Matrix is the mode to use for exporting the captured model to most applications outside of Unity for additional editing and tweaking (such as Blender).

After creating a Matrix animation and switching the model to a "humanoid" rig, Unity will show warnings in the console as shown here.



These errors will not affect the animation in any way. We will work to remove them in a future version of Cinema Mo Cap.

13. Start Delay

We have provided an option to delay when your motion capture begins, so that the user can get into the proper position before recording. This option reduces the amount of cleanup required in the final animation.

14. Record Button

This button will start, and stop the motion capture session. If you have selected a start delay, you will see a countdown on the screen before recording begins.

Using Cinema Mo Cap

Capture Process

When you capture an animation using Cinema Mo Cap, a grey textured character model is created in the current Unity project. This file is placed in the Cinema MoCap folder under "Animations". The name of the file will be reflected by the name the user provided when capturing the animation. Within this model file, will be the actual animation that was recorded during the motion capture session, again using the name the user provided.

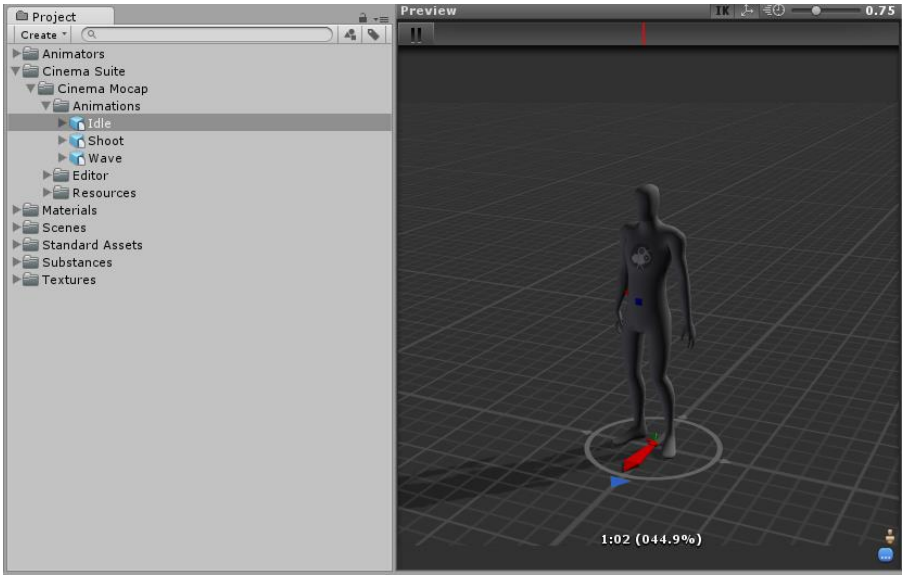


Figure 5: Cinema Mo Cap Humanoid

We take this approach, because when the model file is created (.dae format), any animations associated with it can then be used in the Mecanim system in Unity. Therefore, you can assign any captured animation to Mecanim's Animator tool inside of your Unity Project. This gives the developer the power of adding any of their Cinema Mo Cap captured animations to any humanoid or biped character in their Unity project.

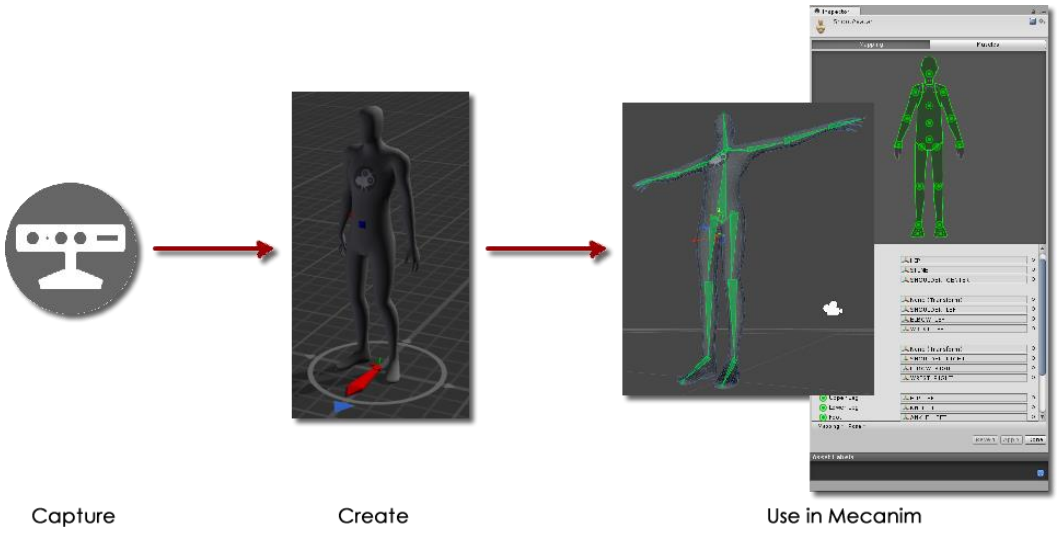


Figure 6: Cinema Mo Cap Workflow

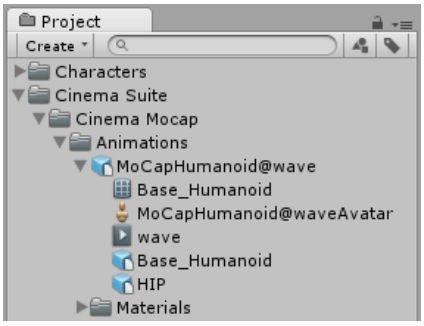
Creating a motion capture session

Capturing an animation in Cinema Mo Cap is quick, easy, and fun. To ensure the best results, review the steps below.

Step 1: Name the animation

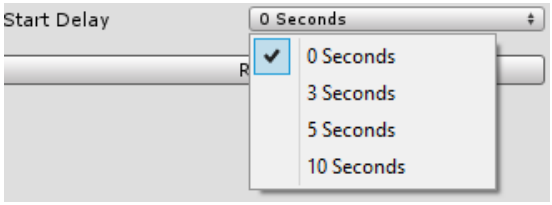
By default, your animation will simply be called "animation". Pick a name that would be associated with the animation you are attempting to create. If you are creating an animation of someone waving, name it something like, "wave". If you create a new animation with the same file name as a previous recording, Cinema Mo Cap will create the new file, with an incremented number at the end (Animation1, Animation2, etc.)

The animation that is captured will be attached and saved to a model in the current Unity project, under the "**Cinema Suite\Cinema Mocap\Animations"** folder. The model will be called **MoCapHumanoid@<your animation>,** with <your animation> being the animation. In the sample below, we captured an animation called "wave".



Step 2: Select start options

You can control how you would like the motion capture session to begin.



Start Delay: Select when capture will begin after the record button is pressed. Choices range from 0 to 10 seconds. If you pick a time greater than 0, a countdown will appear in the capture window as you stand in front of the Kinect® sensor.

Step 3: Set Motion Capture Options

Device Tracking: Push the red "Device Tracking" button to enable the Microsoft Kinect® sensor. When selected, the Cinema Mo Cap logo will disappear, the button will turn green, and you will see what the sensor is seeing. This will be a live screen which constantly monitors the environment.

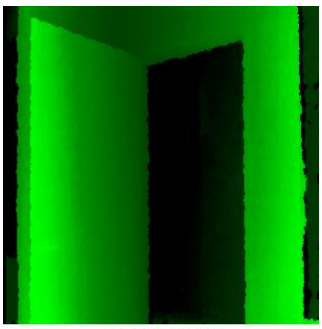
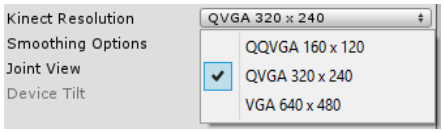

Depth Sensor


Image Sensor

Viewer: You can choose two ways in which you would like the Capture window to appear.

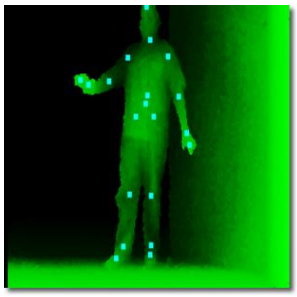
- **Depth Viewer** will display how the Kinect® sensor views depth of the capture object. Bright green shows that the object clearly being picked up by the Kinect® sensor. As the object moves farther from the sensor or closer to it, the shade of green will change. When the sensor begins having problems detecting the object, it will turn black.
- **Image Viewer** will display exactly what the Kinect® camera sees, in full color.

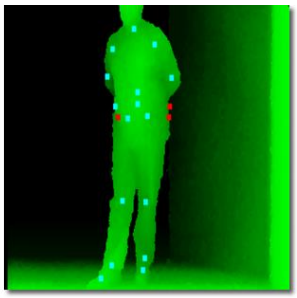
Kinect Resolution: The quality of the image displayed in the capture window can be adjusted. Select one of three resolution options from the pulldown menu. This does not affect the resolution of the motion capture itself, just display image quality.



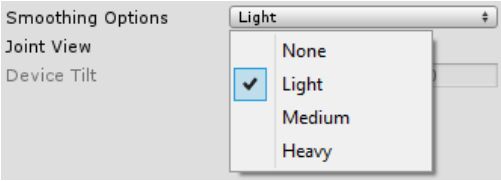
When using the Kinect® 2, Kinect resolution options will not be available. The default resolution for Kinect® 2 is 1920 x 1080 (1080p) and fixed at this resolution.

Joint View: Selecting this checkbox will show and hide the motion capture nodes on the subject being captured. When the node is cyan in color, it means that the Kinect® sensor can fully track the joint on the subject. When the node is red, the sensor has temporarily lost exact location of the joint, and is "interpolating" or taking a best guess, on where this joint should be.


All joints have been detected by the Kinect sensor


Kinect has lost track of 3 joints with hands behind back.

Smoothing Options: Cinema Mo Cap can control the quality of the animation being captured, by allowing the user to select from no smoothing to heavy smoothing. The setting tells the capture device how precise to be when capturing data. Please note, that the heavier the smoothing, the more latency (lag) the device will operate with while it calculates how much to smooth the capture. Make sure to take this into consideration, when performing in front of the device. Cinema Mo Cap will use the "light" setting by default.



Device Tilt: If the subject being captured does not quite fit within the confines of how the Kinect® is aligned, you can control the tilt of the Kinect® using this slider. Lag between setting the tilt value, and the actual Kinect® hardware tilting is about one second, so please be patient. The values in the slider are in degrees. The Kinect® can be tilted from negative 27 degrees, to positive 27 degrees, depending on the requirements of the user. **Note:** Cinema Mo Cap contains an algorithm that will automatically correct the captured animation by compensating for sensor tilt.

This option will not be available when using a Kinect® 2 sensor. Tilt on the device is manual. You must use your hand to tilt the sensor bar.

Step 5: Recording

After going through the steps above, and setting the Cinema Mo Cap environment, it is time to begin your motion capture session by hitting the record button. 

To ensure the best results, make sure that you follow the following guidelines:

1. ***Check your surroundings:*** Make sure you have enough space to operate. The space you are operating in should be open enough to capture your movement, without interference from inanimate objects (desks, furniture, etc.). Refer to the chart below for tips on where to position the subject.

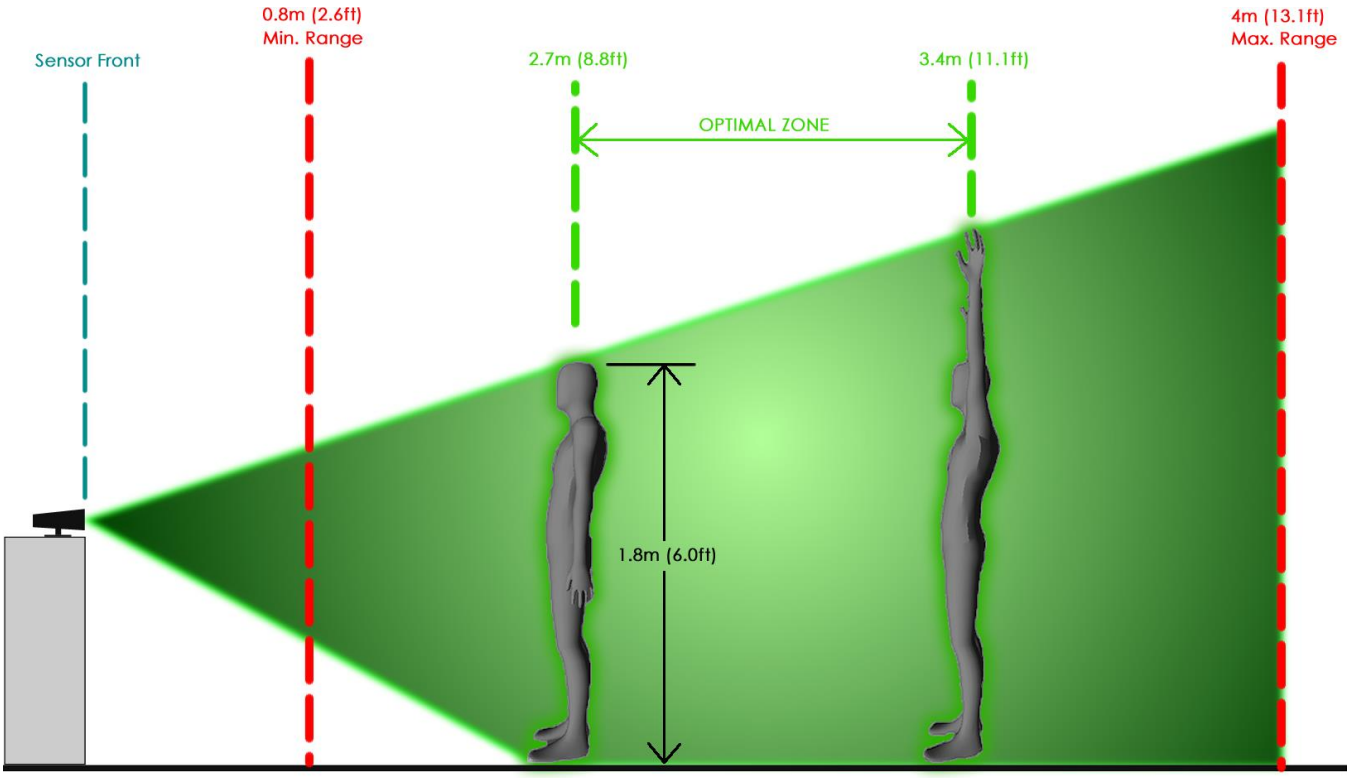
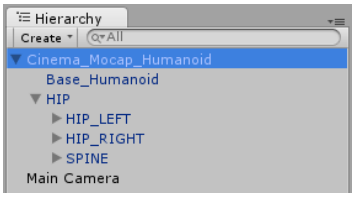


Figure 7: Optimal Positioning

2. ***Enable Model Preview:*** Cinema Mo Cap gives you the ability to watch your animation mapped to the Cinema Suite Humanoid model, live inside your Unity Project. To view yourself as a Unity model, follow these quick steps.

    a. Click the Model Preview "Generate" Button.

    b. A preview model will appear in your Unity Hierarchy called "Cinema_Mocap_Humanoid". The model will be located at the 0,0,0 coordinate in your current scene.



    c. Double-click on the model in the hierarchy to focus on that model in your scene. Reposition your view using Unity if required.

    d. Start Device Tracking and step into the capture area. The Unity model will now represent your movements. Record your session when ready. See image below.

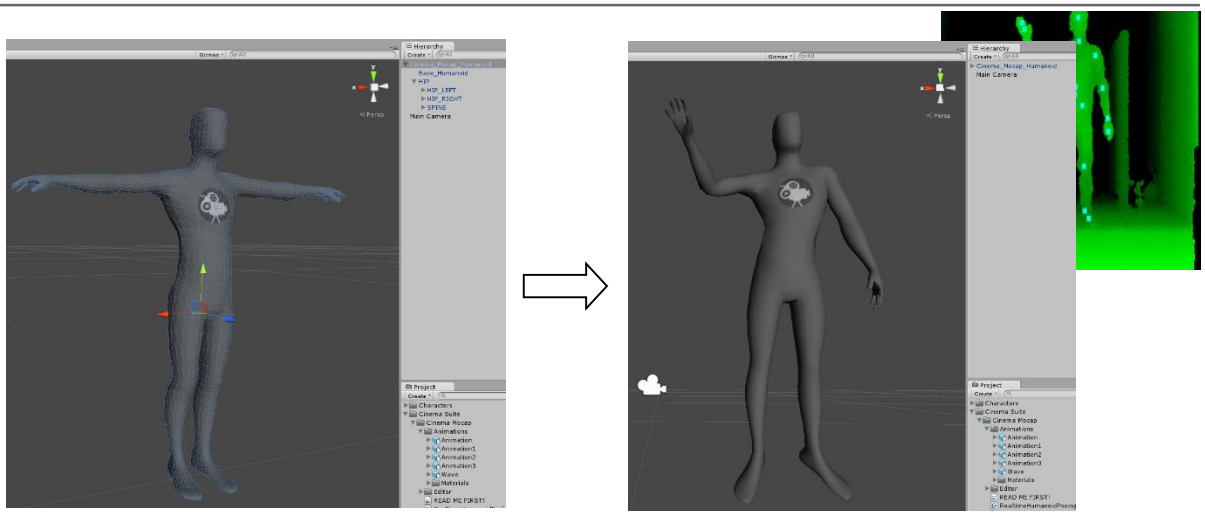
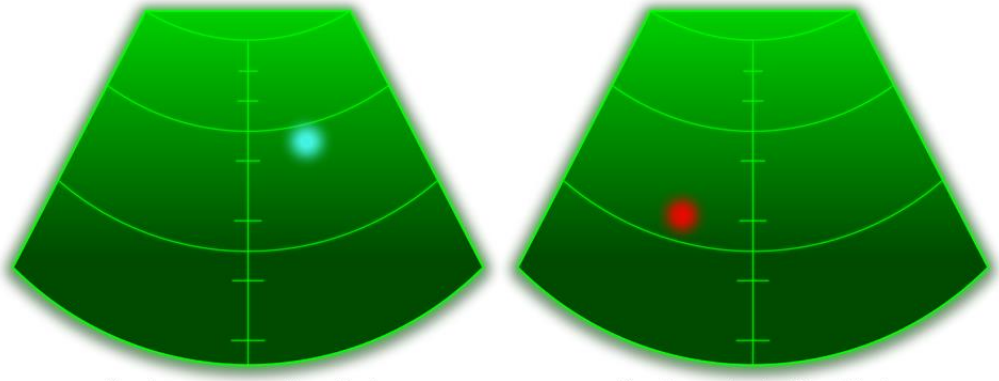


Figure 8: Model Preview Generation

3. ***Check the accuracy radar:*** Before recording, enable the Kinect® and step into the motion capture environment. Pay close attention to the radar. The radar is an accurate representation of the entire area the Kinect® sensor can accurately see. On the radar, the subject will be represented by a cyan colored dot. Walk around your environment, and make sure the cyan dot does not leave the radar environment. If it does, you have exited the area the sensor can accurately track. If for any reason the sensor cannot see you, this dot will turn red.



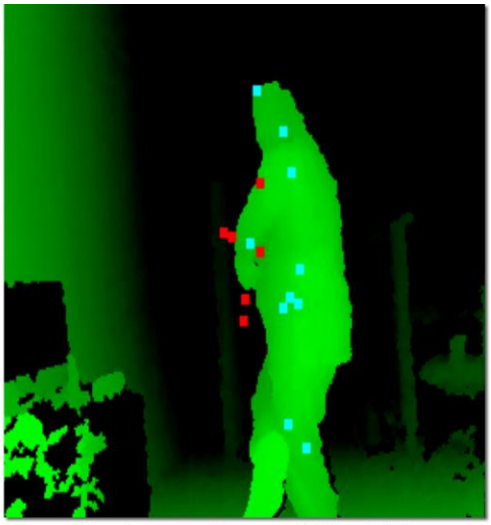
Kinect sensor can see the subject

Kinect sensor has lost the subject

4. ***Respect the Kinect®:*** Cinema Mo Cap at this time, utilizes one single Microsoft Kinect®. The purpose of the application, is to capture simple animations in which the subject is **facing the Kinect®**. Although you may capture any animation you wish, the Kinect® **does not** have the ability to track 360˚ turns, very quick motion, jumping, or high action sequences.

5. ***Keep joints in view:*** During your capture, be conscious about keeping the motion capture nodes cyan in colour (green for Kinect® 2). Once a node turns red, it means the Kinect® has lost view of this joint, and is making a best guess on where that joint may be. Usually the Kinect's internal software is pretty good at doing this, but there will be times that it will affect the accuracy of your animation.

Capture is accurate and clear with all joints visible



Crossing arms, legs and hiding joints will cause Kinect to interpolate lost points. Can lead to inaccurate animation

6. ***Completing your motion capture session:*** Once you have completed your session, hit the stop button. 

Your animation will then save to your Unity project under the filename that was originally entered, with the generated model (.dae format) file. Remember, the file will be saved under the project folder **Cinema Suite > Cinema Mocap > Animations.** If you no longer need the model preview, simply delete it from your project by selecting it in the Unity scene or highlighting and deleting from the Unity Hierarchy.

Using your new animation in Unity

About Mecanim and Unity3D

Unity uses the Mecanim system for controlling animations inside of Unity3D projects. For a full explanation on how Mecanim works, please refer to the Unity tutorial on Mecanim, located here:

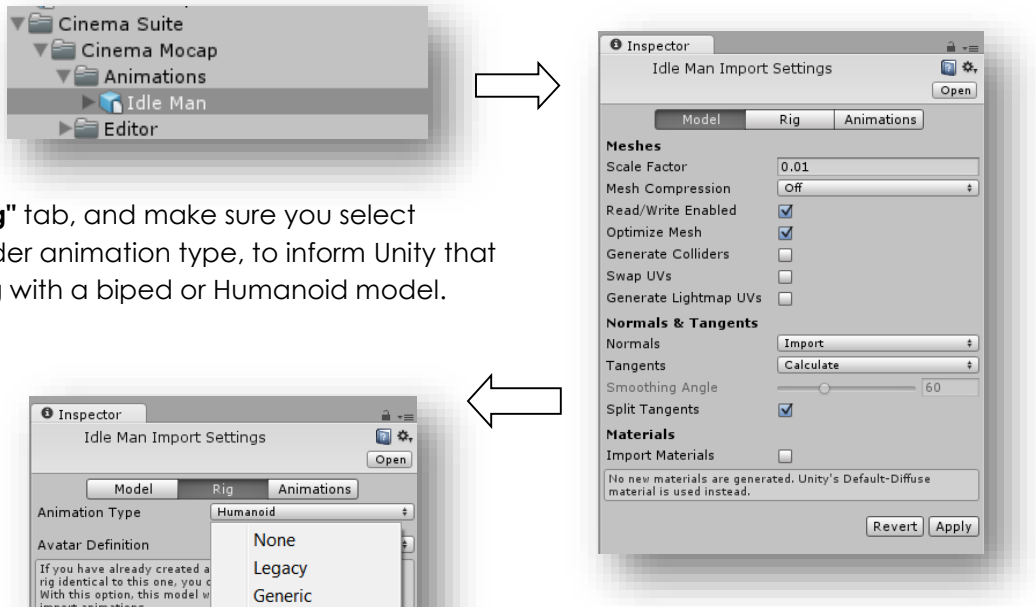
http://video.unity3d.com/video/7362044/unity-40-mecanim-animation-tutorial

We will cover **only basics** of Mecanim in this example, so that you can get started on using your newly created animations effectively, inside of Unity3D.

Once an animation has been created with Cinema Mo Cap, we can use these tools for cleaning up the start and end point of the animation, and control whether or not the newly created animation will be looped.

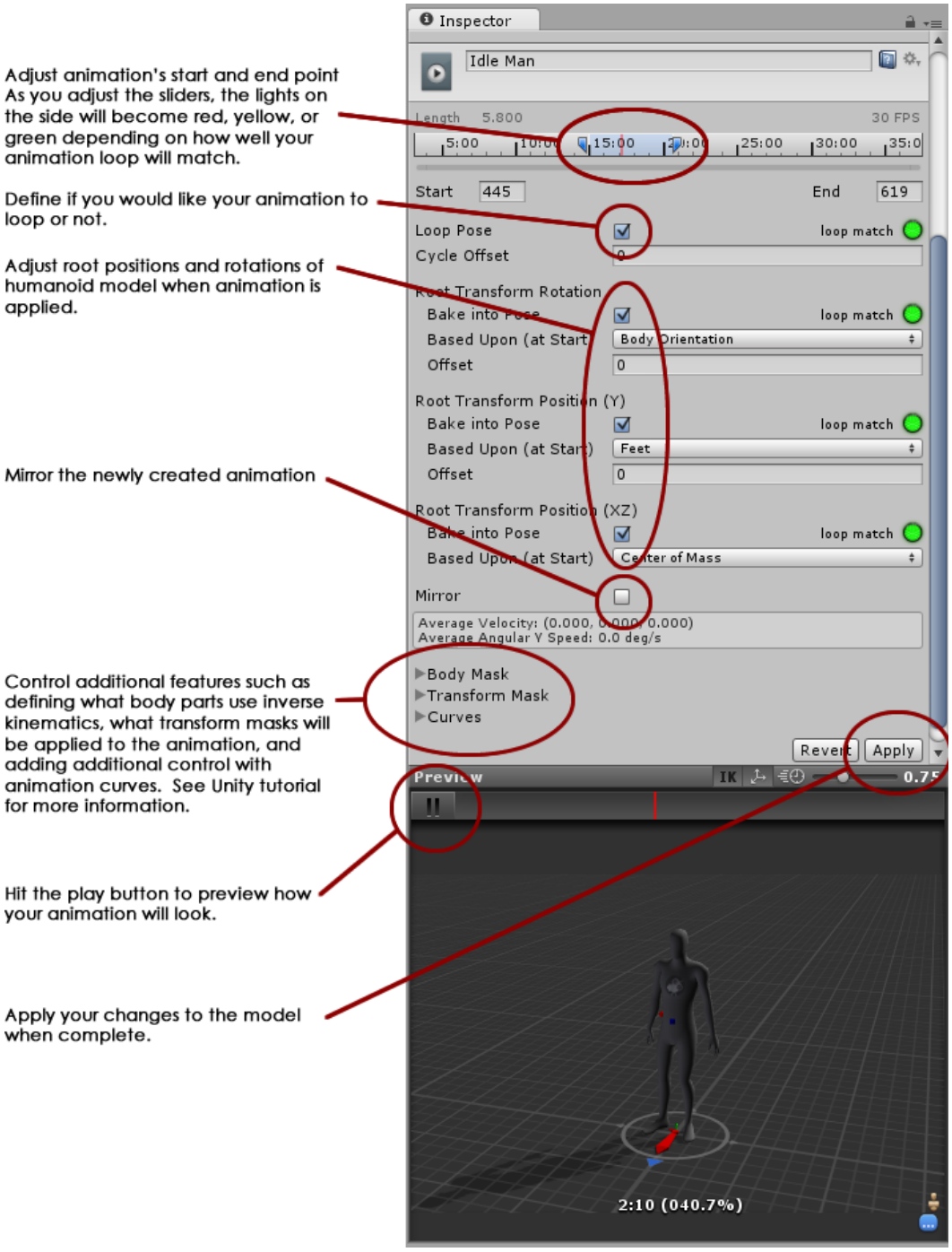
Modifying a new animation for use in Mecanim

In this example, we have created a new Animation called "Idle Man" which is now located inside the **Cinema Mocap > Animations directory**. When you select this model, the Unity Inspector will display model information as shown below:



Click on the **"Rig"** tab, and make sure you select **"Humanoid"** under animation type, to inform Unity that you are working with a biped or Humanoid model.

Next, click on the animation tab. It is here, that you can control the beginning and start point of your animation, as well as other features. We will only outline some of the key features below:

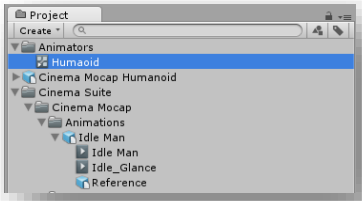


When you are done making modifications to your newly created animation, hit the **"Apply"** button. Unity3D will apply the changes to the newly captured animation.

Using the animation with other characters/avatars

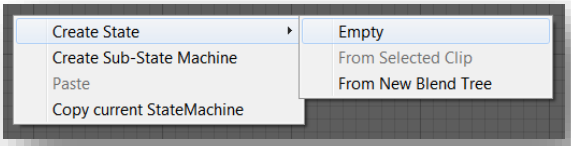
Once your animation is modified and ready for use, Unity makes it very easy to add the animation to other characters you may want to use in your project. Below is a very simplified way to apply a single animation to a Unity character with your new animation.

1. Create a new Animator. This can be done in Unity by right clicking in your project folder and selecting "**Create > Animator Controller**".

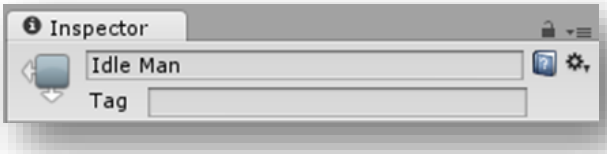


2. Name your Animator. We called ours "Humanoid"

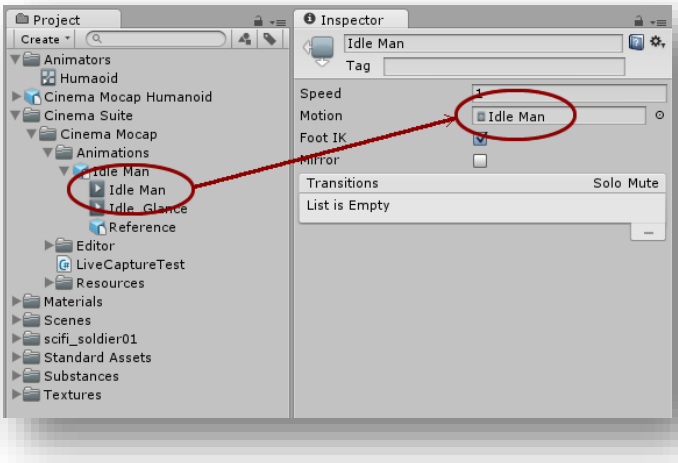
3. Double click your newly created Animator, and the Animator window will open. Right click any space inside the Animator window, and select "**Create State > Empty**"



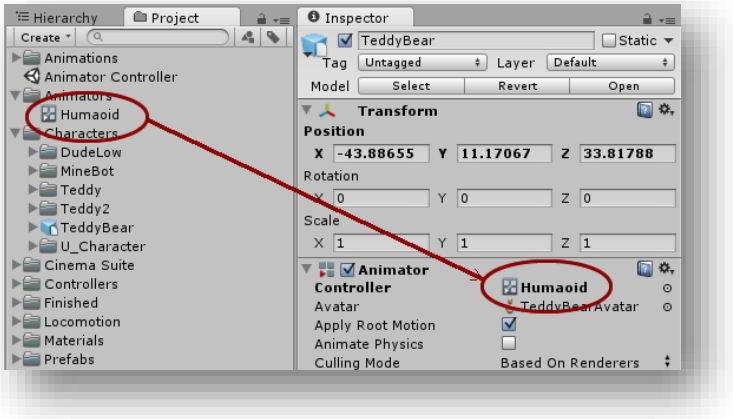
4. Highlight your newly created state. Then, in the Inspector window, give your state a name (we called ours "Idle Man").



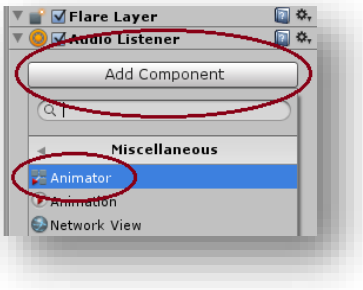
5. Drag the newly created animation from your project into the "**motion**" field. You can also click on the target icon beside the motion field, and select the animation from a list of all other animations in your project.



6. Select your model in your project or Hierarchy window. In the Inspector, drag your newly created Animator Controller to the "**Controller**" field of the Animator script.



7. If you do not have an animator script assigned, add one by clicking the **Add Component** button in the Inspector for your object. Then select "**Miscellaneous > Animator**"



8. Enter play mode in Unity. To do this, select the Game tab, and hit the play button. Your captured animation will now be running, and applied on the model you have transferred the animation onto!

Community

We want to hear from you! Quite simply, without you, none of what we develop would be possible. We always want to hear from our community, whether it is for feedback, sharing ideas, adding features, and providing additional help. Here's how you can find us:

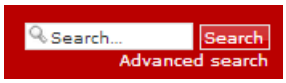
Website:	www.cinema-suite.com
Facebook:	/CinemaSuiteInc
Twitter:	/CinemaSuiteInc
YouTube:	/CinemaSuiteInc
Blog:	www.cinema-suite.com/blog
Email:	support@cinema-suite.com
Forums:	www.cinema-suite.com/forum

Help and Support

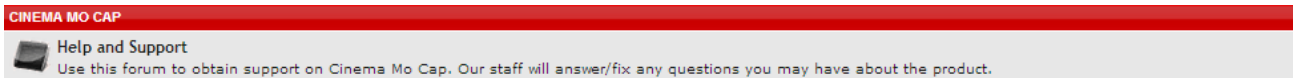
Cinema Suite Forums:

The fastest way to obtain support for Cinema Mo Cap is to visit the Cinema Suite forums. Our forums can be found at www.cinema-suite.com/forum.

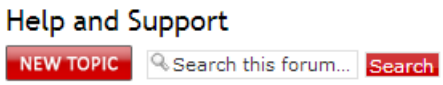
Before creating a post, please make sure to search the forum using the search bar located in the upper right area of our forum site.



If you cannot find what you are looking for, please create a new forum topic under the Cinema Mo Cap category "**Help and Support**" by clicking on the text below.



Once inside the Help and Support area for Cinema Mo Cap, create a new topic by selecting the new topic button in the upper left area of the page.



We constantly monitor our forums for new support inquiries.

Email:

If you fail to receive an answer in the forums, you may also email our support team directly. Our email address is support@cinema-suite.com.

Please note the following when emailing support for quickest service:

1. We need 2-3 days to process email support requests, due to volume.
2. For fastest service, please provide your Unity Asset Store Purchase invoice number for our product.
3. Put invoice number in subject field, with brief description of problem.
4. In the body of the email, please provide as much of the following as possible, for quickest service:
    - Detailed explanation of the problem. Provide screenshots if possible.
    - What version of Unity?
    - What version of Cinema Mo Cap? (Go to **Window>Cinema Mo Cap>About** to obtain version number).
    - Sequence of events leading to issue.

Licensing:

Licensing for Cinema Mo Cap is governed by the Unity Asset Store End User License Agreement (EULA). For more information about the EULA, please click here for more information.

Thank you

Without you, what we do would not be possible. We sincerely thank you for purchasing Cinema Mo Cap, and allowing us to create software that helps the community do their work quicker, easier, and hopefully with a bit more fun.

Cinema Suite Inc., would like to extend a special thank you to the Canada Media Fund, for making Cinema Mo Cap Possible.

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