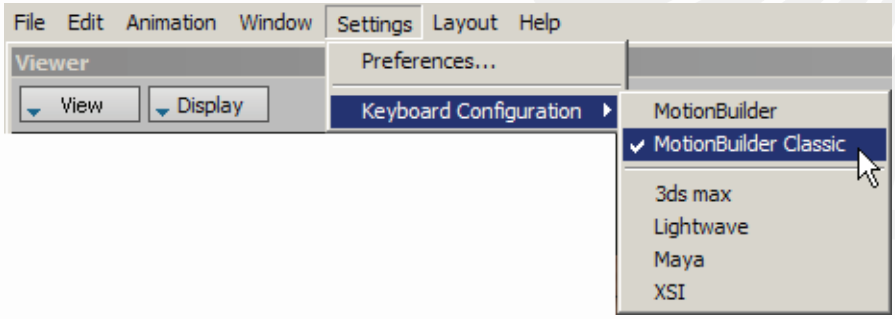
Outline

Getting Started Setup

To get started, set up MotionBuilder as follows:

Shortcut keys Setup and Layout



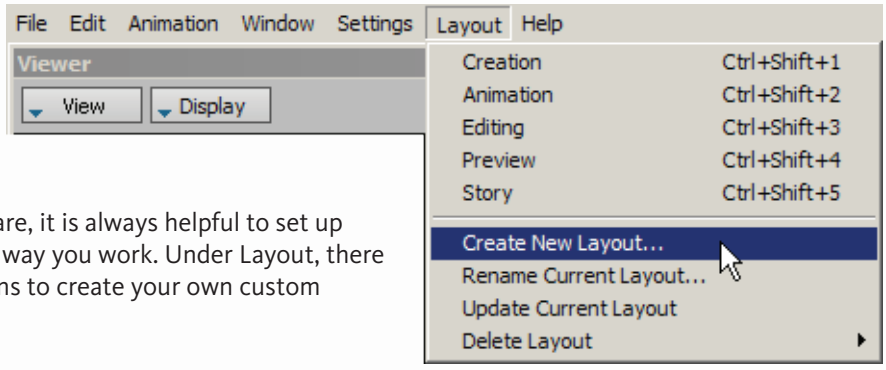
Select the shortcut key setup you are most accustomed to.

- Click Settings menu > Keyboard Configuration.

A list of 3D software applications that MotionBuilder emulates is displayed.
Most functions emulate the same hot key functions as these other software packages, but there are still subtle differences while using emulation.

To set up your layout:

Depending on your personal requirements; a large viewing window, high or low resolution, dual screens, or if you just want to keep your array of tools close at hand, MotionBuilder has the solution for you.



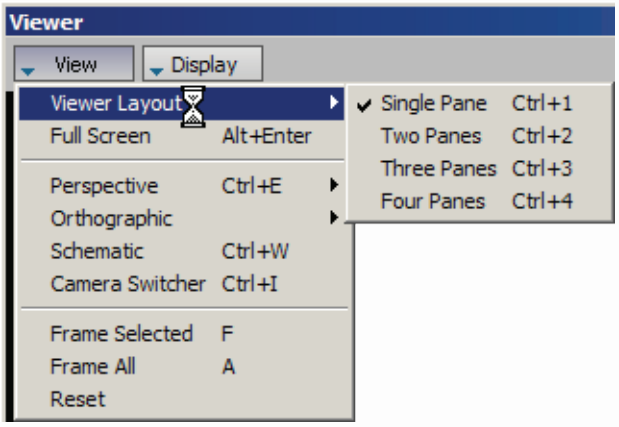
No matter what your hot key preferences are, it is always helpful to set up your windows in an array that best fits the way you work. Under Layout, there are five generic window layouts plus options to create your own custom layout.

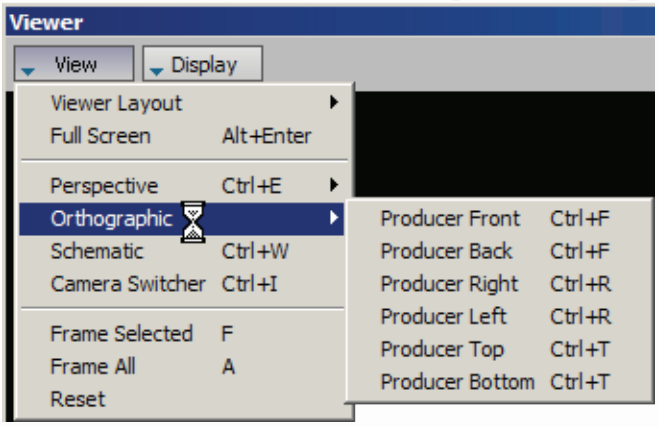
The Editing layout is a good setting to start with if you are unfamiliar with the toolset. Otherwise, it is helpful to create a layout that suits your preferred workspace style. Each setting provides an array of tools sure to suit most workspace styles.

- Select a layout from the list that best suits your workspace style; you can then add extra windows and modify the size and shape of your tool windows.
- After you have configured your layout, click Create New Layout to save the setting.

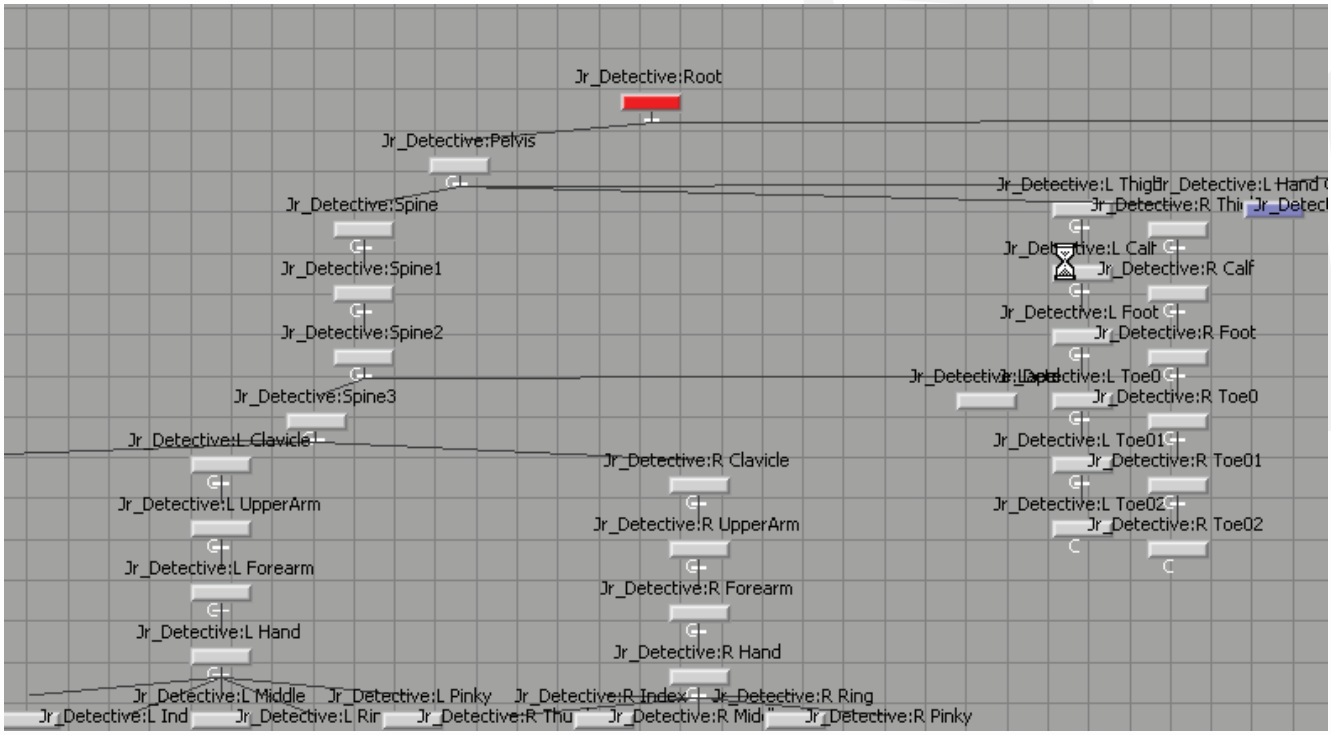
You can split the Viewer window into four different panes.

- To change the number of panes, in the Viewer window, click View > Viewer Layout. You can also use the shortcut keys Ctrl+1, 2, 3, or 4 depending on how many windows you want.
- To change the angle, click Viewer window > View. Select a View option from the list.





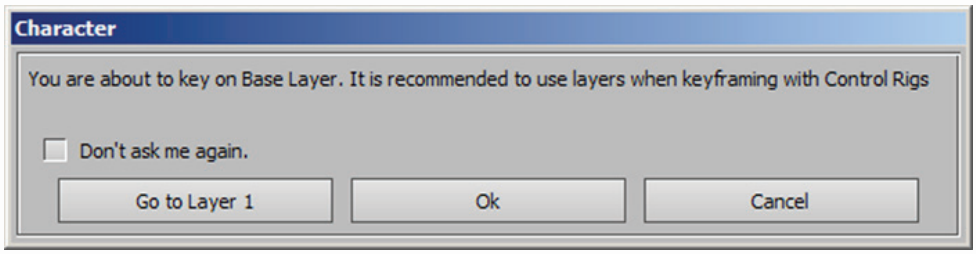
- Press CTRL+W to display the Schematic view. This displays all the objects in your file in a viewing pane similar to a hypergraph.



Key Controls and Layers

The Key Controls window enables you to select several different keying options. The rule of thumb in MotionBuilder is to never set a key frame on the base layer, whether setting key frames from scratch or editing motion capture.

MotionBuilder safeguards from this by opening a menu that gives you the option to go to layer 1 when you try to set a key on the base layer for the first time.

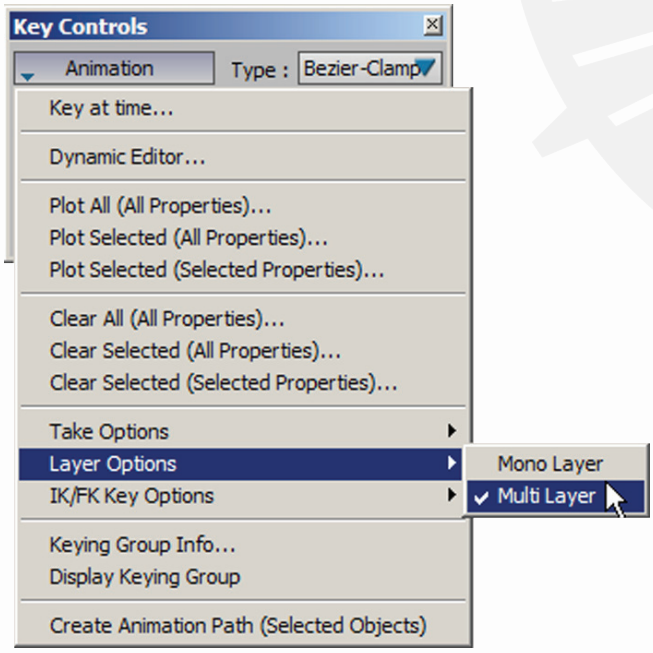


Always make sure to set Layer Options to Multi Layer before key framing.

- On the Key Controls window, Animation menu, click Layer Options > Multi Layer.

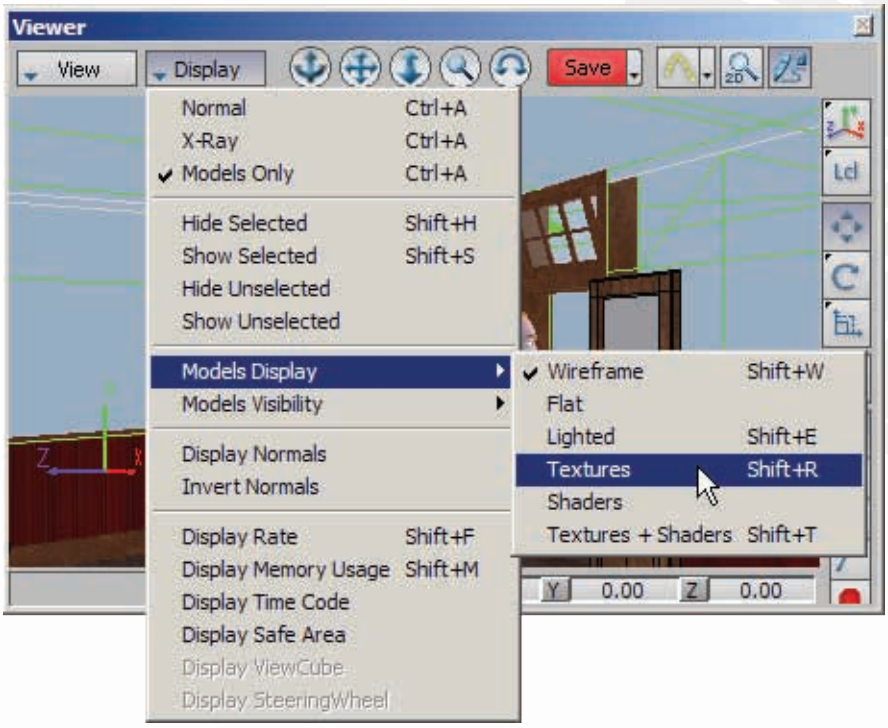
Although there is an Auto Key function in MotionBuilder, it is not recommended for first-time users. This is because there are multiple attributes that you can simultaneously key on any bone or object, and Auto Key will key each of these attributes at every manipulation. This way you can key attributes without detection until it is too late.

While this window offers many different options for setting key frames exactly as you want them, the options that familiarize you the most with animation are found in the Layer selection list: Flat Key and Zero Key. A flat key flattens the Bezier so that the motion eases in and out of that key. Setting a zero key will return a joint or character to its base pose state. This is often used in video games to match character walk cycles seamlessly. To do this you simply start the character in a base pose, make extra edits on a new layer, and add another zero key at the end of the cycle. The result is a nice animation asset for looping.



The layer ability in MotionBuilder sets it apart from other Autodesk key frame software. While you can still create layers in other packages, only MotionBuilder provides full IK/FK control flexibility and control on a layer without heavy setup or rigging.Groups + Hide and Unhide
The Groups tool enables the user to quickly hide or show, make something selectable or nonselectable , editable or non-editable. SectionA.fbx has already been set up with Groups. Each character has its own group for GEO (Geometry) and Collision controls. The Environment is broken up into the following categories:

- Set GEO: environment geometry
- Desk: desk geometry
- Chair: chair geometry
- Door: door geometry
- Floor: floor geometry
- Walls X-Ray: Wall geometry that is set to Wireframe display mode so that you can see through it for edits. To change this setting, you can select this group and use the shortcut key CTRL+R for textured surfaces or CTRL+W to go back to Wireframe.



- Shadows: Planes that have a matte and live shadow shaders so they receive shadows while not visible.
- Rain Maker: A set of spheres with a particle shader attached to emit particles that look like rain drops to add atmosphere to the scene.

Nothing can be hidden from the Schematic view, so if you ever find an object, it is good practice to search for it in the Schematic view.

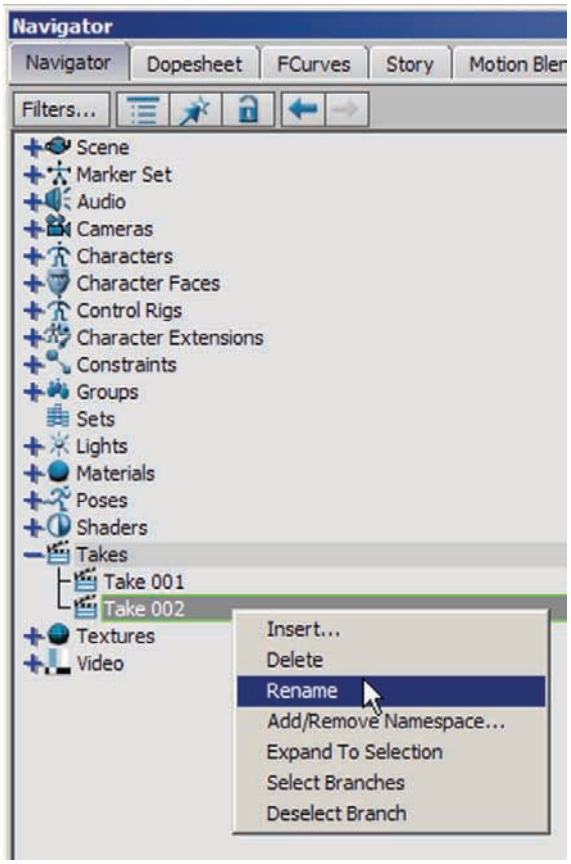
- To unhide a given node, right-click the node. Click Show Selection.

Transport Controls

The Transport Controls are more than just a timeline playback to see your key frames. You can also set the scene to loop at the end of the timeline, change the speed of the playback, change the frames per second rate, and apply a snap-to for framing. However, the one feature in the Transport Controls window that sets MotionBuilder apart from other software is Takes.

- To create a take, click the list with the current take showing (in this case, Take 001).

MotionBuilder automatically names the next take Take 002, but you can rename it in Navigator.



Takes are used in many different ways: some use it as a way to source control a task within the file; others use it to store variations of the same type of animation.
When creating a new take, MotionBuilder gives you the option of transferring all the keys from the current take to a new take or creating a fresh take. For video game production, this can make file management for character movements more manageable.
With the use of Python® scripting, you can set up windows that will enable the animator to batch export entire animation trees from a single file.

Plotting

Plotting is the process of merging layers of animation to the base layer. It also transfers all the edits made on the control rig to the skeleton and vice versa. Depending on which tools you use at a given time, you will need to plot the character several times throughout the course of working on a scene.
Example of tools you need to plot a character to the skeleton are:

- Story Mode
- Time Warp
- Motion Blend
- Exporting

Examples of tools you need to plot a character to the control rig are:

- Aux Effectors
- Pose Controls
- FCurves
- General key frame edits

When it comes to plotting noncharacter objects with bones, there is a different method and different reasons for plotting. These include:

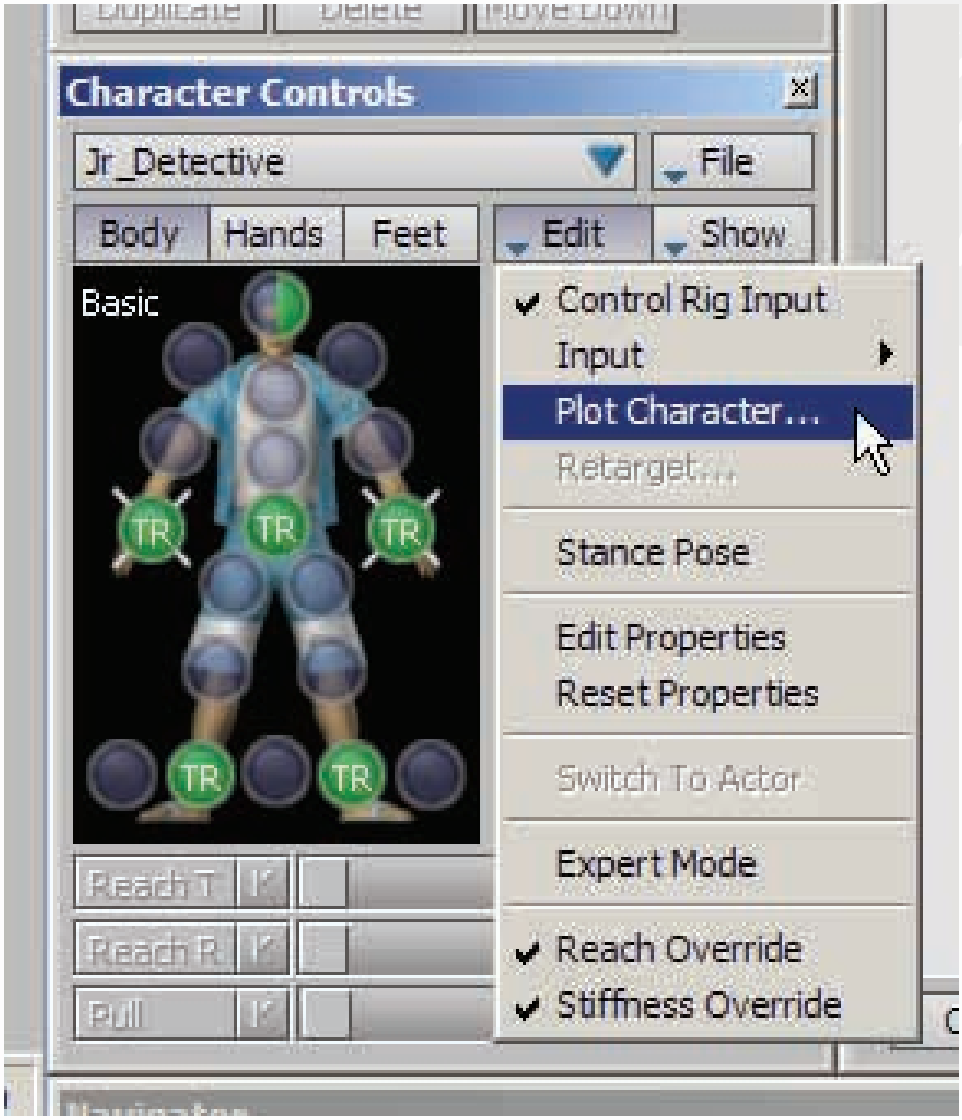
- Solidifying a constraint trajectory
- Swapping between parent constraints
- Exporting

There are several ways to plot; however, the two tools that are used most commonly for both characters and non-characters are Character Controls and Key Controls.

Plotting from the Character Controls Window

Although there are other ways to plot, this is the best way to process for characters:

- Click Edits > Plot Character.



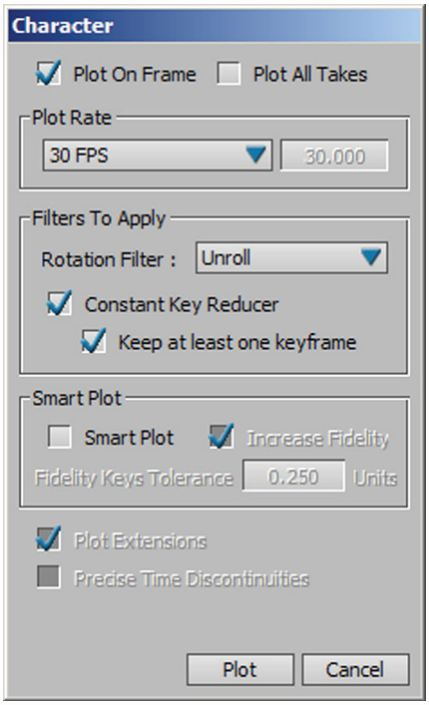
The Character dialog box is displayed, offering the following options:

- Plot All Takes: A great way to save time by batch plotting your entire Takes list.
- Plot Rate: Changing the plot rate reduces the amount of key it writes. This option is useful for film in achieving a true 24 fps, and games for their high refresh rate of 60 fps.

- Filters to Apply:
  - Constant Key Reducer automatically reduces the amount of frames, giving you a slightly compressed version of your animation. This helps to save on memory for games.

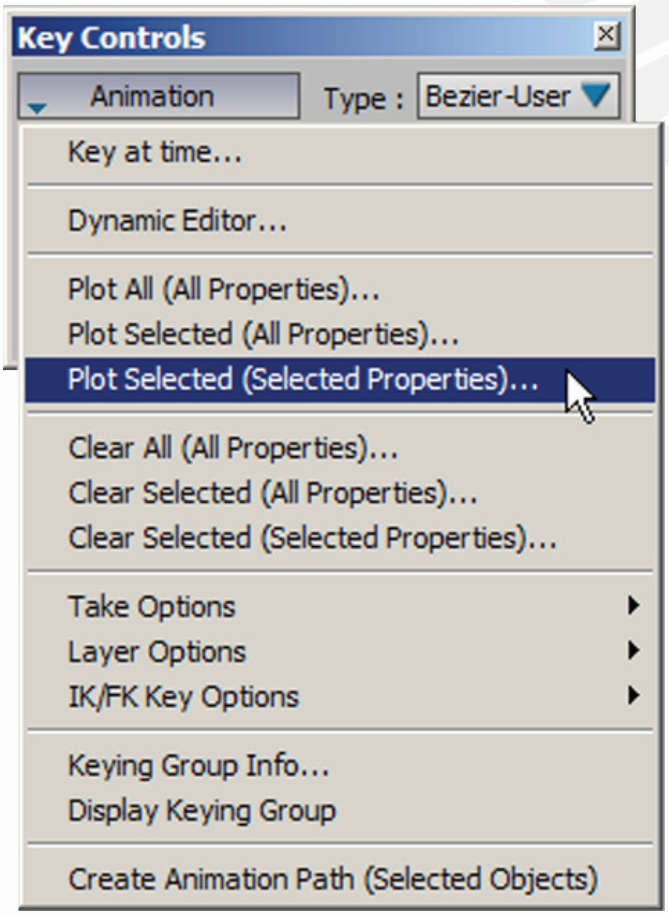
  - Keep at Least One Keyframe should remain selected because some game engines require at least one key frame on every joint or else it will not export the animation asset correctly.

  - Smart Plot plots everything twice to weed out redundancies as a way to further reduce the amount of constant keys. If you work purely from key framed animation, this option will help keep your base layer keys minimal, but if you work from motion capture this option will not have much effect because of the complexity of the base motion.

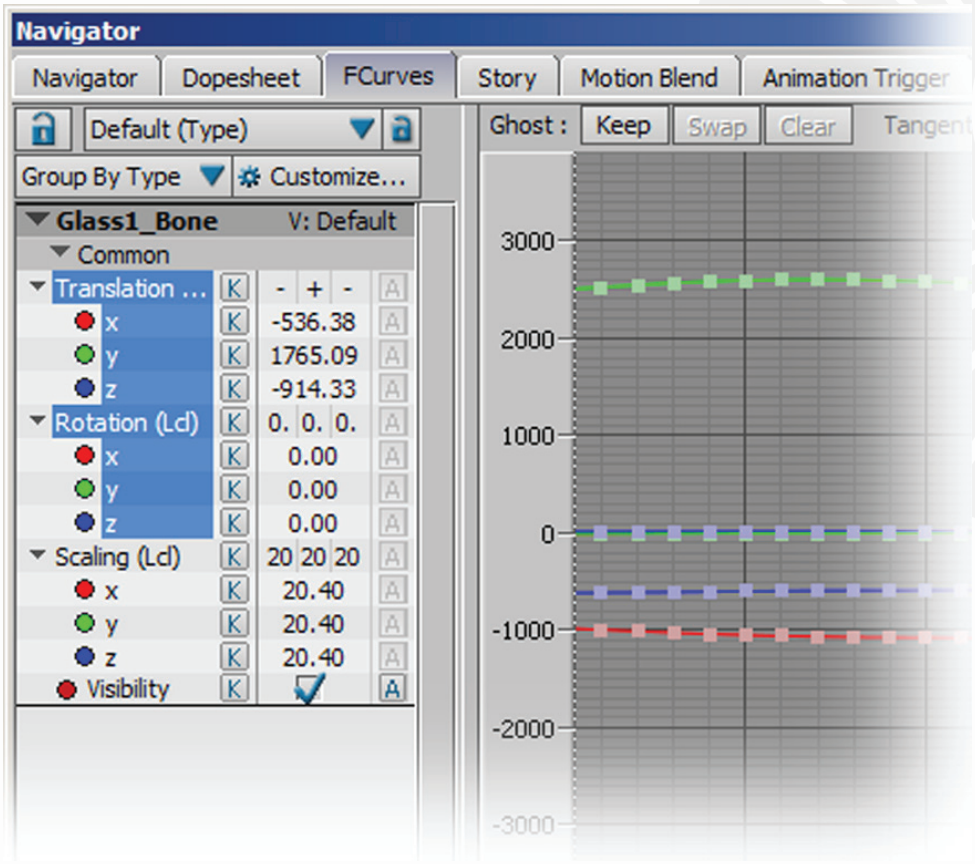


Plotting from the Key Controls Window

To display a menu that includes options to plot, click Animation. This is the best method for plotting non-character objects, but it can also be used to plot a character. The only difference between using this method over others for plotting characters is that it will not convert your control rig to a skeleton or vice versa. This method only bakes keys to the skeleton but the control rig remains active.



Plot Selected (Selected Properties) refers to whatever values you have selected in the FCurves menu for that object. You can selectively plot each translational and rotational value individually as well as scale values. Plot Selected (All Properties) will automatically plot to the scale values. This can be an issue for some video game engines, so it is recommended that you only plot to translation and rotation using the Plot Selected (Selected Properties).



Once plotted, you can create new translation and rotation key frame edits on a new layer.

Applied Exercises

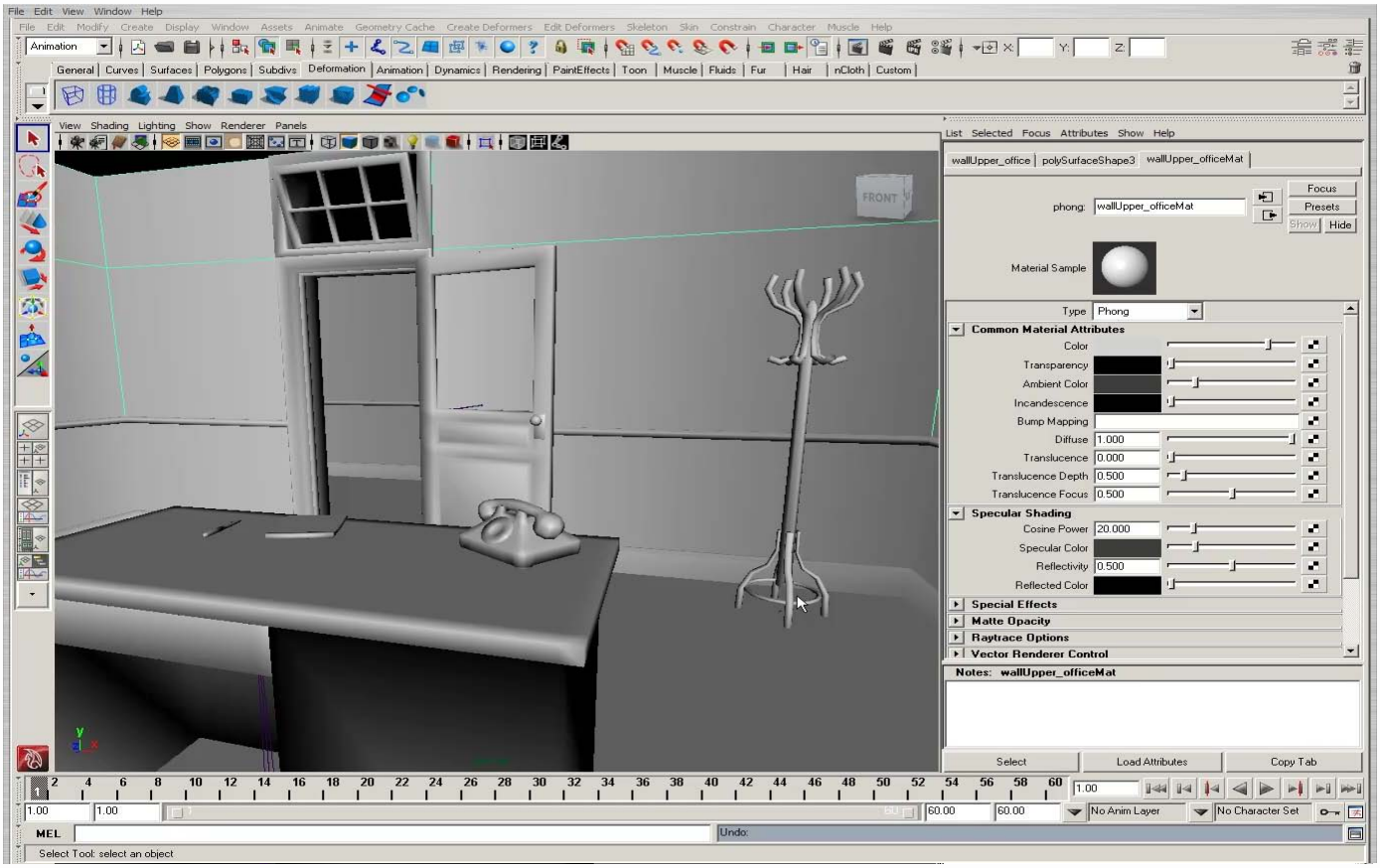
Segment1:

Export the Environment from Maya into Autodesk FBX File Format to Open It in MotionBuilder

In this exercise, you learn to export environments and geometry from Autodesk® Maya® software and import it into MotionBuilder.

Because MotionBuilder is specifically an animation software package, it does not have functionality such as modeling and UV texture mapping that you find in other software applications. This means that all geometry (other than simple primitive shapes) needs to be exported into the Autodesk® FBX ® file format before being able to use it in MotionBuilder. The file you will be using for this module *SegmentA.fbx* already has a sample environment. If you would like to customize the textures of the environment, the file *Environment.mb* is provided so that it can be changed in Maya.

Click on the image below to play the video.



To bring Enviroment.mb into MotionBuilder, you:

1. Select the File and Export All check boxes.
2. Under General Options, change the File Type to FBX. Click Export All.
3. Select the location you want the file to be exported to. Name it Environment.
4. Under Presets, select User Defined
5. Under Animation group, ensure that Animation is selected. In the subgroup Deformations group, select Deformations, Skins, and Blend Shapes.
6. Under Embed Media group, ensure Embed Media and Convert Images to Portable Format (TIFF) are selected. Without this option, your textures will not transfer.
7. Ensure that Units is set to Centimeters.
8. Under Axis Conversion, ensure the Up Axis is set to Y.
9. In the FBX File Format section, set the Type as Binary. Set the FBX Version as FBX2009 or FBX2010.

Exercise: Exporting The Environment
In this exercise, you apply custom materials and textures to your environmental objects to personalize the setting and export for use in MotionBuilder. Refer to Exporting_Environment.mp4.

Segment2 :

Introduction to Character Controls and Pinning

In this exercise, you learn to:

- Use Keying Mode for pinning.
- Manipulate a character with a full body IK/FK rig.

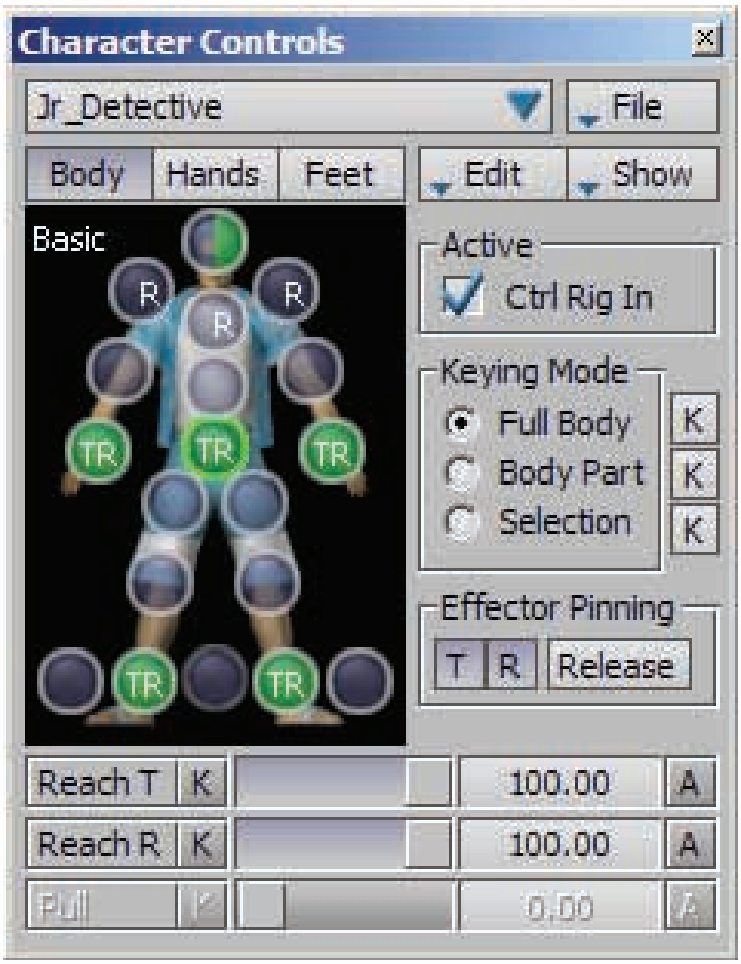
This window not only provides you with a quick guide for each major IK joint of each character's control rig, but it also gives you the flexibility to pose a character by pinning and unpinning the translation and/or rotation of any bone in the character's body.

Keying Modes

Depending on the level of control you need over your character, you will use one of three Keying Modes for pinning:

1. **Full Body**

In this mode, keys set on any joint will globally generate a key frame on every joint on the character. When posing a character, this mode respects any joints that have translational or rotational pin – regardless of the reach values on the joint.



2. Body Part

In this mode, keys set on a joint will only generate key frames on the other members of that joint group. The joint groups consist of Arms, Legs, Torso, and Head. When posing a character from the torso in this mode, it only respects translational or rotational pins if they have the reach value set. This is the mode that animators tend to use most.

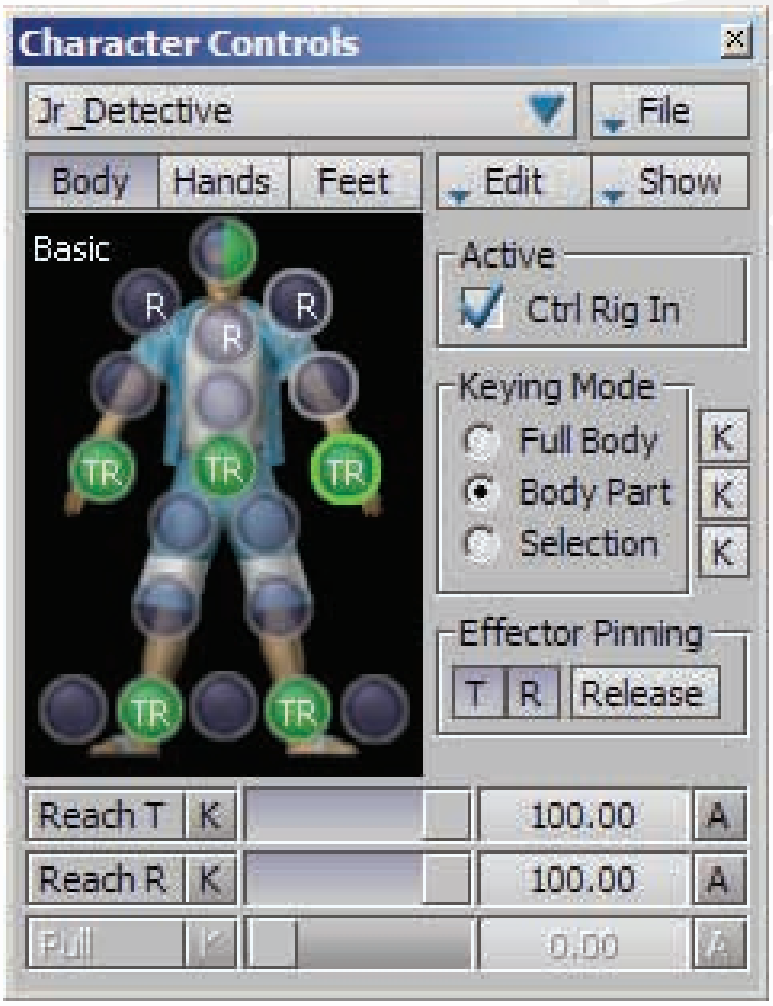


Fig 3: Pinning in Body Part Mode

3. **Selection**

This mode ignores translational and rotational pins and only sets keys on the specific joint that you have selected. While it appears that you have more control, keep in mind that when you key on this mode, the parent joint is not keyed. The results that you get are more in line with a pure FK workflow. This Mode, while very powerful, has drawbacks as it does not enable you to generate poses.

Joint Pinning

The Release button (while in Full Body Keying Mode) ignores all pinned joints when posing the character while it is activated. This is good for moving a character, but make sure to deactivate it before pinning.

- To pin the translation on a joint, select the joint and press the W key.
- To pin rotations on a joint, press the E key.
- Within that joint, you will see a small T or R to symbolize the joint is now pinned on that value. You can also pin the translation or rotation of any joint by clicking the T (for translation) or R (for rotation) buttons in the Effector Pinning window

This is useful in situations where the character's hand is touching a surface and you need to adjust its torso or upper arm but want to keep the hand in the same place.

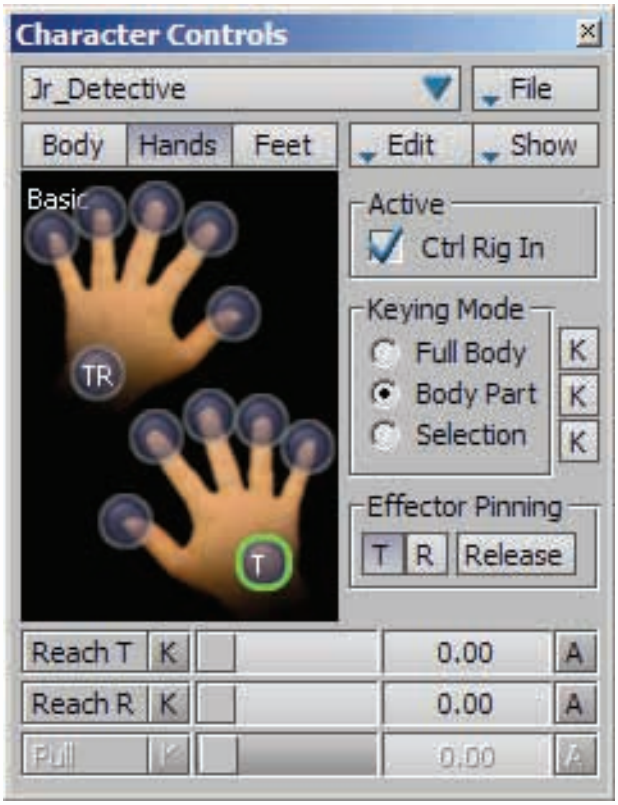


Fig 4: Adding a translation on the wrists

Reach Values

Unlike other animation software, MotionBuilder uses a full body IK/FK rig simultaneously. This means that every key frame you set on the translation or rotation of any joint locally or globally will create an IK and FK path. By adjusting the reach values, you can determine the result shown at any time. Controlling all of values simultaneously can be intimidating, but the key thing to remember is that when troubleshooting an animation on a control rig, you always check the FK curves first.